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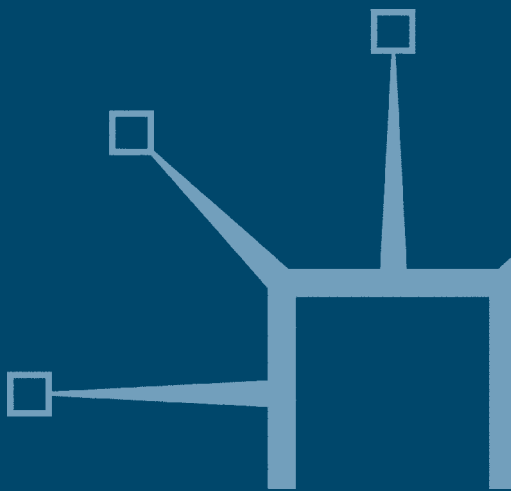
International Financial Architecture

G7, IMF, BIS, Debtors and Creditors

Carlos M. Peláez and Carlos A. Peláez



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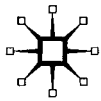

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To Magnolia and Penelope

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List of Abbreviations

AMA Advanced Management Approach of operational risk (Basel II)
ANPR Advanced Notice of Proposed Rule Making
BCB Banco Central do Brasil, Central Bank of Brazil
BCBS Basel Committee on Banking Supervision
BIS Bank for International Settlements
BNDES National Bank for Economic and Social Development (Brazil)
CAC collective action clauses
CAMELS Capital, Assets, Management, Earnings, Liquidity, Sensitivity
CAPM capital asset pricing model
CCF credit conversion factor
CCL contingent credit line
CDS credit default swap
CDO collaterilized debt obligations
CEMLA *Centro de Estudios Monetarios Latinoamericanos*, Center for Latin American Monetary Studies
CGFS Committee on the Global Financial System
CP Consultative Paper of Basel Committee
CPSS Committee on Payment and Settlement Systems
CRM Credit Mitigation in Basel II
EAD exposure at default
ECA export credit agencies
ECAI External Credit Assessment Institution
EDF estimated default frequency
EFF extended fund facility
EFM emergency financing mechanism
EMBI Emerging Market Bond Index of J.P. Morgan Chase
EMU European Monetary Union
ERM Exchange Rate Mechanism
EU European Union
EWS early warning systems
DM default mode of credit risk model
FRB Federal Reserve Board
FSAP Financial Sector Assessment Program
FSF Financial Stability Forum
FSI Financial Stability Institute

FSSA financial sector stability assessment
FT *Financial Times*
G-3 United States, European Union and Japan
G-7 Group of Seven
G-10 Group of Ten
GAAP Generally Accepted Accounting Principles
GDDS General Data Dissemination System
GDP Gross Domestic Product
GEE general evaluation estimator
HLI highly leveraged institutions
IADB Inter-American Development Bank
IAIS International Association of Insurance Supervisors
IASB International Accounting Standards Board
IEO Independent Evaluation Office of the IMF
IFA International Financial Architecture
IFI International Financial Institutions
IFRS International Financial Reporting Standards
IIE Institute for International Economics
ILOL international lender of last resort
IMF International Monetary Fund
IMFC International Monetary and Financial Committee of the IMF
IOSCO International Organization of Securities Commissions
IRB internal ratings based
IT flexible exchange rates with inflation targeting
K capital requirements
LEE loan equivalent exposure
LGD loss given default
LGD′ expected rate of loss given default
LOR lender of last resort
LTCM Long Term Capital Management
M effective maturity
MDB multilateral development banks
MTM mark to market mode of credit risk model
NAB new arrangement to borrow
NAFTA North American Free Trade Agreement
NAMU North American Monetary Union
NGO non government organization
NIF note issuance facilities
NPR Notice of Proposed Rule Making
OCC Office of the Comptroller of the Currency
OECD Organization for Economic Co-operation and Development

PD probability of default
PDF probability density function
PDL past due loans
PINS public information notices
PSBR public sector borrowing requirements
PSE public sector enterprises
PSI private sector involvement
QIS quantitative impact study
R correlation
RNV risk neutral value
RR Rey Report
ROSC Report on Observance of Standards and Codes
RUF revolving underwriting facilities
RWA risk-weighted assets
SBA Stand-By Arrangements
SDDS Special Data Dissemination Standard
SDRM Sovereign Debt Restructuring Mechanism
SEC United States Securities and Exchange Commission
SLI United States Savings and Loan Institutions
SRF Supplemental Reserve Facility
VaR Value at Risk
WP working paper
WSJ *Wall Street Journal*

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Acknowledgments

The present volume originated in an attempt to update an earlier book, Peláez and Peláez (1999). Rewriting one chapter resulted in this new book. We thank Senator Heráclito Fortes, of the National Congress of Brazil, for early advice on the need to relate economic policy to political reality.

Dr Carlos Alberto Queiroz provided orientation on the research design, initially as counselor to the President of the Central Bank of Brazil, Dr Armínio Fraga, and subsequently at CEMLA in Mexico City. Professor Ana Paula Chavantes, Dr Walber Chavantes and Dr Antonio Meireles provided many suggestions of an early version of the manuscript. Professor Paulo Yokota had the patience to review a first version of the manuscript. Professor Peter B. Kenen provided important suggestions of style and substance. However, Professor Kenen is not responsible for shortcomings and errors. Eduardo Mendez allowed us to consult him on his unrivaled knowledge of the insurance industry.

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Amanda Hamilton, Economics Publisher of Palgrave Macmillan, provided numerous suggestions and exceptional professional expertise. We are also very grateful to Katie Button and Ian Evans for steering this book for publication. Philip Tye, editorial consultant of Palgrave, corrected

errors and significantly improved the style. We cannot remember a publication experience as productive and pleasant as the one with Palgrave Macmillan.

Our deepest debt of gratitude is to Clay Cameron and the late Rondo E. Cameron who instilled in us at an early stage the pursuit of sound values of scholarship across national boundaries. The usual disclaimer is even more important in this volume. We alone are responsible for errors, omissions and shortcomings in this book.

Carlos M. Peláez and Carlos A. Peláez, February 2005.

Preface

Changes in the International Financial System

Antonio Delfim Netto

Substantial changes occurred in the world economy, especially in finance, resulting from freer international financial flows that contributed to globalization. The world economy became dependent on financial flows subject to sudden reversal

Institutions created at the end of World War II, such as the World Bank and the International Monetary Fund, are no longer capable of solving new and serious problems that principally affect emerging market economies, less equipped to absorb capital flows. The speed of transactions and propagation of difficulties reached new dimensions.

The Bank for International Settlements (BIS) assumed the role of coordinating events that affected large economies while identifying new problems. The BIS recommended strengthening of structures to increase safety, initially in developed economies and subsequently in their relationship with emerging regions.

Recycling of financial surpluses originating in increases in oil revenues, through international banks, lost relevance. The focus of new and profound problems seems to have dislocated, creating a need for additional mechanisms.

The volume of official financing, both national and international, diminished. Private financing, spread over millions of investors by "securitization," occupied a wide space, without specific mechanisms for adequate coordination.

Financiers all over the world, together with monetary authorities of various countries and even leaders of international institutions such as the IMF and BIS, attempted to find a new institutional structure for capital flows. There were changes in many problems, suggesting new interpretations that require fresh analysis.

The authors of this book are privileged observers of changes that are

occurring in new specialized forums and have a solid academic background. The issues in this volume are not always followed by those who are focused on internal problems of an individual economy. This is especially true in emerging countries, which are the most important subjects of these changes in supervision and regulation. Formulation of alternatives of economic policy are limited without a complete framework of analysis.

This careful volume is an exhaustive analytical survey of great relevance and usefulness to all who need to follow these affairs. The issues are in relief because of brutal external dependence of many countries resulting from years of highly idiosyncratic policy. Many ignore the new institutional restraints that restrict freedom of action by large financial institutions, official or private.

Securitization caused smaller individual investors, such as a widow in Ohio, a dentist in Germany or a retired executive in Japan, to depend much more on international market fluctuations without guidance by bank officers as in the past. Herd behavior, with rapid dissemination of imperfect information, accentuates fluctuations.

New rules of prudential supervision of banks, to reduce their vulnerability and propagation of systemic risks, disseminated by inspiration of the BIS all over the world, reduced the ability of monetary authorities to implement traditional banking operations that could soften problems in some economies, especially in the short term.

This volume will be indispensable to economic authorities and to all those who transact in international financial markets. World forums, supervisors and regulators are designing a new international financial architecture that will never be completed.

This process adds a new dimension, solving grave problems in many emerging countries. Emerging financing of countries that require temporary liquidity becomes very complex, requiring involvement of the private sector. There is indeed a warning to exercise prudence in using available current facilities because short-term convenience is not always compatible with the feasibility of honoring long-term commitments.

Antonio Delfim Netto is Federal Representative (PP-SP) in the National Congress of Brazil. He was Chief Minister of the Secretariat of Planning of the Presidency of the Republic of Brazil (1979–85), Minister of Agriculture (1979), Minister of Finance (1967–74) and Secretary of Finance of the State of São Paulo. He is Professor Emeritus of the Faculty of Economics and Management of the University of São Paulo. He has published, in Brazil and worldwide, numerous books and essays in professional journals and articles.

Foreword

International Official Institutions

José Francisco Gil Díaz

In the last 11 years emerging countries suffered a new generation of financial crises driven by bank excesses that led to sharp reversals in capital flows. Known as the twin crises, they were experienced by Mexico (1994–95), several Asian economies (1997–98), Russia and Brazil (1999), and Argentina (2001–2). An interesting feature of these episodes was the contagion from the infected country to others deemed in its class.

An important challenge was posed to the international financial institutions (IFIs) (the International Monetary Fund, the World Bank, and the Inter-American Development Bank, among others) concerning the role they should play in contributing to a resolution of the crises, as well as to the policy guidelines needed to prevent them.

As usual, the IFIs suggested that governments should implement policy packages around fiscal and monetary correction. Their programs included significant amounts of front loaded IMF support that have been the object of two types of criticism: first, the adjustments required have been considered excessive by some and therefore blamed for internal dissension concerning their advisability. They were blamed for the social and political instability that sometimes ensued. Second, financial support and its size were thought of as a source of moral hazard.

Despite the criticisms, there is no question that in many of the programs the policy guidelines suggested by the IFIs and the support finance worked, among them in Mexico: without this support, capital outflows and bank runs would have been unavoidable. It is paradoxical; an outside financial overkill is necessary to prevent a substantial use of the funds provided. The more cash is committed, the less will be used, but it has to be provided all at once in one single package, not in tranches, as was the case in the Argentinean experience. With ample support the internal adjustment necessary to restore credibility will be less. Something that is quite obvious but seldom

mentioned is that when disequilibriums accumulate, adjustments will come about with or without external support, but without a plan and without outside temporary finance the adjustment will be deeper, longer and more disorderly than without a program. Despite this evident fact, IFIs are often blamed for the pain inflicted by the adjustment.

In this book the reader will find a complete summary of the reform process that IFIs have undergone, partly as a result of the G-7 undertaking a profound revision and reform of the structure and role of the IFIs, and its demand for a worldwide update of internal policies and instruments aimed at regulating and supervising financial markets. The main concern of this reform, known as "the New Architecture of the International Financial System," (IFA) is to find economic instruments to prevent twin crises, to reduce the risk of their contagion and to accelerate the recovery of those economies in difficulties.

From the perspective that the book offers, the G-7 countries and IFIs have been developing the new IFA around three main building blocks:

- According to the IFA, the role of IFIs should focus on recommending the relevant adjustment policies only for the economic recovery of the country in crisis, excluding, for instance, policies related to environmental concerns.
- The role of emerging countries involves crisis prevention and resolution. Confidence in emerging markets requires appropriate standards of information transparency and disclosure to maintain their access to international capital markets. IFIs have been working closely with these countries to develop clear procedures and instruments to assess their real economic situation and evaluate weaknesses in their financial sector that would help to anticipate a financial crisis. Also, IFIs encourage emerging countries to make structural reforms and apply adjustment programs in order to reduce the probability of a crisis occurring.
- Creditors' and investors' (private sector) role: IFIs advise potential investors to carefully evaluate the risks associated with investments in emerging markets. IFIs will not approve the use of their official aid to bail out investors when a crisis occurs nor to allow private creditors to transfer their losses to the economy in crisis. The objective of this policy is for the private sector to bear a share of the cost of crisis resolution.

The book presents no policy recommendations or criticisms of the work by the IFIs, but an unbiased analysis of the financial interactions in the new global economy, which makes it useful for understanding this new breed of financial crisis. It also outlines models and theoretical principles that are the foundations of the international financial markets as well as instruments and rules to supervise and regulate transactions in domestic

financial markets that have been developed in order to strengthen financial institutions in emerging countries.

An illustration of the IFA process is the crisis endured by Mexico in 1994–95. After this crisis Mexico undertook a broad set of reforms to strengthen and transform the banking, foreign exchange and stock markets. Reforms were oriented at establishing new and stricter rules of capitalization of banks; reduce deposit insurance; allow the participation of foreign investment in the banking sector; promote greater transparency in the operations of the stock market and strengthen corporate governance, etc.

One of the main ingredients in the Mexican economic recovery was the substitution of a fixed for a floating exchange rate. This induced a change in the nature of foreign capital flows into Mexico. In another place,[1] I provide a detailed explanation of the advantages of a flexible exchange rate over fixed regimes and how the latter are to blame for the speculative and ultimately destructive behavior that was the common denominator and perhaps in some countries the ultimate cause of the crises mentioned above.

As a result of the policies adopted, the Mexican economy recovered quickly after the 1994–95 crisis and today belongs to a group of emerging markets distinguished by their macroeconomic stability. Country risk level diminished from 2100 basis points, in mid 1995, to around 160 basis points today. The banking system has been strengthened: outstanding banking credit has increased and nonperforming loans have diminished. The Mexican economy sorted out, successfully, the harsh effects of the Asian crises in 1997–98, the Argentinean in 2001–2 and the more recent volatility in Brazil. As a complement to the reforms undertaken immediately after the crisis, Mexico has implemented a policy of transparency. It periodically publishes macroeconomic and public finance indicators in order to provide investors with the relevant information for correct investment decisions.

This book provides detailed and very useful research on the recent evolution of the international financial architecture. The authors are nonetheless aware that an enormous amount of work needs to be done to accurately understand the issues that are still unsolved, like the mechanisms of crisis propagation. Surely the book will become a reference for students, practitioners and policy makers in need of an overview in the area.

José Francisco Gil Díaz is Mexico's Treasury Secretary. He holds an MA and a PhD in Economics from the University of Chicago and has taught at four Mexican universities: ITAM, where he received his undergraduate degree, Universidad Iberoamericana, El Colegio de México and the National University. He has served as Undersecretary of Revenue and headed the Research Department of Mexico's Central Bank. He has also been a member

of the Bank's Board of Governors. José Francisco Gil Díaz and Carlos Peláez met in the 1970s, while the latter was at CEMLA in Mexico City.

Notes

1 José Francisco Gil Díaz, "The China Syndrome or the Tequila Crisis," in Anne Krueger, Jose Antonio González Anaya, Vittorio Corbo and Aaron Tornell, eds. *Latin American Macroeconomic Reform: The Second Stage* (Chicago: The University of Chicago Press, 2003)

Introductory Note

Federico Rubli Kaiser

International Financial Architecture: G-7, IMF, BIS, Creditors and Debtors is a timely book. The global economy is entering a defining phase in which debate on the international financial architecture is dominated by four issues: (i) the tripartite effort on the part of G-7 governments, international financial institutions and private-sector entities to attain better prevention and resolution of financial crises; (ii) the rise of China as a major player in the world economy; (iii) the preeminence of flexible exchange rate regimes vis-à-vis discredited rigid exchange-rate rules; and (iv) the adoption of sound principles and methods for the effective supervision of financial intermediaries through the strengthening of the Basel accords and the introduction of proper codes of conduct for the financial sector. All of these issues are covered in this volume, making it an excellent survey on the themes that are shaping the international financial architecture of the twenty-first century.

One of the book's virtues is its systematic rigor in blending academic research, doctrines of the G-7 and international organizations, and practitioner techniques for managing financial risk. Without doubt, this volume contributes to a better understanding of how investors, creditors and debtors interact within the new global financial scaffolding. Since the book does not contain policy proposals or personal opinions, it is a valuable impartial survey which will enrich the knowledge of academicians, policy decision makers, graduate students and even advanced undergraduates.

I would like to offer some brief comments on two particularly noteworthy chapters. First, Chapter 2 takes the reader step by step through a systematic survey of how the international financial architecture has evolved through international meetings, summits and forums from 1995 to the present. This chapter fills a gap in the literature. I have not seen a similar systematic recounting of this evolutionary process in any other reference.

Chapter 5, which treats issues related to different exchange-rate regimes, is also especially noteworthy. It offers an interesting taxonomy of the pros and cons of various exchange-rate mechanisms. Reading it stimulated some additional thoughts on the Mexican case from a historical perspective on which I would like to comment briefly. After the collapse of the pegged system in 1976, which was in effect for 22 years, the monetary authorities experimented with various exchange-rate regimes. In subsequent years, Mexico went through a wide spectrum of regimes: managed float, crawling peg, preannounced crawl, semi-fixed band mechanism, and finally a free float, in place from the end of 1994 to the present.

The band system was adopted from the end of 1988 to 1994 as the core anti-inflation instrument. This is an example of the use of the exchange rate as a nominal anchor for price escalation. The band had a fixed floor while the ceiling was increasing at a continuous fixed rate. The exchange rate was allowed to fluctuate within the limits of the band. Whenever there were pressures for the rate to go beyond the limits, the central bank intervened in the market. The anchor was successful as a stabilization tool, as annual inflation dropped from 51.7 in 1988 to 7.1 percent in 1994. The success of the anchor was highly dependent on a set of macroeconomic policies that were implemented: fiscal discipline, financial liberalization, privatization policies and a trade liberalization process which culminated in the establishment of NAFTA.

However, as with any fixed exchange-rate regime, the band mechanism carried its own seed of destruction within it. In 1994, amid political turmoil, market uncertainty drove the exchange rate to hit the band's ceiling persistently. Speculators bet heavily against the stock of international reserves at the central bank. Since the authorities were stubbornly committed to the band system, the mechanism could stand only until reserves were depleted. Once reserves were exhausted, the semifixed regime collapsed, as was to be expected. The exchange-rate crisis was coupled with a severe banking crisis, and so the worst Mexican financial crisis in decades was detonated.

Fortunately, as part of the stabilization strategy that was immediately adopted, the authorities decided to install a free float for the peso. Beginning with its inception onward, it was an extremely clean float, with practically no direct official intervention in the foreign exchange market. The float helped significantly to restore credibility to the Mexican financial system in the aftermath of the crisis, together with prudent monetary management, fiscal adjustment and a revamping of the banking supervision framework.

In 2001, the Bank of Mexico formally adopted an inflation targeting framework as its monetary regime. The relative success of Mexico with

inflation targeting has been founded on the free-floating currency regime. Theoretically and empirically, it is recognized–as stated in Chapter 5–that for inflation targeting to be successful, a flexible exchange-rate system is needed. Moreover, an autonomous central bank is key to such a monetary framework. Hence, Mexico today has an efficient monetary regime geared toward the objective of pursuing price stability based on a *tripoidal* scheme: a free-floating currency, an inflation targeting strategy, and an independent central bank free of political interference.

After ten years of functioning with a free float, there is a wide consensus among the business community, academicians and most politicians that the flexible-rate regime has been highly successful in shielding the economy from external shocks. If not for the float, the transmission of external shocks in the recent past would have been much more intense. Also, the float has been a disincentive for short-run capital speculation, contributing to the stability of a sound external balance of payments.

In sum, this clearly written, well-researched book will become a necessary reference for any scholar conducting research on topics related to the international economy.

Federico Rubli Kaiser is Director of External Affairs at the Bank of Mexico, the country's central bank. Previously, he held positions within the Bank in the Economic Research Department and the International Economics Division. He also served as a Senior Economist at the International Monetary Fund. Earlier, at the Center for Latin American Economic and Monetary Studies (CEMLA), he was a research assistant to Carlos Pelaez (one of this book's authors). He has taught at several Mexican universities and has published research on issues related to central bank communication and international monetary economics. He holds an undergraduate degree from the ITAM and graduate degrees from Columbia University. Two of the most respected and influential economists who have stimulated and marked Mr Rubli's professional career are Mr Peláez, as well as Francisco Gil Díaz, author of the Foreword.

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Leading Essay

Looking Forward in Wartime: Some Vulnerable Points in the Global Economy

Richard T. McCormack

Introduction

The purpose of this essay is to address several key economic issues facing the United States and the world at a time when war and terrorism-related activities may potentially further stress the global economy. In some ways the global economy today resembles a large truck racing down the highway at 70 miles an hour, with four or five bald tires. The odds are that the truck will make it to its destination intact. But a major accident is also possible. This essay explores some of those vulnerabilities and is based on recent conversations with political and financial leaders on five continents. Such confidential conversations are necessary in today's global economy, because what happens in one part of the globe often has major consequences, sometimes quite unexpected, in other parts of the globe. For example, a ruble crisis in Moscow seven years ago triggered a meltdown of derivative positions on Wall Street that posed a threat to the US financial system itself. That is just one example of the global interconnectedness of everything.

The consequences of the collapse of large segments of global equity markets in 2001 continue to plague the global economy. The vast monetary and fiscal stimuli needed to refloat the US economy may have led to a new form of asset inflation, a bubble in real estate, and not just in the United States. Vast global economic imbalances have also developed, partly as a consequence of this titanic US macro economic stimulus.

These imbalances and other current global economic conditions remind us of several enduring economic lessons, with powerful future implications. Wise leadership and much good luck may be required to achieve a soft landing and a gradual shift in global trading patterns later in this decade.

Equity markets

How the stock market bubble grew and burst

The bursting of the US stock market bubble erased at one point somewhere between 8 and 9 trillion dollars of wealth. When you add to this the immense sums that were lost in overseas equity markets during the same period, the magnitude of liquidity destruction was simply enormous.

Students of history will remember the famous cartoon by Thomas Nast about the corrupt Tweed Ring in New York in the late nineteenth century. The title of the cartoon was: "Who stole the people's money?" It featured a group of well-fed men standing in a circle, each man pointing his finger at the next person in the circle.

A similar cartoon could be drawn about the great asset bubble and burst of the late 1990s. The former head of the Securities and Exchange Commission points to Congress for failure to heed his warnings. Congress points to some dishonest people on Wall Street for having misled investors. Wall Street analysts point to the Federal Reserve complaisance. The Federal Reserve points to the irrationally exuberant investors and greedy corporate leaders. The greedy corporate leaders point to their auditors. The auditors point to permitted complexities in derivative and accounting rules. And so on around the circle of blame.

The fact of the matter is the blame is widely shared. There was a massive systems failure here and a massive loss of wealth when the bubble burst, particularly for the least sophisticated members of the investment community, including the elderly, many of whom were left holding the bag. The leadership of the Federal Reserve has come in for special criticism because the Federal Reserve is, after all, the ultimate regulator of the health of the nation's financial system, and controls margin requirements and the amount of liquidity made available to the system.

The equity bubble was fueled in part by accommodative monetary policies in the latter part of the 1990s. Indeed the world was awash in liquidity during most of the bubble years. Attractive investment opportunities grew harder and harder to find. Traditional value analysts of stocks were increasingly discredited, as market momentum confounded one after another of their bearish predictions. Available cash continued to flow into already overpriced stocks, and also into overinvestment in capacity for the production of goods and services. Telecoms were a prominent example.

People running US monetary policies were obviously highly competent and experienced individuals. A question now often raised is why monetary authorities did not heed the timely warnings that appeared regularly in *The*

Economist Magazine and other respected publications, and tighten liquidity, or at the very least, increase margin requirements as a warning signal to dampen the raging speculative fever.

We also know from subsequently released minutes of the 1996 deliberations of the Board of Governors of the Federal Reserve, that some of the Governors, including Larry Lindsey and Chairman Greenspan himself, appeared concerned about the potential for a future catastrophic asset inflation bubble, as happened in Japan during the late 1980s.

These troubled deliberations inside the Fed occurred shortly before Chairman Greenspan made his famous "Irrational Exuberance" comment at the American Enterprise Institute.

According to remarks by former Governor Kelly at a conference at CSIS in the summer of 2004, Kelly in retrospect greatly regretted the fact that, after 1996, the subject of a potential asset inflation building in US equity markets never again appeared on the agenda of a single meeting of the open market committee of the Fed. One wonders why this lapse occurred.

Experienced financial leaders, such as former New York Federal Reserve official, Henry Kaufmann, later faulted US monetary authorities for failure to take preemptive action to slow the developing asset inflation. They questioned why Chairman Greenspan did not use his bully pulpit to repeat his warnings about irrational exuberance.

Friends of Chairman Greenspan reply that, as in the Japanese asset bubble of the 1980s, low consumer price inflation might have made it difficult for him to justify to Wall Street and their friends in Congress the sustained increases in interest rates that would have been necessary to deflate the bubble when it was much smaller. Some critics would doubtless have accused him of gratuitously damaging capital markets. Yet this was the very policy advocated by the IMF, *The Economist* and others.

Several other developments that took place in the latter part of the 1990s also made it difficult to use a tight money policy to dampen the US economy and financial markets. In the latter part of 1997, the Asian financial crisis unfolded with a vengeance. With the strong encouragement of the US Treasury Department, monetary authorities poured high-powered liquidity into US financial markets to cushion the blow from Asia. Interest rates were cut by 75 basis points the following year.

The Russian ruble and banking crisis subsequently triggered a series of worldwide repercussions that eventually undermined the highly leveraged derivative investments of a number of New York hedge funds, including the respected Long Term Capital Management firm. This particular hedge fund had leveraged few billion dollars worth of capital into over a trillion dollars worth of notional value on derivative markets. Creditors to these

derivative speculators from the money center banks were also sucked into the threatening vortex, which briefly imperiled the US financial system itself.

Finally, stating worries about the potential impact of the Year 2000 computer glitch, the US central bank preemptively injected large amounts of liquidity into financial institutions in the fourth quarter of 1999, delaying the impact of a tightening cycle that began in July of 1999.

Chairman Greenspan later said that market warnings unaccompanied by large and sustained curbs on available liquidity would have had no more impact on raging bull markets than his original "irrational exuberance" speech.

In 2000 the Federal Reserve System resumed tightening and the enormous bubble eventually burst after the Presidential elections amidst widespread recriminations. There is some talk now about the possible desirability of limits of two terms for future incumbents of the chairmanship of the Federal Reserve, the nation's second most powerful job. The advantage of a chairman with four successive terms is that the incumbent accumulates valuable experience from past successes and mistakes as his tenure in office rolls on. The disadvantage is that any deep-seated biases and blind spots on the part of a powerful and influential chairman inevitably become increasingly imbedded in personnel appointments throughout the institution. The temptation potentially also may exist for a chairman wishing successive reappointments to get too close to political authorities in a position to reappoint him. Some years from now, economists will have a clearer idea of the balance of benefits of a very long serving chairman, when they will be able to assess with the clarity of hindsight the full impact of the Greenspan legacy.

The bubble's consequences and aftershocks

The vast loss of wealth and purchasing power that accompanied the erasure of stock values, plus the excess capacity that easy money made possible, contributed to a threatened imbalance between supply and demand in some key markets. Profits further weakened and the new concern became deflation and recession.

To help stimulate demand and offset the massive loss of wealth from the collapse of the stock market, the Federal Reserve reversed itself in 2001 and progressively lowered interest rates, in part to stimulate the housing market and the borrowing power and net wealth of homeowners and consumers. Many believe that a new bubble in housing and real estate has thus been created. The question is if, how much, and how soon will overall property markets weaken?

In considering these questions, it is important to remember that while mortgage interest rates in recent years were at historically low levels, rising insurance rates, local taxes and energy bills in the United States and elsewhere have steadily added to the cost of real estate ownership. It is also important to remember that current low interest rates will not last indefinitely. Indeed, a rising cycle of interest rates is already underway. Rising commodity and producer prices and other indicators suggest possible future inflationary pressures in sectors of the US economy. Should broad inflation return and interest rates rise beyond the levels that many now anticipate, large-scale holders of fixed rate mortgages and their derivatives will be vulnerable. Fanny Mae, Freddy Mac and those who hold the riskier paper hived off in massive derivative transactions are sometimes cited as weak links in such scenarios. This potential vulnerability has belatedly become apparent to US regulatory authorities, some of whom are now calling for an 80 percent reduction in the trillion and a half dollar mortgage asset holdings of Fanny Mae and Freddy Mac.

In England, where housing costs rose 25 percent in a single recent year, history suggests a possible repeat of the housing bubble that was created and burst during the tenure of former Chancellor Nigel Lawson. This bubble, before collapse, triggered inflation and required draconian monetary retrenchment. This in turn contributed to the sour political climate that ended Margaret Thatcher's historic prime ministership, and helped leave the Conservative Party in a shambles from which it has not yet recovered ten years later. Recently the latest boom in English property markets was noted with concern by the IMF, and is now the subject of close attention by the Bank of England.

In property markets, as in much else, a great deal obviously depends upon the future trajectory of the US business cycle. Massive fiscal and monetary stimulus has been applied in the past several years, a need anticipated by President Bush's economic advisors as he came into office. This enormous economic stimulus has, however, also contributed to a massive increase in the US current account deficit and a dramatic weakening in the US dollar. No one should be surprised at this latter development. The oldest rule in economics, following the law of supply and demand, is that the surest way to weaken a currency is to print too much of it. Today's dollar buys half the house, a fraction of the college costs and medical attention, and far less gasoline than it could have purchased a decade ago. As the dollar weakens on international markets, its purchasing power in other areas is also likely to erode with time.

Members of the Austrian monetary school take a grimmer view of the long term consequences of the generous monetary policies of recent years.

They believe that the subsidized interest rates, repeated bailouts, and asset inflations they have financed since 1997 will only postpone a far larger future economic and financial crisis. The Austrian school favors a cautious monetary policy and a prevention of asset inflation, rather than the bailout model now favored by the Fed and supported by Wall Street.

Because of a lack of information, most outside observers are not yet ready to offer a definitive judgment on this dispute between the Austrian school and Greenspan policy preferences. We may all know the answer to this very large question, however, within five years, unless the tipping point trigger which sets off any future large-scale crisis is in itself so dramatic that it obscures the true role of any past underlying monetary policy mistakes and vulnerabilities.

US Vulnerabilities

Future prospects–a global tour

Should the Iraq war end soon, not spread to other neighboring countries such as Iran and Turkey, and terrorism problems remain manageable, prospects for continued growth in the American economy in 2005 appear positive at present.

A gradually weakening dollar, although a potential source of sectoral inflation and higher US capital costs, should also eventually encourage more investment in manufacturing and in the production of other tradable goods in the United States. However, any rapid fall in the dollar would create many problems both domestically and abroad. Export-dependent economies would face recession and financial dislocations, and the US would experience both sectoral inflation and increase in the cost of capital, which would also impact housing markets and consumers here.

Should the conflict and follow-up with Iraq prove longer and more expensive than anticipated, should terrorists strike key economic targets in the US, or sabotage impact oil shipping and production facilities beyond those damaged in Iraq itself, US and global economic recovery could be derailed for a period depending on the severity and duration of the disruptions.

In 1990, the first Bush administration delayed release of oil from the stockpile until the very eve of the Gulf war. This decision, plus the firing of the Kuwaiti oil fields and the embargo against Iraq's oil, led to an increase in oil prices and inflation in the United States and elsewhere. At present oil markets are already tight. Should the conflict with Iraq spread to neighboring oil-producing economies, directly or indirectly through

terrorism or civil unrest, the oil shortage scenario of 1990 could easily be repeated on a larger scale. Because oil prices are already very high, the impact of any further tightening of oil markets could be quite dramatic.

Other vulnerabilities in the global economy also exist.

Japan's malaise

Vast fiscal efforts to prime the pump and delay painful restructuring of the Japanese economy in the aftermath of the collapse of the Japanese asset bubble in 1990 have contributed to a massive public debt. The OECD estimates that this debt equals at present 169 percent of Japan's entire gross national product, the largest by far of any member of the industrialized world. Other well-informed observers believe that Japan's actual public debt and contingent liabilities are far higher than even the OECD estimates. Japan is able to service a debt of this magnitude only because interest rates, in a deflating economy, are only about 1 percent in nominal terms. But what happens to all those 1 percent bonds when the inevitable day comes that interest rates rise to support the greater risk that this huge and growing debt entails? Who will want to buy these bonds should perceived risk and inflation mount? And what will happen to the banks and insurance companies now holding many of these 1 percent bonds as collateral and capital? Indeed, the Governor of the Bank of Japan recently worried aloud about the exposure of his own institution's balance sheet, should future inflation and interest rates undermine the value of the BOJ's vast and growing bond holdings. According to media accounts, today the BOJ holds a greater percentage of Japanese government bonds than even during the peak war year of 1944. If true, that is an astounding fact.

Dealing with Japan's multiple structural, financial and economic problems must inevitably involve some short-term increase in bankruptcies and unemployment, as part of a fundamental transition. More so-called zombie companies, kept alive by constant transfusions of loans from banks, will eventually have to be closed. Alternative policy would involve ever more bad debt piling up in the banks. Much of Japan's political class was resistant to policies involving short-term adjustment pain in the interest of social and political stability, so the debt build-up continued and continued. Japanese officials were, however, remarkably skillful and successful at the management of most perceptions abroad about the actual state of the Japanese economy and finance at any given moment, despite the 15 years of stagnation and false recoveries since the bursting of the great Japanese asset bubble.

A year ago, however, former Finance Vice Minister Ito published in the *Financial Times* a credible plan for addressing some of Japan's financial and

structural problems. It contained the following elements:

1. Since Japan's central bank had failed to grow the money supply sufficiently with lower interest rates alone–the money supply grew by only 2 percent during one recent 12-month period–Ito urged unconventional measures to inject money into the economy. In current circumstances, broad deflation could only be cured by a monetary expansion.
2. Japan must gradually control excesses in deficit financing to avoid a fatal debt buildup, and eventual crisis in debt servicing. Ito also believes that the tax system and public spending patterns must be reconfigured to encourage greater aggregate demand.
3. The nonperforming loan problem must be progressively solved, so that Japan's capital could be put to higher and more productive uses than supporting zombie companies. The banking system needed reform, injection of public money, nationalization of some banks, more mergers of others, and the outright closure of some weaker banks.

If a program such as this is not consistently implemented over the next few years, the debt buildup in Japan may eventually trigger a crisis that could shake the nation to its roots, destroy an immense amount of wealth, require a massive use of the printing press at the central bank that will be highly inflationary, and force Japan to face its problems with a vastly reduced capital and savings base. Even with interest rates at slightly over I percent, government debt service charges already absorb more than one fifth of Japan's annual budget.

Prolonged oil price increase, a war in Korea, or a deep future US recession would of course put immense new pressure on the Japanese economy and finances. Fortunately, a highly competent man, Mr Fukui, has recently been named head of the BOJ and has begun a reform effort. No one should envy this man. He has inherited a massive problem now under increasingly stressful geopolitical conditions: The dollar is weakening. The competition from China is intensifying. Aging Japan's demographic trends are accelerating. The public debt is mounting.

The Argentina example

Argentina is an example of a country which delayed facing its problems until it was too late. The Argentine economy eventually shrank by 25 percent over a four-year period. The banking system and a large part of the country's domestically held savings were lost. Capital flight added to the disaster. The crisis itself accompanied desperate last minute measures by Finance Minister Cavallo, which further undermined the country's capital base and economy. The political class was largely discredited. Demagoguery

and finger pointing formed an important part of the public discourse. A key problem in Argentina, as in Japan, was that the abler parts of political class were unable for years to implement a sustainable reform program. In the end, foreign holders of a hundred billion dollars worth of Argentine bonds were left holding the bag in one of history's largest defaults. After an excruciating two years, soaring global prices for Argentina's agricultural and commodity exports and the default on Argentina's foreign creditors, allowed growth to resume in Argentina, but at the cost of Argentina's long-term creditworthiness and foreign investment prospects.

Brazil's high wire act

The high ratio of debt to GDP of Brazil is a major source of concern. International institutions consider that ratios above 50 percent in emerging markets could expose countries to crisis. Such high ratios may not seem threatening in Europe and the United States because of their higher capacity of raising government revenue. Theory and data do not provide a reliable measurement of the sustainable debt/GDP ratio for any country. The internal debt of Brazil was 55.5 percent of GDP in 2002, increased to 57.2 percent in 2003 and declined to 51.1 percent in 2004. Vulnerability exists at the point when investors may not be willing to purchase government securities at a "reasonable" cost, forcing default. It may not be feasible empirically to measure such a point. In order to reduce the debt/GDP ratio, Brazil must continue its prudential fiscal management of primary budget surplus, which is now close to 5 percent of GDP. Simultaneously, Brazil converted a current account deficit into a current account surplus of close to 2 percent of GDP by reversing a trade deficit into a trade surplus of more than $30 billion. Simultaneously, the economy is growing again. There are still many challenges in Brazil, in particular, tax and labor reform, which would modernize the country, allowing better control of its own destiny.

Similar problems exist in other major Latin American nations. Much of the work done in the 1980s to encourage the adoption of market-based economic reforms in Latin America has been undermined by policy failure, some corrupt and discredited privatizations, and similar mistakes. But as the former President of Bolivia stated two years ago: "The hangover facing our region is not due to the reforms we have made, but to the reforms which we have not yet made."

As in Argentina, however, soaring world commodity prices have boosted economic growth in many parts of Latin America to levels not seen since the commodity boom of 1980, a boom which ended in tears in 1982, and a lost subsequent decade of economic growth for the whole continent. There is no substitute for getting overall policies right for sustainable balanced

economic development. Otherwise heavily indebted commodity dependent economies will continue to be hostage to the full impact of the booms and busts that accompany the global business cycles.

The United States has a very large stake in the outcome of the intensifying struggle between the demagogues and the sound economists in many parts of Latin America. Our stake in economic growth is equally high in other parts of the globe. Unsustainable US trade deficits cannot be corrected without a major global recession unless growth and demand elsewhere contribute to the solution. This plus other measures would then help permit an orderly shifting of global trading patterns.

The euro dilemma

In Europe, Germany's key economy is weakening with core unemployment exceeding 10 percent. Major structural reforms in labor markets, pension systems, and other aspects of the German economy are urgently needed. Prime Minister Schroeder has accomplished a modest increase in labor market flexibility. Politics impedes a broader assault on imbedded problems, which may not be resolved until Germany's two large parties join in a broad coalition to force through needed legislation. Other serious structural problems exist elsewhere within the Euro zone, recently worsened by the European Union's strengthening currency against the dollar zone. Because of the internal trade within the expanding European Union, and because of favorable relative energy prices in Euros, the impact on Europe's economy of the latest currency shift is less dramatic than some predicted. Still, Europe depends upon exports to the dollar zone for millions of jobs, and reduced competitiveness because of its strengthening currency may encourage some European leaders to turn even more heavily to high profile global politics in controversial areas to secure export markets. The Middle East and China are only two of several such theaters where international politics heavily impact local procurement and mineral concession decisions. This then could create more strain on Europe's ties with the United States, and potentially more strain on the economic side of the relationship in future discussions of trade and technology across the Atlantic.

The China question

China's intense national ambition rapidly to become the dominant Asian power, its low wages and its undervalued currency have unleashed trends that threaten to turn that country into an engine of deflation in sectors of manufacturing. Oversupply of goods continues to cause profit problems for competitors both within China and abroad. Many of China's 150,000 state-owned enterprises, burdened with antiquated facilities and heavy

benefit programs for their workers, remain in business only because banks are required to provide "loans" to subsidize their operations and prevent unemployment. This is contributing to a bad loan problem that may rival that of Japan in its size and potential implications for the future.

Indeed, mismanagement of banking and finance has been the traditional Achilles heel of the Asian development model, and China is not likely to prove a long-term exception to this rule. But in the meantime, China's exports are expanding at a frantic pace–more than 30 percent per year on a compound basis. According to *The Economist* magazine, export industries and international commerce now contribute directly and indirectly more than 50 percent of China's entire two-tiered national economy. This soaring trend in export growth cannot continue indefinitely without major consequences for the stability of China, China's trading partners, and for the global trading system as a whole.

The US deficit

This brings us full circle to the United States, where we have a net debt from accumulated trade deficits now approaching 3 trillion dollars, a debt that must be serviced with interest and profit remittances. This year the US trade deficit is projected to increase to a yearly total of over 700 billion dollars. (China alone contributes 135 billion dollars to this figure.) This unsustainable trend has already helped drive the dollar down against the euro and other floating currencies.

Predicting short-term currency trends in today's volatile conditions is difficult, partly because of massive intervention in Asia, and partly because the dollar's competitors, the yen and the euro, are based on economies that are themselves deeply troubled. Nevertheless, the massive, growing US current account problems leave the dollar extremely vulnerable in the short and medium term. Should the dollar continue to fall, the US market will be less available to overseas exporters, regardless of our trade and tariff policies.

Past US trade policy concentrated on opening US and global markets. We are now engaged in a new round of trade negotiations aimed at further trade liberalizations. But if we do not succeed in creating opportunities for the US to reduce its trade deficit–which continued at record levels even during a past recession–the dollar may continue to fall and this will have consequences.

Moreover, persistent global ill will toward, or misunderstanding of, US foreign policies could trigger a de facto overseas boycott of US goods and services far beyond Macdonald's currently flagging sales in the Arab world, or the disappearance of the Marlborough cowboy from many of its earlier

marketing sites throughout Europe, as a now negative symbol.

Such attitudes overseas could have long-term implications for Boeing and other big-ticket US exporters, which now contribute importantly to our balance of payments. They could also create long-term strategic commercial opportunities for US competitors in Europe, the Middle East, Latin America, and Asia.

The promise–and limits–of economic policies

As we consider the economic developments of the past century, the trends are overwhelmingly positive. Technology, science, democracy, education, and productivity have improved the quality of life for billions of people on this planet. Ancient illnesses have been fought and defeated. Drudgery in daily life and work has been dramatically reduced. These trends will certainly continue and intensify in our present century.

But there have also been bumps in the road of progress. Debt problems, demagogues, wars, asset and consumer price inflation, and overinvestment in capacity, have taken their toll in blighted lives, recessions, and a major depression during the past century. We believe we understand now, better than before, how to cope with fundamental economic problems. While we can learn from the past, it is important, however, to recognize that each major economic accident impacting the national, regional, and global economy has been unique. Attempting to build precise models based on past situations has thus far not been very successful in predicting the next economic crisis. In this sense, notwithstanding all the advanced mathematics and powerful computers, economics is still a young science, still learning, still attempting to build paradigms that will allow us all to peer into the future with more confidence to avoid costly debacles. In the meantime we have to look beyond our computers to assess deeper vulnerabilities.

This is not going to be easy. Human nature, with all of its complexity and vulnerabilities, operates on the basis of emotions, values, drives, and ambitions the impact of which is difficult to quantify. Statistics will continue to be flawed by false data fed into powerful computers. Confidence will suddenly collapse from time to time, triggering runs on banks and countries. Poorly supervised rogue traders in banks and hedge funds will periodically trigger vast losses to shareholders and investors. Political leaders will not always be totally candid with their followers and their countries' creditors. Politics itself is an unpredictable factor, as is war. People also make honest mistakes.

Painful old lessons about such dangers as asset inflation and over concentration in the financial industry will have to be relearned. As each

generation dies off with its deeply imbedded memories of booms and busts, the snake oil salesmen will again appear in force, together with their witting and unwitting accomplices in corporate and public life. There will always be a powerful lobby for a major redistribution of wealth, whether through taxes or monetary policy measures.

Three other issues deserving special attention are problems in the global exchange rate system, some aspects of the derivatives industry, and any underestimation of strain on public finances that could produce renewed inflation.

Global exchange rates

When floating exchange rates were adopted after the collapse of the Bretton Woods system, policymakers expected the new system to trigger automatic adjustments in the balance of payments.

Reality proved more complicated. Some mercantilist countries endeavor to influence currency directions with interventions, dirty floats, fixed arrangements, and large-scale capital transfers of various kinds. Competitive currency devaluations can substitute for tariffs and other nontariff barriers as an important regulator of the terms of international trade.

Over the long term, floating exchange rates have proven their value to most countries with sound regulatory systems. But in the short term, currency interventions by those with fixed exchange rates of various kinds have greatly complicated international trade, and contributed to the large sustained US trade deficit. Such undervalued currencies disadvantage competing manufacturers in the US and elsewhere. The export-favorable currency of China also encourages more investment in local manufacturing than the global market can absorb without producing future deflationary pressures and broader dislocations.

China's economic development is a good thing, not a bad thing. But some of China's policies to jump-start a once moribund state run economy can be dangerous to China and others if continued too long. Recent international efforts were made to persuade China to allow its currency to appreciate. This is because the undervaluation of China's currency does not involve only China, but the whole East Asian production complex. None of the neighboring countries that form China's hub and spokes trading system can afford to revalue its own currency unless China leads the way.

Appeals for an immediate currency revaluation have been rejected. China cites concerns for its strained banking and political system if growth and export rates taper off for any reason.

Therein lies the great dilemma. China says that it cannot afford to slow down its titanic export drive, and the US simply cannot afford to accumulate

current account debts at the accelerating pace of the past few years.

Thus, if internal problems with China's banking system, energy supplies,politics, and environmental conditions do not ease China's torrid pace of export expansion, China's competitors abroad will surely seek ways to slow down the juggernaut. This would allow time and space for other economies, including those in the Western Hemisphere, to grow and adjust. This is what happened in the mid 1980s to blunt Japan's massive export drive, which also was fuelled in part by state capitalism, an undervalued currency, multiple non-tariff barriers, rampant theft of intellectual property and an intense national ambition by the country's leadership to achieve US standards. The fact remains that the US cannot continue to accumulate debt via its collapsing current account position at this pace much longer without undermining the dollar as a reserve currency, radicalizing its domestic politics, and eventually compromising its global strategic position.

Although China has accumulated more than 600 billion dollars worth of foreign exchange reserves to cushion any future problems, China's fears about its own vulnerabilities should not be ignored. China's economy faces serious problems, problems not always fully captured by released official statistics. Although China's economy is stated to be growing at a 9 percent annual pace, China's stock market is at a six year low, as of early 2005. Presumably the companies listed on the stock exchange are among China's best. Their sagging value may say a great deal about the financial health of the other building blocks of the Chinese economy, namely the individual companies. Stock markets tend to be leading, not lagging, economic indicators.

The problem with derivatives

In our time, derivatives have added vast new areas of uncertainty. There is somewhere between 100 and 125 trillion dollars worth of those useful instruments outstanding today. While derivatives do reduce risk to individuals and companies, they also spread that risk, often in highly leveraged form, to other individuals, institutions, and in extreme form to the financial system itself–as we saw with the Long Term Capital Management hedge fund debacle. Some large money-center banks, which are creditors to major derivative issuers, are thought by some to be at risk under some possible scenarios.

It requires a high degree of technical skill, and unusual dedication and effort for outsiders to penetrate constantly evolving derivative markets and understand where the ever-shifting vulnerabilities lie. This cannot be accomplished by the average investor, who is likely to have no idea what recent gambles a firm's management may have made on derivative markets

until the bad news of a massive loss suddenly hits the street. Many have urged greater transparency in derivative reporting. Even Warren Buffett and his skilled associates threw up their hands after attempting to penetrate the explanatory footnotes on the potential derivative-related liabilities of some money-center banks.

Fighting terrorism: balancing short-term costs and long-term goals

Beyond the problem of finding a solution to the global imbalances, the greatest uncertainty facing the American economy undoubtedly has to do with the unpredictable elements of war and terrorism, and the potential for disruption of economic targets, including energy-related production and transportation facilities. The Venezuelan and Nigerian oil production disruptions have complicated all this.

Each year since 9/11, economists at the IMF have attempted to calculate the potential economic impact of perceived geopolitical uncertainties that could cut projected global economic growth.

One of the reasons for this effort is the vast disproportion between the costs of mounting terrorist attacks and the damage that such attacks can inflict on advanced, open, and vulnerable economies like ours. A year after the 9/11 attack, one of Washington's major public policy institutes assembled a group of economists to assess these relative costs. At that time, they concluded that the 9/11 attacks on the Twin Towers and Pentagon had cost Al-Qaeda about $250,000 to mount. The assembled economists calculated that the net cost to the American economy of this attack, direct and indirect, exceeded $800 billion dollars. This included the damage to financial markets, transportation industry, insurance industry, hotel industry, the buildings themselves and the titanic costs of striking back at terrorists and protecting the country from future attacks. In the meantime, new costs have arisen as pressure for more domestic defensive measures has developed.

Knowledge that terrorists have targeted civilian aircraft with cheap antiaircraft missiles, for example, generated proposals to equip civilian planes with antimissile systems at a cost of $10 billion dollars. The war with Iraq, partly aimed at avoiding possible future Iraqi cooperation with terrorists, will certainly cost many hundreds of billions of dollars before it is over, plus the large sums our allies asked to secure their cooperation. Since 9/11 the price of oil has doubled. If there is a deeper oil crisis, or terrorist-related economic disruption, this cost will increase. It should be remembered that each thousand point decline in the Dow Jones costs shareholders roughly a trillion dollars. It should also be remembered that

inflation and other financial instabilities have the potential to jolt bond and derivative markets.

Unless the US successfully shifts budget priorities, the American economy does not have a limitless ability to absorb the costs from war and terrorism without eventually returning to a sharper cycle of inflation and recession.

The Federal Reserve can indeed cushion massive unexpected blows to the American economy and financial markets, but only at a high risk of future inflation, subsequent monetary restraint, and recession.

The US obviously had no choice but to defend itself from evil. We have moved vigorously to strike at Al-Qaeda and their Taliban hosts and now Iraq. But we also have an obligation to look beyond the immediate issue to seek means to drain the other swamps that help spawn terrorists and recurrent regional wars. That is partly why the President's vision of a Middle East settlement with a secure Israel and a democratic Palestine was so well received by diplomats. It is vital that future scenes of cooperation among the leaders of the three great faiths involved replace the constant mayhem on television throughout the Islamic world from violent events in what was once called "the Holy Land."

History suggests that the US will eventually pass through today's problems and uncertainties. Unlike Japanese economic managers who tend to bury their problems for years and compound their costs, the US tends to address its Enron-like problems brutally and move on. Every four years, the Presidential election provides the American people with the opportunity to change, if needed, both policies and personnel. We can also expect that new inventions and technologies will generate whole new areas of economic activity and growth, improving the lives of billions of people.

A key to this happy outcome is wise US leadership and effective diplomacy, plus keeping our economy open, flexible, market oriented, and with a heavy emphasis on quality education. We must also successfully address certain problems in the global trading system that contribute to our current account problem. As long as we continue to master these basic requirements, we will drive over any bumps in the road and continue to lead the world.

Operative lessons for policymakers

Even during the distraction from the current war, policy makers must remember basic economic principles:

1 It is better to prevent inflation than to have to control it, once unleashed. This is also true of serious asset inflation, which produces bubbles that tend to trap the least sophisticated investors.

2 Excessively loose monetary policy which subsequently generates asset inflation also tends to produce excess investment in capacity, including real estate. In effect, such monetary policies borrow economic growth from the future. This resultant excess capacity ultimately weakens profits, banks, and stock values, and can hang over markets for years before a combination of liquidation of excess capacity and new economic growth allows markets to clear.
3 Wars destroy and waste wealth. Financing by governments of past wars has often generated inflation, unless policymakers were vigilant.
4 Stimulating the housing market in an effort to ease the wealth-destructive consequences of a burst stock market asset bubble can either kill or cure the patient, depending on how long the medicine is applied.
5 During inflationary times, low fixed rate mortgages on housing can generate serious problems for those institutions holding large portfolios of mortgages or higher risk housing derivatives. Future higher interest rates will tend to make it more difficult for potential buyers to qualify for mortgages when people want to sell their houses. Higher local taxes, which are often indexed, and rising insurance costs are adding to the cost of home ownership, and will tend to reduce the pool of people able to afford such housing at existing prices.
6 The large-scale debt accumulations, via balance of payment deficits, cannot continue indefinitely without triggering a further weakening of the nation's currency, contributing to sectoral inflationary pressures and increasing the cost of capital. US trade deficits are not merely a macroeconomic phenomenon involving the US budget deficit and monetary aggregates, important though that is, but also and powerfully an accumulation of many microeconomic problems. These include currency misalignments, failure to enforce successfully past trade-opening deals, including China's WTO agreements, subtle but powerful nontariff barriers involving such things as local standards, the European VAT rebate system for exports, poorly negotiated past trade deals such as the 1992 airbus agreement which allowed subsidized and risk-free financing of new aircraft, wholesale theft of US intellectual property and trademarks in many parts of the world, etc, etc. Viewed individually, the impact of some of the microeconomic obstacles to US exports and competitiveness may seem modest. The collective impact of all the micro economic obstacles on American competitiveness and exports, however, is titanic and strategic. US trade deficits have increased steadily since 1990, regardless of the fluctuating US budget position, suggesting that we must look beyond the fiscal macro issue to help address our current account problems.

7 It is nevertheless essential that projected US fiscal deficits be brought under control. They contribute to excess US demand, cause confidence problems at home and abroad, and will otherwise lead to higher future US interest rates.

8 Foreign policy rationales for trade policy measures need to be considered from time to time, but only if the collective impact of generous trade policies conducted on this basis do not collectively generate potentially disastrous current account problems.

9 Encouraging more economic growth abroad is the painless textbook solution to a global imbalance problem in trade. Realism compels us to consider the political obstacles likely to delay such growth in Europe and Japan, and understand as well that more export led growth in places like China will only compound our problems. We also need to remember the catastrophic results of efforts in the mid 1980s to encourage Japan to engage in expansionary monetary policies aimed at stimulating more domestic demand. In short, we may need to look beyond this textbook solution to help ease our pressing current account problem.

10 As Argentina demonstrates, delay in addressing an underlying national economic imbalance can cause an economy to contract severely when problems have to be addressed in the middle of an urgent crisis. If this happens to the American economy, the consequences will be massive and global.

11 As in Brazil, funding a large public debt with short-term borrowings can be dangerous if, for any reason, markets lose confidence in the borrower's ability to service the debt.

12 Floating exchange rates have proven their value over the long-term for most countries with sound regulatory systems, but such countries can suffer short-term competitiveness problems against trade sold with fixed and undervalued currencies. Major countries like China with such fixed exchange rates and large pools of savings and inexpensive labor can dominate some sections of global markets for years, but at a risk of future financial, banking and political instabilities for themselves and for their trading partners.

13 Past models of financial disasters are imperfect guides for predicting future financial debacles. There are several reasons for this. One key problem is a lack of transparency in information. Political and business leaders with financial problems are seldom candid. Political responses to crises are unpredictable. Part of modern finance relies heavily on opaque derivative operations whose individual and collective impact during a crisis cannot be quantified in advance. Human nature itself is volatile,

subject on occasion to credulity, panic, and the other manifestations of "the madness of crowds." Relying wholly on computers and the statistics in them can dangerously mislead policymakers who fail to understand the limitations of their economic models.

14 Allowing the economy to operate on the basis of market signals remains the best available means of running a modern economy. Rapid advances in science and technology will continue to place a tremendous premium on flexibility, quality education, and on the optimum use of capital and labor that a market-driven process makes most likely.

15 Notwithstanding current overall global economic growth, today's world is filled with economic vulnerabilities, large and small. Policymakers and economists need to monitor and address the more obvious individual problems to lessen potential future systemic risks.

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Introduction

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The Group of Seven industrialized countries (G-7)–United States, United Kingdom, Germany, France, Italy, Japan and Canada–developed a new doctrine of international supervision and regulation of financial markets. In periodic meetings, the G-7 instructed international financial institutions–International Monetary Fund (IMF), Bank for International Settlements (BIS), the World Bank and Multilateral Development Banks (MDB)–to tighten their supervision and regulation of international finance. This volume is an exegesis of this doctrine sometimes known as the "New Architecture of the International Financial System" (IFA). The emphasis is highly utilitarian, on what official and private practice is and how it affects creditor banks, investors in securities and debtor countries. Financial institutions and debtor countries cannot affect doctrine in the short-run. On the contrary, crisis resolution must work within official doctrine and procedures.

Strengthening the architecture of the international financial system never ends. It resembles the creative ambiguity by the United States Federal Reserve Board on what institution is too big to fail. Every new crisis results in a new form of thinking and measures to tighten institutional structure to prevent its repetition. Moreover, methods of resolution of crises evolve in response to those that occurred recently. Supervisors and regulators in G-7 countries developed methods to deal with financial emergencies in a case-by-case fashion, with principles but also with flexibility.

Debt crises in emerging markets caused substantial losses to financial institutions and investors. Default of bank debt by emerging countries after 1982 resulted in sharp reductions of principal in the Brady Plan. The Russian default in 1998 caused substantial losses to investors. Argentina is currently in default of $100 billion to over 600,000 bondholders, many of whom individuals in Europe and Japan who invested their life savings in Argentinean securities. Sudden stops of capital flows have caused sharp

losses of output in emerging countries–ranging from around 5 percent for Mexico and Argentina in 1995, through an average 7.2 percent for the Asian Five in 1998 and 15 percent in the first quarter of 2002 for Argentina. There is no agreement on what causes crises and what are the best policies for resolution. However, there is strong evidence that output losses can be quite high.

The Executive and Congressional branches in crisis countries are accountable for crisis resolution and prevention. In fact, if countries do not "own" programs, they will not likely implement them. The IMF does not enforce programs on countries or even encourages them to use its facilities. On the contrary, countries develop programs and request emergency financing from the Fund. Moreover, the G-7 and IFI determined that emergency assistance to countries requires private sector involvement (PSI) that is, negotiations with creditors that must share in costs of workouts.

New processes for crisis prevention and resolution developed rapidly after Mexico and Argentina in 1994–95 and consolidated after the Asian crisis in 1997–98. Exegesis of doctrine is essential for a debtor country to avoid a liquidity crisis without catalytic official financing. A country has little hope of obtaining private sector credit without official financing or support for an adjustment program. Larger and sophisticated emerging economies, such as emerging Asia, China, Brazil, Mexico and Argentina, need trade finance to import inputs required for production of output for the internal market and for exports. In fact, China is a major importer of commodities in world markets. Loss of access to credit markets translates into internal recession.

There have been recurring vulnerabilities in international finance. In the past few years, interest rates in the United States declined to their lowest levels in more than four decades. Fear of deflation dominated Japan, China, Europe and the Federal Reserve Board. Simultaneously, the United States moved from fiscal surplus to deficit. China's accession to the World Trade Organization (WTO) and its increasing share in world trade from 1 to 6 percent, pose a challenge to many countries. In 2002, capital flows to emerging countries declined sharply, causing concern because of the default of Argentina, weakness in Mexico and an election in Brazil. These flows increased sharply in 2003 with lowering yields for government securities and global economic recovery. There is a risk now that a rise in interest rates along with world economic recovery and increases in oil prices could raise spreads again. Chapter 1 provides a background of the current environment, its risks and opportunities to motivate, and for the subsequent chapters on IFA.

External and internal imbalances of the United States constitute a source of significant concern. In the 1990s, the United States followed a policy of "strong dollar" to restrain domestic inflation and interest rates, which would promote economic growth. Productive investments exceeded savings, requiring foreign savings in the form of trade and current account deficits. The Administration, according to Professors DeLong and Eichengreen, was not concerned with the trade deficit and capital inflow, since they reflected higher returns of investment in the United States. The current account deficit of the United States increased from 1.6 percent of GDP in 1997 to 4.2 percent in 2000, the trade deficit increased from 1.3 to 3.8 percent and the net international investment position from 9.9 to 16.1 percent.[1] This situation worsened since 2001, with the current account deficit reaching 4.5 percent of GDP in 2003 and close to 5 percent in 2004. Moreover, the net international investment position of the United States is exceeding three times exports of goods and services. The fiscal balance of the United States deteriorated from a surplus of 2.4 percent of GDP in 2000 to a deficit of 3.6 percent in 2004.

There has been intensive research on the risks and policies of United States external and internal imbalances. The main risk is that abrupt adjustment by the United States could result in a global recession because of the high share of 25 percent of that country in world output.

Professor Richard N. Cooper borrows a phrase from John Kenneth Galbraith, "conventional wisdom," to label the most influential proposal.[2] The policies of this conventional wisdom consist of slow depreciation of the dollar, revaluation of East Asian currencies, decrease in demand relative to income in the United States and increase in demand relative to income in Europe and Japan.[3]

Important theoretical and empirical results have reshaped international macroeconomics.[4] Professors Obstfeld and Rogoff provide perceptive evidence that a short-term overshooting of the depreciation of the dollar may prove less effective in improving the current account deficit than slower depreciation.[5] An important reason for this contention is the low pass-through of depreciation to inflation.

The economic counselor of the IMF, Professor Raghuram Rajan, analyzes the issue in the broader context of global imbalances.[6] The IMF estimates that the current account deficit of the United States could be sustainable at 3 percent of GDP. The Fund has consistently provided policy advice in three areas: 1)The United States should increase savings and adjust its fiscal deficit; 2)Japan and the euro area require structural reforms; and 3) Emerging Asia should engage in financial reform and exchange rate flexibility.

The balance of the volume consists of an exegesis of official doctrine and strategy by creditors and debtors to adapt to new practice. The G-7 structured the international financial system in its continuing consultations beginning with the Halifax meeting in 1995. Chapter 2 shows the evolution of doctrine pragmatically after major crises showed weaknesses that required correction. This is the traditional approach by supervisors and regulators in the G-10 countries. These authorities designed reforms of international finance. This chapter also provides information on IFI, international forums and MDB.

Crisis prevention consists primarily of surveillance by the IMF within Article IV consultations. Because of twin crises of balance of payments in which crisis of the internal financial system magnifies output loss, surveillance focuses on stability of the financial system. Chapter 3 considers in detail vehicles and tools of surveillance by the Fund and World Bank's joint program. Countries must develop banking institutions and financial talent to even improve on requirements and reap benefits in policy and prevention.

Concerns with moral hazard prompted the G-7 and IFI to ensure private sector involvement (PSI) in crisis resolution. Increasingly, crisis resolution requires almost simultaneous assurance of recovery of access to private credit. Chapter 4 covers the main issues in loss and recovery of access to private sector credit.

Any observer of emerging market crises will find striking similarities in individual country behavior. Public deficits were high and growing in Mexico in 1994, Argentina 1994–95 and 2000–3, Russia 1998 and Brazil 1998–99. Commonly, authors point to low fiscal deficits in the Asian crisis. However, there is a valid argument that deficits did potentially exist in future bailouts of domestic financial institutions. Crisis countries had soft pegs of exchange rates such as Mexico 1994, Russia 1998, the Asian Five 1997–98 and Brazil 1998–99. Argentina had a hard fix in the current crisis. All crisis countries had external deficits. Although there are suggestive theories explaining crises, there is no general agreement on the relative role of various factors. Chapter 5 deals with the highly debated issue of choice of exchange rate regime during crises.

The Asian crisis, and other crises, caused major shocks of confidence in data, standards, codes, transparency of policy, payment and settlement systems and corporate governance. A wide array of international institutions developed standards and codes to strengthen institutional frameworks in emerging countries. Assessment of these standards and codes is part of Article IV consultations and extremely important in a country's credibility and access to official aid and private credit. A key standard is the new

Capital Accord or Basel II that will be adopted by institutions with more than 75 percent of international banking assets. Chapter 6 considers these standards and codes. Finally, the Conclusion summarizes some key issues on what is official doctrine in international finance and how it affects creditors and debtors.

A bibliography follows the text to facilitate reference in notes to the literature. We are grateful to many friends in various countries for help and encouragement, but remain entirely responsible for errors and omissions.

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1
Risks of the International Financial System

The world economy has multiple vulnerabilities that challenge the international financial system. These vulnerabilities are similar to those that stimulated the G-7 to strengthen architecture of the IFIs. The objective of this chapter is to provide a framework of information on these vulnerabilities to motivate discussion of strengthening the IFA in the following five chapters. After 10 years of efforts by the G-7 and IFIs, many of the vulnerabilities in the world economy persist in similar or new forms. Events since 2000 reveal such vulnerabilities.

The Federal Open Market Committee (FOMC) has been active in the past 15 years. Since 1990, the Fed has lowered fed funds rates by 500 basis points or more on two occasions and increased them by 300 basis points on another. The Fed lowered the fed funds rate from 6.50 percent on May 16, 2000, to 1.0 percent on June 25, 2003, that is, a reduction of 550 basis points. Interest rates in 2003–4 have been at their lowest level in more than four decades. The American fiscal surplus of 2½ percent of GDP in 2002 turned into an estimated deficit of 3.6 percent of GDP in 2004. Economic growth finally accelerated in the United States. The American economy grew at an average rate of 6 percent in the second half of 2003 and could grow at 4 percent in 2004. To be sure, inflation is still low in the United States, barely above 1 percent in forecasts of the Fed for the fiscal year 2004.

The Fed may increase rates because the combination of fiscal deficit and high economic growth could cause higher inflation. The Fed increased the fed funds rate from 3.0 percent on February 1, 1994, to 6.0 percent on February 1, 1995, in a concern of increasing inflation. Spreads of emerging market debt increased from 405 basis points at the end of 1993 to 800 basis points in mid December 1994. Increasing interest rates could affect world economic growth, the value of the dollar and international capital flows. Wide fluctuation in international financial variables could trigger

international crises in countries with weak fundamentals as in the debt moratorium of 1982 and in the Mexican crisis in 1994–95.

The Fed lowered the fed funds rate to 1 percent because of disinflation. Monetary authorities were concerned that deflation, as in Japan, could occur in many economies such as those of the United States, Germany and China. Fear of deflation partly motivated lowering of interest rates by the Fed. Analysis of deflation permits an understanding of policy by the Fed and events in Japan. Japan grew at 3.2 percent in the fiscal year ending in March 2004, the best performance since 1996. However, the Bank of Japan continues to forecast deflation of consumer prices. There is still doubt if recovery of growth in Japan is sustainable or transitory. Japan and the United States jointly have a share in excess of one-third of world output. Growth of the United States and Japan could provide a stimulus to the world economy because of weaker conditions in the euro zone.

The Argentinean economic and institutional crisis since 2000 constitutes one of the most important events in international finance. Argentina implemented all reforms for crisis prevention designed by the G-7 and IFIs as early as 1999. The country had a program with the IMF almost continuously during the 1990s. A sudden stop, or actually sudden reversal, of capital flows caused an exchange crisis that spread to the domestic banking system, which was nearly paralyzed. The crisis in Argentina occurred in the areas of technical superiority by the IMF: monetary, fiscal and exchange policies. Moreover, catalytic financing by the IMF and IFIs did not reverse the crisis. The prime method of crisis resolution of the IMF is precisely this type of package of catalytic financing. Private sector involvement (PSI), another ingredient in crisis resolution, did not succeed. Argentina came close to default obligations with IFIs, an event that had never occurred before with a major country. The IMF was unable to conclude a third review of the program with Argentina in August 2004.

Italy, Japan and United Kingdom abstained from voting at the Executive Board of the IMF in the first review of the Argentinean program in January 2004. The financial authorities of the G-7 even issued a warning at a meeting in Boca Raton in February 2004 that Argentina had to restructure its foreign debt in cooperation with external creditors. A cooperative solution with creditors is part of the IMF conditionality. Argentina is in default of more than $100 billion in bonds. There are still no clear signs that negotiation with over 600,000 bondholders, many of whom had locked their life savings in Argentinean securities, will be successful. Progress in restructuring Argentina's debt is uncertain. The Argentinean crisis became a challenge to the IFIs.

There is no consensus on what caused the Mexican crisis in 1994–95.

Leveraged mismatches of balance sheets of government, banks and financial institutions caused an internal financial crisis that magnified the effects of sudden reversal of capital flows. Catalytic finance did work in Mexico. The country repaid foreign assistance and recovered in two years. However, Mexico still needs reform of taxation and vehicles for development of infrastructure.

Moreover, China is posing a major challenge to labor-intensive producers such as Mexico. The share of China in world trade has jumped from 1 to 6 percent. The country plans to grow at more than 7 percent per year to reach the current GDP level of Japan by 2020. China has vulnerability similar to many countries in Asia. Nonperforming loans account for 22–40 percent of bank assets, depending on the source of the estimates. As in Japan, sound growth in China depends on successful resolution of the weakness of local banks. It is more difficult to conceptualize a sudden reversal of capital flows in China because of huge reserves. However, external weakness could cause difficulties in internal financial markets and extend regionally to other Asian countries.

Spreads of yields on emerging market securities have widened on occasion after increases in yields of treasuries. The IMF finds a significant relation between these spreads and anticipations of increases in fed funds rate. Capital flows to emerging countries could diminish during a rate increase in the United States. Flows of capital to emerging countries declined sharply in 2002, contributing to concerns about another round of international financial crises. Recovery of access to credit markets is indispensable for a country to avoid exceptionality, which is a state of difficult negotiations with IFIs and private creditors. Capital flows recovered sharply in 2003, following declines in yields of bonds and improving fundamentals for corporations and countries. However, there is new concern because of a possible inflation control policy by the Fed. Oil price trading above $40 per barrel adds another dimension to the risk of emerging markets.

Brazil is important because of its high share in emerging market finance. The country finds itself at a crossroad, nearly experiencing a liquidity crisis during an election in 2002, aborted by sound central bank policy. Brazil improved significantly because of catalytic finance by the IMF in 2002 and 2003, together with sound fiscal/monetary policy by a new administration. The Executive Board of the IMF evaluated that Brazil made significant progress in adjusting its economy in 2003.[1] However, IMF directors identified three key sources of vulnerability:

- Size and structure of public debt
- High foreign financial needs
- Low economic growth

IFIs believe that public debts of emerging countries are not sustainable if they are too high relative to GDP. Emerging economies do not have the capacity to extract high percentages of GDP in the form of taxes, as is the case of mature economies. Certainly, public debt in excess of 50 percent of GDP can cause difficulties. Brazil's net debt of the non-financial public sector increased from 55.5 percent of GDP in December 2002 to 58.7 percent in 2003. Brazil's debt was 55.3 percent of GDP in July 2004. Brazilian authorities increased the target of primary surplus to 4.25 percent of GDP in 2003 in an effort to reduce the ratio of debt to output. Potential vulnerability is uncontrolled growth of debt relative to economic activity leading to financial crisis in the form of difficulty in financing the public deficit and rollover of debt. Even with high interest rates, the government may encounter difficulties if there is an expectation of default.

In the short term, a country must continue to manage its public debt adequately to avoid adverse expectations that could cause an increase in the gap of foreign financial needs. Official doctrine recommends a primary surplus sufficiently high to curb growth of the ratio of debt to GDP and tight monetary policy to continue to attract foreign financing. Tight fiscal and monetary policy already occurs in a weak economy with unemployment. There is an issue if the country is governable, that is, if the authorities can obtain support of the population during a sufficiently long period to adjust the economy.[2] Early abandoning of adjustment, or merely expectation of a change in course, could cause an international financial crisis with internal political uncertainty, contraction of economic activity and loss of employment. Recent data for Brazil appear to confirm the forecast of growth of more than 3 percent in 2004, which may still be insufficient to reduce unemployment significantly, at least in the medium term.

Risk of international interest rates and Federal Reserve policy

Interest rates have shown interesting behavior since 2002. Emerging market bonds had returns of 17 percent in the first half of 2003. Part of this performance originated in improved expectations for many countries.[3] However, low yields of American fixed income securities motivated investors to seek higher returns in emerging markets. Until July, emerging market funds received an inflow of $2.6 billion, the highest value since 1995, when data became available. There is concern if risk spreads of emerging market bonds increase together with yields of American treasuries. Pension funds of companies in Standard & Poor's 500 showed a surplus of $300 billion at the end of 1999, reverting to a deficit of $300 billion in mid 2003. There is a risk of repeating the experience of 1994. During the increase of

fed funds rate by the Fed in 1994, spreads of emerging market bonds over treasuries rose from 405 basis points at the end of 1993 to 800 basis points in mid December 1994. In the same period the yield of the 30-year treasury increased by 150 basis points and the rate of the 30-year mortgage jumped by 200 basis points. Losses to markets exceeded $1 trillion.

The collapse of yields for all maturities and the pledge by the Fed to maintain fed funds at 1 percent caused a run for yields by investors. Merrill Lynch's index for American corporate bonds with BBB rating showed a spread of 2 percent over treasuries in mid 2003, well below 4 percent a year earlier in 2002. Yields of these bonds declined to 9 percent in mid 2003 compared with 14 percent a year earlier. The emerging market bond index of J.P. Morgan Chase, EMBI+, showed a decline of spread of emerging market bonds from 10 percent in October 2002 to a little over 5 percent in July 2003.[4]

There is sharp contrast with interest rates for major countries in Latin America. The yield for Mexico's benchmark bond was 7.42 percent with spread over treasuries of 3 percent. Emerging markets as a group showed a spread similar to the average of Brazil and Mexico, around 5 percent. Argentina showed extremely high yields because of default.

Benchmark bond yields of advanced countries declined to their lowest levels in decades. On May 22, 2003, yields of 10-year American Treasury notes declined to 3.31 percent, the lowest level since 1958.[5] There was a similar performance in markets in Germany and Japan. Table 1.1 shows yield curves of treasuries since 1999. The 10-year yield declined from 6.45 percent at the end of 1999 to 3.37 percent at the end of April 2003, remaining almost always above 4 percent subsequently. If the world economy continues to grow, increases in yields in the United States could cause financial risks, including restraint of economic growth.

Testimony in Congress by Chairman Alan Greenspan on July 15, 2003, showed the difficulty in designing monetary policy.[6] Optimistic assessment of economic growth and strong expectations for the second half of 2003 and 2004 stimulated stock markets but caused an increase in yields of treasuries. The yield of the 10-year note rose to 3.95 percent, the highest in 11 weeks, jumping over 4 percent subsequently.

Testimony to Congress by Chairman Greenspan contained important points such as: forecast of the growth of the American economy above the long-run trend of 3.5 percent, assurance that the Fed would not increase interest rates, room for expansive monetary policy even with fed funds at 1 percent and assurance that the Fed would not repurchase long-term treasuries to lower their yields. The markets expected that the Fed would repurchase long-term securities, which caused

Table 1.1 Yield curve of the United States

	6m	1y	2y	3y	5y	7y	10y	20y
2004								
Aug	1.79	1.99	2.41	2.75	3.33	3.76	4.48	5.22
Jul	1.77	2.13	2.68	3.09	3.71	4.13	4.50	5.24
Jun	1.68	2.09	2.70	3.16	3.81	4.24	4.62	5.33
May	1.39	1.83	2.54	3.10	3.81	4.26	4.66	5.39
Apr	1.17	1.55	2.31	2.86	3.63	4.11	4.53	5.31
Mar	1.01	1.20	1.60	1.99	2.80	3.33	3.86	4.77
Feb	1.01	1.21	1.66	2.13	3.01	3.48	3.99	4.85
Jan	1.01	1.28	1.84	2.35	3.17	3.68	4.16	5.00
2003								
Dec	1.02	1.26	1.84	2.37	3.25	3.77	4.27	5.10
Nov	1.04	1.39	2.06	2.56	3.38	3.89	4.34	5.20
Oct	1.04	1.31	1.85	2.36	3.27	3.80	4.33	5.20
Sep	1.01	1.15	1.50	1.95	2.85	3.41	3.96	4.91
Aug	1.06	1.35	1.95	2.51	3.46	4.00	4.45	5.33
Jul	1.02	1.28	1.80	2.33	3.38	3.98	4.49	5.43
Jun	0.98	1.09	1.32	1.66	2.46	3.03	3.54	4.52
May	1.09	1.13	1.33	1.58	2.30	2.87	3.37	4.36
Apr	1.15	1.22	1.51	1.95	2.85	3.39	3.89	4.79
Mar	1.13	1.19	1.51	1.93	2.78	3.35	3.83	4.84
Feb	1.19	1.24	1.53	1.91	2.69	3.24	3.71	4.70
Jan	1.20	1.36	1.77	2.21	3.07	3.61	4.06	5.01
2002	1.23	1.32	1.61	1.99	2.78	3.36	3.83	4.83
2001	1.83	2.17	3.07	3.59	4.38	4.84	5.07	5.74
2000	5.70	5.32	5.11	5.06	4.99	5.16	5.12	5.59
1999	5.74	5.98	6.24	6.29	6.36	6.55	6.45	6.83

Source: http://www.ustreas.gov/offices/domestic-finance/debt-management/interest-rate

a decline in the yield of the 10-year Treasury note to 3.31 percent. The markets could expect a "rational bubble," according to which stock prices were rich but not those of bonds. If the Fed could increase inflation by 1 percent, yields of 10-year treasuries would rise to 5–6 percent. A yield of 4 percent would be equivalent to a probability of 2/3 of success by the Fed

Table 1.2 Mortgage rates in the United States

	Rate	Points
2004		
Aug	5.87	0.7
Jul	6.06	0.7
Jun	6.29	0.6
May	6.27	0.7
Apr	5.83	0.7
Mar	5.45	0.7
Feb	5.64	0.7
Jan	5.71	0.7
2003	5.83	0.6
2002	6.54	0.6
2001	6.97	0.9
2000	8.05	1.0
1999	7.44	1.0
1998	6.94	1.1
1997	7.60	1.7
1996	7.81	1.7
1995	7.93	1.8

Source: http://www.freddiemac.com/ppms/pmms30.htm

in re-inflating the economy.[7] However, a yield of 3.9 percent could possibly be low.

Continuing the practice initiated in 1994, the Fed released comments on reasons for maintaining fed funds at 1 percent during the meeting on August 12, 2003.[8] Possible disinflation in future months could be the most important event. Interest rates would remain at low levels even with acceleration of economic growth. Traders in financial markets believed that the Fed addressed comments to bondholders with the objective of preventing an increase in yields. However, the Fed's credibility was eroded by the rise in yields of long-term securities. After the comments by the Fed, yields of shorter-term securities declined, but those of terms of 10 years or longer increased. The 10-year note jumped from 4.39 to 4.45 percent, reflecting concern with future inflation.

Mortgage rates followed the rise in bond yields. Table 1.2 shows mortgage rates. In June 2003, the 30-year fixed mortgage rate declined

to 5.21 percent, the lowest in 40 years. In the 1980s, mortgage rates were consistently at two-digit levels. However, at the beginning of August 2003, the rate jumped to 6.34 percent. Refinancing of mortgages declined by 68 percent in relation to the record in May and mortgage solicitations declined by 36 percent in only three weeks. Exposures to duration in mortgage portfolios had increased significantly. To lower risk, portfolio managers sold long-term financial assets, such as Treasury bonds, causing an even higher increase in yields.[9] Mutual funds of Treasury bonds showed record losses of 5.7 percent in July. The rise in yields occurred during growing needs for financing deficits in the United States and Europe, contributing to further pressure on interest rates.

Merrill Lynch did not expect a decline in prices of American treasuries.[10] Yields rose from a trough of 3.11 percent in June, the lowest in 45 years, to around 4 percent, after testimony by Chairman Greenspan in Congress. Merrill believed that the American economy would continue to grow below its long-term trend with a resulting gap of actual to potential output. Without inflation in the future, there would be no reason for a dramatic rise in yields. Assuming the cost of real capital of 2 percent and inflationary expectations of 1.5–2 percent, yields should settle between 3.5–4 percent. A yield of 4.7 percent with zero inflation corresponds to a yield of 8 percent ten years ago with inflation of 4 percent.

Testimony to Congress by Chairman Greenspan showed sufficient confidence in economic recovery, with high growth in 2004 even with an increase in medium and long-term interest rates. However, the testimony left the impression that the Fed would not increase interest rates until the second half of 2004. Furthermore, the Fed would still be able to use monetary instruments to stimulate the economy by interest rate reduction.

Nevertheless, there were doubts that a rise in yields of medium and long-term securities could prevent effective recovery of economic growth in the United States. While Chairman Greenspan affirmed that the Fed would maintain interest rates at low levels as long as necessary, he discarded the possibility of buying long-term securities to lower their yields. There was doubt about recovery of the stock markets because of the expectation of economic growth coexisting with a "bubble" in fixed income securities.

The Business Cycle Dating Committee of the National Bureau of Economic Research announced the trough in November 2001, ending the recession that began in March of that year.[11] The length of eight months was lower than the average of recessions since World War II. American GDP in mid 2003 stood at 4 percent above its trough in the third quarter of 2001 and 3.3 percent above the peak before the recession. However, there was a loss of 938,000 jobs between November 2001 and mid 2003, while

150,000 people left the workforce frustrated at not finding employment.[12] Slow growth, loss of jobs and increases in productivity characterized the initial phase of recovery. The 2001 recession caused contraction of output of only 0.6 percent, the second lowest in history. In earlier recoveries, output increased at a rate of 5.3 percent on the average but declined at 2.6 percent in contractions.

Core wholesale prices in the United States, excluding energy and food, fell by 0.1 percent in June 2003. This was the fifth consecutive decline in eight months.[13] The Consumer Price Index, CPI, increased by 2.1 percent in the 12 months ending in June, at the annual rate of 2.2 percent in the semester. However, the core index, excluding energy and food, increased by only 1.5 percent, the lowest in 37 years, at an annual rate of 0.9 percent.[14] Costs of health and housing explain most of the increase in prices while commodity prices remained stable or even showed some deflation.

Capacity utilization in the American economy stood at 74.3 percent in mid 2003, the lowest value in 20 years. There was limited pressure on prices and on creation of new productive capacity. Capacity in manufacturing stood at 72.8 percent in June 2003, extremely low by historical standards. However, stocks were depleted, suggesting possible jumps in production in the future.

Chairman Greenspan obtained replies from American businessmen on the differences between the United States and Japan on the threat of deflation: more flexibility in American economic structures, booms of investment in rapidly depreciating goods and not in solid assets such as property, more efficient allocation of capital and more robust, dynamic capital markets relative to the banking system in Japan.[15] However, there was perception of similarities in the United States with Japan in low growth, inflation and interest rates and in the collapse of the stock market. Both Japan and the United States implemented aggressive policies to stimulate the economy. There was a new vision of stimulating the economy at any cost, in contrast with earlier views that structural reforms were more important and that the economy should eliminate inefficiencies without intervention. In the Japanese case, structural reforms would have consolidated a stronger economy in the future. In practice, there was an insistence on reactivating the economy with major distortions such as nonperforming loans.

DeLong argues that the United States is moving toward deflation.[16] In mid 2002, real American GDP was 2 percent below its level in 2000. However, according to his calculations, the technological revolution increased potential output by 7 percent in those two years. Therefore, real American GDP was 3-4 percent below potential, causing downward pressure on prices.

Table 1.3 Forecasts of the Federal Reserve Board (%)

Indicator	2003	2004	2005
Nominal GDP	5.9	6¼–6¾	5¾–6½
Real GDP	4.3	4½–4 ¾	3½–4
PCE, Prices	1.4	1¾ –2	1½–2
Unemployment			
Average IVQ	5.9	5 ¼–5 ½	5–5¼

Source: Board of Governors of the Federal Reserve,
http://www.federalreserve.gov/boarddocs/hh/2004/july/ReportSection1.htm

In its report to Congress, the Federal Reserve Board defended expansive monetary policy because American inflation still showed signs of a decrease while economic growth was incipient.[17] The Fed believed in recovery of the American economy in the second half of 2003 and during 2004, partly because of an expansive monetary policy and an improved financial environment. Fiscal policy should also contribute to recovery.

In mid 2003, Fed forecasts for the American economy discarded deflation. The Fed forecast growth of real GDP by 2½–2¾ percent in 2003 and 3¾–4¾ percent in 2004. Consumer prices would increase by 1–1½ percent in 2003 and 1–1½ percent in 2004. The rate of unemployment would be 5½–6 percent in 2003 and 3¾–4¾ percent in 2004. The Fed based its decision to continue monetary stimulus on the expectation of the higher probability of further disinflation than inflation. The Federal Open Market Committee expressed greater concern with the low probability of significant decline of the rate of inflation.

In February 2004, the Federal Reserve Board concluded that some of the uncertainties in the American economy had disappeared. Monetary and fiscal stimulus accelerated the economy in the second half of 2003. Real GDP grew at an average rate of 6 percent in the final two quarters of 2003 in contrast with 2½ percent from the end of 2001 to mid 2003. However, there was idle capacity, unit cost of labor continued to decline because of increasing productivity and core inflation decreased. Increasing productivity and monetary-fiscal stimulus would maintain economic expansion with low inflation in 2004. However, the fiscal year deficit in 2003 reached $375 billion, much higher than $158 billion in 2002. Congress estimates the deficit at $422 billion, or 3.6 percent of GDP, in 2004, and $348 billion in 2005, or 2.8 percent of GDP.

The new central scenario of the Fed for 2004 forecasts growth in the United States between 4½ and 4¾ percent from the final quarter of 2003 to the final

Table 1.4 Target rates of fed funds

Period	Beginning Rate	Rate After Adjustment	Change in Basis Point
September 21, 2004	–	1.75	50
June 25, 2003	1.0	–	–
May 16, 2000	6.50	–	–
June 25, 2003	–	1.0	550
May 16, 2000	–	6.5	175
November 17, 1998	4.75	–	–
February 1, 1995	5.50	–	–
November 17, 1998	–	4.75	−125
February 1, 1995	6.00	–	300
February 4, 1994	–	–	3.00
February 4, 1994	3.00	–	–
July 13, 1990	–	8.00	−500

Source: Board of Governors of the Federal Reserve, http://www.federalreserve.gov/fomc/fundsrate.htm

quarter of 2004, and 3½–4 percent in 2005.[18] Table 1.3 shows the forecast. Unemployment would fall from 5¾ to 5–5¼ percent. However, the Fed lowered the forecast of growth and increased that of inflation in the report to Congress. It is difficult to reconcile fed funds rate below the higher range of inflation of 2 percent. It appears likely that the Fed could return to a policy of real rate of interest on fed funds. Open market purchases and sales of treasuries and other securities of federal agencies constitute the instrument of implementation of monetary policy by the Federal Reserve Board.[19] Banks lend excess reserves at the fed funds rate. In 1995, the Fed began to announce the target rate of fed funds. Since February 2000, the Federal Open Market Committee (FOMC) has been commonly announcing its evaluation of the risks of attaining its objectives of price stability and sustained economic growth.

The Fed has been very active in monetary policy during the leadership of Chairman Greenspan over the past 15 years. In practice, it has shown behavior rarely found in fixed income traders (see Table 1.4). Some traders prefer to take long positions in the expectation of benefiting from the difference in short and long-term interest rates, remaining outside the market otherwise. Others prefer short positions in expectation of rising interest rates. Few maintain net long exposures and reverse them

to short exposures and vice versa. The Fed under Chairman Greenspan, based on confidence in its forecasts of the economy, lowered fed funds rate by 500 basis points on two occasions and increased them by 300 basis points on another. If inflation threatens again, it is quite likely that the Fed will increase interest rates rapidly, especially from the trough of 1 percent, the lowest in 46 years and negative in real terms.

In a third consecutive year, economists of the survey by the *Wall Street Journal* forecast recovery of the American economy in 2003 with growth at 3.5 percent in the first quarter and 3.8 percent in the second quarter.[20] Fiscal policy and higher corporate profits would be the engine of growth. In the first half of 2004, the economy would grow at an annual rate of 3.8 percent. The trend of long-term growth in the United States is around 3.5 percent. According to that forecast, the yield of the 10-year Treasury note would rise to 3.85 percent. In fact, the yield rose above 4 percent two weeks after the forecast. In September 2004, the same survey of 55 economists by the *Wall Street Journal* showed an estimate of growth of 3.6 percent in the third quarter of 2004 and 4 percent in the fourth.[21] The corresponding forecast for inflation was 3.0 percent for 2004 and 2.3 percent for 2005 with fed funds rate of 2.0 percent by December 2004 and 2.7 percent in mid 2005. Economists continue to revise upward the forecast for interest rates because of strengthening labor markets that cause fears of rate increases. The forecast for the unemployment rate was 5.4 percent on average in 2004 and 5.2 percent in 2005.

Short-term indicators of the American economy show excellent economic conditions.[22] Industrial capacity utilization in August 2004 reached 77.3 percent, with 76.8 percent for manufacturing. However, the level of capacity utilization in the expansion of the 1980s exceeded 80 percent with a low of 70.9 percent in 1982 and a high of 85.2 percent in 1988–89. GDP grew at 7.4 percent in the third quarter of 2003, the highest rate in 20 years, maintaining a rapid pace at 4.2 percent in the final quarter. The economy grew at 4.5 percent in the first quarter of 2004 and at 2.8 percent in the second, raising fears of an interruption of growth. Core American inflation was 1.1 percent in November 2003, the lowest level in 40 years, rising to 3.0 percent in the 12 months ending in March 2004.

The Chairman of the Fed abandoned the dialogue of deflation. However, such fear still influences monetary policy. The sample of nonfarm payrolls showed creation of 308,000 new jobs in March 2004, the highest increase since April 2000. A light recession followed by a limited recovery has not generated the desired increases in new jobs. Naturally, there is a lag in job creation in the business cycle. The Fed and the market closely follow the Index of the Institute of Supply Management (ISM) because of its high correlation with the business cycle. The index reached 59.0 percent in

August 2004, well above the cutoff of 50 below which the economy could be in recession.

The United States fiscal surplus of 2½ percent of GDP in 2002 changed into an estimated deficit of 3.6 percent for 2004. This deficit coincided with a period of easing monetary policy that reduced fed funds rates to their lowest level in 46 years. The IMF believes American deficits contribute to growing output in the world, but fiscal adjustment and tighter monetary policy in the future could weaken the world economy and emerging countries.[23]

The Federal Reserve Board increased the fed funds rate by 25 basis points during three consecutive meetings on June 30, 2004, August 10 and September 21. The FRB increased the target rate of fed funds by another 25 basis points to 1.75 percent at its meeting on September 21, 2004.[24] The assessment of the economy as "moderating," growing at 2.8 percent in the second quarter, changed to an economy that regained "some traction," growing at 3–4 percent. The FRB argued that inflation and expectations eased even after a rise in energy prices. It is likely now that the Fed will pursue a policy of real rate of interest on fed funds.

The outlook for increasing interest rates worldwide solidified during a meeting of central bankers of the G-10 in Basel in mid September 2004.[25] The President of the European Central Bank, Jean-Claude Trichet, stated that oil price increases could have a negative impact on growth but they also reflected higher economic growth. In contrast with some market economists, the ECB raised the forecast of growth for the euro zone to 2.5 percent. The United States is still optimistic that growth would be above the trend rate of 3.5 percent. The governor of the Bank of Japan was encouraged that the Japanese economy was reaching growth momentum. The only exception was the UK, which expects some deceleration in 2005.

The ECB conducts open market operations mainly through main refinancing operations.[26] The principal instrument is reverse transactions: the ECB purchases an asset with an agreement to resell it or provides a loan against assets as collateral. The ECB divides eligible assets into Tier 1, marketable debt instruments, and Tier 2, marketable and nonmarketable assets that are important to national financial and banking systems. The ECB also offers two standing overnight facilities: a marginal lending facility, higher than the variable rate tender, and a deposit facility, lower than the variable rate tender. Thus, the standing facilities provide a "corridor" or bound around the variable rate tender. In March 2004, the ECB decided to lower the term of main refinancing operations from two weeks to one.

Inflation at the 2 percent limit, even with weak economic performance, constrains reduction of interest rates by the ECB that is more aggressive

Table 1.5 Indicators of the European Monetary Union

	GDP Δ%	HICP	Capacity Mfg	Unemployment	USD/€	EMU Deficit
2004 Q2	2.0	2.3	81.0	9.0	1.2046	
2004 Q1	1.3	1.7	80.6	8.9	1.2497	
2003	0.5	2.1	81.0	8.9	1.1312	−2.7
2002	0.9	2.3	81.5	8.4	0.9456	−2.3

Source: European Central Bank, Monthly Bulletin, Sep 2004.

in inflation control.[27] Growth in the euro system has been low, as shown in Table 1.5. In May 2004, the ECB estimated growth of 1.4–2.0 percent in 2004 and 1.7–2.7 percent in 2005. The forecast for consumer prices (HICP) is 1.9–2.3 percent in 2004 and 1.1–2.3 percent in 2005.[28] In September 2004, the ECB estimated GDP growth of 1.6–2.2 percent in 2004 and 1.8–2.8 percent in 2005, with decline in the unemployment rate in 2005. The HICP would increase by 2.1–2.3 percent in 2004 and 1.3–2.3 percent in 2005.[29] Chances for tightening are increasing.

Fiscal policy continued to be a source of conflict between governments and the ECB, which believes that recovery of confidence in the economies of Germany and France depends on increases in taxes and reduction of expenditure.[30] France should exceed its Maastricht Treaty deficit limit of 3 percent of GDP in 2004, for the third consecutive year. This is also the case for Germany. Table 1.6 shows high fiscal deficits in various EMU countries.

The former President of the ECB, Win Duisenberg, insisted on controlling deficits and on reforms of pensions, health and the labor market before stimulating growth in Europe.[31] According to Duisenberg, monetary policy was adequate based on inflation of the euro zone. The ECB would not promote devaluation of the euro to stimulate exports because exchange rate realignment would require reform measures.[32] The ECB believed in perverse expectations in European economies because the population did not respond to a fiscal stimulus that would imply greater fiscal burden in the future. Brittan explains Germany's difficulties by rigidity of labor markets and lack of effective devaluation.[33]

The governor of the Bank of France, Jean-Claude Trichet, became the chief executive of the ECB in November 2003, replacing Duisenberg,

Table 1.6 Fiscal deficits in selected EMU countries

	2003	2002	2001	2000
Germany	3.9	−3.5	−2.8	1.3
France	−4.1	−3.2	−1.5	−1.4
Italy	−2.4	−2.3	−2.6	−0.6
Netherlands	−3.2	−1.9	0	2.2
Portugal	−2.8	−2.7	−4.4	−2.8
Greece	−3.2	−1.4	−1.4	−2.0

Source: European Central Bank

generating doubts about the continuity of tight policy. The greatest threat to a single currency would arise when some important countries experience weak economic conditions over a prolonged period. This would result in divergent fiscal policies, probably opposed to a unified monetary policy.

Inflation in the euro zone reached 2 percent in June 2003, the upper limit of inflation allowed by the ECB. The highest rates were in countries such as Ireland, 3.8 percent, and the lowest in Germany, 0.9 percent.[34] The ECB reduced rates on repurchase agreements by 0.5 percent, to 2 percent, at the beginning of June 2003, based on a concern about the weakness of the economy of the euro zone. The stagnation of the European economy and appreciation of the euro, with adverse impact on exports, mitigate in favor of interest rate reduction. However, inflation around the upper limit of 2 percent restricts policy.[35] Table 1.7 shows the ECB has been more cautious in reducing interest rates than the Fed or the Bank of Japan.

The ECB have left the key interest rate at 2 percent since June 6, 2003.[36] Private forecasts estimate growth in the euro zone of 1.9 percent in 2004. However, 10-year German bonds, for example, showed yields of 4.89 percent in April 2004 in contrast with 4.19 percent for American treasuries of equivalent maturity. Fixed income traders anticipated a reduction in the ECB's rate on repurchase agreements in June 2004 because of the weakness of the European economy.[37] However, official policy by the ECB still consists in maintaining inflation at 2 percent.[38] There is speculation of internal disagreement among the 12 members of the ECB Council, partly because the announcement after the April 2004 meeting suggested reduction of interest rates.[39] However, inflation in the euro zone increased to 2.5 percent in May, from 2 percent in April and 1.7 percent in March. Data begin to show some economic recovery, with growth of GDP of 0.6 percent in the first quarter of 2004 and expectations of further growth during the

Table 1.7 Interest rates of the European Central Bank

Effective Date		Deposit Facility	Variable Rate Tender	Lending Facility
2003	6 Jun	1.00	2.00	3.00
	7 Mar	1.50	2.50	3.50
2002	6 Dec	1.75	2.75	3.75
2001	9 Nov	2.25	3.25	4.25
	18 Sep	2.75	3.75	4.75
	31 Aug	3.25	4.25	5.25
	11 May	3.50	4.50	5.50
2000	6 Oct	3.75	4.75	5.75
	1 Sep	3.50	4.50	5.50
	28 Jun	3.25	4.25	5.25

Source: http://www.ecb.int/stats/monetary/rates/html/index.en.html

rest of the year. Thus, at the meeting of June 3, 2004, the ECB maintained the main refinancing rate at 2 percent. Future interest rate markets began to price an increase in that rate of 25 basis points by the end of 2004.[40]

Ten-year yields of EMU bonds have decreased but not by as much as in Japan and the United States (Table 1.8). In part, this reflects the slower pace of reduction of interest rates by the ECB. It is remarkable that ten-year bonds in Europe and the United States converged to comparable rates although currencies have fluctuated divergently.

Table 1.8 Yields of bonds of the Euro system, USA and Japan

	€ 2y	€ 3y	€ 5y	€ 7y	€ 10y	USA 10y	Japan 10y
2004 Q2	2.56	2.92	3.47	3.84	4.36	4.73	1.77
2004 Q1	2.31	2.63	3.23	3.63	4.15	3.81	1.35
2003	2.49	2.74	3.32	3.74	4.16	4.00	0.99
2002	3.68	3.94	4.35	4.70	4.92	4.60	1.27
2001	4.11	4.23	4.49	4.79	5.03	5.01	1.34

Source: http://www.ecb.int/pub/pdf/mobu/mb200408en.pdf

Table 1.9 Forecasts of the IMF

	GDP Δ%		CPI		Current Account*	
	2004	2005	2004	2005	2004	2005
World	4.6	4.4	–	–	–	–
USA	4.6	3.9	2.3	2.2	−4.2	−4.1
Euro zone	1.7	2.3	1.7	1.6	0.7	0.8
Japan	3.4	1.9	−0.4	−0.1	3.1	3.2
China	8.5	8.0	3.5	3.0	1.6	1.9
Brazil	3.5	3.5	5.9	4.7	−0.4	−0.9
Mexico	3.3	3.3	4.3	3.2	−2.0	−2.2
Argentina	5.5	4.0	6.7	9.5	4.6	1.6

Note: *% of GDP
Source: IMF, World Economic Outlook, April 2004.

The IMF forecasts a world economic growth of 4½ percent in 2004–05. Improvements in the environment include growth of the American economy, increases in financial flows with resulting decline in risk spread and growth of world trade. With the exception of the euro zone, economic growth accelerates throughout the world, as shown by data in Table 1.9, creating favorable conditions for adjustment of emerging markets and return to economic growth. Japan is experiencing in 2004 its best year since 1996. Deflation appears to have been merely a fear, with the exception of Japan. In fact, there is now the reverse fear of inflation in China. However, inflation continues to be moderate in nearly all countries, which creates conditions for recovery of economic activity with relatively stable prices.

Nevertheless, several sources of vulnerability threaten the forecasts. Twin American deficits, fiscal and in the current account, can result in increases in interest rates and appreciation of the dollar that could diminish the pace of world growth. The terrorist attack in Spain generated fears of geopolitical risks that affected economic growth in the past.

The risk of oil price increases constitutes another doubt. The commodity price index increased by 20 percent in dollars during the second half of 2003 and the beginning of 2004. World output growth and depreciation of the dollar caused increases in commodity prices. The price of a barrel of oil increased to $34 in April 2004 and reached a record above $42 in June. Several factors determined oil price increases: higher consumption resulting from world growth, delays in normalizing the supply from Iraq

and devaluation of the dollar. World oil consumption increased by 2.1 percent during 2003, equivalent to 1.6 million barrels of oil per day. China, the United States and emerging Asia, precisely the more dynamic growth areas, increased consumption.

Fear of deflation in Japan, China, Europe and the Federal Reserve Board

Since the beginning of 2001, the Fed reduced the fed funds rate 13 times, for 550 basis points. In the same period, the ECB reduced the repurchase rate 7 times, for 275 basis points. While American GDP grew by 2.9 percent in 2002 and 3.0 percent in 2003, euro zone GDP increased only 0.9 percent in 2002 and 0.5 percent in 2003. It appears that such a discrepancy in growth will prevail in the future.[41] The euro began trading at $1.17 in 1999, devaluing to less than $0.90 and revaluing to $1.17–$1.18. Weighted by foreign trade, the dollar devalued 18.2 percent in 2002 and 8.3 percent in the first half of 2003.[42] In mid 2004, the euro trades around $1.18 relative to the dollar.

There was a decline in consumer prices in Brazil in June 2003, by 0.15 percent, in contrast with inflation in May of 0.61 percent, causing fear of deflation and appeals to reduce interest rates.[43] However, this temporary episode of deflation originated in transitory factors such as appreciation of the currency and decline in prices of energy and food.

Fear of deflation occurred in an environment of significant declines of equity markets, increases in idle capacity and frustration with the pace of global recovery. After World War II, economic policy concentrated on inflation control. However, concern with deflation developed recently after the crisis in Japan of the three Ds: debt, deflation and disaster.

The IMF defines deflation as a sustained decline in prices, measured by the consumer price index or the deflator of national accounts.[44] Deflation is a generalized fall of prices, or negative inflation, while disinflation is a reduction in the rate of inflation, which is still positive. The United States shows a decline of the rate of inflation since the beginning of the 1980s, while the only true recent deflation occurred during the Great Depression in the early 1930s. In the 1990s, the rate of inflation of the United States was 2.1 percent on average in contrast with 7.0 percent in the 1970s and 4.3 percent in the 1980s.[45] Decline in prices of assets characterized past deflation, such as the collapse of the stock market in 1929, coinciding with the failure of banks, decline of demand and prices. Deflation increases the real value of existing debts while reducing the real value of collateral. During the years 1929–33, the implicit deflator of American national accounts showed deflation of 22.5 percent while real GDP fell 33 percent and real wages 45

percent. More than 5000 banks closed because of financial stress.[46]

There are numerous deficiencies in consumer price indexes, which do not permit substitution of goods over time, do not allow for commercial discounts and do not make adjustments for improvements in product quality. There is a common belief that indexes overestimate inflation by 1 percent. Thus, inflation of 1 percent could mean price stability.

The Chairman of the Fed, Alan Greenspan, emphasizes the importance of prices in allocation of resources in a market economy.[47] Measurement of price indexes is essential to the process of formulation and implementation of monetary policy. Errors of measurement of tens of centesimal points may not be significant in an inflation of two digits, but can be very important when inflation is close to zero. Inflation of 1 percent per year with a measurement error of 0.75–1 percent can imply that the economy is close to deflation.

Deflation affects resource allocation in ways similar to inflation, distorting long-term planning, camouflaging true changes of relative prices and creating difficulties for processes that use nominal values such as taxes. While in inflation there is a flight from money into goods, in deflation there is a flight from goods into money. As nominal interest rates approach zero, real interest rates become positive, causing unemployment in labor markets with rigidity of nominal wages.

It is not possible to adjust by deflation contracts with fixed nominal value, such as interest rates, debts and wages. While family and corporate income declines because of deflation, debts contracted earlier in fixed nominal values increase in real terms. Japan has excessive corporate debts and a large volume of loans in default at banks, both increasing in real terms because of deflation.

The Bank of Japan attributes deflation to three factors: the limit of a nominal interest rate of zero that reduces effectiveness of monetary policy, the problem of non-performing loans in banks and the weakness of sentiment on the economy.[48] Financial institutions face a reduction of capital because of decline in market value of their positions in corporate equities and growth of nonperforming loans. Therefore, banks are not willing to take risks because of fear of unexpected losses.

Deflation originating mainly in demand factors can affect effectiveness of economic policy. Because the nominal interest rate has a floor of zero, the demand for money is perfectly elastic at low levels of nominal interests rates.[49] The economy reaches equilibrium by declines in general prices and aggregate output after a downward shock of aggregate demand. A positive real rate of interest aggravates conditions. Increases in the money supply do not have an impact on output making monetary policy ineffective.

Expectations of price decline may accentuate output reduction.

According to Krugman, expectations of deflation can cause downward displacement of aggregate demand.[50] Actual output would decline below potential, generating further deflation. The deflationary spiral would continue with new expectations of continuing deflation, actual output below potential and renewed deflation.

The transmission of deflation could be stronger in a regime of fixed exchange rates such as the Gold Standard.[51] However, in a system of flexible exchange rates, deflation does not transmit easily from country to country. In fact, the Great Depression of the 1930s affected many countries with less impact than in the United States.[52] In the United States, consumer prices fell 24 percent from August 1929 to March 1933. Simultaneously, real GDP declined 30.5 percent.

It is difficult to identify theoretically and measure empirically costs of deflation. However, there appears to be consensus that costs of deflation are higher when it originates in decline of demand. Deflation originating in expansion of supply, such as technological progress, can last less and have neutral consequences. During decline of demand, deflation erodes the value of collateral of debts, creating the possibility of bankruptcies. Debtors probably would not have sufficiently high income to service debt contracted before deflation. Thus, they would have an incentive to surrender collateral, now lower in market value relative to principal of debt. The lower limit of zero of nominal interest rates prevents compensatory monetary policy.

Downward inflexibility of wages can accentuate effects of deflation. Real salaries would increase, reducing corporate profits and generating unemployment, with risks of a deflationary cycle. Historical analysis by the IMF suggests that deflation and its expectation can generalize rapidly, imposing high costs. Thus, economic policy should act preventively, effectively and rapidly. Control of deflation after it begins can be quite difficult, as shown by Japan, in large measure because of the limited effectiveness of monetary policy with nominal interest rates near zero.

The BIS estimated the frequency of effective deflation in the past five decades as the percentage of quarters with inflation of less than 1 percent for various types of price indexes.[53] For basic inflation, the frequency was 3.5 percent in 1960–69, 1.6 percent in 1970–79 and 3.4 percent in 1980–89. However, the frequency increased to 14.7 percent in 1990–99, 31.3 percent in 2000–1 and 17.9 percent in 2002.

The objective of a central bank consists in promoting welfare with price stability. In practice, most central banks focus on price stability with a low, but positive, inflation rate. In an economy with flexible labor and product

markets, slight deflation may not constitute a worse problem than low inflation.

DeLong argues that macroeconomic losses resulting from deflation exceed those of the same magnitude of inflation.[54] The high real rate of interest of deflation depresses investment, reduces demand and increases unemployment. By transferring wealth from debtors to creditors, deflation undermines financial intermediation, causing downward pressure on investment, demand and employment.

Deflation would be more damaging if it followed accumulation of significant volumes of debt with decline of asset prices. There could be a deflationary movement of difficult control in such a case. There would be several rounds of deflation of debts, reductions in collateral in debt contracts and erosion of capital ratios. Bankruptcies of financial institutions could widen deflationary expectations. Product and employment would fall with financial markets losing their function of intermediation.

Forecasts for 2002 of prices and output for countries with deflation–China, Hong Kong, Japan and Taiwan–erred significantly. The forecast of inflation of 2.5 percent for Hong Kong erred in direction with an actual deflation of 3 percent. In all countries, forecasts predicted inflation, with the exception of 0 percent for Japan, with actual deflation of 0.9 percent. Forecast errors ranged from -0.9 percent to 3.2 percentage points. Forecast errors of output ranged from -0.1 percent to 4.3 percentage points.

There can be asymmetry in deflation control relative to inflation. That is, the central bank may reduce interest rates more rapidly during deflation control than during inflation control. The Fed apparently followed such a guideline during rapid reduction of interest rates in 2001, maintenance of low rates in 2002 and further reduction in rates in 2003.

The IMF constructed an index of vulnerability to deflation using general prices, the gap of actual to potential output, indicators of asset markets and monetary-credit indicators. The index suggests an increase in vulnerability to deflation of some countries, but little risk for those that did not experience it. Japan shows the highest vulnerability followed by Hong Kong, Taiwan and Germany. China does not show vulnerability because of the supply nature of deflation. In the Americas, the United States, Brazil and Mexico show low vulnerability.

According to the Fund, the channels of propagation of deflation are:

- *Exchange rate*: floating rates smooth transmission while fixed rates facilitate propagation
- *Asset prices*: deflation distorts calculation of relative returns, frustrating risk taking

- *Expectations*: after initiation of deflation, real wages and interest rates increase
- *Credit*: reduction of collateral in bank loans causes defaults and credit restrictions

Germany posed an important risk of deflation because of its importance in Europe. According to the IMF, the German economy shows price stability with demand constraint of growth. Economic growth, production, income and labor markets weakened significantly in 2001 and 2003. There was deeper decline of asset prices, such as equities and real estate, than in other countries. Banks and insurance companies experienced the worst conditions since World War II. There are no expectations of recovery in investment. In addition, in accordance with the Maastricht Treaty, Germany had to reduce the public deficit in 2003 by 0.75 percent of GDP, contributing to any deflationary pressure.

Japan continues to experience deflation of consumer prices. There are adverse characteristics in the Japanese economy: a large gap of actual versus potential output, high unemployment and record business bankruptcy. The consensus forecast attributed a 70 percent probability to deflation of 0.8 percent in 2003.

Technical research on deflation by the Federal Reserve Board originated in the lowering of the fed funds rate to 1.75 percent. Subsequently, the rate collapsed to 1 percent. There was concern that monetary policy would lose its effectiveness because of the zero lower bound of nominal interest rates. Monetary policy with zero nominal interest rates relates to the liquidity preference of Keynes. The Fed's research concentrated on Japan, the most important, prolonged and recent experience of deflation.[55]

Forecasts of all types–by Japanese monetary authorities, the Federal Reserve Board of the United States, economists' consensus and prices of financial variables–did not predict deflation in Japan. Therefore, after 1995, Japan experienced deflation without any warning from economists in the private or public sectors. Because of concern with inflation until the case of Japan, forecast of deflation, a much less frequent occurrence, defies economists technically. Forecasts of turning points of variables are deficient and rarely anticipate change in direction.

In the first half of the 1990s, Japanese authorities eased monetary policy to reverse the decline of economic activity. However, this policy was insufficient to prevent deflation when nominal interest rates approached zero because the authorities feared repetition of the puncturing of the stock market bubble. The Fed's research concluded that in such a situation monetary policy must be more aggressive to prevent risk of deflation. Simulations by the Fed suggest that a decrease of 200 basis points in

interest rates would have broken the process of deflation.

Effectiveness of monetary policy decreased, although it is very difficult to measure. The Japanese case shows the typical deterioration of balance sheets in deflation, with declines in asset prices eroding debt collateral. Monetary policy is less effective in promoting economic recovery in such an environment.

Similarly, fiscal policy could have been more aggressive in Japan. Naturally, these observations take place after the facts. The Fed did not find evidence that fiscal policy lost effectiveness during deflation. Japan began to experience relief from deflation with an increase in long-term interest rates to 1 percent from a low of 0.4 percent, placement of government securities and recovery in investment.[56] The government opened three fronts against deflation in monetary and exchange rate policy and in nonperforming loans in banks. The Ministry of Finance of Japan purchased dollars to avoid downward pressure of the dollar/yen exchange rate. Devaluation of the yen relative to the euro of around 30 percent could benefit recovery of demand through exports.

The Bank of Japan accelerated the growth of base money, trying to lower interest rates to small and medium companies. It also provided funding for repurchase of bank loans. The government nationalized the Resona bank and new policy measures may occur in bank loans.

Table 1.10 shows economic indicators for Japan. The Tokyo price index fell for a 45th consecutive month in June 2003 settling at 0.4 percent below a year earlier.[57] The index for Japan as a whole fell by the 44th consecutive month in May 2003, 0.4 percent lower than a year earlier. Real expenditures of wage earners fell 1.8 percent in May 2003 relative to a year earlier. Japanese GDP increased at the rate of 5.9 percent in the first quarter of 2004. This rate was lower than 6.4 percent in the final quarter of 2003, but higher than the forecast of 3.6 percent. GDP increased at 4.2 percent in the second quarter of 2004. Exports and investment of companies grew by 15 percent and family expenditures by 3.5 percent. In the fiscal year ending in March 2004, Japan's economy grew by 3.2 percent, well above 1.1 percent a year earlier, the best performance since fiscal year 1996. The Bank of Japan intends to continue monetary policy without changes. It forecasts a continuing moderate fall of consumer prices on a 12-month basis after May 2004. The Bank of Japan believes corporate prices will continue increasing moderately, primarily because of oil price increases. There is continuing milder deflation in 2004.

Various transitory factors of deflation in China included lower prices of commodities, reduction of tariffs by entry into the WTO and controls of administered prices because of social concerns. Long-term factors consisted

Table 1.10 Japan, economic indicators

	GDP Δ%	Unem-ployment	CPI Japan	CPI Tokyo	JGB 10y Yield	USD/ Yen
2004 Q2	4.2	4.6	0	−0.1	1.843	108.96
2004 Q1	5.9	4.7	−0.1	−0.1	1.632	103.95
2003	3.3	5.1	−0.2	−0.4	1.606	106.97
2002	1.1	5.4	−0.6	−0.7	1.262	119.37
2001	−1.2	5.2	−1	−1.3	1.575	131.47
2000	3	4.7	−0.6	−1	1.86	114.9
1999	0.9	4.7	−0.5	−0.6	2.047	102.08
1998	−1	4.3	0.2	0.3	2.509	115.2
1997	0.6	3.5	2	1.8	2.326	129.92
1996	3.6	3.3	0.4	0.1	2.882	115.98
1995	2.4	3.2	−0.3	−0.4	3.356	102.91

Source: http://www.boj.or.jp/en/stat/sk/ske.htm

of gains in productivity resulting from large capital investments, reform of state companies and use of new technology in a process of foreign capital inflow within a framework of higher market orientation. Another major source of deflation originated in idle capacity resulting from inefficient operations by state companies.

The Vice Chairman of the Fed, Roger W. Ferguson, Jr., points out that the United States experiences the most important disinflation in 40 years.[58] The puncturing of the stock market bubble, which reduced wealth of American families by one half, and geopolitical tensions after September 11, 2001, constitute important determinants of this disinflation. Ferguson does not believe in the possibility of deflation in the United States. However, the failure to anticipate deflation in Japan requires concern on the issue.

The Bank of Japan reduced the nominal interest rate in overnight transactions from 8 percent in 1991 to 0.5 percent in 1995, maintaining it at that level until reducing it to zero in 1999. Inflation has remained at practically zero since the beginning of 1995. In March 2001, prices began to decline by 1 percent per year.

Banking fragility is an important problem in Japan. Insufficient capital, non-performing loans and lack of profitability in Japanese banks prevent recovery of growth financed by bank loans. Japanese banks play an important role in the economy and, thus, in the process of transmission

of monetary policy. Fragility of banks accentuates the trap of deflation. Deflation and lack of growth reduced risk taking in an economy with high capital ratios, low remuneration of investment and major economic uncertainty. Risk aversion prevents recovery of investment and growth.

The IMF contends that various pressures for price decline in China affect industrial sectors globally. China is the largest exporter to the United States, sharing in 11 percent of total imports, which is only 1 percent of American consumption. However, while the percentage of Chinese goods in consumption of industrial countries is minute, its future potential could cause deflationary effects. Nevertheless, the IMF concludes that China does not transmit deflation to the rest of the world. In mid 2002, the consumer price index of Hong Kong was 12 percent below its level four years earlier and the implicit deflator 15 percent lower.[59]

Monetary policy affects bank reserves to determine short-term interest rates. However, reduction of short-term rates does not directly influence long-term rates. In deflation, reduction of long-term rates could influence recovery of investment. The central bank can repurchase long-term securities with the objective of reducing their yields. In the United States, the Fed tried to attain this effect in 2001 by eliminating the issue of 30-year bonds. Pension funds and other long-term investments require those bonds to match their assets and liabilities. Financial institutions engaged in arbitrage by buying mortgages and securities with high duration that caused declines in long-term rates. Mortgage rates declined continuously, causing a wave of refinancing that injected more money in consumer budgets than tax reductions. The Fed's objective was to reduce the slope of the yield curve of treasuries to reduce capital costs to companies. Lack of investment was more important than consumption as a factor in the recession of 2001.

Professor Bernanke underscores balance sheet effects resulting from deflation.[60] When the nominal interest rate approaches zero, the expected rate of deflation is the real interest rate. During the Great Depression, American prices declined at the rate of 10 percent per year between 1930 and 1933. Deflation caused immense cost to debtors that had to repay in dollars of much higher purchasing power, the opposite of inflation. Therefore, real rates of interest became much higher because of deflationary expectations. The cost of money is prohibitive in a period of pronounced deflation. For example, interest rates of 20 percent with expected inflation of 10 percent imply real interest rates of 9 percent (1.2/1.1). Nominal interest rates of 2 percent with expected deflation of 1 percent imply real interest rates of 3 percent (1.02/0.99). Deflation originating in significant decline of demand results in output decline, unemployment and major financial stress.

Bernanke departs from the general assumption that authorities must use

monetary/fiscal policies aggressively to prevent deflation by maintaining adequate aggregate expenditures. Central banks have three measures of prevention at their disposal. First, monetary authorities must fix inflation targets above 0 percent or perfect stability, typically 1–3 percent in industrial countries. Second, central banks must use their powers of supervision and regulation to maintain a banking system that is adequately capitalized and capable of managing risks. Finally, central banks must act aggressively and decisively, to reduce interest rates whenever there is a threat of deflation.

According to Bernanke, monetary policy could still be effective during deflation. The central bank always has means to increase base money to reduce the price of currency in relation to goods, causing, eventually, an increase in aggregate demand. Holders of financial wealth are indifferent between holding money and Treasury bills at low interest. Because of high real rates, the economy can continue in deflation or recession. However, Bernanke argues that sufficient issues of currency could always reverse deflation.

If the fed funds rate reached zero, the central bank would still have instruments to reverse deflation. As in the case of Japan, the monetary authority can maintain short-term interest rates at zero percent. Long-term interest rates are average actual and expected short-term rates. The zero percent interest would force a decline of long-term rates, reactivating the economy and breaking deflation. Another possibility would be to fix limits on long-term rates by purchases of government securities by the central bank. If successful, such a policy would lower long-term rates of mortgages and government bonds.

Short-term loans to banks at zero nominal interest would be another alternative of central bank policy. Collateral in those loans could consist of bonds and corporate debt, commercial paper, bank loans and mortgages. An aggressive policy would reduce risk spreads of assets used as collateral and, eventually, cost of capital to banks and the nonfinancial private sector.

Bernanke also refers to the example of breaking deflation in the United States during the Great Depression. Gold purchases by the Roosevelt administration caused devaluation of 40 percent of the dollar in relation to gold. Consumer prices fell 10.3 percent in 1932 and 5.1 percent in 1933 but increased 3.4 percent in 1934 together with economic recovery. Thus, the central bank can use exchange rate policy to reverse deflation.

Fiscal policy can work in coordination with monetary policy. Bernanke mentions the example of a broad reduction of taxes financed by issue of money to prevent an increase in interest rates. Other authors would

prefer government expenditures to prevent taxpayers saving part of the tax reduction.

Professor Bernanke declared more recently that the Fed must be willing to lower interest rates to zero if it were necessary and even adopt an inflation target.[61] Even with economic recovery, the core index of personal consumer expenditures could fall to 0.7 percent. Consumer prices, excluding food and energy, fell to 1.5 percent per year in June 2003 in contrast with 2.3 percent a year earlier. Bernanke believes that the Fed should not tolerate further decline of inflation, maintaining inflation above the interval of 0–1 percent. At this low inflation, the Fed requires a monetary policy of the same level of stimulus required to reverse deflation. The economy would continue to lose jobs, with idle capacity. In two years, the Fed reduced the fed funds rate from 5.5 percent per year to 1 percent. In case of failure to maintain inflation above 1 percent, the Fed could use nontraditional instruments. An inflation target could be a policy alternative. Other policies could consist of reduction of interest rates by purchases of government bonds, an announced program of supply of excess bank reserves, rediscount loans to banks at very low interest rates and options to borrow from the Fed at low rates.

According to Vito Tanzi, former director of fiscal affairs of the IMF, abandoning fiscal prudence could create future disasters.[62] Tanzi recalled the warning by Rudi Dornbusch that uncontrolled increase of the fiscal deficit could take Japan to disaster. The Japanese deficit reached 7.5 percent of GDP in 2002 and public debt 158 percent. The major countries of the EMU, France and Germany, surpassed their deficit limits of 3 percent, which is also possible for Italy in 2004. The United States forecast a surplus of 3 percent in 2003, but the deficit may reach close to 4 percent in 2003 and 2004. Almost all emerging countries are suffering fiscal constraints. Tanzi recalls the asymmetry of fiscal policy: reducing taxes and increasing expenditures are easier than the opposite. There is a high future burden in abandoning fiscal prudence, extended to all types of countries.

Feldstein warns about the risks of an active vigorous fiscal policy of deflation control when inflation falls to low levels, such as 1 percent in the United States: undesirable rise of inflation and increases in prices of financial assets and real estate.[63] It is quite difficult to specify when authorities should implement such a policy. In relation to the Fed's research, there is doubt how to determine when economic conditions are similar to those of Japan. However, fiscal policy could be appropriate to deal with more prolonged recession, such as that of Japan. In contrast with fiscal deficits causing a dangerous increase of internal debt, structural and tax policies benefiting investment could be more effective and with less risk of future problems.

In testimony to the United States Senate on April 20, 2004, the Chairman of the Fed, Alan Greenspan, stated that American companies were slowly regaining the ability to raise prices, dispelling the risk of deflation.[64] Investors began to price increases in fed funds rates in 2004, causing increases in 10-year Treasury notes to 4.47 percent. There is expectation that the Fed is more inclined to prevent inflation with increases in interest rates than to maintain fed funds rates at 1 percent, the lowest level in 46 years.

Argentinean default and economic and political crisis

Argentina is extremely important for a number of reasons. According to Anne O. Krueger, the IMF's First Deputy Managing Director, Argentina successfully implemented the Convertibility Plan in 1991 with a Currency Board that lowered inflation from four digits to nil and then even deflation.[65] Simultaneously, the country grew at 6 percent per year on average between 1990 and 1997, the best performance in Latin America in that period. Krueger dismisses the impacts of the Tequila and Asian crises on Argentina as being minor. Growth between 1993 and 1998 was 4–5 percent on average, still a remarkable performance relative to Argentina's history.

According to Krueger, Argentina was an early example of implementing reforms by the IFIs derived from Mexican and Asian crises. Argentina strengthened its banking system before and after the Mexican crisis, with foreign ownership of banks and enhanced supervision and regulation. Argentina agreed to assessment of standards, codes and policy transparency as early as 1999. It is fair to say that the country was behaving adequately within the new architecture of the international financial system.

As Economic Counselor of the IMF and chief of its Research Department during the 1990s, Michael Mussa underscores the importance of Argentina in evaluating the IMF.[66] The IMF and Argentina were closely involved during the 1990s. The country had an IMF program almost continuously in that decade. In addition, in contrast with earlier crises–Mexico 1994–95, Indonesia, South Korea and Thailand 1997–98 and Brazil 1998–99–the Fund engaged in a program after the Argentinean crisis started.

Crisis prevention, in the form of IMF surveillance, failed in the case of Argentina, which is especially important because of the large Argentinean presence in emerging market financing. In addition, crisis resolution also failed in that repeated efforts by the IMF and Argentinean authorities did not prevent the crisis from becoming a deep political and economic disaster.

The Argentinean crisis occurred after a major effort by the G-7 and the IFIs to prevent and anticipate repetition of crises similar to the Mexican-

Argentinean crisis 1994–95, Asian crisis 1997–98, and Russian–Brazilian–LTCM crisis 1998–99. By the time of the Argentinean crisis beginning in 2000, the IFIs had implemented most of the apparatus of surveillance, crisis resolution, assessment of standards and codes, data dissemination and transparency in monetary, fiscal and financial policies known as strengthening the New Architecture of the International Financial System. Argentina was an example of emerging market programs of both IFIs and private sector financial institutions. Moreover, failure occurred in the areas of enhanced competence of the IMF: monetary, fiscal and exchange rate policy.

Krueger attributes problems in Argentina to effects of a "destructive cocktail." Fiscal policy was weak. Prices, such as wages, were not flexible enough. High inflation and a stronger dollar overvalued the currency. The country needed other sources of adjustment because of the fixed exchange rate.

Argentina's fiscal problem originated in various factors: lack of discipline at the provincial level and excessive public sector employment–12.5 percent of the labor force compared with 7 percent in Brazil–remunerated at 45 percent above private sector labor costs. Because of its deficits, Argentina's public debt increased from 33 percent of GDP in 1990 to 41 percent in 1998. Krueger recalls that the Maastricht criterion stipulated a debt ceiling of 60 percent of GDP. However, emerging markets such as Argentina cannot support high levels of debt because of several factors: inability to raise tax revenue, vulnerability to lack of confidence and high foreign currency share in total debt with low export/GDP ratio. Krueger points out a shocking fact: Argentina's foreign debt was five times higher than revenue from exports. Krueger's important lesson is that the IMF was not too vigilant on fiscal restraint but rather complacent, especially during the boom years.

Mussa argues that the Fund committed two critical errors in Argentina. The IMF should have insisted on much stronger fiscal discipline at an earlier date. In addition, it should have provided more finance in the summer of 2001 when default became a true possibility. Mussa finds that the Fund was correct in doubting, as Mussa did internally at the IMF, the durability of the hard fix of the currency at the beginning of the Convertibility Plan. He also argues that the Fund was correct in supporting the hard fix after its implementation and in providing large financial support in December 2000, approved in early 2001.

Mussa identifies the origins of the deteriorating fiscal deficit during 1993–98 when Argentina's economy performed well in terms of an excellent rate of economic growth and no inflation. Moreover, the government received substantial revenues from privatization. However, in those years the ratio

of debt to GDP increased by 12 percentage points. Evidently, this was not fiscal discipline and would eventually lead to problems. Mussa points out that Argentina has difficulty in raising government revenue above 20 percent of GDP. Financing government with foreign debt caused loss of credibility because of the high ratio of debt to exports. While GDP rose by 25 percent in 1992–98, foreign debt increased from $62 billion to $142 billion. Argentina's foreign debt was not sustainable. Mussa argues that the rate of increase of debt to GDP is as important as its level. The debt to GDP ratio grew rapidly before the crisis. Argentina was highly vulnerable to foreign crises because of its hard fix. In addition, vulnerability increased during crises because of high external financing.

Mussa observes that it was evident by the end of 2000 that Argentina could not comply with the fiscal targets of its program. Perhaps at that juncture, the Fund should have withdrawn support. However, the consequences would have been financial and economic chaos and probably institutional change, all of which eventually happened. Late in 2000, it was clear that some sort of debt restructuring would occur in Argentina. The Fund opted to prevent default. The Argentinean bailout package consisted of $40 billion, of which $14 billion came from the IMF, $5 billion from the Inter-American Development Bank, $1 billion from the government of Spain and the remaining $20 billion, in accordance with the G-7 doctrine in Prague, from private sector involvement (PSI).

Mussa provides a simple condition of fiscal sustainability in Argentina.[67] Consider the following inequality:

$$b \geq d(r - g) \tag{1.1}$$

where b is the ratio of the primary budget surplus to GDP, d the ratio of debt to GDP, r the interest rate on government debt and g the growth rate of the economy. In words, the ratio of primary surplus to GDP should be higher than or equal to the ratio of debt to GDP times the difference between the rate of interest on foreign debt and growth rate of the economy. That is, the primary surplus should be large enough relative to GDP to prevent an increase in the debt to GDP ratio resulting from the interest rate on debt in excess of growth of GDP. In Argentina in 2000, d was 50 percent. With interest rates of the comparable United States Treasury at 5.5 percent in late 2000, and Argentinean risk of 550 basis points above United States treasuries, r was around 11 percent. Argentina did not have inflation. Fiscal sustainability would have required a primary surplus of at least 3.5 percent

Table 1.11 Indicators for Argentina

Year	Real GDP Δ%	Inflation %	Current Acct.		Foreign Debt		Reserves
			$B	% GDP	$B	% GDP	$B
1991	10.5	84.0	−0.4	−0.2	62.3	32.9	6.0
1992	10.3	17.5	−6.5	−2.8	62.7	27.4	10.0
1993	6.3	7.4	−8.0	−3.4	72.2	30.5	13.8
1994	5.8	3.9	−11.1	−4.3	85.7	33.3	14.3
1995	−2.8	1.6	−5.2	−2.0	98.5	38.2	14.3
1996	5.5	0.1	−6.8	−2.5	109.8	40.3	18.1
1997	8.1	0.3	−12.2	−4.2	124.9	42.7	22.3
1998	3.8	0.7	−14.5	−4.9	141.4	47.3	24.8
1999	−3.4	−1.8	−11.9	−4.2	144.5	51.0	26.3
2000	−0.8	−0.7	−8.8	−3.1	146.3	51.5	25.1
2001	−4.4	−1.5	−3.9	−1.4	140.3	52.2	14.9
2002	−10.9	41.0	9.1	8.5	136.6	128.2	10.5
2003	8.8	3.7	7.8	6.1		139.6	14.1

Source: International Monetary Fund (2003d); Banco Central de la Republica Argentina, http://www.bcra.gov.ar

of GDP, or 50 percent of the difference between the rate on the public debt of 11 percent and the growth rate of the economy of 4 percent. That is,

$$b \geq 0.5(11\% - 4\%) = 3.5\%$$

With Argentina in recession, extracting a primary surplus of 3.5 percent of GDP would have been difficult. With Argentinean risk spread of 1000 basis points, interest rates on the public debt of 5.5 percent, r would be 15.5 percent. At those high rates, the economy would grow at zero. Thus, the primary surplus would have to be 7.75 percent of GDP, or 50 percent of the rate on the foreign debt of 15.5 percent. Argentina could not obtain such a primary surplus politically or economically. The rise in Argentinean risk spreads over treasuries in late 2000 suggested fiscal difficulties, according to this simplified calculation.

Krueger focuses on the difficult issue of when to exit an exchange rate anchor, concluding that earlier exit would have been desirable, after

inflation disappeared. Inflexibility of wages and prices caused loss of competitiveness and inferior export growth performance relative to the rest of Latin America. Exit should have occurred after recovering credibility of money, in about three years. According to Krueger, the last chance for exit was after recovery from the Mexican crisis in 1996.

Argentina's conditions deteriorated sharply after the Brazilian and Russian crises in 1998–99, with devaluation of Brazil's real coinciding with growing debt and worsening fiscal deficit. Table 1.11 shows indicators for the Argentinean economy 1999–2002. Argentina's foreign financing reached $20 billion, excessive for the risk appetite for its name in emerging market financing.

A key issue is whether the Fund should have lent to Argentina under those conditions in 2000. The rescue package was $20 billion, of which $14 billion came from the IMF. Krueger justifies it, without having been involved in its decision, based on the IMF equality of programs to other countries at the time. In Krueger's analysis, Argentina ran out of policy options to deal with the problem and maintain convertibility at the fixed parity. Nevertheless, the Fund disbursed fresh cash, in vain.

In the first quarter of 2002, Argentina's economy worsened significantly. GDP declined by 15 percent in the first quarter relative to a year earlier. Wholesale inflation increased by 100 percent in the first six months of 2002 and consumer inflation by 30 percent. The currency increased by 26 percent in the 12 months ending in June 2002 in contrast with a decrease of 27 percent a year earlier. Argentina's currency devalued sharply. Formal external default coincided with widespread domestic default. The banking system virtually closed after December 2001. Argentina plunged in an institutional crisis with three presidents in ten days.

In retrospect, the IMF identifies a series of determinants of the Argentine crisis 2001–2:[68]

- Weak fiscal policy with large public deficits
- Exchange rate rigidity of the currency board
- Volatility of capital flows to emerging countries
- Slow pace of structural reform that prevented adjustment of wages and prices
- Institutional and political factors that prevented adjustment policies
- Appreciation of the dollar, the Russian crisis, Long Term Capital Management, devaluation of Brazil's real and slowing world economy
- Impact of slow growth and high interest rates on the expectation of the debt to GDP ratio
- Weakening prudence and supervision of the banking system

An interesting aspect of Argentina's episode is the effort to avoid default,

as narrated by Domingo Cavallo in an analysis of his own economic policies.[69] There was a threat of default already in late 2000, with the drain of bank deposits close to 1 billion pesos monthly in October and November. The IMF, World Bank and Inter-American Development Bank provided financial "Armour" (*Blindaje*) to Argentina for disbursement in 2001 and 2002 with which to meet fiscal deficits of $6.5 billion for the national government and $2 billion for the provinces. The currency board mechanism prevented financing in pesos. As part of private sector involvement (PSI) banks would have to roll over provincial debt, finance their deficits and roll over $10 billion of Treasury notes maturing in 2001. Argentina also required new funds of $7 billion to pay capital amortization on debt.

Blindaje arrested the drain of deposits of the banking system until early in 2001. The threat of default was suggested by the drain of $5.5 billion from the banks in March, and the beginning of an institutional crisis with cabinet resignations preceded the appointment of Domingo Cavallo as Minister of Economy in March. Cavallo correctly judged that default would be extremely adverse to Argentina. He tried to avoid default because it would lead to devaluation. There were important reasons to avoid default. Many savers providing debt funding were Argentinean, who would run for the exits on news of default. Private companies would default, resulting in weakening economic activity. Foreign creditors would restrain from providing new money to Argentina. According to Cavallo, the most important effect would have been depreciation of every asset in Argentina after default, which would have led irremediably to devaluation. An important aspect, covered in Chapter 5, is that expectation of depreciation of nontradable goods leads to default of bank debt. Collateral in those debts is in nontradable goods. Collateral value declines below the present value of debt encouraging default.

An important threat of *Blindaje*, and thus of default, was the eroding fiscal situation of Argentina. Cavallo's instrument consisted principally of a bank debit or financial transaction tax, similar to those used in other countries.[70] While there are strong economic reasons to criticize such a tax, Argentina was in a truly desperate condition. Obtaining political support constituted an important difficulty in Argentina coinciding frequently with a deteriorating economy.

A "competitiveness" effort to recover exports without devaluation complemented fiscal efforts to avoid default. Many of the measures, including those within Mercosul and dual dollar/euro parity, constituted effective devaluation. Cavallo found significant difficulty in backing debt with collateral of taxes, especially at the provincial level.

Argentina engaged in a Global Bond Exchange, or *Megacanje*, which also

constituted an effort to avoid refinancing, perhaps not even available at very high interest rates. In practice, Argentina engaged in a "voluntary" debt swap operation. Politicians and technicians of every type and political affiliation contributed to the roadshow for the *Megacanje*, which swapped $26.2 billion of Global 08, Global 18 and Global 31 bonds with bonds pledging tax revenue as collateral. Argentina reverted the drain on banking with an initial strong revenue from new tax measures. Bank deposits increased by 1.5 billion pesos in April, May and June 2001 combined. In April 2001, Cavallo complained to a group of Brazilian businessmen that markets were myopic, that he would have to provide them lenses and that anybody speculating against Argentina's currency would "lose a lot of money." Meanwhile, the fiscal deficit of 3.0 billion pesos in the first quarter declined to 2.2 billion in the second.

However, the bank drain rose to 5.3 billion pesos in July. Provincial governments declared they needed 3 billion pesos of extra financing. Cavallo argues that at that time Argentina realized PSI was insufficient to support *Blindaje*. Argentina anticipated for the second half of 2002, instead of 2003, the zero deficit provision of the Law of Fiscal Responsibility. This was an effort to regain credibility on the critical source of funding need, the fiscal deficit.

New negotiations began with the Fund to avert loss of reserves from the central bank and the financial system. Argentina bargained with the Fund, offering a plan of zero deficit and restructuring of national and provincial debt, reducing interest payments from $14 billion in 2001 to $7 billion in 2002. The IMF provided another loan of $8 billion, $5 billion of which was paid on September 10, 2001, and the remainder between November 2001 and March 2002. Proceeds of the loan would support reserve levels at the central bank. However, the drain of bank deposits again exceeded two billion pesos per month in November and December 2001. By then institutional deterioration combined with economic difficulties to cause stress in the political and economic conditions in Argentina.

By the end of November 2001, the deposit drain on Argentinean banks rose to nearly 1 billion pesos a day. Argentina only had $15 billion of reserves, enough only to back the currency in circulation. The government closed banks and imposed a ceiling on bank withdrawals of $250 per week. Chaos and riots developed over the country, resulting in the death of 30 people. Cavallo resigned and President de la Rua resigned shortly after. Argentina had three presidents in a matter of ten days before the selection of Eduardo Duhalde, who was placed second, after de La Rua, in the election two years earlier.

Krueger points to four factors of failure in Argentina's economic policy:

weak fiscal restraint during the upswing, unfavorable external environment and shocks, overvaluation because of inflexibility of internal prices and wages and unsustainable debt. Argentina's economy experienced jointly weak economy, overvaluation and excessive debt

Krueger finds five lessons on crisis prevention and resolution from Argentina's experience:

- Debt sustainability and dynamics require careful calibration.
- Currency boards are not durable, especially if fiscal and structural policies are weak.
- Access to foreign debt must be judicious, especially by the public sector
- Exit from unsustainable debt should be easier, with a mechanism of smooth debt restructuring
- Dialogue with countries on economic policy should be wider and strong during periods preceding actual crises

Fund programs require ownership by countries. However, the economic program must be sound and effective in itself. Ownership of an unsound program would cause difficulties.

Feldstein is concerned that the economic crisis of Argentina may obscure reforms of greater market efficiency.[71] He attributes the causes of Argentina's debacle to the hard fix of the exchange rate and to loose fiscal policy. Loss of competitiveness over a decade of hard fix eroded the ability to obtain external revenue, with $30 billion of external financing maturing in 2002.

Feldstein's analysis shows the difficulties in exiting hard fixes. Reasons for not devaluing earlier include: fear of return of inflation, large dollar debts accumulated during fixed rates and expectation that one day the dollar would devalue, improving Argentina's competitiveness relative to Europe and other markets. There is an important lesson here. The fixed exchange rate in currency board and dollarization may correspond to a dollar rate versus other currencies that is sound for the issuer of dollars, the United States, but may result in deficit for the country fixing to the dollar. Argentina waited forever for dollar devaluation that would increase its competitiveness versus Europe.

Feldstein concludes that a hard fix eventually overvalues the currency and leads to a currency crisis. In addition, Argentina shows the dangers of excessive borrowing abroad. Finally, opening to trade and capital movements is beneficial to a country, but not under circumstances of unsound exchange rate policy and excessive foreign debt.

Professor Joseph Stiglitz disagrees with the orthodox view of adjustment of emerging countries.[72] He advocates a new form of managing international financial crises. In his view, Argentina deserves part of the blame. However,

even if the country had implemented all the advice of the IMF, there is no evidence that it would have avoided the crisis or even limited its dimensions. Even complying with the IFIs, Argentina would not recover foreign private credit. Policy should have reactivated the economy by providing credit to companies to create demand for Argentinean products. Professor Stiglitz argues that Mexico's recovery from the crisis in 1994 occurred through credit to import Mexican products in the United States and not because of the IMF program.

An independent report by distinguished international experts on Argentina found major challenges: depressed output and employment, breakdown of the banking system, interruption of government debt service and circulating quasi-currencies.[73] Argentina has an interim government and lack of confidence in the financial system.

The panel included Hans Tietmeyer, Luis Angel Rojo, John Crow and Andrew Crockett. It analyzed implementing a monetary anchor and independence of the central bank. It considered a monetary anchor as a reference that would recover confidence in money. According to the panel, such an anchor would be necessary but not sufficient to attain price stability, in turn necessary for banking to recover. It identified other requirements for success, such as: respect for the law and contracts, sound fiscal restraint, a central bank that can carry out its tasks and a belief in society that monetary integrity is indispensable.

The panel considered a domestic financial system based on the peso that would attain permanent reduction in inflation. Maintaining stability requires avoiding increases in money resulting from fiscal deficit and frozen assets under *El Corralito* ("Little Corral")-that limited withdrawals of demand deposits to 2000 pesos per month, affecting $6 billion – and *El Corralón* ("Big Corral")-that froze dollar-denominated deposits of $40 billion. Success would require slow release of frozen assets within a sound monetary framework in which monetary authorities drain the excess supply of liquidity to avoid price increases. A traditional liquidity drain by reserve sales is not an option because of the low level of reserves, which the country needs for recovery of external confidence.

The panel agreed with implementing inflation targeting in Argentina similar to the success in Chile, Mexico and Brazil. However, it outlined certain preconditions: higher demand for claims in pesos, sustained fiscal adjustment and a strong central bank. Institutional reform requires a central bank that can act in its role of restoring confidence in financial markets. The panel found recovery of the banking system to be indispensable, including clear recognition of property rights of banks. Mussa ponders that recapitalization of Argentinean banks may require $10–15 billion.

The IMF has been extending forward repayment of the supplemental reserve facility (SRF).[74] IMF directors found that Argentina attained improving economic and financial stability during the second half of 2002 primarily because of fiscal restraint.[75] Continuing improvement would require political support for reforms, adequate fiscal adjustment, confidence in banking, debt restructuring and trade liberalization. The IMF released the report on Article IV consultation.[76] The Fund approved release of funds according to the stand-by agreement in March 2002, $307 million, and June 2002, $320 million.[77]

According to IMF Managing Director Horst Köhler, Argentina experienced its worst recession since World War II.[78] He suggested establishing a monetary anchor and implementing policies and reform of institutions to eliminate uncertainties causing bank deposit flight. Argentina requires agreements with its provinces to restrain fiscal deficit. Another important key to recovery is the restructuring of banks. The Fund's approach was a very short-term stabilization agreement with the Duhalde administration until August 2003 and then a more permanent arrangement with the next administration.[79] Argentina scheduled elections for April 2003 and a change in the executive in May. The IMF bridge program did not provide new money, simply avoiding default of Argentina with the IFIs.

The Argentine crisis affected GDP growth: −3.4 percent in 1999, −0.8 percent in 2000, −4.4 percent in 2001 and −11 percent in 2002, for a cumulative decline of 18 percent. The economy jumped from deflation of 1.1 percent in 2000 to inflation by the implicit deflator of 41.7 percent in 2001 and 43.3 percent in 2002. The Argentinean drama illustrates the profound effects of an international financial crisis.

In July 2003, the Executive Board of the IMF completed its third evaluation of the Stand-By to Argentina approved on January 24, 2003 to the value of SDR2.17 billion, or $3.04 billion.[80] With the favorable vote, Argentina received SDR749 billion, or $1.05 billion. The IMF negotiated a new medium-term agreement with the new administration of President Néstor Kirchner that took office in May 2003.[81] During a visit to Argentina, the IMF's Managing Director Horst Köhler emphasized three areas on which the country should focus to recover the confidence of investors:

- Fiscal system
- Internal capital market for intermediation between savers and investors
- Implementation of legal and institutional reforms

There were signs of normalization of financial markets in Argentina.[82] Banks had losses of $2.39 billion in the first quarter of 2003 and $13.2 billion in 2002. However, some banks were anticipating limited profits by the end

of 2003 and beginning of 2004. Argentinean GDP in the first quarter of 2003 grew by 5.4 percent, the first expansion since 1998.[83]

There were still frictions between Argentina, the markets and the IMF. Without sound reasons, Argentina implemented controls on foreign capital.[84] During a visit of an IMF mission, the Argentinean authorities again created an environment of stress.[85] Economy Minister Roberto Lavagna warned that Argentina would not be able to offer private creditors a proposal for debt restructuring without a medium-term agreement with the IMF.[86] The stand-by agreement allowed only rollover of $6.8 billion until August 2003. However, another $3 billion of debt to the IFIs would be due in September. Argentina courted default with the international financial community. Including due interest and principal, Argentina's default with the private sector reached close to $100 billion by year end 2003. This default affected 600,000 small investors in Europe and Asia, some of whom had invested their lifetime savings in that country. Minister Lavagna warned that restructuring of debt depends on rollover of multilateral credit. There was a complex political climate with elections for Congress in September and 12 elections for governors in 2003.

On September 20, 2003, the Executive Board of the Fund approved a stand-by agreement with Argentina of SDR8.98 billion, or $12.55 billion. The Board also approved an extension of the expectation of payment by Argentina of approximately $2.43 billion.[87] The IMF program consists of three aspects:

- Fiscal adjustment in the medium term to attain objectives of growth, employment and social values while normalizing relations with creditors to ensure sustainability of debt. Primary surplus should attain 3 percent of GDP
- Inflation should be less than 10 percent, with strengthening banking in the form of an autonomous central bank and inflation targeting by year end 2004
- Institutional reform restructuring company debt, public utilities and improving investment environment

Argentina and the Fund reached an agreement in a letter of intent on March 10, 2004.[88] The new agreement permits Argentina to receive SDR2.1 billion, approximately $3.1 billion. According to Anne Krueger, Argentina recovered by monetary and fiscal discipline, lower interest rates and private investment. The country complied fully with the agreement. Argentina predicts growth of 5.5 percent in 2004, one-digit inflation and a strengthening central bank. In addition, Argentina will continue strengthening the banking system and reforming public utilities. The government intends to reach a cooperative agreement with foreign creditors, using investment

banks to ensure meaningful negotiations. Official statistics show growth of GDP of 8.8 percent in 2003.[89]

The former governor of the central bank of Argentina, Alfonso Prat-Gay, analyzed how the country resolved its internal financial crisis.[90] At the beginning of 2003, three-quarters of bank deposits were frozen, there was no feasible plan to recapitalize the banks or prudential rules in banking and the largest borrower, the Argentine government, was in arrears with the World Bank. However, 20 months later, Argentine banks have ample liquidity, shareholders are contributing to the capital base, nonperforming loans are decreasing and credit to the private sector is growing at an annual rate of 40 percent.

Argentina chose not to shock banking because it had already initiated downsizing during the 1994–95 Tequila crisis and proceeded in the crunch of 1998–2002. Prat-Gay recalls that Mexico had $50 billion of foreign available assistance in 1994–95 while Argentina made payments of $8 billion to the IFIs from early 2002. The central bank focused on increasing credit to the private sector–only 8 percent of GDP at the beginning of the crisis–by implementing a set of rules to promote banks. Relaxation of prudential rules allowed banks to recapitalize with retained earnings, providing banks with time to deal with crisis losses. Banks could assess borrowers on their future cash flows and not on crisis experience. Lower interest rates and strong economic recovery permitted recovery of the financial system. High fiscal surpluses helped to revalue the debt of the biggest borrower, the government. The improved fiscal situation of state governments permitted recovery of the provincial banks.

The Executive Board of the Fund reviewed the agreement with Argentina on March 22, 2004, releasing SDR 2.1 billion, or $3.1 billion.[91] Anne Krueger emphasized three aspects of the official plan:

- Advice by investment banks to propose and market the offer of debt exchange
- Constructive negotiations with all representatives of creditor groups
- Formulation of an offer acceptable to creditors that results in sustainable debt

Argentina appointed three foreign investment banks and three national ones. It invited 25 representatives of creditor groups to Buenos Aires for meetings between March 24 and April 16, 2004. The groups included the Global Committee for Argentine Bondholders (GCAB), the Association of Savers of the Argentine Republic and the Committee of Investors in Argentine Bonds. Argentinean success in negotiating debt restructuring is essential to continuing support by the international official community. However, Argentina's initial negotiation with creditors suggests continuing

confrontation.[92] On one side, Argentinean authorities do not seem to be interested in improving the Dubai offer. On the other, creditors insist on conditions that are more favorable.

The consequences of default by Argentina with the IFIs are significant.[93] Default would trigger distribution of the burden to protect IMF income, with lower payment of interest to suppliers of funds and higher interest rates to borrowers. Argentina could not use resources of the Fund until becoming current in its debt. Gradually, the IMF could expel Argentina in 24 months.

The proposal of Argentina in Dubai, in September 2003, consisted of payment of 25 cents per dollar of the nominal value of defaulted securities.[94] President Kirchner argued that Argentina would not pay if it would cause a higher number of Argentineans to go without education, health, shelter and a decent job. Investors argued that Argentina was actually offering 10 cents per dollar when considering accrued interest, maturities and interest of proposed new bonds in net present value calculations. Debtor representatives complain of the lack of a serious effort to restructure debt. They argue that meetings with Argentina consist only of "road shows," without true intentions of making progress in negotiation.

In May 2004, Argentina offered to include $23 billion in unpaid interest accrued since default in December 2001. This would lower the loss of bondholders to 75 cents per dollar compared with 92 cents in the initial offer. GCAB, representing investors that hold more than $37 billion of securities and 73 percent of foreign bondholders, rejected the Argentinean offer. Bondholders plan to increase pressure through the G-7 and some may continue to explore litigation. Argentina hopes to convince the IMF, during the second quarter review of the program, that it acted in good faith by improving the offer. Bondholders plan to lobby the IMF with the position that Argentina is not engaged in serious negotiation.[95]

Economy Minister Roberto Lavagna disputes the claim of bondholders reiterating that Argentina had 54 meetings with creditors in two years. Data show the complexity of the problem. Argentina accrues $700 million monthly in due interest, 0.5 percent of GDP, because of default of $100 billion of securities. Argentina issued bonds in 8 jurisdictions in 7 currencies. In addition, close to 20 percent of Argentinean debt is with IFIs to which it paid $7 billion, net, in the past 22 months. The G-7 insisted on full payment to the IFIs. Investors complain that the primary surplus of Argentina has been only 2.4 percent of GDP in contrast with 4.25 percent in Brazil and close to 6 percent in Ecuador.

Relations with IFIs and external creditors continue to come under stress. The IMF announced in August 2004 that it was unable to conclude the

third review of the program with Argentina.[96] Argentine President Néstor Kirchner and IMF Managing Director Rodrigo de Rato agreed to continue discussion of the review of the program at an undetermined future date. The IMF Managing Director stated that the review would require an assessment of the process of debt restructuring and structural reforms.[97]

President Kirchner replaced Alfonso Prat-Gay with Martin Redrado, the second-ranking official at the foreign ministry, on September 17, 2004, subject to approval by Congress. The substitution was almost simultaneous with approval by the Fund to defer $1 billion of $2.5 billion owed by Argentina in 2004. The Executive Board of the IMF deferred one-year forward debt of Argentina in the amount of approximately $1.1 billion (779 SDR) maturing September 2004–January 2005.[98] IMF policy is to grant such deferments when repayment could cause "undue hardship or risk." However, deferment is a "technical" consideration that does not result from an assessment of the country's economic program. Argentina is committed to remaining current in repayments to the Fund. The IMF will continue discussions with Argentina. The Board advised the Argentinean authorities to continue with sound reforms and restructuring of the foreign debt.

Negotiations between Argentina and the Fund for release of part of the $13 billion program broke down in July because of differences on the budget, fiscal and banking reforms.[99] Argentina announced its intention to focus exclusively on restructuring the foreign debt by January 2005. The country will increase the share of debt payments in the budget from 2.7 to 3 percent.[100] Because of Argentina's primary surplus of 6 percent of GDP, bondholders demand a better offer than an expected 25 cents per dollar in a new restructuring. A few days earlier, the Institute of International Finance suggested the IMF should take urgent measures to solve the impasse in the restructuring of the foreign debt.[101]

The Argentine government is awaiting regulatory approval from the SEC to begin restructuring its foreign debt in late 2004.[102] However, the proposed budget surplus for 2005 is 2.7–3 percent, causing disappointment among bondholders because it would translate into 25 cents per dollar. The Global Committee of Argentine Bondholders and other major groups have rejected the proposal. In meetings with President Kirchner, IMF Managing Director Rato expressed the view that the budget would have to support a strong, feasible restructuring of the debt. Economy Minister Roberto Lavagna announced that Argentina will provide all money earmarked for interest payments on the debt to bondholders who enter the government exchange of debt. This was a radical departure from the initial terms of the offer, probably intended to force bondholders to participate. The recovery value

of 22–25 cents per dollar of bonds is less than the price in the secondary market.[103]

Strength of Mexico and challenge of China

The Mexican crisis of 1994–95 constituted the first twin crisis, motivating significant changes in IFA and a major effort in analytical research.[104] Professor Francisco Gil Díaz points out that Mexico had various sources of vulnerability.[105] The country virtually fixed the exchange rate. The current account deficit increased significantly relative to GDP, 8.37 percent in 1993, mostly because of large increases in credit instead of exchange rate overvaluation. In addition, interest rates in the United States rose sharply in 1994 in pursuit of inflation that did not materialize. Finally, Gil Díaz argues that there was a crisis trigger in the form of political tension throughout 1994.

Mexico's GDP declined by 6.2 percent in 1995, as shown in Table 1.12, and that of Argentina by 2.8 percent. However, in 1996, Mexico's GDP rose by 5.2 percent and that of Argentina by 4.2 percent. The crisis was deep but recovery was strong and rapid. Both countries experienced deep repercussions of the crisis on their banking systems. The analysis of balance sheet effects of an exchange crisis developed in part as an internal reaction to the crises of Mexico, Argentina and subsequently of Asia. These effects had been present in the debt crisis of 1982 and in most business cycle episodes. Chapter 5 considers in detail the relation between an exchange crisis and an internal financial crisis, a combination denominated "twin crisis" in the literature. The Mexican crisis shaped official thought and led to the G-10 or Rey Report, discussed in Chapter 2. Mexico's reserves were $6 billion and debt in dollar-indexed *Tesobonos* $28 billion. Criticism developed that the $40 billion international rescue package allowed investors in risky Mexican securities to exit "with no loss of value." A possible moral hazard in an international safety net of countries rose as an argument in official financing during emerging country crises.

Mexico turned around and made significant progress in economic policy and structural reform. Mexico recently experienced relatively high rates of growth of GDP–4.3 percent in 1998, 3.3 percent in 1999 and 6.2 percent in 2000–before the first recession in 2001 without domestic causes, with output declining by 0.3 percent. Meanwhile, inflation declined to 4.4 percent at the end of 2001, well below the target of 6.5 percent. Currently, 90 percent of Mexico's exports are to the United States and 75 percent of imports originate in that partner in the North American Free Trade Agreement, NAFTA.

Mexican financial markets began to show the strain because of risk

Table 1.12 Indicators of the Mexican economy

Mexico	GDP	CPI	Pesos/USD	CETES 91 Days
2004 Q2	3.9	4.4	11.41	7.26
2004 Q1	3.7	4.2	11.15	6.21
2003	1.9	3.9	11.24	6.18
2002	0.6	5.7	10.31	7.27
2001	−0.3	4.4	9.14	7.53
2000	6.6	8.9	9.57	17.41
1999	3.6	12.3	9.51	17.65
1998	5.0	18.6	9.87	34.5
1997	6.8	15.7	8.08	19.88
1996	5.2	27.7	7.85	26.51
1995	−6.2	52.8	7.64	48.01
1994	4.4	7.1	5.32	19.31

Source: Banco de México, Economic and Financial Indicators, http://www.banxio.org/mx/siteBanxicoINGLES/jMapaSitio/FSmapaSitio.html

aversion originating in Brazil in the second quarter of 2002. Nevertheless, rating agencies, Standard & Poor's and Fitch IBCA, increased Mexico's risk to investment grade early in 2002. Spreads over Treasury declined to a historical low of 233 basis points to rise over 300 after expectations before elections in Brazil caused aversion in emerging market risk. Mexico's current account deficit is moving below 3 percent of GDP and the IMF expects that foreign direct investment will finance two thirds, with public and private sector borrowing financing the remainder. The IMF expects foreign debt to remain at around 27 percent of GDP. Gross international reserves exceed $45 billion, or 125 percent of short-term debt and 82 percent of gross external financing requirements.

The IMF concurred with the changing policy mix in Mexico, cyclically tightening fiscal policy while relaxing monetary policy, during the recession.[106] The policy mix should proceed carefully in Mexico. The country needs additional sources of government revenue. Meanwhile, monetary policy should try to attain an inflation target of 3 percent, taking into account soft economic conditions, both in Mexico and in the United States. Mexico tightened fiscal and monetary policy after renewed growth in the economy in 2003–4. The IMF also praised Mexico's ability to avoid the contagion of international crises to its domestic economy.

Table 1.13 Mexico, economic indicators

	1998	1999	2000	2001	2002
Percent Change Per Year					
GDP	5.0	3.6	6.6	−0.3	0.9
Consumer Prices	18.6	12.3	9.0	4.4	5.7
% of GDP					
Current Account	−3.8	−2.9	−3.1	−2.9	−2.2
Foreign Debt	39.4	36.8	28.3	26.0	26.7
Public Debt	50.0	46.6	42.2	42.0	43.5

Source: IMF, "IMF Concludes 2003 Article IV Consultation with Mexico," PIN No. 03/130, November 6, 2003.

Mexico is improving public debt management. While public sector external debt reached 42 percent of GDP in 1995, it declined to 16 percent in 2001. Table 1.13 shows indicators of the Mexican economy. The government has repurchased Brady bonds. Domestic sector public debt also shows an improving profile. Inflation-indexed debt is only 8 percent of the total. However, floating rate debt is 61 percent, in a declining inflation environment, but vulnerable to rising inflation. Fixed rate debt increased to 8 percent of the total. However, gross public sector borrowing requirement (PSBR) stands at 12 percent of GDP, and net PSBR at 3.8 percent of GDP.

IMF Article IV consultations identified vulnerabilities in Mexico:

- Mexico had significant foreign financial requirements of around $65 billion in 2003, 10 percent of GDP, 140 percent of gross international reserves and 15 percent of gross inflows to developing countries. IMF stress tests–discussed in detail in Chapter 3–for Mexico show that its external sector would be able to withstand capital account crises similar to those in the past such as Mexico 1995, Russia 1998 and Brazil 1999. Simulations show that the external financing gap would range between $3 billion and $6 billion in 2002. Adjustments of policy—exchange rate depreciation combined with reduction of reserves—would fill the gap
- The IMF estimated gross financing needs of the public sector of $71 billion in 2003, or 12 percent of GDP. Foreign debt structure is of longer profile, with average terms of eight years for Mexico's foreign debt bonds, than for domestic debt of which 20 percent matures in one year
- Increases in interest rates and decline of economic growth could affect the public sector. The IMF conducted a sensitivity analysis of PSBR for

Mexico. As customary in stress tests surveyed by the BIS-discussed in Chapter 3-the Fund used scenarios of repetition of past crises in Mexico 1995, Russia 1998 and Brazil 1999. During tests of repetition of Mexico's crisis in 1995, PSBR would rise by 3.4 percentage points of GDP, by only 0.6 percentage points in a repeat of Russian crisis and 0.1 percent in another Brazilian 1999 crisis. Mexico has exposure to a favorite stress test of financial institutions. A decline in the price of a barrel of oil by $1 would reduce government revenue by 0.2 percent of GDP. In another sensitivity test, the IMF concluded that a moderate decline of economic growth, higher interest rates or depreciation of the real exchange rate would not affect public debt dynamics significantly. Suppose GDP growth were to decline by one half of the IMF's forecast. In that growth scenario, gross public sector debt would increase from 40 percent of GDP in 2002 to over 53 percent in 2007. Stabilizing debt at current levels would require an increase in the primary surplus of 0.9 percent of GDP each year on average. There is here again the argument of what is an optimum debt level for emerging countries, likely much less than in the Maastricht Treaty

- The corporate sector is vulnerable to foreign bank lending, with mitigating claims on foreign banks. Analysis of emerging market crises places strong emphasis on balance sheets of government, corporations and individuals. The best available tool is stress testing. IMF's tests showed that moderate combined shock of exchange and interest rates and growth would result in severe financial difficulties for some companies

In its assessment of Mexico's Article IV consultation, the IMF's Executive Board commended the country for prudent economic policy.[107] It considered Mexico as "a relatively 'safe haven' among emerging markets." Mexico controlled the current account deficit, lowered inflation and experienced the country's first economic recession that did not originate in domestic factors. The Board focused on important reforms in the tax system to reduce dependence on oil revenues, in the energy and telecom sectors, labor market and judicial system.

In addition, the Board noted continuing improvements in observance of standards and codes.[108] In particular, Mexico improved its budgetary process, disclosure of fiscal information and internal controls.

The Board of the Fund alerted to an environment of volatility in equity markets, doubts on the strength of the recovery in the United States and risk aversion to emerging markets. Mexico gained significant recognition from the IFIs in weathering economic crises with prudent economic management.

In October 2003, the Executive Board of the Fund concluded consultations

under Article IV with Mexico.[109] The IMF directors praised the Mexican authorities for adequate policies that strengthened the macroeconomic and investment environment of the country. They underscored the continuing modernization of the financial sector, the improving structure of public debt, reduction of inflation and progress in reducing poverty. The directors believe Mexico should approve and implement structural reforms of the tax system, electricity, labor markets and the judicial system. Reforms would encourage private investment and employment, increasing Mexico's competitiveness in an environment of growing global competition.

The economy experienced weak conditions in the first three years of the current administration of Mexico. Mexican exports increased from $96 billion in 1996 to $160.7 billion in 2002, in large part because of NAFTA. As a result, the Mexican economy became closely related to the American economy. Mexico has been in at least a slow growth recession because of weak external demand since 2001. However, in the first two quarters of 2004, as shown in Table 1.12, the economy has been growing at close to 4 percent. The consensus forecast for 2004 is for growth of 3.2 percent with consumer price inflation of 4.3 percent and 28-day CETES of 6.3 percent.[110] In 2005, the forecast is growth of GDP of 4.0 percent, consumer price inflation of 3.9 percent and 28-day CETES of 7.2 percent.

Fiscal and monetary policy in Mexico changed because of renewed economic growth. There is agreement among the Mexican parties in Congress on the need for tight budgets. The share of the deficit in GDP has been decreasing yearly. The administration sent a budget proposal to Congress reducing the public sector deficit from 0.3 percent of GDP in 2004 to 0.1 percent in 2005.[111] Mexico tightened monetary policy five times in the first eight months of 2004.[112] The objective is to curb possible inflation that could result from higher economic growth. Overnight interest rates rose from 4.1 percent in August 2003 to 7.3 percent in August 2004.

Mexico requires various reforms to use optimally its resources and opportunities–fiscal, labor markets, energy and infrastructure–as well as to increase productivity to compete more effectively in world trade. Unfortunately, the Executive does not find sufficient support in Congress to implement reforms that require legislative approval.

Mexico has maintained conservative fiscal deficit targets, 0.65 percent of GDP in 2002 and 0.5 percent in 2003. Receipts of the tax on oil exports constitute 30 percent of tax revenue in Mexico.[113] In the view of Mexico's Secretary of Finance, insufficient revenue forces Mexico to indebtedness that generates pressure on interest rates and reduces the pace of economic growth.[114] The ratio of tax to GDP of Mexico fluctuates around 11 percent, one half of that for countries of the OECD. The inadequate tax structure

prevents Mexico funding its needs in education, health, infrastructure and debt service. Mexico's tax base is limited and its management precarious. Various tax regimes and exemptions stimulate tax evasion and fraud.[115]

The administration's initial proposal of tax reform in 2001 intended to increase tax revenues by 2 percent of GDP, broadening the tax base, eliminating exemptions and applying value added tax to a larger number of products. Lack of political understanding prevented implementation of broader and deeper fiscal reform. Mexico's Secretary of Finance still had hopes, even after the government party lost representation in Congress in the election of July 6, 2003, that there could still be tax reform in the final three years of the Fox administration.[116]

However, a proposal of tax reform failed again in December 2003. In that month, PRI voted for the second time in three years against tax reform.[117] Similarly, the administration has not made progress in two other structural reforms–flexibility of labor laws and access of foreign investment to electricity. Esther Gordillo, Secretary General of PRI, led a movement to approve 10 percent value added tax on food and pharmaceuticals but lost her position in November 2003. A dozen elections for governors clouded even further the mood for change. An opposition party is not likely to vote for increases in taxes in congress in an election year for governors. There is speculation of the need for constitutional reform allowing reelection for Congress, which could make legislators more accountable.

Mexico increased revenue from the value added tax by more than 11 percent in 2003 even with limited economic growth.[118] This result encourages the administration to broaden the value added tax. Mexico's tax base is limited, only 12 percent of GDP. Laws are inadequate and tax evasion rampant, reaching 2.28 percent of the value added tax. Modest economic growth of 1.3 percent constrained tax revenue. The increase of 11 percent in revenue from the value added tax resulted from technical changes that allowed small companies to compute their own taxes.

Insufficient investment in improving and broadening energy infrastructure causes loss of foreign investment of $5–6 billion per year. Mexico requires reform of its energy policy to increase its competitiveness. Because of the high cost and inadequate service of electricity, many multinationals opted to create their own generating plants. This is the case of DuPont in its titanium factory for exports to Europe.[119]

Mexico faces a major challenge in its *maquiladoras*, factories producing industrial components used in final production in the United States. In the past two years, 540 *maquiladoras* abandoned Mexico in search for lower costs in Asia, mainly China. This exodus is causing a loss of close to 200,000 jobs. Productivity increase was 8 percent in 1994 but fell to less than 3 percent

in 2002, raising doubts about Mexico's ability to face the Asian challenge. Nevertheless, Secretary Gil Díaz estimates that an increase of productivity by 7–8 percent per year is unfeasible, but 3–3.5 percent will maintain the economy in its long-term trend.[120]

NAFTA transformed Mexico's economy. Exports increased their share of GDP from 15 percent in 1985 to 30 percent in 2002. Foreign direct investment increased from $4 billion in 1992 to $14 billion in 2002. FDI fell 25.7 percent in 2003, to only $10.73 billion, because of weaker global conditions.[121] However, Mexico expects recovery in 2004 because of announcements of investment decisions by corporations in various countries. The liberalization of the economy made change in the country somewhat more difficult.[122] Neither the party of President Fox, PAN, nor the party that governed 1920–2000, PRI, obtained a majority in Congress in the elections of 2000 and 2003.

China is growing at 9 percent per year, became the sixth largest economy in the world, entered the World Trade Organization and increased its share in world trade from 1 to 6 percent. The effects of China's accession should benefit the world as a whole. However, China's challenge can affect sectors and countries concentrated in production of labor-intensive goods.[123] Some affected sectors and countries may require adjustments of their productive structure that could be burdensome in the short and medium term. At the same time, China's growing demand for commodities could generate pressure on prices of essential inputs.

China is a commercial challenge to Mexico. Mexico's labor costs exceed those of China by multiples of three and four. Mexican electricity is twice as expensive because of lack of foreign investment. While Mexico depends on exports of cyclical goods, such as vehicles and electric appliances, Taiwan's companies are aggressively expanding Chinese technological exports. Direct investment in China is about $55 billion per year, of which $16 billion is for technology. Total FDI in Mexico is between $12 and $14 billion.

Francisco Gil Díaz calmed the international financial markets about Mexico's maturity following election on July 6, 2003, in which PAN reduced its share in Congress relative to the PRI.[124] According to Secretary Gil Díaz, the election could raise the possibility of significant reforms to broaden Mexico's tax base. Mexico's risk spread rose from 207 basis points in May to close to 300. Gil Díaz argued that the major political parties believe they can win the presidential election in 2006, thus having an incentive to lead Mexico on the right path. The proposal by Gil Díaz consists in reducing the rate of the value added tax while increasing its base. Exemptions in the code add up to 5 percent of the GDP. A simplification of the code with lower rates would broaden the tax base. Similarly, the administration prepared a package of reforms to open electricity to foreign investment.

Mexico should articulate the country toward increasing productivity and public sector efficiency to use optimally available opportunities. However, there was no consensus for reforms.

China has a number of distortions that limit its prospects and the true challenge to Mexico. Authorities undervalue the exchange rate and this policy conflicts with major trading partners and competitors. The economy is growing at very high rates but producing many goods that consumers will not acquire.

China intends to attain the level of Japanese GDP by 2020 based on consumption of middle class and private initiative. However, the authorities will maintain the political system unchanged. China significantly increased the public deficit to fight unemployment. As in most of Asia, there is a future public deficit in the form of the need to rescue a fragile banking system. Foreign investment created a two-tier economy, increasing domestic overproduction. There are doubts as to how long the economy can continue to grow with such distortions. Therefore, it is valid to ponder if China will face profound economic adjustment in the future with uncertainty over the feasibility of the political system and economic growth. There is conflict in developing a capitalist economy within a closed regime.

Chairman Greenspan warned that intervention to fix the Chinese currency, renminbi, is not sustainable.[125] This policy, according to Greenspan, requires purchases of assets denominated in dollars by Chinese monetary authorities that would prevent the functioning of the monetary system. The Chinese central bank must purchase $600 million per day to maintain the renminbi/dollar parity. This causes unnecessary issue of money, conflicting with sound monetary policy. On the real side, the structure of relative costs in the world economy should be rigid, maintaining competitiveness with the undervalued Chinese currency. However, China announced that it would not change the exchange rate policy of fixing the renminbi to the dollar.[126] During a visit to Washington of the Governor of the People's Bank of China, in March 2004, the Secretary of the Treasury of the United States, John Snow, again raised the need to fluctuate the Chinese currency.[127]

The Executive Board of the IMF stated that the medium-term perspectives of China depend on structural reforms, especially in banking, state enterprises and labor markets.[128] Continuing growth of credit may deteriorate further bank portfolios. However, the directors do not believe in undervaluation of the renminbi, especially because of the small share of China in world trade. Nevertheless, reserve inflow prevents internal monetary control. Greater exchange rate flexibility in the future would protect the economy from external shocks. An independence of internal monetary policy would benefit structural reforms.

Table 1.14 China, selected indicators

	2002	2003	2004
GDP, Billions of Dollars	1,229	1,378	1,521
GDP per Capita, $	1,010	1,060	1,160
GDP Growth %	8.3	9.1	9.0
CPI %	−0.8	1.2	3.5
Reserves, Billions of Dollars	291.1	407.5	466.1
Foreign Debt, % GDP	13.8	14.4	14.0
Current Account, Billions of Dollars	35.4	46.0	40.0
Current Account, % GDP	2.8	3.2	2.5
Trade Account, Billions of Dollars	45.0	44.0	31.0
Budget Balance % GDP	−3.3	−2.8	−2.2
Exports to USA, 21.5%, Imports from USA, 9.2%			
Exports to Japan,14.9%, Imports from Japan,18.1%			
Population: 1.3 billion			

Source: *Financial Times*, December 16, 2003; "IMF Concludes 2003 Article IV Consultation with the People's Republic of China," PIN No. 03/136, Nov 18, 2003; "IMF Concludes Article IV Consultation with the People's Republic of China," PIN No. 04/99, Aug 2004.

China intends to quadruple its GDP by 2020. Growing at 7.3 percent per year, it would attain the current level of Japan in 18 years. Table 1.14 shows key indicators for China. The country encourages growth of the middle class, precisely the foundation of Western capitalism. There are no limits to the means of attaining relative importance in the world economy. Businessmen participated in the Congress of the Communist Party in November 2002 and one of them holds a seat on the central committee of the party.[129] Private property will have legal rights in the future, whether or not originating in labor. There will be increasing rights to rural property. This will result in a new class of rich landowners among 400 million agricultural farmhands at subsistence level.

The party's Congress endorsed a new philosophy of representation of the productive sector, the progress of culture and of "masses of people," that is, the middle class. The objective is to promote growth by consumption of the middle class, estimated at 200 million, or 18 percent of population. In

1991–97, the value of output of the private Chinese sector increased by 71 percent per year on average. In 1998, the private sector shared 33 percent of Chinese GDP, or 51 percent when including agriculture. There are around 2 million private businesses in China, employing 23 million people. Between 1998 and 2001, the state sector eliminated 25 million jobs.[130] This change even includes acquisition of state companies by foreigners. Direct investment presently constitutes the best economic sector in terms of industrial performance, contributing 20 percent of tax revenue, 50 percent of exports and generating 23 million jobs.

However, China does not pretend it is eliminating the one-party system, prohibiting opposition parties and elections for important positions. There was the episode of leadership and intervention in Hong Kong showing that Beijing does not tolerate democratic change.[131]

Estimates of nonperforming loans in Chinese banks range between $374 billion and $749 billion, or 30–70 percent of GDP. [132] Chinese authorities state that the percentage of nonperforming loans relative to bank assets is declining 2–3 percentage points per year.[133] Estimates of nonperforming loans in the four largest commercial banks amount to 22 percent of assets. Therefore, China would solve the problem in 5–6 years. However, private sector estimates of nonperforming loans reach 40 percent of bank assets. Accelerating growth, an investment boom and deterioration of property value may generate another wave of nonperforming loans. After 1998, the government adopted an active fiscal policy, raising public expenditures as a percentage of GDP from 12.1 percent in 1996 to 20 percent in 2001. The public deficit rose from 0.7 percent of GDP in 1997 to 2.5 percent in 2001.

Chinese government economists estimate that the economy should grow at 9 percent in the first half of 2004 and at 8 percent for the year as a whole.[134] They estimate growth in 2003 at 9.1 percent and at 9.9 percent in the final quarter. However, the Chinese government intends to reduce the pace of investment to avoid overheating the economy. Economists estimate inflation at 3 percent, which does not raise alarm in the government because of its low level after four years of deflation.

The Chinese economy grew at 9.7 percent in the first quarter of 2004. Some economists believe that the true number could have been between 11 and 12 percent.[135] However, while accelerating growth improves the economic conditions of the population, there are doubts about the soundness of loans to industrial and infrastructure projects. The central government does not control the pressure on local government to finance projects with bank loans. In the first two months of 2004, projects at the local level increased by 60 percent in relation to a year earlier. There was increasing concern about inflation that reached 2.7 percent in the first quarter of 2004, generating the

possibility of higher interest rates. Inflation reached 3.8 percent in the 12 months ending in April 2004, raising the likelihood of interest rate increases. Chinese authorities continue to deny the need to revalue the renminbi.

There could be deceleration of growth in China because of measures to restrict investment.[136] Consumer prices increased by 4.4 percent in the first half of 2004 compared with 1.2 percent in 2003. FDI reached $47 billion in 2003. The IMF expects GDP growth at 7.5 percent in 2005. The Fund found significant progress in structural reforms, particularly in strengthening the financial sector: restructuring of state banks, tighter prudential regulation, changing management of state companies, improving lending practices and recovery of assets by asset management companies. The Executive Board urged China to adopt greater exchange flexibility.

Part of the overheating of the Chinese economy originates in local authorities, which use bank credit to finance local projects that were not approved by the regulatory authorities.[137] Central authorities believe that there is excessive investment in steel, cement and real estate. In 2003, central authorities began to slow investment activities by tightening credit and banning new projects in overheated activities. China's premier, Wen Jiabao, dismissed arguments to soften macroeconomic controls. The main impulse of economic growth, fixed asset investment, slowed its 12-month growth from 32.3 percent in July 2004 to 26.3 percent in August. Authorities and investors are concerned about a soft landing of the Chinese economy. Beijing is likely to continue attempts to restrict investment for another few years. The focus is on curbing land sales for wasteful projects and in restructuring the financial sector.

Broad money, M2, increased by 13.6 percent in August 2004 compared with the central bank target of 17 percent, and outstanding loans by 14.5 percent, the lowest in 20 months. However, inflation continued to threaten. Consumer prices in the 12 months ending in August increased by 5.3 percent, the same rate as a one-year lending rate of the commercial banks. Investment in infrastructure, property and factories is the main impulse of growth resulting in growing production of steel, aluminum and cement. China has the challenge to control inflation without causing an internal recession that could have regional repercussions in Asia.

Capital flows to emerging markets

Capital flows to emerging markets decreased in 2002, recovered in 2003 and may weaken again because of possible rate increases in the United States in 2004. This section shows vulnerabilities in the behavior of markets 2001–2 and 2003–4. IMF research and consultation with market

participants globally point to increasing risk aversion in financial markets in 2002.[138] There are various signals of this phenomenon. Yields of United States Treasury securities declined to near record levels. High-yield bonds experienced significant widening of spreads and major defaults. Apparently, investors experienced risk aversion, abandoning high-yield markets for the security of American treasuries. Equity markets performed weakly. Bank lending to emerging markets declined. Balance sheets of financial institutions, corporations and individuals weakened. Credit discrimination in tiers dominated various segments of the financial markets. Therefore, many borrowers with weak fundamentals lost access to credit markets. In contrast, borrowers with strong fundamentals maintained market access.

Argentina's default continued to create caution in emerging markets, especially in Latin America. The Fund noted the importance of events in Brazil because of the size of its economy and large weight in emerging market bond indices.[139] There is high exposure by emerging bond investors to Brazilian risk. However, the Fund evaluated that measures of confidence building by the new administration would support Brazilian debt prices and currency markets.

Yields of 10-year United States dollar interest rate swaps rose to a peak in June 2004 to decline by 65 basis points in late August.[140] Simultaneously, yields of the 10-year euro and yen interest rate swaps declined by 35 and 20 basis points, respectively. This behavior is different from that of tightening by the Fed in 1994 when yields increased sharply after the first increase in rates. In addition, volatilities also declined in 2004 but increased in 1994. According to the BIS, there are two reasons for this difference in behavior. The Fed began to announce its stance on policy. Thus, market prices incorporate future rate increases. A second factor is that the economy in the second quarter suggested slower growth than in 1994. Therefore, the expectation is that the Fed may not be as aggressive in raising interest rates. Fixed income markets in Europe and Japan priced American factors somewhat more closely than local ones.

There was relative stability in credit markets. Spreads of BBB-rated bonds fluctuated between 120 and 150 basis points in the first eight months of the year. Even the high-yield segment showed relative stability.

There is vulnerability in the huge flow of funds borrowed by the United States, both private and official.[141] Reduction of this flow could increase the risk premium of dollar-denominated assets. Therefore, yields on bonds issued in dollars would increase, possibly causing increases in European and emerging market yields. Balance sheets denominated in dollars could deteriorate, which could undermine global economic recovery.

Table 1.15 Issues by emerging markets, billions of dollars

	2000	2001	2002	2003	2004*
Gross Issue	261	162	136	195	141
Bonds	81	89	61	97	74
Equities	42	11	16	28	25
Loans	94	62	58	70	42
Asia	86	68	54	82	67
Latin America	69	54	33	42	25
Other	61	41	48	71	49
EMBI+ Spread	735	728	725	403	453
ML *High Yield*	890	795	871	418	393
U.S.10-year note	5.12	5.05	3.82	4.25	4.78

Note: *January-June
Source: IMF, *Global Financial Stability Report April 2004*, 20;*Global Financial Stability Report September 2004*, 28.

Table 1.15 shows improvement in emerging markets in 2003–4 after the drop in 2000–1. There were significant difficulties in 2001 and 2002 because of crises in countries such as Argentina and Turkey and less favorable conditions in industrial countries. Diverse events contributed to a tightening of emerging market bond spreads in 2003.[142] The decline in yields in industrial countries, especially the United States, may have been the key factor. Liberal fiscal and monetary policies increased liquidity. Decline in yields of treasuries increased risk appetite, causing a major inflow of investment to emerging markets and high yields. Simultaneously, credit rating agencies improved country ratings. Reduced inflation and lack of international financial crises also contributed to increase capital flows. In 2003, the spread of emerging bonds fell 322 basis points. EMBI+ showed a return of 28.8 percent. Financing for emerging markets may be favorable in the second half of 2004. The IMF estimates that emerging countries completed 80 percent of planned issues in the first half of the year. In addition, there could be further improvement in the credit ratings of sovereigns.

There is an interesting comparison of data by the Institute of International Finance (IIF).[143] Capital flows to emerging countries increased

Table 1.16 Financing of emerging markets, billions of dollars

	2002	2003	2004	Average 1992–2002
Net Private Flows	128.3	194.1	225.6	186.6
(% of Nominal GDP)	2.3	–	–	3.9
Equity, net	115.6	122.4	147.2	121.5
FDI, net	115.3	94.9	113.8	98.0
Portfolio, net	0.3	27.4	33.4	23.5
Private Creditors, net	12.7	71.8	78.3	65.1
Commercial Banks, net	−5.1	24.7	27.9	20.6
Non-banks, net	17.2	44.7	45.0	44.5
Official Flows, net	−6.8	−23.7	−17.8	24.7
International Financial Institutions	7.6	−10.6	−10.6	15.2
Reserves (- = increase)	−150.1	−260.3	−197.4	−68.2

Source: International Institute of Finance, "Capital Flows to Emerging Market Economies," September 18, 2002 and January 16, 2003; "Capital Flows to Emerging Market Economies," May 15, 2003; "Capital Flows to Emerging Market Economies," April 15, 2004.

sharply during the first half of the 1990s, reaching $335 billion in 1996. However, in 2002 capital flows to emerging countries were about the same as in 1992, a decade earlier. In fact, capital flows declined in real terms because of inflation in that period. Capital flows as a percentage of GDP declined from an average of 4 percent in 1992–2002 to slightly over 2 percent in 2002. The bulk of financing to emerging markets in 2002 was $115.3 billion of FDI.

The IIF estimates flows of capital to emerging markets of $225 million in 2004, an increase of $31 billion in relation to 2003 and of $100 billion in comparison with 2002. Table 1.16 shows that forecast flows in 2004 would exceed the average for 1992–2002. The level of $128 billion in 2002 was the lowest since 1992. Maintenance of liberal monetary policy is the basic assumption of the forecast. The increase in flows originates in higher growth in industrial countries with historically low interest rates. Investors from other market segments constitute another risk. Opportunistic investments

attracted by higher relative returns tend to flee rapidly after an adverse event.

Direct investment should increase from a low level of $95 billion to $114 billion. It reflects both continuing flows to China as well as improving expectations for Latin America, especially Mexico. According to IIF estimates, flows of external financing to Latin America should increase from $24.4 billion in 2003 to $43.1 billion in 2004. Net FDI to Latin America fell from $52.5 billion in 2001 to $25.1 billion in 2003, but should increase to $31.8 billion in 2004. Flows of nonbank debt to the region could increase from $5 billion in 2001 to $19 billion in 2004.

The IIF estimates growth of output by emerging countries in 2004 at a rate of 5.8 percent, much higher than 2.9 percent in 2001. Latin America experienced stagnation in the past few years, growth of 0.1 percent in 2001, −0.9 percent in 2002 and 1.2 percent in 2003 but an estimate of 3.8 percent in 2004.

Brazil at a crossroads

A significant determinant of the Brazilian crisis of 1998–99 was an internal public deficit close to 10 percent.[144] Sound fiscal performance is extremely important for Brazil and an essential ingredient of its commitments under the Stand-By Agreement with the IMF of August 2001. There may be vulnerability in the level of public debt and its structure. IFIs, academicians and technicians express increasing concern about debt to GDP ratios in emerging countries. Their capacity to extract taxes from emerging market economies is much more limited than in the G-3–United States, European Union and Japan.

Table 1.17 shows the increase of debt as a percentage of GDP in Brazil from 53.4 percent in 2001 to 58.7 percent in 2003. The authorities tightened fiscal policy, increasing the primary surplus from 1.9 to 4.3 percent. This was likely the only alternative of policy. The authorities were able to reduce the share of exchange-index debt from 28.6 percent of total internal debt in securities to 10.8 percent. Revaluation of the real after sound fiscal policy by the new administration in 2003 permitted this change in the structure of debt. Selic is the interest rate on overnight sale and repurchase agreements financing government securities. Selic is the major instrument of monetary policy in Brazil. Thus, almost two thirds of the internal debt in Brazil is linked to an overnight repo rate. Authorities were also able to increase the share of fixed rate debt in total.

Net public debt as a percentage of GDP declined from 58.7 percent at the end of December 2003 to 56 percent in June 2004 and 55.3 percent in July.

Table 1.17 Brazil, debt and deficit

	2001	2002	2003
Primary Surplus, % of GDP	1.9	3.9	4.3
Public Deficit, % of GDP	3.5	4.6	5.2
Public Debt, % of GDP	53.4	55.5	58.7
Fixed Rate Debt, % of Total	7.8	2.2	12.5
Selic Indexed Debt, % of Total	52.8	60.8	61.4
Exchange Index Debt, % of Total	28.6	22.4	10.8

Source: Banco Central do Brasil, Indicadores Econômicos Consolidados, http://www.bcb.gov.br/?INDECO

The primary surplus reached 4.23 percent of GDP in the first four months of 2004, close to the yearly target of 4.25 percent.

Brazil's debt ratio level is high and difficult to revert. Mussa argues that at real rates of interest below 10 percent, determined by spreads on sovereign debt, the authorities can maintain a primary surplus of around 5 percent of GDP, under reasonable assumptions on the economy, until the debt ratio declines below 55 percent.[145] However, Mussa argues, debt-restructuring could be inevitable unless the authorities restore confidence and interest rates decline.

Joint work by the IMF/World Bank departs from the premise that sustainable and prudently managed public debt reduces financial vulnerability and the possibility of contagion with external crises.[146] Vulnerabilities of public debt originating in maturity structure, types of interest regimes, currencies and high exposures in contingent assets may amplify the domestic impact of international crises.

The joint working group of the Fund and the Bank issued criteria of management of the public debt with the objective of reducing vulnerability to external crises. Their objective is not to impose criteria but simply to disseminate prudential policies to help countries in their efforts to manage debt. The basic objective is that countries obtain financial requirements at lowest possible cost in the medium and short term with a prudential level of risk. Specific criteria address transparency, accountability, institutional structure, managerial strategy, approach to risk management and creation of an efficient market of government securities.

Brazil's public debt is sustainable if the spread over treasuries of foreign debt declines such that domestic real rates of interest also decline. John Williamson shows that Brazil's debt increases by costs of

dollar-denominated debt, fixed-rate debt and overnight-indexed debt less the primary surplus properly adjusted by skeletons or illiquid government claims that should not be subtracted from debt.[147] One such skeleton would be, for example, debt to the development bank BNDES at a fixed long-term rate. Williamson calculates the debt/GDP ratio at 66 percent, average rate on the debt at 8.3 percent, growth of the economy at 4 percent, primary surplus at 4.2 percent and skeletons at 0.75 percent. Thus, the fiscal solvency inequality results in:

$$4.2 - 0.75 = 3.45 \geq 0.66(8.3 - 4.0) = 2.8$$

Fundamentals in Brazil are in an intermediate range from no default to certain default. According to the analysis by Mussa and Williamson, debt can become unsustainable if markets collectively believe that Brazil may default. Brazil's most important policy effort is to improve fundamentals and convince private creditors and IFIs that it will follow sound policies.

Brazil has had several external shocks related to domestic economic events and policies that came close to a major international financial crisis. Such an event would have coincided with Argentina's default. There were public deficits and current account deficits that were quite high relative to GDP. The public deficit reached 10 percent of GDP in 1998. The current account deficit was around 4 percent of GDP until 2001 (see Table 1.18). Simultaneously, Brazil had a deficit in its trade account until 2001. FDI was very high in the 1990s and Brazil financed current account deficits with FDI of over $20 billion. Brazil had to alter its exchange rate policy after the Russian crisis in 1998. The country floated the currency, the real, and adopted a system of inflation targets in 1999. The real depreciated from 1.2 to the dollar to 1.8.

Weakness in global finance and emerging markets in 2002 coincided with a presidential election. Brazil was unable to roll over short-term trade finance lines with international banks. The reversal of capital flows caused a sharp reduction in the ratio of current account to GDP, from -4.6 percent in 2001 to -1.7 percent in 2002, while the trade account increased from $2.7 billion in 2001 to $13.1 billion in 2002.

Table 1.19 shows analysis of balance of payments adjustment by Banco Central do Brasil (BCB) during 2002. There were large losses in a number of items. Retrenchment of credit markets for Brazil caused a loss of long-term loans of $15.9 billion. Foreign direct investment was a major source of funding in the past decade, but declined by $6.5 billion. Short-term capital including a large number of items–short-term trade finance, equity investment, fixed income debt traded in Brazil and abroad, short-term loans,

Table 1.18 Indicators of the economy of Brazil

	2004 Jun	2003	2002	2001	2000	1999	1998	1997
GDP Δ%	4.2	−0.2	1.9	1.3	4.4	0.8	0.1	3.3
CPI % p.y.	6.8	9.3	12.5	7.7	5.9	8.9	1.7	5.2
Current Account $B	2.8	4.1	−7.7	−23.2	−21.5	−22.0	−22.8	−20.0
Current Account %GDP	1.7	0.8	−1.7	−4.6	−4.0	−4.7	−4.3	−3.8
Foreign Debt $B	207	215	211	210	217	226	224	202
Trade $B	8.9	24.8	13.1	2.7	−0.7	−1.2	−6.6	−6.8
FDI $B	3.2	9.9	14.1	24.7	30.5	26.9	26.0	17.9
Real/USD	3.0	2.9	3.5	2.3	1.9	1.8	1.2	1.1
Reserves $B	49.8	49.8	37.8	35.9	33.0			

Source: Banco Central do Brasil, Indicadores Econômicos Consolidados, http://www.bcb.gov.br/?INDECO

financial derivatives, nonresident deposits, other liabilities and errors and omissions–declined by $4.6 billion. Brazilians increased assets abroad by $0.8 billion, mostly acquisition of debt by corporations at substantial discounts.

The bulk of the adjustment consisted of reduction of the current account deficit by $15.5 billion. The jump in the trade account from a surplus of

Table 1.19 Sources of losses and adjustments of balance of payments of Brazil, billions of dollars

Losses		Adjustments	
Long-Term Loans	15.9	Current Account	14.9
Foreign Direct Investment	6.5	Amortization	5.1
Short-Term Capital	4.6	IMF Loan	4.8
Assets	0.8	Reserve Assets	3.0
Total	27.8		27.8

Source: Banco Central do Brasil, *Relatório de Inflação, Dezembro 2002.*

$2.7 billion in 2001 to $13.1 billion in 2002 constituted an important part of the current account decrease. Reduction of long-term amortization by $5.1 billion through conversion of debt into FDI, direct loans and refinancing constituted another important part of the adjustment. There is a benefit to future balance of payments in terms of reduction of future claims. Issue of sovereign bonds and disbursements by the IMF provided enough funds for the claims on central government and part of the claims on the private sector.

The rollover rate of notes and commercial paper declined from 81 percent in 2001 to approximately 34 percent in 2002. The direct loan rollover rate declined from 138 percent in 2001 to 65 percent in 2002. Brazil did not issue new bonds while amortization totaled $703 million.

The Central Bank of Brazil expects the trade account in 2004 to show a surplus of $26 billion with exports of $83 billion and imports of $57 billion.[148] The current account would show a surplus of $2.5 billion and FDI would reach $12 billion. Roll over of debt by the private sector would reach 100 percent, 95 percent for securities and 115 percent for loans. The current account would show a surplus of $2.5 billion or 0.4 percent of GDP. Moreover, prospects for economic growth are much better with GDP growing at 4.2 percent in the first half of 2004.

The Executive Board of the IMF completed its third review of the Stand-By with Brazil in June 2003, releasing SDR6.55 billion, approximately $9.3 billion.[149] In September 2003, the Fund completed a fourth review of the Stand-By, releasing SDR3 billion, or approximately $4.1 billion.[150]

In December 2003, the Executive Board of the IMF approved an extension of 15 months of the Stand-By with Brazil, raising the commitment by SDR4.5 billion, or $6.6 billion.[151] This decision coincided with inspection of the original program that released SDR5.6 billion ($8.2 billion) immediately. However, the Fund suggested that Brazil's vulnerability consisted of a possible change in sentiment by markets. Brazilian authorities continued to face other vulnerabilities, such as high foreign financing requirements and low reserves of $17 billion.

Brazil agreed to maintain a primary surplus of 4.25 percent of GDP in 2004. In addition, the Brazilian authorities would continue to reduce the share of internal debt indexed to the exchange rate or at fluctuating rates, while increasing the share of debt at fixed rate or indexed to inflation. The agenda of structural reform for 2004 would include priority to increasing financial intermediation, reduction of spreads of bank loans and improvement in the business climate. The authorities would make efforts to implement tax and pension reforms.

The Managing Director of the IMF, Horst Köhler, praised the conduct

of economic policy in Brazil after a visit to the country.[152] He stated that the authorities had followed prudential macroeconomic policies, making progress in tax and pension reforms and working on a law of default. Köhler was optimistic that the economy would recover rapidly in 2004, increasing employment, reducing vulnerabilities and accelerating export growth. Brazil positioned itself for recovery of the world economy. Following requests by the authorities, the IMF is working on the development of new guidelines of policy and statistics to grant higher flexibility in public investment within the scope of fiscal and debt sustainability.

The directors of the IMF completed a sixth review of the agreement at the end of March 2004, allowing the release of SDR911 million or $1.34 billion.[153] However, the Brazilian authorities decided not to withdraw funds. Anne Krueger stated that the Brazilian economy would grow rapidly in 2004, significantly because of sound economic policy. In particular, fiscal performance in 2003 and plans for 2004 ensure a sound trend of debt. In September 2004, Brazil announced the increase to 4.5 percent of the primary surplus for 2004 and, probably, also for 2005.

The IMF Managing Director, Rodrigo de Rato, stated that Brazil's economic performance had been impressive.[154] The government pursued sound macroeconomic policies and an ambitious structural reform to strengthen public finance. Brazil is complying admirably with its IMF program. The IMF believes that Brazil is experiencing robust and sustained economic growth. However, primary surpluses are still required because of the vulnerability of the high public debt.

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2

The G-7 and the New International Financial Architecture

An exegesis of international financial doctrine and practice by private creditors in crisis prevention and resolution proves useful in understanding policy options. The Balance of payments constitutes a restriction on economic policy in debtor countries that requires priority in current conditions.

A debtor country requires a strategy to avoid a twin crisis of its balance of payments and the internal financial sector. The country requires two teams, a roving negotiating team, similar to the American roving ambassador, convincing the G-7, IFIs, and private creditors that adjustment will not confront the new IFA and that the country will be successful in avoiding a financial crisis. Specifically, the negotiating team will have to present a convincing adjustment program, within the practice of the IFIs, designed by a management team with solid internal and external credibility. The program must be convincing to private financial institutions.

The management team would ensure that adjustment would not cause significant divergence, or even minor divergence, with the IMF agreement. The administration would crush divergences immediately.

After the Mexican crisis of 1994–95, industrial countries developed the "New International Financial Architecture" (IFA), changing policies and institutions to manage the rescue of countries in temporary liquidity crises. Choice of country to rescue, nature of the rescue and conditions of programs changed significantly. Understanding the New Financial Architecture and official doctrine by the G-7 constitutes a basic exercise to design a strategy to avoid international financial crises. Without this effort, a country is at risk of deep economic crisis, not only in the balance of payments but also in its financial sector, with threats of decline of employment and production. A country requires continuing liaison with G-7, IFIs and private financial institutions. Relations must begin well before crises.

International economists of the Clinton administration concentrated on the reform of the international financial system after the midterm elections of 1994.[1] In a famous speech at the Brookings Institution, on April 14, 1998,

Secretary of the Treasury Robert Rubin called the effort "strengthening the architecture of the international financial system," resulting in major intellectual contributions.[2] Actually, the IFIs, especially the Fund and the Bank, changed institutionally and in policy. Deep changes could actually become a new architecture.

The Federal Reserve Board of the United States determines what financial institutions it will rescue from temporary illiquidity based on the doctrine of "creative ambiguity." Banks of the dimensions of Citigroup, J.P. Morgan Chase and Bank of America are evidently too big to fail because of the fear that their bankruptcy would spread to other financial institutions and markets. However, the Fed never defined the minimum size of a bank that it would rescue, acting in a case-by-case fashion. What is important in the new architecture is what country and when is too big to fail according to the G-7 and the IFIs.

The criterion for bailout by the IFIs is the potential of a country to create a "systemic crisis." International doctrine evolved in accordance with the changing nature of international crises, much the same as domestic central banking.

Since 1995, the G-7 has been changing the mechanism of international programs by the IFIs. In practice, changes have consisted of profound reform of IFI and of institutions and markets in countries that would qualify for financing. Reforms are voluntary. However, countries that resist change are not likely to receive financing. Loss of official financing is almost certain to result in loss of private financing.

Gradually, the IFIs created a new mechanism for surveillance of countries under Article IV of the IMF: FSAP (Financial Sector Assessment Program) and FSSA (Financial Sector Stability Assessment). Surveillance includes policies as well as institutions.[3]

The G-7 and IFIs are increasingly less tolerant with divergences in conventional approach to policy and institutions of countries that are candidates for rescue programs. Lack of international repercussions of Argentina's crisis–although the country was a major factor in emerging market bonds and investment–reinforces the new posture. There is not yet a definitive verdict on systemic crisis and contagion, theoretically and empirically.[4] However, there is a new ad hoc criterion to allow problems to develop in a country if there are no immediate major crises in other markets and countries.

During the 1990s, the IFIs abandoned bailouts of countries with institutional conditionality after criticism following the Asian crisis.[5] Official intervention occurred in an environment of relatively free capital flows, apparent endorsement by the United States Treasury and the IMF of flexible exchange rates and inflation targeting, adjustment of economies under a typical IMF program and strengthening internal financial markets. Currently, there does not appear to be an emerging country that is too big to fail. Perhaps Mexico would be the only case of a mega program of financing

because of its integration and frontier with the United States.

The new architecture evolved rapidly during annual meetings of the G-7. The process constituted another example of creative ambiguity and case-by-case resolution. Every international crisis, beginning with Mexico in 1994, generated the need for an even larger bailout. Specific causes and channels of transmissions in every crisis shaped the international financial system.

The G-7 considered prevention and resolution of crises. It sanctioned the preponderant role of the IMF, in accordance with Article I,[6]in maintaining stability of the international financial system. The G-7 determined that periodic surveillance of economic and financial conditions within Article IV consultations would constitute the source of information and implementation of prevention measures.

The Financial Sector Assessment Program (FSAP),[7] a joint Bank–Fund program,[8] constitutes one of the vehicles for surveillance of economic and financial conditions of countries. FSAP considers microprudential and macroprudential indicators[9] of financial institutions, governments, corporations and individuals.[10] There appears to be a consensus in policy debates that deterioration of domestic financial sectors after external liquidity crises magnifies the impact of crises in terms of declines of production and employment. An important approach consists of analysis of the feasibility of managing foreign debt and international reserves.[11]

FSSA (Financial Sector Stability Analysis) constitutes the second vehicle of surveillance. It conducts stress tests of the financial sector to verify resilience to changes in different scenarios of variables.[12] Part of the prevention effort concentrated in harmonizing transparency, standards, codes, policy and institutions in all countries. The new architecture mobilized supervisors and regulators from all sectors to standardize financial markets and economic policy in order to improve resistance to crises.

FSSA includes a Report on Observance of Standards and Codes (ROSC)[13] which analyzes progress by the country in observing recommendations on standards and codes. From the side of monetary policy, the Basel Committee[14] generated Core Principles for Effective Banking Supervision[15] and a New Capital Accord[16] to strengthen banking systems in accordance with standards of G-7 countries. The International Organization of Securities Commissions (IOSCO) developed standards for the securities industry, the International Accounting Standards Board (IASB) provided standards of accounting,[17] the International Association of Insurance Supervisors (IAIS) provided standards for insurance supervision and the OECD contributed basic principles of corporate governance.[18]

Prevention efforts identified transparency and data dissemination[19] of financial and monetary policy as essential for adequate decisions on risk taking and supervision. The IMF started Special Data Dissemination Standards (SDDS), making available information needed to improve functioning of financial markets. The G-7 instructed the IMF itself to be

transparent and accountable in its decisions, being the subject of evaluation by an independent office.[20] The BIS led an important effort to improve systems of payments and settlement with the objective of containing internal systemic crises.

Prevention efforts depart currently from the basic principle that official financing must be limited to avoid moral hazard. Thus, private sector involvement (PSI) must increase proportionately to official financing. At the request of the G-7, the IMF is developing a mechanism for restructuring sovereign debt.

At the Fukuoka meeting in Japan in 2000, the G-7 insisted on PSI in prevention and resolution of crises. If official financing provided liquidity for private capital flight, national or international, programs would resemble a barrel without bottom. The G-7 determined on the immediate implementation of a set of PSI measures: establishment of dialogue between a country and creditors in normal times, use of instruments such as collective action clauses (CACs) for orderly resolution of crises, and CACs in bonds issued in G-7 countries and in those guaranteed by the Multilateral Development Banks (MDBs). All programs must include assumptions of how a country will recover access to credit markets, which is highly important in the case of countries with vulnerabilities. It is not possible to imagine a situation in which a debtor country with vulnerabilities would receive official financing indefinitely without any possibility of PSI.

There are three possible types of catalytic official financing. In a few cases, the G-7 believes that a country would repidly recover full access to markets. In other cases, IFIs must stimulate voluntary PSI to circumvent problems of coordination by creditors. In extreme cases, it may not be realistic to believe that the country will recover credit in the medium term, requiring debt restructuring.

From the point of view of a debtor country, exceptional financing, through any facility of the IMF, requires evidence that the country experienced an abrupt decline of confidence with adverse effects; IFIs expect rapid correction of difficulties and there are risks of contagion that may threaten the stability of international finance.

At the Halifax meeting in 2002, the G-7 announced the decision, especially on the part of the United States, to limit various forms of bailouts of countries. Proving exceptional conditions in the new environment will be extremely difficult. A debtor must avoid falling in this category to protect its domestic production and employment.

International financial institutions and forums

The objective of this section is to provide a description of IFIs and forums. There are various groups active in international financial affairs. The Group of Seven (G-7) started initially as the Group of Six, meeting for the first time

in 1975 in Rambouillet, France, including the UK, France, Germany, Italy, Japan and the United States. Canada joined in 1976 converting it into the Group of Seven. The Group of Eight (G-8) is G-7 including Russia, which has attended meetings since 1991 but became a full member only in 1998. The President of the European Commission represents the European Union but does not participate in political discussions. Originally, the meeting was a forum for trade and economic issues but gradually included political and security matters. Leaders appoint personal representatives, "sherpas," who meet regularly to discuss agendas and evaluate progress.[21] Ministers continue to meet during the year to complete work discussed at the summit. Members rotate yearly in presiding over the G-8. It is becoming common for the G-8 to invite leaders of other countries to participate in the meetings.

The Group of Ten includes a group of industrial countries – Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, UK and United States. The central banks of this group cooperate to regulate international finance. The Group of Thirty is a private, nonprofit institution whose members are distinguished in private and public sectors and academia. G-30 is a consultative group on international economic and monetary affairs.[22] It meets twice a year to discuss important economic and financial events and issues.

The IFIs include the International Monetary Fund, the World Bank Group, Bank for International Settlements and Multilateral Development Banks– the Inter-American Development Bank, the European Investment Bank and the Asian Development Bank. A group of nations created the Fund and the World Bank in 1944 at Bretton Woods to promote stable economic growth. The IMF would provide short-term assistance. The World Bank would extend assistance to countries requiring long-term reconstruction. International rules would promote growth of world trade with falling tariffs. An important motivation for the creation of new international economic institutions was avoiding repetition of the failures of the Paris conference after World War I and the Great Depression of the 1930s.[23]

Various events changed the role of the IMF in the 1990s.[24] The transition of the Soviet Union and Eastern European countries generated the need for assistance of a different nature by the IMF. That group of countries required temporary financing to implement structural reforms that could permit improved fiscal and economic management. The IMF and other institutions contributed advice and assistance in transforming countries in transition.

Capital account crises in the 1990s posed a major challenge to the international financial system. These crises occurred in emerging markets – Mexico 1994–95, Asia 1997–98, Russia 1998, Turkey 2000 and Argentina

2001–3. According to Krueger, the crises were different in nature and scale. Krueger classifies them as capital account instead of current account crises. These crises occurred after liberalization of financial flows. Crises occur rapidly and require immediate policy measures and assistance. Foreign investors lose confidence in the ability of the emerging country to service its debt. Even if economic policy is sound, there is a reversal of capital flows. Catalytic financing by the IMF intends to reverse investor expectations on the capacity of the country to service debt. However, support of a program by the IMF is no longer a guarantee for recovery of investor confidence as shown by the recent crisis in Argentina.

Currently, the IMF has 184 members that contributed $316 billion in quotas. However, total usable resources are only $150 billion. The IMF has outstanding loans of $107 billion to 87 countries. The staff of the IMF totals 2690 in 141 countries. In 2003, the IMF concluded 136 surveillance consultations, of which 96 voluntarily published the reports.[25]

IMF resources originate in quota contributions by members. The economic position of a member relative to other members largely determines its quota. The Fund denominates quotas in terms of its unit of account, Special Drawing Rights (SDR). The United States is the largest contributor with a quota of SDR 37.1 billion, approximately $55.2 billion. A country pays 25 percent of its quota in SDR or widely accepted currencies (dollar, euro, yen or pound sterling) and the rest in the member's own currency. Quotas determine how much an individual country can borrow from the IMF. The IMF conducts review of quotas every five years. Approval of quota increases requires 85 percent majority of votes. In January 1999, the IMF approved an increase in quotas by 45 percent because of the growth of the world economy, risks of financial crisis and liberalization of trade and capital flows. The IMF earns a spread between interest payments and receipts. In 2003, the IMF paid $1.8 billion to quota subscribers and other operating expenses and received $3.7 billion from borrowing countries. Administrative expenses of the IMF totaled $0.9 billion. The IMF added the surplus of around $1 billion to the General Reserves Account.

Article I of the IMF defines its major responsibilities. The role of the IMF is to promote international monetary cooperation. The Fund would facilitate growth of international trade with exchange stability. It would assist in creating a multilateral system of payments. The IMF would make resources available, under safeguards (conditionality), to member countries that experience balance of payments difficulties. Currently, prevention of crises and resolution of those that occur are the most important functions of the IMF. The tools of the IMF are surveillance to prevent crises, technical

assistance to strengthen countries and catalytic financing to facilitate crisis resolution.

The highest decision body of the IMF is the Board of Governors. There is one governor and one alternate governor for each country. The member country appoints the governor, usually the finance minister or the governor of the central bank. The Board of Governors meets once a year. It can delegate to the Executive Board all except certain reserved powers.[26]

The Executive Board conducts the daily business of the IMF. Member countries or groups of countries appoint its 24 directors. The Managing Director of the IMF is the Chairman of the Executive Board. It meets several times each week. IMF management and staff prepare papers used for decisions by the Executive Board. G-7 countries have a combined 47.3 percent of voting power, 17.14 percent is held by the United States alone.[27]

Article IV, Section 3(a) provides that "The Fund shall oversee the international monetary system in order to ensure its effective operation, and shall oversee the compliance of each member with its obligations under Section 1 of this Article." Section 1 has four obligations: implementing economic policies that foster economic growth with price stability, promoting economic and financial conditions that do not cause disruptions, avoiding manipulation of exchange rates to prevent external payments adjustment and maintaining exchange rates that are compatible with objectives. Section 3(b) authorizes the Fund to engage in surveillance of exchange rate policies of members. Moreover, each member must provide information to the Fund that is necessary for surveillance.[28]

Surveillance still focuses on exchange rate, monetary and fiscal policies. However, the IMF has added other concerns over time. The Fund added structural policies after the debt crisis of the 1980s that required structural changes. Assistance to countries in transition motivated broadening structural policies. In the 1990s, capital account crises caused significant disruption of internal financial sectors, magnifying the impact of crises. The IMF and the World Bank created the Financial Sector Assessment Program to evaluate financial sectors of countries. The Asian crisis revealed numerous institutional weaknesses in countries that could have contributed to worsening crises. In addition, financial institutions were not transparent, contributing to asymmetry of information. The IMF and the World Bank created reports on observance of standards and codes, an integral part of Article IV surveillance. The Fund continues to assess risks and vulnerabilities, expanding beyond current account and foreign debt to vulnerabilities in capital flows.

A typical loan by the IMF is an "arrangement," stipulating policies and measures that the borrowing country will implement to resolve its balance

of payments difficulties. The country formulates the economic program in consultation with the IMF. The Executive Board receives the program in the form of a "Letter of Intent." After approval by the Board, the IMF releases the loan in installments.

There are various facilities for borrowing from the Fund. The IMF disburses the largest amount of resources through the Stand-By Arrangement (SBA). The term of an SBA is 12–18 months with repayment normally within 2¼–4 years. Countries pay the basic rate, reviewed weekly by the IMF, and there are surcharges for high access levels. Normally, the SBA has a limit of 100 percent and cumulative 300 percent.

The Fund established in 1994 current limits to resources under the credit tranches and the Extended Fund Facility. Access limit is 100 percent of quota annually and 300 percent cumulatively. Assistance above these limits can occur under exceptional circumstances. The Executive Board determined in 2003 policies and procedures regarding exceptionality. There are three criteria for access. Balance of payment need considers sources of financing and reserve level. Access cannot exceed balance of payment need. The Fund needs to maintain revolving resources. Thus, it examines capacity of debt service and timing of improvement of balance of payments. Strength of adjustment program is essential in judging capacity to repay. Finally, the Fund also considers existing use of Fund resources and the history of repayment by the country.[29]

Table 2.1 shows the use of exceptional financing of Fund resources. Member countries borrowed heavily during crisis episodes in Mexico 1994–95,Asia 1997–98, Russia 1998, Brazil 1998–99, 2001–3, Argentina 2001–3 and Turkey 2000–2. Uruguay encountered problems following the Argentinean crisis in 2001 because of close financial relations of those two countries. In the past three years, use of the General Resource Account (GRA) increased rapidly, by 15 percent per year. In 2002 and 2003, the outstanding stock was higher than during the Asian crisis in 1998. Five countries–Russia, Brazil, Argentina, Indonesia and Turkey–account for 85 percent of outstanding resources at end 2003. This is a higher concentration than in 1984 after the debt moratorium.

The IMF established the Extended Fund Facility (EFF) in 1974 to assist countries with long-term balance of payments difficulties requiring structural reforms. Terms are longer for EFF, 3 years, and repayment within 4½–7 years. There are surcharges for high levels of access. The IMF created the Supplemental Reserve Facility in 1997 in response to the Asian crisis. Those countries required substantial amounts of financing in short periods, partly because of the high ratio of short-term foreign liabilities relative to reserves. The terms are for 2½–3 years, but countries may request an extension of six months. Surcharges for SRF are high, 3–5 percentage points.

Table 2.1 Exceptional financing by the IMF

Country	Type	Effective Date	SDR Million	% of Quota
Mexico	SBA	2/1/1995	12,070	688
Russia	EFF	1/26/1996	6,901	160
Thailand	SBA	8/20/1997	2,900	505
Indonesia	SBA	11/5/1997	7,338	490
Korea	SBA	12/4/1997	15,550	1938
Indonesia	SBA	7/15/1998	8,338	557
Russia	EFF	7/20/1998	15,363	356
Indonesia	EFF	8/25/1998	4,669	312
Brazil	SBA	12/2/1998	13,025	600
Indonesia	EFF	3/25/1999	5,383	259
Turkey	SBA	12/22/1999	2,892	300
Indonesia	EFF	2/4/2000	3,638	175
Turkey	SBA	12/21/2000	8,676	900
Argentina	SBA	1/12/2001	10,586	500
Turkey	SBA	5/15/2001	15,038	1,560
Argentina	SBA	9/7/2001	16,936	800
Brazil	SBA	9/14/2001	12,144	400
Turkey	SBA	2/4/2002	12,821	1,330
Uruguay	SBA	6/5/2002	1,752	572
Uruguay	SBA	8/8/2002	2,128	694
Brazil	SBA	9/6/2002	22,821	752
Argentina	SBA	9/20/2003	8,891	424
Brazil	SBA	12/12/2003	27,735	902

Source: IMF, http://www.imf.org/external/np/fin/2004/access/eng/020504.pdf

The World Bank has the same origin as the IMF in the Bretton Woods conference in July 1944. Its first loan was $250 million in 1947 to help France in war reconstruction. Currently, the focus of the World Bank is on poverty reduction. There are also 184 member countries in the World Bank Group. It has a multidisciplinary staff of 10,000 in 109 country offices, including its headquarters in Washington, DC.[30]

The World Bank provides grants, interest-free loans and technical assistance to countries. Loans have terms of 35–40 years with 10-year grace

periods. International Development Association (IDA), part of the Group, provided $8.1 billion in financing for 133 projects in 62 low-income countries in 2002. Approximately 40 high-income countries contribute to IDA every four years. Another member of the Group, the International Bank for Reconstruction and Development (IBRD), provides loans to higher-income developing counties. In 2002, the IBRD provided $11.5 billion in loans for 96 projects in 40 countries. Terms of these loans are 15–20 years with 3–5 year grace periods. Another arm of the group, International Finance Corporation (IFC), promotes private investment with support to high-risk projects and countries. The Financial Sector Assessment Program is a joint program of the IMF and the World Bank.

The objective of creation of the Bank for International Settlements (BIS) in 1930 was to manage the Young Plan on war reparations that the Treaty of Versailles imposed on Germany at the end of World War I. However, the BIS focused rapidly on cooperation among central banks and, eventually, with other agencies in promoting monetary and financial stability. The BIS is also the forum for central bank governors and experts on central banks and other agencies. The Bank conducts its own research in financial and monetary economics and contributes to collection, compilation and dissemination of economic and financial statistics.[31]

The BIS has been a banker for central bankers, providing banking functions for gold and foreign exchange transactions. It has played an important role in European payments and exchange rate arrangements. The BIS provided financial assistance in cases of currencies and in IMF programs in Mexico in 1982 and Brazil in 1998.

There are 55 member central banks of the BIS, which vote at general meetings. Voting power is proportionate to the number of BIS shares held by a member central bank. The Board of Directors has 17 members. There are six ex officio directors, consisting of the governors of the central banks of Belgium, France, Germany, Italy, the United Kingdom and the Chairman of the Board of the Governors of the Federal Reserve System. These ex-officio members appoint another member of the same nationality. The Board elects a Chairman from its members. Since 1948, the Chairman also holds the position of President. The Board meets six times a year to review reports from BIS management. The BIS employs staff of 526 from 44 countries. The Board delegates daily management of the BIS to the senior executive officer, General Manager. The BIS has three main departments: General Secretariat, Monetary and Economic Department and Banking Department. There is also a General Counsel.

The Inter-American Development Bank (IADB) is the oldest regional development bank.[32] The IADB started with a proposal by Brazilian

President Juscelino Kubitschek in 1958. The Organization of American States drafted the Articles of Agreement creating the IADB. The Bank approved $129 billion in loans and guarantees to finance projects with investments totaling $291 billion. It also provided $1.95 billion in grants and technical cooperation financing. The Bank has a Board of Governors that delegates daily operations to the Board of Executive Directors with 14 members. Voting power in the two boards is proportionate to subscription of capital to the institution.

The IADB has $101 billion of ordinary capital, 4.3 percent paid directly by member countries. The remaining 95.7 percent is callable capital guaranteed by member country governments. This capital structure, together with preferred creditor status provided the IADB by borrowing member countries, allows the Bank to issue bonds in global financial markets. The Bank has an AAA rating and issues $8–10 billion of bonds yearly. The IADB has never had losses in its loans and never had to use callable capital to pay off debt. The IADB participates in cofinancing of large projects with the World Bank, the International Finance Corporation and the Andean Development Corporation.

The Asian Development Bank (ADB) dates to 1966 and has 63 members, mostly from the Asian region. Loans by the ADB in 2003 totaled $6 billion of which 42 percent were for transport and communication, 18.5 percent for social infrastructure and 12.4 percent for energy. Two thirds of loans were to China, Pakistan and India. The ADB also engaged in $2.5 billion of cofinancing. Net income was $436 million in 2003, declining from $978 million in 2002. The Bank has $51 billion of authorized capital and $48 billion of subscribed capital.[33]

The objective of the ADB is shifting to poverty reduction. The Bank has a Board of Governors with 45 members from the Asia-Pacific region and 18 from outside the region. The Board of Directors consists of 12 directors elected by the Board of Governors, eight from the Asia-Pacific region and four others from outside the region. The directors work full-time at the headquarters in Manila.

The Treaty of Rome created the European Investment Bank.[34] The objective of the EIB group is to promote smaller business by medium and long-term financing jointly with the banking sector. It is also a source of venture capital in the region. The members of the EIB are members of the European Union that subscribed capital. The EIB works closely with banks in the region providing long-term finance for specific capital projects. In 2003, EIB approved loans of €46 billion. Subscribed capital increased from €150 billion in 2003 to €163.7 billion in May 2004. In 2003, the EIB borrowed €42 billion in 15 different currencies in many markets using multiple

instruments. Standard & Poor's and Moody have rated the EIB as AAA since its first rating in 1975, the same as Fitch since first rating in 2003. The 25 members of the EU own the EIB, three-quarters of which have an AAA rating.

The Financial Stability Forum (FSF) has organized since 1999 meetings of senior national financial authorities, IFIs, international regulatory and supervisory groups, committees of central bank experts and the European Central Bank.[35] The FSF has a small secretariat at BIS. The FSF publishes the Compendium of Standards with multiple economic and financial standards, constituting best practice in key fields. The FSF considers that these standards are important for a sound, stable and adequately functioning financial system. There are 12 key standards in the Compendium. Table 6.1 shows these standards.

The Group of Ten established the Basel Committee on Banking Supervision (BCBS) at the end of 1974.[36] The Committee meets regularly four times a year. It has 30 technical working groups and task forces, which meet frequently. Central banks and agencies responsible for prudential supervision of banking represent countries in the BCBS. The Basel Committee does not have any supranational legal authority. It recommends standards and guidelines of banking supervision. National authorities may adopt them and adapt them to their own needs. The objective of the BCBS is convergence toward a standard of best practice without detailed harmonization of supervisory standards. The BCBS contributed Core Principles for Effective Banking Supervision, one of the standards in the Compendium of the FSF. In addition, the Committee introduced the Basel Capital Accord of 1988. In 1996, it provided the Amendment to incorporate market risk. The Basel Committee is now completing work on a New Capital Accord, commonly referred as Basel II.

In 1990, central banks created the Committee on Payment and Settlement Systems (CPSS) at the BIS.[37] The CPSS is a forum for central banks of the Group of Ten to monitor and analyze issues in domestic payment, settlement and clearing. The BIS hosts the Secretariat of the CPSS. The Committee coordinates efforts by central banks to oversee payment systems. It considers efficiency and stability of payment, clearing, settlement and related issues. In addition, it analyzes relationships between payment and settlement arrangements, central bank payment and settlement services and major financial markets. The CPSS organizes working groups to conduct studies of payment and settlement systems either at its own discretion or at request of G-10 central banks. The CPSS broadened its functions by extending relations with central banks, providing organization and substantive expertise. It is also active in emerging countries, which need technical

assistance, training and support. The CPSS produced Core Principles for Systemically Important Payment Systems, one of the standards in the Compendium of the FSF.

The Committee on the Global Financial System (CGFS) is a central bank forum of broad issues on financial markets and systems.[38] The objective is to elaborate policy proposals to support central banks in the function of promoting monetary and financial stability. The CGFS focuses on threats to the stability of financial markets and the global financial system to assist governors of central banks. It monitors and analyzes sources of stress, functioning of financial markets and systems and policy proposals useful to governors of central banks. The Committee interacts with other institutions, in particular with the BCBS and CPSS.

The International Accounting Standards Board (IASB) is the successor to the organization of the International Accounting Standards Committee 1973–2001.[39] Accountancy bodies in several countries founded the institution in 1973. The IASB inherited responsibility for setting accounting standards and has its base in London. The parent entity is the IASC Foundation. The IASC Foundation is an independent organization with two bodies: the trustees and the IASB. The trustees appoint members of the IASB to exercise oversight and raise funds. The IASB has sole responsibility for developing standards, also producing the International Financial Reporting Standards (IFRS). It also adopted the International Accounting Standards (IAS) issued before 2001 by its predecessor body.

The International Federation of Accountants (IFAC) is a global organization of professional accountants. It encourages best practice by accountants in conjunction with 158 member organizations in 118 countries. Members represent 2.5 million accountants in all types of functions. The IFAC promotes best practice professional standards and international convergence of these standards. The values of the IFAC are integrity, transparency and expertise. It encourages accountants to follow these values through its code of ethics.[40] The IFAC produces the International Standards of Auditing (ISA) one of the codes in the Compendium.

The International Organization of Securities Commission (IOSCO) started as an organization of securities commissions of the Americas in 1973.[41] Currently, the IOSCO has 181 members worldwide. Members of the IOSCO regulate more than 90 percent of the global securities markets. In 1998, IOSCO adopted a comprehensive group of Objectives and Principles of Securities Regulations, the IOSCO Principles. This is an international benchmark for all markets. In 2003, the IOSCO approved an Assessment Methodology to evaluate implementation of IOSCO Principles in member countries. The CPSS and IOSCO contributed the Recommendations for

Securities Settlement Systems, one of the standards in the Compendium.

Insurance supervisors established the International Association of Insurance Supervisors (IAIS) in 1994.[42] The IAIS represents insurance supervisors from 100 jurisdictions. The Association sets international standards for insurance supervision and regulation. In addition, it coordinates work with regulators in other financial sectors and IFIs. The IAIS issued in 2003 its new Insurance Core Principles and Methodology, one of the standards in the Compendium. It also provides Principles on Minimum Requirements for Supervision of Reinsurers. In 2002, it introduced Principles on Capital Adequacy and Solvency for life and nonlife insurance. An Executive Committee with representation from all geographical areas manages the IAIS. It has also a committee on emerging markets.

The Organization for Economic Co-operation and Development (OECD) is a group of 30 countries that share a commitment to pluralistic democracy and market economy.[43] However, it involves in its work another 70 nonmember countries, including Brazil, China and Russia. Its Secretariat is located in Paris. OECD's predecessor institution administered American and Canadian assistance under the Marshall Plan. Member countries provide $200 million per year to fund a research institution with a staff of 2300. The OECD produced the Principles of Corporate Governance, one of the standards in the Compendium of FSF.

Halifax meeting of the G-7 in 1995

The Communiqué of Halifax in 1995 postulated that globalization, driven by technological change, increased interdependence in the world economy.[44] Growth, diversification and integration of world capital markets created new opportunities and risks. The G-7 defined the challenge as the administration of interdependence while maintaining macroeconomic and financial stability. Consultation and cooperation in macroeconomic policy among G-7 members would promote noninflationary self-sustained growth, without external and internal imbalance and greater stability in exchange markets. The Mexican crisis of 1994–95 reaffirmed the vision of the G-7 that coordination and consultation in economic policy would allow crisis resolution in an increasingly integrated world economy.

The Halifax G-7 meeting developed significant part of the effort to strengthen the IFA. The G-7 emphasized that success in crisis prevention required sound monetary and fiscal policies by every country. However, the meeting recommended establishment of an early warning system (EWS).[45] Effective surveillance of national economic policies, financial market events and data dissemination would complement EWS.[46] The G-7 encouraged

the IMF to publish standards of relevant financial and economic data, to identify countries that complied with data requirements and to advise members more aggressively on economic policy.

In the case of failure of prevention, the G-7 advised that larger economies and IFI implement crisis resolution with rapid coordinated action. The meeting recommended that the IMF create a new Emerging Financing Mechanism (EFM).[47]

Halifax also advised that greater cooperation in regulation and supervision of financial markets and institutions is crucial to protection of the financial system and suggested standards of prudence. Surveillance and control of risks require strengthening of standards, transparency and systems. The meeting recommended elimination of restrictions to capital markets jointly with advice by the IFIs on structures and supervision. The G-7 requested finance ministers to commission IFI research on banking and securities regulation and their effectiveness.

Halifax already suggested the implicit principle of G-7 that emerging markets would not experience crises if they had the same institutions and policies as developed countries. This constitutes a veiled form of conditionality.

Rey Report

Halifax requested from the Ministers and Governors of the Group of 10 (G-10) for an analysis on the resolution of sovereign liquidity crises. The G-10 created a Working Group that produced the so-called Rey Report, because of Jean-Jacques Rey, of the National Bank of Belgium, who presided over the proceedings.[48]

The Rey Report (RR) developed:

- Measures to prevent occurrence of crises
- Criteria to improve market discipline and surveillance of economic performance by sovereign debtors
- Changes in economic policy of sovereign debtors in expectation of declines in foreign capital inflow

The RR concluded that:

- Authorities should preserve market discipline and integrity of contracts. However, temporary suspension of debt payments during an adjustment period is valid for functioning of a program
- There should be no guarantee of bailout. Markets must evaluate existing risks of sovereign credit
- Official financing must be flexible, case by case and evolutionary
- There is no legal process of bankruptcy applicable to sovereigns

- There should be strengthening of financial markets of emerging countries to reduce risks that may spread during sovereign liquidity crises
- Credit contracts should include process of consulting between creditors and sovereigns during crises
- The Working Group analyzed lending in arrears to private creditors by the IMF during implementation of an adjustment program. It recommended that the Executive Board of the IMF review the possible extension of lending in arrears and other forms of debt, maintaining prudence and strict conditionality

The RR identified three important changes in international finance with important effects on sovereign crises:

- Domestic and international markets developed deeper and wider connections that magnify financial crises
- Securities increased their share in capital flows to emerging economies
- New money is highly unlikely

One of the major principles of the RR is that official financing in sovereign crises can generate moral hazard, interfering with market discipline. Moral hazard occurs when debtor countries, and institutions within them, manage policy, or business, without taking into account risks in expectation of rescue by international bailouts.

To avoid expectations of moral hazard, the RR identified a set of principles to resolve sovereign crises in a flexible fashion, with an approach of case by case taking into account the prevailing circumstances of the nature and intensity of crises and characteristics of each debtor. The concrete conclusion is that there is no guarantee of bailout. The doctrine of creative ambiguity prevailed at an international level. Rescue will be decided if and when need arises.

Currently, the question continues to be if a liquidity crisis by a debtor country would cause such major problems in world finance that the country could convince the G-7 and the IFIs to engage in a gigantic bailout. The possibility of exceptional official financing to a debtor country appears more remote than when the G-10 produced the RR.

The RR relied on the experience in pragmatic and flexible resolution of crises by G-10 officials over two decades. IMF programs constitute the beginning of crisis resolution. The modus operandi consists of joining voluntarily different market actors–official community, private creditors and sovereign debtor–in rapid and permanent crisis resolution.

The crises of Mexico and Argentina in 1994–95 influenced the RR. It recommended work by IFIs to strengthen financial systems of emerging economies in order to reduce risks. Banking crises in Mexico and Argentina showed how an internal financial crisis can dramatically increase output

loss during an initial crisis of external liquidity. The Report advised of the necessity of clauses in credit contracts to encourage consulting among creditors and debtors, PSI. Increases in shares of securities in foreign debt significantly reduced negotiations with creditors.[49]

Probably, the most important principle of the RR was accepting Fund lending in arrears. In the case where a country adopted an appropriate program of adjustment approved by the IMF, while negotiating with its creditors, the Fund could lend in arrears. The IMF strengthened its role as the key institution for sovereign crisis resolution.

Lyon meeting of the G-7 in 1996

There was less emphasis on architecture in the Lyon meeting of 1996 because there had not been an international sovereign crisis.[50] Participants at the meeting agreed that expansion of wealth and prosperity constituted a beneficial impact of globalization. Benefits would be in the form of growth of trade and investment, dissemination of information and technology and proliferation of technical jobs. However, countries must follow adequate economic policies and structural reform to control risks of instability of global financial markets.

Control of risks required increasing international cooperation. An important area of this cooperation consisted of the capacity to respond to crises differing in nature and scale. Lyon recognized the importance of policies of industrial countries in promoting growth without inflation. The prime objective was promoting global growth of trade to spread prosperity and employment. Advanced countries should reduce internal and external disequilibria to attain international monetary stability. Economic policies to attain these objectives should consist of credible programs of fiscal consolidation, successful control of inflation, structural reforms and resulting lower interest rates.

The meeting emphasized control of positions in markets with standards of capital, adequate capital, disclosure of information and market surveillance. Improved management of risks and transparency of information constituted important pillars. IFI should promote effective structures of supervision in emerging economies.

Greenspan in the debate

Seeds planted in Halifax and Lyon to strengthen the architecture of the international financial system rapidly genrminated research and changes for a deeper and wider agenda in the Denver meeting in 1997.

The Chairman of the Federal Reserve Board, Alan Greenspan, contributed an important document on prudential supervision and regulation to the Denver meeting.[51]

Greenspan departs from the principle that no market lacks at least some regulation. Because of personal and institution interests, financial institutions are self-regulated. That is, private institutions implement their own risk control. Credit committees monitor limits of positions relative to capital. Financial institutions also impose internal limits on trading, margins and collateral. The key issue is whether government intervention improves self-regulation by private institutions and at what cost. Potential or actual intervention by government can reduce self-regulation of financial institutions, causing moral hazard.

Greenspan is concerned with the role of safety nets of financial systems. In exceptional cases, central banks provide liquidity to highly illiquid portfolios of financial institutions. Financial institutions intermediate excess funds from savers to investors, providing an important function for self-sustained growth. If authorities and statutes restricted banks in their lending to 100 percent of capital, there would be no need for safety nets. Banks generate leverage for loans in excess of their capital by accepting deposits from the public. Safety nets of central banks permit leverage of the private sector in excess of what would occur in perfectly free markets.

Safety nets introduce a spread between a bank's risk and its cost of capital, permitting more leverage than in the absence of a central bank. There is a greater need for supervision and regulation of financial systems because the safety net reduces the observed cost of capital relative to the actual risks of the system as a whole. Without supervision and regulation, there would be a nonzero probability of risks of financial systems. To prevent crises, the financial system requires a lender of last resort (LOR) which can create unlimited amounts of money. Therefore, central banks provide financial insurance against catastrophe. Cost of capital for financial institutions should consist of the expected rate of return for the economy adjusted by risk. The higher the leverage, the higher the rate adjusted by risk. The objective function of a bank consists in maximizing profits from leverage because of the presence of the safety net.

According to Greenspan, central banks should not prevent all failures of banks but rather avoid spreading of those that occur. At an abstract level, cost of bailout should be equivalent to present current and future social cost of loss of employment and economic activity. Bank rescues have been very expensive, from a few percentage points of GDP to 30 percent or more.

There are serious complications in extending analysis to cover international finance. There is significantly less regulation in the case of nations than

in domestic financial institutions. Political influence may distort credit allocation and leverage. There is not yet a definitive verdict of theory and measurement of contagion among nations.[52] The measurement of international costs of crises constitutes a theoretical and empirical challenge. Costs of bailout of countries should consider that assistance consists of loans that countries must repay. There are conceptual and empirical difficulties in extending the rationale of the safety net of an individual country to the world as a whole. However, there is a version of an international safety net applied, in practice, with creative ambiguity, similar to that of a national monetary authority.

Greenspan observes that integration and efficiency of financial markets increased the rapidity of world crisis propagation. Even if fundamentals constitute the only form of propagation of crises, without "pure" contagion, transmission rapidity increased. Technological factors of globalization in the real sector are similar to those that influence financial integration of markets.

Transparency and availability of information on risk management processes to market participants constitute an important aspect of Greenspan's proposal as well as of the G-7. Transparency and information are essential for market participants and regulators and also to financial institutions that can thus evaluate their methods in relation to the market. However, Greenspan recognizes limitations in the central bank's capacity to inspect and evaluate risks of diversified global financial institutions.

Denver meeting in 1997

The G-7 met in Denver on June 20–22, 1997, coinciding with the beginning of the Asian crisis that started on June 25, 1997, when Thailand's exchange difficulties surfaced. The agenda in Denver included opportunities and challenges to global stability caused by growth, globalization and complexity of international financial markets.[53] Greater efficiency of international financial markets would constitute a major benefit that could promote and spread growth of the world economy. The G-7 warned about controlling possible risks of contagion, preserving financial stability without restricting innovation to reap the benefits of liberalization and competition.

Denver warned against "regulatory arbitrage," consisting of migration of financial activities to less regulated markets. The meeting encouraged the Fund, the Bank and other IFIs to monitor risks and control possible systemic effects of contagion. It concluded that international cooperation among central banks, including sharing information, constituted an essential aspect of evaluating global risks and taking prompt measures.

The G-7 emphasized that financial institutions involved in global transactions should acquire systems to measure, monitor and control risks, while having adequate capital. Insolvency or liquidity problems of global financial institutions could affect payment and settlement systems.

Denver recognized significant progress in strengthening the architecture. Supervisors researched risk management by global financial institutions, developing criteria on adequate control systems. The Basel Committee supervised the implementation of the 1996 amendment to incorporate market risks, providing adequate capital for trading risks.[54] The Committee developed principles to evaluate rate risks by banks. IOSCO began to analyze the minimum capital standards of supervision of securities. The Committee and IOSCO began a process to provide supervisors information on derivatives.[55] The G-10 continued efforts to reduce risk in settlement of exchange transactions through the Committee on Payments and Settlement Systems (CPSS).[56]

The G-7 encouraged improvements in standards of accounting, internal controls and risk management. Supervisors should analyze the possibility and convenience of greater disclosure in financial reports. It called for principles to evaluate the capital positions of regulated enterprises, including those affiliated to financial groups.

The Basel Committee prepared consulting work on the Core Principles for Effective Banking Supervision and another on improvements in supervision of offshore banks.[57] The BIS, IOSCO and IAIS increased representation of emerging markets in their work. This was the beginning of ROSC, Reports on Observance of Standards and Codes, which has become an important component of yearly consultations under Article IV.

The G-7 requested emerging markets to implement macroeconomic policies in a framework of market competitiveness and transparency. It requested the IMF to focus on stability and surveillance of the financial sector. The G-7 asked the Fund, the Bank and other international supervisors to report progress at the 1998 meeting.

Many of the elements of the new architecture had been created by 1998: transparency and disclosure, standards of advanced countries in all markets and economies, strengthening of supervision and regulation and predominant role of the IMF, the World Bank and BIS. In a few years, there was a major transformation of the organization and functioning of the international financial system. Of great interest to debtor countries, there was an increasing refinement of the doctrine of creative ambiguity, or what country and when IFIs would rescue from a twin crisis.

Birmingham meeting in 1998

The Birmingham meeting occurred after the profound Asian crisis of 1997–98. Revealingly, the subject was "Strengthening the Architecture of the Global Financial System," incorporating the famous phrase of Secretary of Treasury Robert Rubin.[58] The departing premise of strengthening architecture was crisis prevention–that is, reducing probability of incidence of crises–and crisis resolution–or improvement in management of crises that occurred.

The meeting postulated that self-sustained growth required risk taking by financial institutions, commercial enterprises and entrepreneurs. Authorities should not eliminate entirely risk of failure. Large financial institutions should be sufficiently strong to absorb occasional failures while at the same time prevent risks that threatened the international financial system. A major principle enunciated that policies promoting self-sustained growth without inflation constitute the best way to avoid financial crises. The meeting proposed that ownership of programs by countries receiving financing would constitute a condition for success of IMF programs. Implementation of a program requires that an IMF member believe in its ownership.

Birmingham identified five areas of action to strengthen IFA. Transparency is the first area.[59] Availability of economic data, without errors and with timely disclosure, is essential for economic management, risk evaluation by investors, stability of markets and surveillance by monetary authorities. The Asian crisis showed the need for precise and timely information on international reserves and short-term assets and liabilities of the financial sector.

Work in progress on transparency included organization and publication of data by the BIS on external exposures of banks. The G-7 requested the IMF to encourage its members to provide transparent data within surveillance work on Special Data Dissemination Standards (SDDS). Key data in this effort included internationally comparable measurements of reserves, external exposures and indicators of stability of the financial sector. It suggested that the private sector also use SDDS. The meeting proposed that countries provide qualitative information on their financial sectors, markets, institutions, laws, bank supervision, procedures of bankruptcy, credit culture, structures and techniques of banking sectors and relations of banks with the government, other banks and industry.

The G-7 affirmed that transparency of the process of economic decision-making would help to prevent crises and obtain public support for good policies. It praised the Code of Good Practices on Fiscal Transparency

of the IMF and suggested a similar one for monetary and financial policies,[60] encouraging their use in Article IV surveillance. The meeting stimulated IFIs to focus on governance and disclosure of policy decisions in their operations and surveillance.

At Birmingham, the G-7 emphasized that transparency should be extended to the Fund, the Bank and MDBs. Public information notices (PIN) of the IMF constituted a vehicle of disclosure for consenting members of consultations under Article IV of the IMF. The Fund could consider publication of consultations under Article IV, letters of intent, policy essays and other country information on approval by relevant members and avoiding adverse impact on markets. The World Bank could consider greater disclosure within the strategy of country aid. The G-7 instructed the Fund and the Bank to promote greater understanding of their roles in the world economy by explaining publicly their policies and procedures.

Global capital flows constituted the second field of action. The G-7 declared that greater allocation of capital would promote economic development. However, the Asian crisis led to deterioration in global capital markets, causing higher risks and vulnerabilities in countries with weak financial fundamentals. Inadequate liberalization of capital markets generated vulnerabilities. Authorities must strengthen national financial systems during liberalization to eliminate vulnerabilities. The Fund, the Bank, BIS and OECD should play a larger role in strengthening capital markets. These institutions should provide more information to markets to promote stability.

Strengthening national financial systems and corporate governance was the third field of action by the G-7. The meeting argued that the IMF could have detected and mitigated the Asian crisis if supervisors, IFIs and market participants had information on the weakness of Asian financial markets and their vulnerability to external shocks. It requested improved evaluation of risks by members of the G-7. Supervisors, cooperating in Basel and elsewhere, should encourage improvements in country risk analysis by private financial entities, better supervision of large financial institutions and monitoring of external liquidity. There was concern by the G-7 to eliminate asymmetry of information in financial markets.[61] Errors in evaluation of risk occur because creditors do not have information on the real situation of debtors and, similarly, central banks do not know the actual situation of financial creditors.

The meeting stimulated countries to guarantee that financial institutions have information, methods and corporate incentives to take adequate credit and risk decisions under proper supervision and regulation. Countries should encourage regulators of financial institutions and corporations to

disclose precise accounting and auditing reports. Local markets of securities with depth, transparency and disclosure of information should constitute an alternative to short-term foreign debt.

Birmingham recognized the need to develop internationally accepted principles of accounting and auditing with disclosure and assurances of their implementation. It welcomed the OECD's corporate governance initiative and a report it would deliver in 1999.[62]

The G-7 affirmed that confidence in emerging countries requires establishment of appropriate and transparent standards to maintain access to capital markets. The Fund focused on surveillance of the financial sector, especially within Article IV. Birmingham encouraged the Fund to work with supervisors to promote the Core Principles of Effective Banking Supervision contributed by the Basel Committee. IFIs and international regulatory institutions should play an important role in technical assistance and advice on strengthening and restructuring financial systems in emerging markets. The meeting recommended multilateral surveillance of national financial systems and their supervision and regulation. Surveillance could include supervision of banking and securities, accounting, disclosure and bankruptcy codes.

Sharing by by the private sector and moral hazard constituted the fourth field of action by the G-7. Private sector involvement (PSI) consists of sharing of the costs of lending decisions in crisis resolution by private creditors. Programs should manage debt arrears in such a form that private institutions share part of costs.

National policy should guarantee that supervisors provide lender of last resort financing in local currency only when there is real systemic risk. The Fund should have the capacity to lend in arrears to countries. PSI must occur even when a country incurs arrears.

Resources and financing by IFIs was the fifth area of action by the G-7. The Asian crisis required substantial commitments by the Fund and other IFIs. As a result, the G-7 endorsed the creation of a Supplemental Reserve Facility (SRF). It encouraged implementation of a New Arrangement to Borrow (NAB) and bilateral financing.

The G-7 encouraged global dialogue to ensure participation of countries. It proposed development of the Interim Committee of the IMF to provide more effective and deeper conditions for dialogue.

At a point, the IMF estimated that the Asian crisis could have cost 1 percent of world GDP. There was a significant international effort by technicians and academicians to analyze the causes of crises, their prevention and rapid resolution. The G-7 was concerned with criticism of conditionality and nation building in rescue programs. Consequently, the G-7's mission

became an effort to structure financial markets and institutions of emerging markets, and even those of advanced countries, in accordance with recommendations by central banks, supervisors and regulators. The G-7 was motivated to prevent repetition of crises in the future and to attain immediate resolution because of loss of output and employment, with possible political consequences.

Meeting of the G-7 in Cologne in 1999

After the Birmingham meeting in 1998 there was a new international crisis: the moratorium of Russia in August 1998, the loss of reserves by Brazil requiring another IMF program and, within the G-7, the episode of Long Term Capital Management (LTCM), followed by Brazil's devaluation in January 1999. Once again, finance ministers of the G-7 discussed policies and institutional reforms to contain international financial crises.[63]

Th ministers of G-7 agreed on the following principles:

- The IMF and the World Bank play a central role in the international economic and financial system and promote cooperation among countries
- International supervisors and regulators are essential in strengthening the international financial system
- IFIs, supervisory and regulatory institutions must strengthen transparency and performance
- A wide spectrum of countries must be included in discussions on how to adapt the international financial system to changes in global environment

The IFIs created a Financial Stability Forum (FSF) to widen international cooperation and coordination in supervision and surveillance.[64] Three initial areas of work consisted of implications of highly leveraged institutions, offshore centers and short-term capital flows.[65]

The Interim Committee of the IMF became a permanent forum with a different name, International Monetary and Financial Committee (IMFC) within the IMF.[66] The IMFC constituted another step in strengthening the IMF as the major institution of cooperation among nations, especially in macroeconomic and monetary affairs as provided in Article I of the Fund. The IMFC would meet biannually just before meetings of ministers of the G-7. Brazil, Argentina and Mexico are members of the IMFC, which widened dialogue within the international financial system. It constitutes an important bridge of communication with the G-7 and is one of the most important forums in international financial affairs.

The G-7 agreed to improve effectiveness of the IMF and other IFIs by:

- Continuing monitoring of policy commitments while there are purchases of Fund resources but also after the end of conditionality to encourage good performance
- Focusing IFIs where they possess greater comparative advantage, encouraging ownership of programs
- Increasing accountability of results by the IMF with improvement in transparency, process of decisions and flow of information
- Deepening surveillance of the IMF, specifically on large and abrupt flows of capital across borders
- Encouraging the IMF to continue evaluations of various programs, policies and procedures

Cologne emphasized that precise information permits better evaluations of risks by investors and of policy by regulators. It acknowledged asymmetry of information, which means that investors do not know precisely the situation of debtors, and supervisors the actual situation of investors. The meeting recommended improvement of SDDS and data on debt. The IMF introduced a draft of the Code of Good Practices in Monetary and Financial Policies. The Fund continued its efforts of transparency in its own operations and in member countries.

The Basel Committee, IOSCO and IAIS established the Core Principles in their respective areas of responsibility. The BIS Committee on the Global Financial System (CGFS)[67] concentrated on ways to increase disclosure of information on markets. The Committee on International Accounting Standards completed a set of basic principles of international accounting standards. The G-7 instructed their implementation after harmonizing principles.

Concerned by the LTCM, the G-7 reiterated that creditors and investors tend to underestimate financial risks in their pursuit of high returns. The G-7 recommended prudence in leverage and in evaluation of credit risks in emerging markets.

The G-7 stimulated industrialized countries to:

- Improve evaluation and management of risks
- Evaluate implications for supervisors of HLI[68]
- Encourage offshore centers to adopt international standards

Cologne postulated that diverse individual characteristics cause differences in choice of the best exchange regime for a specific economy. However, exchange stability depends on adequate macroeconomic policies and solid financial systems. It agreed that IFIs should not provide official financing to countries with heavy intervention in the market to sustain an exchange policy that is inconsistent with internal policies. The meeting recommended the IMF to continue research on exchange rates.

The G-7 emphasized improvements in financial supervision in emerging economies. Specifically, it encouraged the creation in September 1998 of the Financial Sector Liaison Committee, a joint effort of the IMF and World Bank, and the FSAP, the Financial Sector Assessment Program.

The G-7 instructed the IMF to continue liberalization of international capital flows. Specifically, it recommended improvements in availability of data. The Financial Stability Forum would be concerned with short-term capital flows.

The ministers of the industrialized countries adopted principles for debt management to:

- Motivate longer maturities and whenever possible in domestic currency so as to attain debt structure with less vulnerability
- Avoid incentives to short-term debt
- Create internal securities markets with longer maturities
- Include contractual clauses in sovereign bonds that permit orderly restructuring
- Manage debts to avoid liquidity risks

Cologne also announced a set of PSI principles:

- The framework of crisis resolution should not distort the obligation of countries to pay their debts fully in accordance with contracts
- Market discipline will function adequately only if creditors share risks
- Reduction of payments to the private sector during a crisis may contribute to meet required financing by a country
- Debts to bondholders should not have priority of payments to banks
- Management of crises should stimulate solutions based on cooperation between the debtor country and its creditors within a previously stipulated dialogue

The Asian crisis generated concerns of moral hazard because of the unprecedented magnitude of bailouts. The G-7 reiterated the validity of the principle of resolution case by case, with flexibility, within creative ambiguity. There was particular concern that official financing may simply provide liquidity for capital flight of private investors, national and foreign. Therefore, the meeting outlined a set of tools by the international financial community conditioning official financing to:

- Negotiations between a country and its creditors to explain adjustment programs
- Efforts by the country to seek voluntary sources of financing and new money from private markets
- Efforts by the country to obtain commitment by private creditors to maintain their exposures
- Efforts by the country to restructure or refinance its obligations

It stipulated further to:

- Impose a floor on reserves that guarantees the contribution by the private sector
- Allow loans by the IMF in arrears whenever the country seeks a cooperative resolution with its creditors
- Permit capital and exchange controls in exceptional cases under an IMF program

Meeting of the G-7 in Fukuoka in 2000

Major measures of strengthening architecture had occurred because of work by international forums, which continued to improve national and international financial institutions with the objective of avoiding crises and resolving those that did occur. At the Fukuoka meeting of the G-7 in Japan, participants welcomed progress in improving the international financial system.[69]

Many emerging countries promoted stability by strengthening their financial sectors, adopting adequate exchange rate regimes, improving debt management and adopting standards and codes. The IMF improved implementation of standards and codes. The IMFC replaced the Interim Committee. The FSF initiated its operations in 1999, contributing to improved functioning of markets and reducing systemic risk.

Fukuoka concentrated on reform of the IMF. Governors of central banks elaborated key principles for the Fund. It would continue to play a central role in macroeconomic and financial stability. The IMF would be transparent, accountable for its work and evaluated independently.[70] Fund objectives would be reduction of vulnerabilities and prevention of international crises. Tools included surveillance of financial and economic conditions and implementation of standards and codes. Medium-term financing would be the vehicle to help in resolution of crises. The Fund should avoid distortions in risks and returns of investments, assuring PSI.[71]

The G-7 decided that the IMF would design its surveillance activities within Article IV, focusing on macroeconomic policy, stability of the financial sector and, specifically, indicators of national liquidity and bank risk. It stimulated the IMF to coordinate and implement ROSC, an important ingredient of joint work with the World Bank in the FSAP.[72] The meeting recommended that countries publish their FSSA reports. The process of evaluation by the IMF–World Bank should include 12 key codes included in the Compendium of Standards of the FSF.[73]

Countries should increase their transparency and disclose intentions and progress in implementation of standards and codes. The G-7 emphasized that countries must feel ownership of programs of standards and codes, the only way in which they will maintain them and implement them vigorously. The objective was to increase efficiency in markets and by supervisors through elimination of information asymmetry.

The IMF should continue simplification of its credit lines. The Fund created the Credit Contingent Line (CCL) to ensure that countries observe standards and improve relations with creditors in accordance with predetermined policies. Unfortunately, the CCL did not attract demand because of fear by countries of downgrading their country risk evaluation. Stand-By Arrangements (SBAs) and Extended Fund Facility (EFF) allowed the solution of temporary difficulties of balance of payments and structural reform programs. The Supplemental Reserve Facility (SRF) permits a rapid response by the Fund in a magnitude required to contain systemic crises. SBAs should continue to be the facility for short-term financing and the EFF would be the vehicle for medium-term structural reforms. The CCL requires revision to increase its attractiveness. The SRF would be the instrument to contain systemic crises.

The G-7 gave priority to transparency and accountability by the Fund. IMF documents should be available to the public. The Executive Board should continue to participate in formulation of country programs. The Independent Evaluation Office (IEO) would start operations in one year. The meeting decided that transparency and accountability were essential if the IMF were to comply with its functions.

Fukuoka insisted on PSI in crisis prevention and resolution. If official aid provided resources only to facilitate exit by private capital, national or foreign, programs would be a barrel without a bottom. The G-7 decided immediate implementation of a set of PSI measures: establishment of dialogue between a country and its creditors during normal times, use of instruments such as collective action clauses to foster orderly resolution of crises and use of these clauses in bonds issued in G-7 countries and in those guaranteed by the MDBs. All programs should include assumptions of how a country can regain access to credit markets, which is extremely important to debtors. It is difficult to visualize official financing to a debtor without any possibility of regaining at least short-term credit.

There are three types of cases. The G-7 found that only in some cases would official financing and adjustment policies permit a country to regain full access to markets rapidly. In other cases, there would be a need to encourage voluntary approaches to circumvent problems of coordination by creditors. In extreme cases, it may not be realistic to believe that a country

will regain credit in the medium term; then debt restructuring would be required.

In extreme cases, IMF programs should conform to the following operational principles:

- Emphasize financial viability in the medium term with the IMF determining the appropriate degree of economic adjustment
- Find equilibrium between contributions of official and private financing, maintaining comparability with Paris Club negotiations
- Ensure fair treatment of different creditors and ample participation of all
- Hold debtor countries accountable for negotiation with private creditors without management of details by IFIs
- Inform countries in advance of possible consequences in their programs, especially in official financing, resulting from failure to obtain required participation by private creditors in accordance with maintaining sustainable medium-term payments
- After decisions, the IMF should announce publicly which policy frameworks are in accordance with Cologne

Meeting in Rome in 2001

The G-7 acknowledged progress by the IMF in revising credit lines to use resources more effectively and strengthen the catalytic role of official financing.[74] The IMF improved its surveillance activities by creating the Department of International Capital Markets to establish a constructive dialogue with the private sector. It also continued joint work with the Bank in the FSAP, FSSA and ROSC.

The G-7 continues to focus on PSI as an integral part of efforts to strengthen the architecture of the international financial system. It would be the only way to ensure sustainability of payments in the medium term to guarantee official catalytic finance. Program objectives should not encourage default but rather, on the contrary, promote agreement between a debtor country and its creditors by voluntary cooperation.

To ensure PSI, the G-7 resolved that debtors should share information in periods of market tranquility to develop a dialogue that could be of critical importance during crises. Orderly resolution of external crises would require collective action clauses in contracts and IFIs should encourage them.

If a debtor country were to require exceptional financing, by any facility of the IMF, there would have to be: evidence that the country experienced an abrupt decline of confidence with adverse repercussions, that prompt

correction of difficulties is expected and that there are risks of contagion that could threaten the stability of the international financial system. Fund programs should include evaluation of medium-term sustainability of debt, balance of payments and private capital flows during program implementation.

The G-7 suggested IMF revision of its policy of lending in arrears. The Fund and the Paris Club should act jointly, guaranteeing participation of the private sector and comparability of conditions. All programs should be transparent with evaluation and monitoring ex post of private sector participation. The meeting stimulated continuing liberalization of international capital flows coupled with sound internal policies and a realistic exchange rate that jointly promoted internal stability.

Halifax meeting in 2002

The meeting continued to focus on similar subjects.[75] Part of the relevance for debtors concerned the treatment of Argentina. A debtor country can expect different treatment relative to Argentina only if it avoids divergences, significant or otherwise, with IFIs.

The G-7 emphasized discipline in size and conditions of exceptional financing. It noted progress by Argentina in fiscal affairs, but stated categorically that much more was required in the monetary framework and in bank restructuring. Therefore, the meeting sanctioned the doctrine that there would not be rescue for all countries. The G-7 decided to limit official financing and increase private sector cooperation. A new action plan would guarantee that all countries attain investment grade in the future, which the G-7 found feasible with appropriate policies but appears doubtful.

The new Halifax encouraged collective action clauses in contracts.[76] However, it suggested more independence in the role of the IMF in surveillance and official financing. Surveillance of economic conditions should incorporate more analysis of sustainability of debts, including market information. The G-7 agreed to support reforms for collective action clauses in contracts even if they required changes in the articles of the IMF and in member country legislation. Halifax incorporated a new position, especially on the part of the United States, to limit various forms of rescue packages for countries. Proving exceptionality in the new environment will be quite difficult.

Meeting at Evian after the Iraq War

The G-7 members reaffirmed their commitment of multilateral cooperation to continue the Action Plan on International Trade and promotion of the Doha Development Agenda.[77] Members agreed to continue the joint effort of coordinating macroeconomic policy to ensure external and internal sustainability, contributing to a strong global economy.

At Evian, the G-7 maintained the commitment on business governance, strengthening market discipline and increasing transparency. Participants acknowledged progress in improving the framework of prevention and resolution of crises. This framework is vital to attract private investment in emerging countries. As a result of the meeting, the IMF will continue surveillance in a form that is more comprehensive, independent, accountable and transparent. This includes a strict discipline in providing official financing. The Fund was also directed to make progress in the restructuring of sovereign debt. Meanwhile, the G-7 will continue the commitment to collective action clauses (CACs) building on concrete efforts by various countries. Issuers of debt, the private sector and the official community will jointly develop a Code of Conduct.

The G-8 issued a joint declaration to promote a responsible market economy.[78] It postulated that efficient capital markets are indispensable to attain and maintain economic growth. Economies require sound legal systems, effective regulation and transparent processes of corporate governance. Disclosure of information constitutes an important factor in sound functioning of markets. Stockholders and investors can take better decisions with accurate information. Regulatory agencies require sound information to fulfill their functions, monitor markets and identify vulnerabilities. Consequently, the G-8 ratified the need to continue improving corporate governance and transparency.

The G-7 ministers expressed commitment to economic growth in a framework of external and internal sustainability, structural reforms and sound macroeconomic policies.[79] Europe was to implement reforms to markets of labor, capital and products to foster a more flexible economy. The United States was to generate employment, encouraging savings and investment by the private sector. Japan would continue its attempts to control deflation together with structural reforms, including both financial and nonfinancial sectors. Canada would invest in productivity, maintaining monetary prudence and fiscal equilibrium. Russia's path lay in continuing structural reform, especially in finance.

The ministers postponed to September the analysis of the New Basel Capital Accord, Basel II, after completion of the consultation process by

the Basel Committee. They commended a proposal by the FSF on potential financial vulnerabilities, corporate governance and related subjects. The ministers adopted a principle to develop international accounting standards, applied, interpreted and regulated in accordance with principles of financial stability.

The G-7 ministers and governors of central banks urged emerging countries to implement sound policies, strengthen their investment environments and reduce vulnerabilities. They praised "ambitious" structural reforms by the Brazilian authorities.[80] The G-7 financial authorities reaffirmed their commitment to strengthening measures of crisis prevention and resolution.

Ministers and governors of central banks of the G-7 evaluated progress in various areas of the Action Plan agreed a year before in April 2002:

- *Surveillance and crisis prevention.* The Fund deepened its surveillance capacity with more robust analysis of sustainability and national accounts. Surveillance will be more comprehensive, independent, accountable and with more evaluation of vulnerabilities. The G-7 requested that the Fund prepare a study on currency mismatches
- *Access limits.* Ministers and governors supported the decision by the Fund to limit normal access to 100 percent of a country's quota in a given year and the cumulative total to 300 percent of the quota. Any loan above these limits would be exceptional. The Fund developed criteria and processes for decisions on exceptionality that it would apply even if a country experienced a capital account crisis. The IMF would only use the Supplemental Reserve Facility (SFR) for strong pressures in the capital account of the balance of payments
- *Code of conduct.* Consultations with government officials and private sector would result in a proposal of code of sound practices
- *Collective action clauses (CAC).* The G-7 is committed to incorporating CACs rapidly and widely in bonds. They welcomed the leadership of Mexico in including CACs in its issues of bonds within the jurisdiction of New York
- *Sovereign Debt Restructuring Mechanism (SDRM).* The Fund should continue work on aspects of the SDRM such as aggregation, type of debt and others related to rapid resolution of crises

Dubai, Boca Raton and New York

At the Dubai meeting in September 2003, the monetary authorities of the G-7 welcomed implementation of macroeconomic policies and structural reforms by the Brazilian authorities.[81] They continued to monitor progress

in economic analysis and risk measurement incorporated in prices of financial assets. The IMF improved the process of country surveillance with more robust analysis of debt sustainability, placing emphasis on national accounts. Authorities urged the Fund to improve analysis of vulnerability, including currency mismatches. They endorsed the decision by the Fund to limit normal access to 100 percent of quota in a year and a cumulative of 300 percent of quota. The IMF would consider as exceptional withdrawals above those levels, with special criteria and decisions. The Fund would only use the SRF in exceptionality. As on other occasions, financial authorities continued to promote CACs in securities of emerging countries.

At the meeting in Boca Raton, Florida, in February 2004, the financial authorities of the G-7 issued a warning to Argentina.[82] They instructed that country to follow policies in accordance with the IMF program. In addition, the financial authorities suggested that Argentina should attain constructive involvement with its creditors to obtain a high rate of participation in debt restructuring.

The United States intermediated relations of Argentina with the G-7 and the Fund. The Executive Board of the IMF decides release of withdrawals (or "purchases"). Most directors of this Board are representatives of G-7 countries.[83] In the first review of the program in January, Italy, Japan and the UK abstained from voting, an extremely rare event, especially for Japan, which always follows the United States. While Argentina complied with monetary and fiscal targets, there was significant concern with an agreement to restructure more than $80 billion of defaulted debt.

Comments by the G-7 during the Boca Raton meeting reflected growing disappointment by the United States and a stronger united front by several members of the G-7. The Fund insisted that Argentina negotiate with the Global Committee of Argentine Bondholders (GCAB) which represents a wide spectrum, from small investors to hedge funds. The GCAB represents bondholders with a share of more than 50 percent of defaulted bonds. The IMF demanded that Argentina obtain approval of more than 50 percent of creditors and that the country authorize retained investment banks to advise in organization, restructuring and marketing.

Treasury Secretary Snow mentioned the ongoing strategic review by the G-7 of the IMF and World Bank during the meetings of finance ministers in New York on May 23, 2004. He stated that ministers had commended recent reforms, such as limits on exceptionality, CACs, grants by the World Bank and quantifiable results management by IFIs. The G-7 intends to continue this review with participation of the institutions and their shareholders. The G-7 also expressed satisfaction with enhanced surveillance and streamlined conditionality. Finance ministers expressed the view that reforms should

also include accountability, good governance, transparency, clarity of objectives and effectively working with markets.[84]

Professor Rogoff, former economic counselor of the IMF, believes that it would have difficulties in facing another rescue program of a major country such as Brazil.[85] From 1970 to 2003, world GDP increased from $3372 billion to $36,163 billion. The IMF has usable funds close to $151 billion. This may not be sufficient to face a crisis in a large country or a region. There have been seven defaults by Brazil, five by Argentina, nine by Venezuela and six by Turkey. The United States Treasury is leading the review of the IMF and presses for CACs, which allegedly would make defaults easier to manage and require lower funding by the IMF.

The review could result in ceilings for IMF lending on exceptionality. However, moral hazard may occur at the G-7 itself because of geopolitical concerns, especially in a new world of armed conflict. The United States Treasury also defends restriction of the IMF to macroeconomic issues, without involvement in microeconomic reforms. It is unlikely that the review could lead to drastic changes unless there is another major emerging market event. Argentina failed to create that environment because its crisis did not spread to other countries and markets.

The International Monetary and Financial Committee (IMFC)

The IMFC constitutes one of the major international forums, a sort of widened G-7 that orients policy of international financial assistance. The IMFC meeting on September 29, 2002, considered crisis prevention and resolution.[86]

On prevention, the IMFC emphasized transparency within implementation of standards and codes, as part of the IMF process of surveillance of economic conditions under Article IV. The Committee recognized progress in assessing debt sustainability and its incorporation in the process of surveillance of members.[87] Special emphasis would be on countries that could generate systemic crises, not only from a global perspective, but also at the regional level. It stimulated the FSAP process, including the ROSC and corporate governance.

On crisis resolution, the IMFC considered the need to continue implementing contractual clauses as well as a request from the IMF for a mechanism of sovereign debt restructuring. It examined conditions for exceptional financing and their implementation.

In the report to the IMFC in 2001, the Managing Director of the IMF specified initiatives to prevent crises.[88] The general philosophy consists of reforms of systems and crisis prevention.

Reforms of the international financial system arising from the Asian crisis of 1997–98 included:

- Transparency in economic policy and timely disclosure of economic data within acceptable international standards
- Strengthening of internal financial systems, especially prudential supervision
- Encouragement of monetary and exchange regimes that are less vulnerable to crises
- Improvement of vulnerability analysis and formulation of economic and financial policy

Impulse for reforms and activities originates in G-7 meetings, the IMF, other IFIs and forums of dialogue and consultation (IMFC, FSF, CGFS, CPSS, IOSCO, IAIS and OECD). The IMF strengthens surveillance of countries and crisis prevention using multiple instruments.

Means to reduce external vulnerability after crises in the 1990s consider greater participation of private international financial capital in emerging markets, interrelation among global markets and causality among domestic institutions and corporations and the impact of crises on economies of countries. Beginning on October 22, 2001, the Fund's Executive Board began continuing monitoring of progress in evaluating external vulnerability of member countries, especially emerging economies.

The Executive Board sanctioned efforts to combine quantitative analysis of individual countries with indicators of vulnerability and other quantitative tools. It recognized the need to integrate bilateral and multilateral surveillance because crises could originate both in advanced and emerging countries. Use of information on markets and evaluation of vulnerabilities by the Department of International Capital Markets of the IMF constitute an important link with the private sector. The Fund uses various sources of information:

- *World Economic Outlook*, with its risk scenarios
- Early warning system, for crisis prevention, jointly with individual country research
- Financing requirements and stress tests of balance of payments
- Risks of contagion and market information on spreads and financing costs
- Vulnerability assessment of the financial sector and stress tests under conditions of adversity

The SDDS (Special Data Dissemination Standard) of the IMF established a process to disclose reserves and foreign debt. Other required data for vulnerability evaluation include exchange positions of the financial sector and corporations and conditions of financing such as rollover of debt, trade

financing and bonds. The Executive Board of the IMF encourages staff to improve quality and availability of data and information, assisting members whenever required.

The Board agreed with the Fund that it should discuss vulnerabilities with members and attempt to persuade them of measures required to avoid crises. The Fund and the Bank developed and published criteria for effective management of public debt and, jointly with other members of IFIs, criteria for management of reserves.

Part of the theory of finance shows how asymmetry of information of debtors and creditors may amplify crises, prevent adequate decisions on credit and increase loan costs. Therefore, the Board of the IMF emphasized the importance of transparency in economic policy and financial data. The Fund evolved significantly, disclosing ample information on its members and itself, to reduce uncertainty in financial markets. The Fund publishes summaries of consultation with the Executive Board, within Article IV, in the form of a PINs and encompassing 86 percent of members.

The Fund publishes complete reports under Article IV whenever approved by members. A significant part of details of use of funds is available publicly. Similarly, the IMF provides its decisions and analyses publicly. The Fund maintains dialogue with academicians, NGOs and government technicians in order to widen information on its activities. The Independent Evaluation Office (IEO) evaluates IMF activities with external specialists.

The international financial system encourages development, disclosure and adoption of internationally accepted standards and codes to facilitate comparison with individual countries. There is promotion of transparency, good governance, credibility and evaluation of policy by standards and codes in 11 key areas, a subject discussed in detail in Chapter 6.

In addition to the SDDS, the Executive Board of the IMF approved a Data Quality Assessment Framework and its incorporation in the ROSC. The Fund examines jointly frequency, timeliness and coverage of data. The IMF developed methodological criteria to evaluate data in consultation with national statistics institutes, international organizations and users of data. It took into account data quality and other aspects of the process such as integrity, methodology, precision, availability and institutional requirements.

Official international doctrine postulates that the opening of the current account promotes allocation of international savings and increases in productivity, with international diffusion of technology among nations through direct foreign investment. Similarly, it encourages portfolio diversification, sharing of risks, inter-temporal allocation of resources,

deeper and wider financial markets and efficient international division of labor.

However, there is concern that volatility of international capital flows could have played an important role in recent crises. The Executive Board of the Fund concluded that there are no rules applicable to all countries on the relation between sequence of liberalization of the current account and internal and external financial stability. However, it enunciated principles that could orient the sequence and coordination of capital account liberalization.

The priority is to ensure macroeconomic stability by reforms of the financial sector. The essential characteristic of the process is transparency. In most cases, countries should liberalize long-term capital flows, especially direct investment, before short-term flows. In some cases, gradual liberalization may be appropriate but may not guarantee success.

At the Dubai meeting, the IMFC reaffirmed that vigorous implementation of structural reforms, strengthening of governance and corporate transparency constitute the foundations of a global stable equilibrium. Japan should continue to strengthen its banking and financial sector. The United States should focus on medium-term fiscal sustainability.[89]

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3
Surveillance by the Official International Financial Community

Crisis prevention and resolution constitute the two pillars of enhancement of the international financial architecture (IFA). There is a major emphasis by IFIs on surveillance of economies within consultations under Article IV of the IMF.

The instrument of surveillance and communication with the Executive Board of the IMF consists of a report developed jointly with the World Bank, the Financial Sector Assessment Program (FSAP).[1] A subsequent report, the Financial Sector Stability Assessment (FSSA), complements surveillance. These reports constitute one of the major channels of communication of a country with the IMF and the international financial community.

The FSAP-FSSA originated in analyses of twin crises. Conventional interpretation of these crises, influenced primarily by the Asian crisis, postulates that an exchange crisis, originating in external illiquidity, can have high-powered effects on the real sector, in the form of decline of GDP and unemployment, if there is a simultaneous internal financial crisis.

A model of crises accepted officially and by many academicians departs from the asymmetry of financial markets. Debtors know their own financial situation much better than creditors. In turn, monetary authorities do not fully know the situation of creditors, which are financial institutions. Asymmetry of information in the financial sector combines with two distortions–moral hazard and adverse selection–deepening the crisis of the real sector, with contraction of GDP and unemployment.

The theory of the "financial accelerator" postulates that banks and other creditors experience increases in capital and profits during expansion of the economy.[2] In these periods of euphoria, there is more lending with lower credit requirements. American real estate shows this phenomenon. During booms, margins on loans decline to 10 percent and in some cases even zero. Less qualified debtors obtain loans with higher fees.

During recession, loan loss provisions increase, for expected and unexpected losses, as measured by a probability distribution, causing a decrease in profits and capital. Banks reduce their loans. Asymmetry of information prevents creditors from evaluating adequately projects with real economic value that do not receive credit. The financial sector no longer provides financial intermediation, failing to allocate resources to projects with sound future cash flow that would move the economy away from recession, increasing productivity and production. There is generalized adverse selection, that is, sound projects do not receive credit. Recession could be profound and deep. The theory of the financial accelerator generated new forms of design of monetary policy during recessions.

Application of the model to twin crises concentrates on effects of devaluation and increases of interest rates on balance sheets of corporations, government and individuals. During the phase of euphoria, there is a form of moral hazard by the maintenance of an overvalued exchange rate. Moral hazard develops because creditors and debtors believe that the government will subsidize the exchange rate at overvalued levels, rescuing creditors and debtors that have systemic potential, that is, those too big to fail. Countries accumulate significant international reserves at high spread between funding and investment rates. There is high leverage through the economy with net exchange positions and maturity mismatches, by both creditors and debtors. Numerous projects should not receive financing. However, because of adverse selection and moral hazard, financial institutions financed them at high interest rates during the economic boom.

Devaluation causes devastating impact on internal debtors and creditors. Exchange rates explode without control, at very high speed, with capital outflow, a sudden reversal. Institutions and individuals short country risk in many different ways including derivative markets for sovereign bonds and short-term interbank credit lines. Banks experience increases in provisions for nonperforming loans, losses or lower profits and decline in capital, directly because of proprietary net exchange positions, or indirectly because of those of their clients. Adverse selection generalizes because the financial system ceases to channel resources to potentially productive economic activities. Recession deepens.

Monetary authorities no longer have control of their exchange and monetary policy instruments. Authorities should devalue to adjust the balance of payments and to attract foreign financing. However, devaluation bankrupts the internal economy and even the government itself and individuals, directly because of exchange exposures or indirectly by unemployment and lower revenues.

Monetary authorities should increase interest rates to prevent excessive

devaluation and resulting inflation. Nevertheless, high interest rates bankrupt corporations and financial institutions, depreciate public debt instruments, increase internal default and burden refinancing of internal debt. High interest rates magnify effects of adverse selection. The capacity of policy to react to a crisis diminishes because of political restrictions and pressure on monetary authorities.

The international official community reacted, after crises, to create an instrument of evaluation of vulnerability of the financial sector that would permit anticipation of financial crisis and to prevent them from occurring, resulting in the FSAP-FSSA. The departing principles originated in a conventional analysis of prudential supervision and regulation by the central banks of the G-10 countries based on practice over decades.

Prudential supervision starts with the generally accepted definition of financial soundness indicators (FSI).[3] They consist mainly of ratios, such as that of capital to loans adjusted by risk, on which the Basel Committee specified minimum requirements. Analysis divides indicators into two types, macroprudential and microproduential.

Micro indicators originate mostly in the CAMELS system, that is, capital, assets, management, earnings, liquidity and sensitivity, used by monetary authorities in various countries. Every subset of indicators provides information on the soundness of the banking sector in an aggregate set. As an example, the ratio of capital to assets adjusted for risk shows compliance or not with the Basel Capital Accord.[4] However, 8 percent of capital relative to assets adjusted for risk does not guarantee survival during a twin crisis with profound balance sheet effects. The recent history of many countries suggests that under adverse conditions, such as the international debt crisis of 1982, for American banks, or as in the Asian crisis, for Tigers, banks operate with negative capital or disappear. The framework suffers from a lack of theory to determine and measure optimum ratios and methods of forecasting, characteristic of all mechanical accounting. There may never be a sound theory of forecasting a twin crisis, especially within financial theory. Much the same happens with all indicators. However, the process permits surveillance of financial systems, showing areas of risk. What is truly important for emerging markets is that it constitutes the method used by the international financial community.

Macro indicators originate in various macroeconomic theories, national accounts or in practice by supervisors. For example, one indicator is the ratio of the public deficit, appropriately defined and measured, to GDP. There is no theory of the optimum ratio or its relation with the rest of the economy. Evidently, deficits of 10 percent of GDP by Brazil during the crisis in 1998-99 prevented sound management of the economy, especially

when combined with high deficits in the current account relative to GDP. Without precise theory and measurement, analysis becomes more of an art than a science. However, significant divergence from numbers tolerated by the international financial community could cause loss of official financing resulting in a crisis without control.

Traders never rest, calculating constantly, electronically or in their minds, risk, or probability of loss, and return of their portfolios. There are numerous quantitative methods using advanced math and some available financial theory. Almost every trader, and even one of the inventors of the option pricing formula, Fisher Black, knows that nobody profited consistently with naked option positions arbitraging differences between actual and formula-predicted prices.[5] The major model of general equilibrium, the capital asset pricing model (CAPM),[6] suffers from operational limitations. Traders work with talent, capital and techniques, admitting humbly that they must protect capital against risks. Institutions and traders disappear once they exhaust capital.

Long Term Capital Management (LTCM) illustrates the precariousness of knowledge on risk management. LTCM leveraged a portfolio of $125 billion with approximately $5 billion, that is, 25 to 1. One of the premier managers of fixed income in the United States, John Meriwether, who headed the desk of Salomon Brothers when it dominated fixed income, created LTCM. Advisers to LTCM included Robert Merton and Myron S. Scholes, professors at Harvard and Stanford, who received the Nobel Prize in 1997 for the simultaneous discovery, with Fisher Black, of option pricing formulas. LTCM was one of the few hedge funds managing risks in some positions with hedges in others in global portfolios of derivatives. Resulting combined cash flows of portfolios changed risk profiles and sensitivity to changes in market variables. Market admiration for LTCM sealed its destiny. Other funds, investment banks and investors imitated LTCM's positions. After the Russian crisis, many imitators exited their positions with resulting changes in correlations that reduced hedge protection. LTCM experienced margin calls for marked to market losses in extremely imaginative positions that Warren Buffett, whose fund did not mark to market, wanted to acquire because of their intrinsic value.

LTCM became the first probable crisis of the United States and Europe when authorities and the market felt systemic potential. Some of the leading global financial institutions financed LTCM and many of their senior executives invested their own savings in the fund. Peter Fisher, former Undersecretary of the Treasury, coordinated a market bailout of LTCM from the Federal Reserve Bank of New York. Many executives of large financial companies resigned their positions.

However, crisis propagation did not occur.[7] Meriwether returned to the market recently and manages another fund, with less risk. Nobel Prize economists continued their successful academic activities and consulting, avoiding personal difficulties that could have occurred with LTCM in 1998, a year after they received the Prize in 1997.

LTCM constituted one of the most important recent events in finance. It showed clearly that there is no technique to control financial risk. Correlations may change during market events. Not even trading talent combined with superior academic knowledge avoids the threat of catastrophe. Traders work in solitude, constantly calculating risks and returns with only talent, capital and courage.

The FSAP-FSSA and other alternatives operate with theoretical and empirical limitations. Originators of the reports recognize the difficulties in measuring financial risks. The foundation of the reports consists of stress testing of the capital of the financial system, practically only for banks, in response to shocks of exchange and interest rates, credit and liquidity. There are major theoretical and practical limitations of aggregation. Fortunately, concentration of banking capital, assets and deposits permits tests based on a few banks.

Stress tests suffer from many limitations but constitute one of the few tools available. Debtor countries should have conditions, in the form of talent in banks and financial technicians, to improve significantly work by the Fund, which is more hurried and less specialized in local conditions. In fact, these countries should aggressively test vulnerabilities of their financial sector, which will reveal avenues of financial policy to restrain crises. Perhaps countries should retain advice from investment banks on their vulnerabilities and how to hedge them. Evidently, monetary authorities and banks can work together to implement advanced stress tests that can be of help in identifying vulnerabilities, avoid crises and improve countries' financial image. Tests constitute a basic input in negotiations with the international financial community and international creditors.

The remainder of FSAP-FSSA consists of a Report on Observance of Standards and Codes (ROSC).[8] It compares standards and codes of the country with best international practice in sensitive areas such as transparency of monetary and financial policy, payments and settlement systems with systemic potential, basic principles of effective bank supervision, corporate governance and basic principles for supervision of insurance and securities. Suggested changes would strengthen institutional capacity to avoid crises. Larger countries should not face major hurdles with the ROSC.

Value at Risk (VaR)

This section provides some background material before proceeding with the surveillance activities of the IMF. Value at Risk (VaR) measures maximum expected loss in a target horizon for a desired level of confidence.[9] Calculation of VaR requires a probability distribution of future profit and loss scenarios of financial assets in the portfolio. A pricing function calculates profits and loss of the instruments. A VaR of 99 percent is the loss corresponding to say, 1 percent, in the left tail of the distribution of profit and loss scenarios, measured in a fixed time horizon. Generally, banks announce maximum loss, VaR, as, for example, $100 million per day with 99 percent probability. That is, the bank expects the loss to exceed $100 million in only 1 percent of possible occurrences.

VaR considers "risk factors," or financial variables, in particular equities, foreign exchange rates, commodity prices and interest rates. The method requires generating future scenarios of profit and loss of portfolios combining financial instruments that are sensitive to risk factors. A classic approach by RiskMetrics™ assumes that logarithmic returns of risk factors, standardized by a measure of volatility, are independent across time and normally distributed.[10] That is, one-day returns of risk factors conditioned on current level of volatility are independent across time and normally distributed. In addition, exponentially weighted moving averages of past returns provide the best method of estimating volatilities of risk factors. The process follows a geometric random walk with a drift or expected return, μ, and a volatility, σ. There is an explicit assumption that the return is zero, equivalently, $\mu = \frac{1}{2}\sigma^2$. The approach can consider any number of risk factors, using a covariance matrix of correlations among factors.

The VaR method uses several approaches. The delta-normal methods consist of a set of return measurements using first derivatives, delta, under assumption of normal distribution. A basic assumption in this method is that a linear equation can approximate pricing functions of every instrument. Historical data or values implicit in option pricing formulas provide input for calculation of parameters. The first derivative of the financial instrument measures sensitivity. The delta-normal method has as an important advantage that profit and loss of individual positions add to the total profit and loss of the portfolio.

One example is to adjust positions in options by delta, the first derivative of option price relative to the underlying instrument, or by the first derivative relative to time to expiration, time decay. Option pricing formulas assume lognormal distribution of stock prices. There are several deficiencies. First derivatives localize effects in very small intervals. Thus, first derivatives do

not capture major risks resulting from jumps of variables, such as behavior of interest and exchange rates during stress. In addition, distributions of financial assets in reality show fat tails, kurtosis and other peculiarities not captured by normal distributions. Moreover, nonlinearities characterize many financial risks. The major advantage of delta-normal methods consists of the simplicity of aggregation of normally distributed returns with straightforward calculation of risks. However, delta-normal methods may not capture important risks.

The method of "Greek letters" uses second derivatives of option prices to calculate risk. The Amendment of the Capital Accord to Incorporate Market Risks, analyzed below, uses a truncated Taylor series expansion of option prices:

$$dC = \Delta dP + \tfrac{1}{2}\Gamma dP^2 + \Lambda d\sigma \tag{3.1}$$

where C is the option price; Δ, delta, the first derivative of option price relative to underlying; P, the price of underlying; Γ, gamma, the second derivative of option price relative to underlying; Λ, vega, the first derivative of option price relative to σ, volatility (standard deviation) of underlying. The Greek letters method captures the behavior of nonlinear processes. However, computation becomes complex for positions with numerous risk factors.

The method of historical simulations uses historical series of price or return of financial assets to calculate returns. The method uses these returns to calculate profit and loss scenarios with which to generate probability distributions. Suppose there are 1000 profit and loss scenarios. The 95 percent VaR would be the lowest fifth percentile of the losses. In the case of 1000 scenarios, it would be the highest 50 losses. In words, VaR would be the maximum loss of the portfolio 95 percent of the time. It circumvents many problems such as nonlinearity, lack of fat tails, assumptions on stochastic structure of markets and errors of models. However, historical market data do not show satisfactory results in measuring financial risk. History does not project the future precisely, especially extreme events. Short series are insufficient but long series include periods that are no longer relevant. Similarly, econometric relations may be valid for some periods but not for others. Structural change of relations among variables characterizes financial markets.

Option pricing uses the Monte Carlo method to calculate prices of instruments with embedded options such as mortgages. Correlations and volatilities obtained from historical data or implicit in prices such as options provide input for estimates of parameters. A stochastic process generates

prices or rates of financial variables for every interval in the future with a corresponding probability of occurrence. Price formulas measure position values, calculate returns and generate a distribution of returns with which to measure VaR. Monte Carlo methods encompass numerous types of risk including: nonlinear, volatility, model, volatility changes, fat tails and extreme scenarios. However, in addition to high cost, the stochastic model is arbitrary as well as the price formulas for options and mortgages. All methods have deficiencies. Thus, other tests of sensitivity considered below complement VaR.

VaR provides synthetic information for market risk of the entire bank, trading activities and traders.[11] Marginal VaR is the difference of VaR with a specific position less VaR without that position. It permits calculation of what happens to risk by adding a position or group of positions. Incremental VaR measures changes in risk by adding a small portion of a position. Expected shortfall is a measure of losses on average when they exceed VaR. A risk report could list VaR at a confidence level and expected shortfall for parametric, Monte Carlo and historical methods. Assuming the normal distribution, parametric methods are suitable for linear relations and Monte Carlo methods for nonlinear relations. For nonnormal distributions, historical methods are best for either linear or nonlinear relations. It may be convenient to report VaR internally by business unit and counterparty. A corporate level VaR report can provide VaR for business units and risk factors (FX, interest rate, equity and commodity). In fixed income trading units, it is possible to report VaR by maturity and traders.

The strategy of Long Term Capital Management (LTCM) was "convergence-arbitrage," making profits from trades capturing small differences in prices of very similar instruments.[12] The strategy assumes that eventually these price differentials will disappear as securities converge to the same or closer value. Because profits of individual trades are small, leverage must be large to remunerate capital according to targets of the hedge fund. Jorion calculates LTCM's leverage as 25 to 1, based on assets in the balance sheet of LTCM of $125 billion and equity of $7 billion, of which $1.9 billion came from its 16 partners. In addition, the notional value of off-balance sheet items was $1.25 trillion. Because many of LTCM's trades offset each other, this notional value is not meaningful. By the beginning of the Russian crisis in August 1998, the capital of LTCM was around $4 billion, because it returned investors part of their funds and incurred $400 million of losses in mortgage-backed securities in June 1998. The press, including Paul Krugman, announced LTCM's position as being as high as $1 trillion, corresponding to approximately 10 percent of United States' GDP.[13]

Part of the leverage of LTCM consisted of sale and repurchase agreements of securities it held. LTCM acquired a position in a security and financed it by selling it at market price to a bank with an agreement to repurchase it in the future at that market price, a "repo" agreement, plus interest. There was risk for parties financing LTCM's assets–reverse repo or purchase and resale agreement–because the fund was able to avoid expensive "haircuts," or reductions in contract prices below market prices to cover for possible default. In such default, the financing party in the agreement would hold a security that at the current market price would not cover all the financing granted to LTCM. Typically, the crash of security prices causes default of the repo agreement.

Problems for LTCM began on August 17, 1998, when Russia defaulted its debt. Credit spreads, risk and liquidity premiums widened sharply; stock markets collapsed. LTCM attempted to make profits from differences in these credit, risk and liquidity spreads using internal models with parameters calculated with historical data that included some abnormal events such as the 1987 stock market crash. LTCM's internal VaR models did not capture widening spreads and premiums such as those experienced during the Russian crisis. Stress tests conducted by LTCM suggested a loss of $2.3 billion, much lower than the actual $4.4 billion. By the end of August, according to Jorion, LTCM had lost 52 percent of its market value, raising the leverage ratio to 55 to 1. Securities in LTCM's portfolio were marked to market. Lenders to LTCM requested increases in margins to compensate for decreases in asset prices.

The Federal Reserve Board decided that LTCM was too big to fail. The Federal Reserve Bank of New York used "moral suasion" by providing offices and coordination in the bailout of LTCM. Chairman Alan Greenspan explained arguments for not allowing liquidation of LTCM:[14] "there is no reason for central bank involvement unless there is a substantial probability that a fire sale would result in severe, widespread, and prolonged disruptions to financial market activity."

According to this view, the sale of $125 billion of assets of LTCM during its liquidation could cause further disruption in financial markets worldwide beyond those occurring after the Russian crisis and the Brazilian overvaluation. The Federal Reserve Bank of New York organized a consortium of 14 financial institutions to invest $3.6 billion in LTCM in exchange for 90 percent of the equity of the firm. LTCM's bailout was quite successful because prices recovered and the consortium of financial institutions unwound the positions by late 1999, without loss of their investment.

Of the trading loss of $4.4 billion of LTCM, approximately $3 billion

originated in positions in interest rate swaps and equity volatility. Because LTCM reduced its capital before the Russian crisis, continuing margin calls would have caused its liquidation. Scholes concludes, from the vantage point of partner of LTCM, that VaR models did not constitute a problem.[15] Scholes pointed out that the main lesson from LTCM would be greater reliance on stress tests.

Jorion suggests several causes of disaster at LTCM:[16]

- Hedge correlations declined. Consider an example. There is a credit spread between a corporate bond and a United States Treasury bond. A convergence trade would consist of a long position in the corporate bond hedged by a short position in the Treasury bond. In practice, yields of corporate bonds and Treasury bonds do not correlate perfectly. Traders use correlations to determine the hedge ratio, or short position in Treasury bonds per long position in corporate bonds. If a trade assumed correlation of 0.95 between prices of corporate and Treasury bonds, and the correlation declined to 0.80, LTCM would consume capital in margin calls for the leverage it used. Widening of the credit spread between corporate and Treasury bonds resulting from the Russian crisis caused a loss in price of corporate bonds with no matching gain by a short in Treasury bonds
- LTCM concentrated on trades capturing convergence in credit, liquidity and volatility spreads, which are similar risk factors. Its portfolio was extremely exposed to liquidity and not consistent with its leverage. In a run for the exits in search of liquidity, correlations would change, forcing collapse of LTCM through margin calls
- LTCM underestimated risk. Strategy consisted of not taking positions on directions of variables, such as naked short positions on bonds, in the belief that interest rates would increase. Jorion argues that LTCM actually took positions with high exposure to credit, political or market disruption risks, which may be riskier than directional trades. In fact, Jorion argues that LTCM's net position was merely a naked short option position. Stress tests underestimated losses from breakdowns of correlations. Market experience is rich in failure of trades based on assumptions of correlations

LTCM is a fascinating episode relating to the issues in this book. The Fed intervened because of alleged risks to the United States economy and world financial markets resulting from forced unwinding of LTCM's positions in liquidation by its creditors. There is here the ever-present counterfactual in economics: an observation of variables under moral suasion but not under conditions of lack of official intervention.

Furfine analyzes LTCM by means of overnight-unsecured rates paid by

nine commercial banks financing Long Term.[17] These nine banks participated in the coordination by the Fed to avoid liquidation of LTCM, suggesting that they were financing the fund. There is no evidence that other banks restricted financing to the LTCM banks. These banks apparently reduced their unsecured overnight lending after crisis resolution began perhaps because they probably learned through participation in the rescue the true extent of LTCM's problems.

Banks did not publish their exposures to LTCM and the rescue did not involve public funds. The four banks attending the meeting on LTCM's rescue on September 3, 1998, had an abnormal return of −11.0 percent, or a loss in capitalization of more than $8.8 billion in the three days around the meeting.[18] Nonexposed banks gained $26.8 billion. Thus, banks with LTCM exposure underperformed nonexposed banks by 14.2 percent. On August 26, the four exposed banks had market value of $145 billion, which declined to $102 billion by September 4, or a loss of 29.5 percent. Nonexposed banks saw their market value decline from $596 billion to $540 billion, in the same period, or a loss of 9.4 percent. On September 24, exposed banks lost another 3.6 percent while nonexposed banks had an insignificant loss.

LTCM provides interesting conclusions. In contrast with foreign crises, banks did not gain from the rescue. Banks exposed to LTCM experienced a much larger impact than those exposed to emerging markets. Although the magnitude of impact on exposed banks was quite high, there was no significant impact on nonexposed banks. The market distinguished banks at risk from those without direct exposure three weeks before the rescue.

LTCM raised again the issue of moral hazard in central banks' safety nets. Benefits and costs are hard to measure. The main benefit would consist of losses resulting from the disruption of financial markets. Meanwhile, the main cost would consist of the fragility introduced in the markets by eroding the discipline of risk control. Part of the cost mitigation consisted of resignations or dismissals of the CEO of a large global bank and other executives. Credit allocation to LTCM affected executives at the highest levels.

International supervisors and regulators emphasize the use of internal models in risk management. Financial institutions know their risks best, have a stake in controlling them and can invest larger funds than supervisors in risk models. In addition, as part of international and national doctrine, supervisors encourage the use of internal models because institutions truly implement them only if they own them. LTCM assembled arguably one of the most competent teams of traders and technicians in financial history. However, internal models did not prevent its failure. Evidently,

risk management is important and useful but should not be a substitute for prudence and zeal in preservation of capital.

Stress tests at international banks

Stress tests consist of a set of technical methods used by financial entities to calculate potential effects of exceptional, but plausible, events on values of positions.[19] Principal methods include:

- *Simple sensitivity tests*: measure effects on portfolio values of predetermined changes in only one factor, or variable. A common example consists of measuring effects on positions of changes of plus or less 100 basis points in yields of bonds
- *Scenario analysis*: calculates the impact on portfolio values of simultaneous change in several factors, or variables. Tests can use changes in exchange and interest rates, commodity prices and stocks in historical episodes–the Asian crisis, stock market declines in the United States in 1987, 2000–3–or hypothetical scenarios–global decline in stock markets, monetary policy tightening in the United States and conflict in the Middle East.
- *Maximum loss*: measures highest possible deterioration of portfolio value resulting from adverse combination of various factors or variable levels. It is not very useful in fixing operational limits
- *Theory of extreme value*: obtains values of portfolio losses in tails of probability distribution of returns, considering fat tails and kurtosis. A great advantage is to estimate probability of exceptional events. However, there is difficulty in including several types of risk simultaneously. The method assumes lack of correlation among extreme value over time. Another problem consists in lack of information on extreme events to make statistical inference

The survey by the Committee on the Global Financial System (CGFS) found various forms of use of stress tests in entities and by professionals. Funding risk originates when a company has difficulty in financing positions in markets or costs increase abruptly and significantly. In financing positions of securities with few wholesale sources, companies would have to offset positions under unfavorable conditions, such as the case of Long Term.

Stress tests estimate risks in tails of probability distributions. Well-behaved distributions, such as the normal distribution, provide VaR for a given level of confidence, say, for example, $100 million with 99 percent confidence. However, exceptional events do not generate data to make statistical inference. Jumps of variables as in emerging market crises occur only occasionally. Stress tests calculate losses in fat tails or in exceptional events.

Volatilities and correlations may show varying behavior in extreme market events. Long Term showed that not even enhanced professional and technical resources can guarantee performance of portfolios consisting of diverse instruments selected on expected statistical behavior of correlations and volatilities. Unfortunately, even well structured positions may underperform during periods of stress. Tests complement information of statistical models, including elements to estimate prices and volume in structuring a portfolio.

Stress tests are also useful to set limits on positions. Simple sensitivity tests provide a required risk profile as part of the inputs on loss limits. Simulations of returns of nonlinear positions under extreme conditions can suggest an ideal strategy to offset positions.

Census of stress tests

The CGFS conducted a census of stress tests by international banks.[20] The census objectives were to strengthen knowledge on the role of stress tests in risk management, identify events that banks considered to be of high risk and develop information on heterogeneity of risk decisions.

The term "stress test" used in the census refers to a set of techniques used by financial institutions to evaluate their sensitivity to events with low probability but important effect. Stress tests of scenarios simulate the impact on the company of events that affect the market as a whole. For example, the decline of the stock market in 1987 was the most simulated historical scenario in the CGFS survey. A sensitivity stress test considers the impact on the company of a shock to a segment of the market such as, for example, a parallel increase of 200 basis points in the yield curve.

Several limitations characterized the census. Banks conduct tests to evaluate risks of large positions and their hedge or to verify lack of sensitivity of a position. Therefore, a census does not reveal actual positions or an estimate of probability of events by banks. The census could not derive a hierarchy of key risks in global financial markets. Additionally, it only covers tests on May 31, 2000. Fluidity of financial events causes constant changes in test parameters, changing analyzed risk profiles.

The scenarios used variables in asset classes–commodities, credit, stocks and exchange and interest rates–in geographical regions–Europe, Japan, North America and emerging countries. Data combined asset classes in regions or groups of regions. Scenarios of stocks used the crash of October 19, 1987, "black September," the shock of the new economy with collapse of technology stocks, Greenspan's "exuberance" and other hypothetical crashes. The crash of bond markets in 1994, after increases in interest rates

by the Federal Reserve Board, constituted one of the most common events. Other hypothetical scenarios of interest rates included global and American tightening. Institutions simulated various historical crises in emerging markets, such as Mexico 1994, Asia 1997–98, Brazil 1998–99, Russia 1998 and a hypothetical scenario of global crises of emerging markets. Various currency scenarios tested the dollar, the yen and European currencies. Credit scenarios considered hypothetical tightening of swaps, the Russian crisis and LTCM. In commodities, the favorite test was alternative oil prices in a Middle East crisis. Hypothetical shocks of volatility of interest rates, stocks and currencies tested various portfolios.

Census results showed asymmetry in risks reported by banks, with tests preponderantly in one direction: crash of stock markets, increases in interest rates and depreciation of the dollar. Managers explained that tests reflected bank positions, probability of events and interests of senior management. In practice, banks buy short-dated funds and lend long term, a position affected adversely by increases in interest rates. Generally, positions in stocks and currencies are long, showing losses with stock market crashes and dollar depreciation. Investors and traders may have the capacity to reverse positions from long to short, and vice versa, in the same day, but that is not the case of large banks, which simply try to hedge exposures originating in core lines of business.

Another result of the census is that banks use stress tests to simulate events not included in statistical models like VaR. The crash of bond markets in 1994 started in the United States after increases in short-term rates by the Federal Reserve Board, which resulted in an increase of around 150 basis points of the yield of the 30-year Treasury, shown in Table 3.1. Because of high duration, 30-year bond prices declined by approximately 13 percent per 100 basis points increase in yields. Leveraged positions with high duration suffered significantly. The 30-year fixed mortgage increased in yield by close to 200 basis points. Subsequently, bond prices of European countries also declined after large increases in 1993 caused by lags in business cycles relative to the United States. European bond prices deteriorated throughout 1994 while many analysts and traders awaited a decoupling from American bond prices that never occurred. Correlation in normal times of bond yields of the G-3–United States, European Union and Japan–is only 0.18 and that of stock markets 0.40. Therefore, statistical models would not capture world scenarios of a crash of fixed income securities and stocks in contrast with stress tests. Correlations suggest low risk, but global bonds declined in 1994 following American monetary tightening, which was an important factor in the Mexican crisis.

Table 3.1 Fed Funds rate, 30-year Treasury, 30-year mortgage and CPI

	30 Year T Bond	30 Year Mortgage	Fed Funds Rate	CPI Past 12 months
1994				
Jan	6.29	7.07	3.00	2.52
Feb	6.49	7.15	3.25	2.51
Mar	6.91	7.68	3.50	2.51
Apr	7.27	8.32	3.75	2.36
May	7.41	8.60	4.25	2.29
Jun	7.40	8.40	4.25	2.49
Jul	7.58	8.61	4.25	2.77
Aug	7.49	8.51	4.75	2.69
Sep	7.71	8.64	4.75	2.96
Oct	7.94	8.93	4.75	2.61
Nov	8.08	9.17	5.50	2.67
Dec	7.87	9.20	6.00	2.67

Sources: www.federalreserve.gov, www.data.bls.gob/cgi-bin/surveymost

The IMF measured empirically the effects of several variables on emerging market bond spreads.[21] Predicted credit ratings have the strongest influence on EMBI. Anticipations of increases in fed funds rate also have a significant impact on spreads. The model forecasts that an increase of the fed funds rate by 275 basis points by mid 2005 would increase EMBI by 100 basis points.

In LTCM, after the Russian and Brazilian crises, changes in correlation among assets in the portfolio cause unwinding of hedges, a possibility not captured by statistical models. Most stress tests concentrate on emerging market shocks, which statistical models do not simulate adequately.

The CGFS concluded that stress tests constitute common practice in risk management of surveyed banks. They capture both discrete jump characteristics of emerging markets as well as nonlinear behavior of out of the money options. Tests allow analysis of potential and actual situations of market illiquidity. Banks can also use limits of stress tests to determine when to offset positions.

Banks in the CGFS sample concentrated stress tests on stocks and emerging markets. Some historical scenarios used crises, such as in Asian and Russian crises, to generate parameters. There was asymmetry in scenarios, probably in search of probable losses in long positions in fixed

income (rise in rates), stocks (crash of markets), currencies (decline of the dollar) and emerging markets (loans and bonds).

International official doctrine

Interpretation of financial crises by the official community developed from financial crises, especially the Asian crisis in 1997–98[22] and the Mexican crisis in 1994–95. In both cases, there was a twin crisis,[23] with an exchange crisis jointly with an internal financial crisis. There is a model of twin crises that influences official thought. Professor Mishkin[24] defines a financial crisis as a nonlinear disturbance of financial markets with problems of information asymmetry such as adverse selection[25] and moral hazard. Markets cease to channel funds to the best opportunities of productive investment, prolonging a weak economy.

In most crises, deterioration of balance sheets,[26]especially of the financial sector, constitutes the major problem of information asymmetry. Erosion of bank balance sheets forces banks to reduce loan volume to improve capital ratios. A deep crisis with insolvency of banks could cause a loss of lending capacity by the financial sector. Similarly, deterioration of bank balance sheets could feed an exchange crisis. An increase in interest rates would worsen bank balance sheets, raising short-term costs and credit risk because of economic weakness. The central bank suffers the restriction of increasing interest rates to defend the exchange rate because of bank failures.

In many emerging markets, credit contracts in local currency are short-dated; those in foreign currency are medium term; and debtor assets are mismatched in local currency. Devaluation deteriorates balance sheets of companies and generates credit risk for banks, worsening further their balance sheets. Normal asymmetry of information deteriorates. Moral hazard and adverse selection cause companies with sound production and investment opportunities not to receive financing. Lack of credit strangles the economy. Japan has been suffering for over a decade because of the failure to resolve the banking crisis.

Devaluation also causes increases in internal prices.[27] Because of short-dated credit contracts, increases in domestic interest rates cause deterioration in balance sheets of corporations, raising credit risk with an adverse impact on bank balance sheets. In addition, worsening asymmetry of information reduces loans, investment and production. Another source of increasing asymmetry originates in mismatches of currencies in bankbooks, with assets in local currency and liabilities in foreign currency. The 1999 crisis showed that Brazilian banks did not fall into this trap, as was the case in the Asian crisis and recently in Argentina. However, exposures

of clients could have affected banks if the crisis had deepened.

The theory of twin crises implies that prevention efforts should focus on sound macroeconomic policies jointly with prudential supervision of the financial system. Transparency of policies and information, of both government and private sectors, is essential because it reduces information asymmetry and its adverse effects on functioning of the financial sector. The IMF and World Bank cooperate in surveillance of economies of members, within Article IV, with the objective of reducing vulnerability of economies and within them of the financial sector. Internal financial crises magnify declines of output and employment.[28]

The IMF advises that effective surveillance depends on:

- Timely availability of reliable and comprehensive data
- Continuing surveillance
- Focus on the financial sector, capital accounts and management of public and external debt
- Transparency
- Observance of standards and codes

Country surveillance proceeds through consultations, normally yearly, within Article IV. The IMF missions, currently including technicians of institutions participating in standards and codes and the Executive Director of the region, meet with entities and institutions to analyze a country's economy. The mission prepares a report that may or may not be published, depending on approval by the country. The staff submits the report for consideration by the Executive Board of the IMF. The President of the Executive Board summarizes the deliberations. The IMF can then publish the set of works under Article IV with approval by the region's Executive Director, in the form of a PIN. The staff of the Fund continues its periodic consultations and surveillance after the mission, in the case of significant commitment to the country.

The Articles of Agreement that created the IMF provide for its surveillance of exchange rates to guarantee functioning of the international monetary system. The Fund evaluates whether member policies are compatible with growth and macroeconomic stability. After international crises, the IMF increased effectiveness in surveillance to prevent crises. The Fund identifies the vulnerability of the financial system, capital accounts, governance and management of internal and external debts.[29] Surveillance proceeds through consultations with members under Article IV, globally through the *World Economic Outlook*, by the work of the Department of International Capital Markets and by regional efforts.

The reports on the financial sector and macroeconomic vulnerability, the FSAP and FSSA, constitute the major tool of IMF surveillance.

Macroprudential analysis consists of one of two pillars of quantitative and qualitative evaluation of vulnerability.[30] It combines aggregate microprudential data to assess the strength of the financial sector. The IMF conducts stress tests and scenario analysis to determine the sensitivity of the financial system to macroeconomic shocks. Prices of stocks and bonds and credit ratings help to evaluate the soundness of financial institutions.

The ROSC complements analysis with qualitative information on observance of standards and codes. There is additional valuable structural information on the share of major segments of the financial system on GDP, concentration, type of ownership and creditworthiness of clients.

Table 3.2 shows financial soundness indicators (FSI), a term suggested by the Executive Board of the IMF for macroprudential indicators. The Fund uses other terms indistinctively.

Table 3.2 Macroprudential indicators used by IMF

Aggregate Microprudential Indicators	**Macroprudential Indicators**
Capital Soundness	Economic Growth
Aggregate capital ratios	Growth Rates
Distribution of ratios	Sector crises
Asset Quality	Balance of Payments
Creditors	Current account deficit
Sector concentration of credit	International reserves
Loans in foreign currency	Foreign debt
Non-performing loans and reserves	Terms of trade
Loans to government	Foreign capital maturities
Risk profile of assets	Inflation
Loans to affiliates	Volatility of inflation
Leverage ratios	Exchange and Interest Rates
Debtors	Volatility of interest and exchange
Ratios of debt/capital	Level of internal interest rates
Profitability of companies	Sustainability of exchange rates
Family debts	Exchange guarantees
Quality of Management	Booms of Loans and Assets
Expenditure ratios	Loan booms
Profits per employee	Asset price booms

(Table Cont.)

Aggregate Microprudential Indicators	Macroprudential Indicators
Profits/Profitability	Contagion Effects
Return on assets	Market correlations
Revenue and expenditure ratios	Trade contagion
Return on capital	
Liquidity	Other Factors
Central Bank credit	Investment and loans
Deposits/Monetary Aggregate	Government financing
Loans and deposits	Arrears in the economy
Maturity structure of Assets/ Liabilities	
Secondary market liquidity	
Yield indicators	
Market segmentation	
Market Sensitivity to Risk	Market Indicators
Exchange risk	Price of instruments and capital
Interest rate risk	Credit
Stock risk	Sovereign bond spreads
Commodity risk	

Source: International Monetary Fund (2001i, 2001j, 2001k); Evans et al. (2000).

The left-hand side of the table shows indicators of the CAMELS system used by many bank supervisors. Data suffer from aggregation, which could hide individual company difficulties.[31] The right-hand side shows macroeconomic ratios and information. There are no theories to determine optimum values of risk control of these indicators. Therefore, macroprudential analysis consists significantly as art based on experience. For example, an important counterfactual proposition is if Brazil would have experienced major exchange rate devaluation after the Real Plan in the absence of the Russian crisis and Long Term Capital Management.[32] There is currently significant emphasis on adequate reserves and debt management.[33]

Sensitivity of various bank risks–credit, liquidity and market–depends on individual bank portfolio characteristics, systemic potential, relations with other institutions and markets together with magnitude and nature of risks. Credit and market risks can affect banks directly when marked to market or indirectly by affecting clients. Shocks of bank confidence can create a run on deposits, eroding capital and profitability. Bank vulnerability increases

when portfolios are not liquid, without hedge or diversified with insufficient capital. IMF experience shows that deterioration of credit constitutes an important factor of vulnerability.[34]

Academic research concludes that bank behavior may widen crises through channels of credit, capital and loan loss reserves. Banks experience more credit losses and less capital during crises than during growth periods.[35] Supervisors tighten inspections, probably contributing to recession. Loan loss reserves increase during recessions, reducing capital and loans, and decline during expansion, increasing capital and loans. Exchange rate adjusted debt affects both creditors and debtors. Loan value adjusted by devaluation may exceed actual or implicit collateral of debtors, raising default probability. Similarly, the debtor company and industry may not withstand exchange rate adjusted debt because of lower profits, market or economic effects and recession accompanying exchange crises.

During crises in Korea and Thailand, failure of the nonbanking financial sector contributed directly or indirectly to financial system crisis. In Brazil, insurance companies, investment funds and finance companies have been of relatively minor dimension. Financial intermediaries are not subject to the same regulations as banks, becoming more vulnerable during crises. Adequate indicators and behavioral analysis still need improvement.

Emerging market crises, like economic cycles in other countries, document how deterioration of corporate clients can reduce bank capital and profits. Analysis includes reaction of companies to macroeconomic shocks and how production, financing and investment decisions affect the aggregate economy. Decline of asset prices, increases in interest rates, devaluation and recession affect net capital and market value of collateral, causing credit problems in banks. There is no theory of optimum ratios used as indicators of net worth and cash flow of companies to assess how their values could affect potential risk. However, actual indicators reveal important risks in the corporate sector. There is no need for theory to raise concern about debt exceeding capital by several digits, as in the Asian crisis.

Individual budgets may experience pressure during twin crises causing difficulties when personal credit is important in portfolios of banks and other financial intermediaries. There are multiple indicators of financial soundness of individuals and how personal credit affects banks, with similar limitations of financial ratios.

Loans to finance real estate booms with high leverage ratios and risky projects characterized the Asian crisis.[36] There have been numerous real estate crises in various countries with deep repercussions on the banks. The IMF process identified indicators of real estate, but the Fund rarely monitors this sector. Currently, real estate does not appear to be a problem

in many countries. Nontradable prices collapse during crises, in particular real estate.

The Fund applied the analysis of FSIs to more than 60 countries.[37] FSIs consist of a core set and a suggested set. For institutions taking deposits, the core set indicators consist of the following:

Capital soundness	Required capital to assets adjusted by risk
	Nonperforming loans to gross loans
	Tier 1 capital to assets adjusted by risk
	Nonperforming loans net of capital charges
	Sectoral distribution of loans to total loans
Revenue and profitability	Large exposures to capital
	Returns to assets
	Returns to net worth
	Interest margin to gross revenue
	Noninterest expense to gross revenue
Liquidity	Liquid assets to total assets
	Liquid assets to short-term liabilities
Sensitivity to market risk	Duration of assets
	Duration of liabilities
	Net foreign exchange exposure to capital
Selected FSIs	Bank capital to assets
	Market liquidity
	Business leverage and profitability
	Family debt

There are still obstacles to access FSIs for most countries. The data bank of the IMF contains FSIs used in quarterly assessment of vulnerabilities reported in the *Global Financial Stability Report*. The objective is to integrate FSIs within the FSAP in Article IV consultations. For purposes of the FSAP, stress tests for market risk reveal vulnerability more adequately than FSIs.

The IMF mentions that ten countries use the FSI approach to produce Financial Stability Reports (FSR).[38] Brazil's central bank conducts tests of stress of the financial system to assess vulnerability in a process of reporting financial stability.[39] The Basel capital ratio for Brazil was 16.7 percent in December 2002, above the minimum required of 11 percent. Sharp fluctuations in financial variables in 2002–3 provide an excellent

sample to test the soundness of Brazil's financial system. Risk spreads of Brazil reached 2400 basis points in September 2002, falling to less than 700 basis points in 2003. Brazil lost access to foreign credit and recovered it in less than a year. Internal interest rates increased significantly and inflation appeared threatening after the real traded at 3.95 per dollar in October, falling to less than 2.90 in 2003.

Stress testing in Brazil is quite comprehensive, including 148 banking institutions accounting for 97.9 percent of required net capital of the country's financial system. The BCB simulated the impact on capital requirements of scenarios of shocks of interest and exchange rates and credit. Banks maintained capital requirements in most scenarios. A scenario of combination of interest and exchange rate risk with credit risk resulted in decline of the Basel capital ratio to 12.3 percent. A group of 36 public and private institutions would have had to increase net worth by 8.2 percent. These stress tests constitute an important function of surveillance of the central bank and an essential ingredient in surveillance by the IMF and World Bank. Equally important, the BCB maintains and improves institutional requirements for sound prudential supervision, again one of the key elements of strengthening IFA. Development of systemically important payment and settlement systems paralleled development of sophisticated open market operations by the BCB.[40] Brazil implements fiscal and monetary policy according to criteria of transparency.

In June 2003, the Basel capital ratio of Brazil's National Financial System stood at 16.6 percent, well above the minimum 11 percent. The ratio oscillated between 14.7 and 17.8 percent in 24 months. The BCB conducts periodic stress testing to determine the impact on bank capital relative to required capital of changes in credit risk, exchange rates and interest rates. Capital shortages relative to requirements would show soundness of the financial system. Simulations used four scenarios of stress with alternative combinations of changes in fixed interest rates, exchange rate and credit risk, using data for June 2003. Research included 146 institutions that account for 97.8 percent of required capital in the National Financial System.[41]

In the scenario of highest stress, with combined increases of fixed rates, exchange rate and credit risk, the Basel ratio fell to 12.2 percent, still above the required 11 percent, but below the actual 16.6 percent. There were 38 institutions with capital below the minimum, requiring an injection of capital of 5.7 percent.

The Fund intends to:

- Monitor the impact of shocks on the financial sector using FSIs within the macroprudential surveillance role
- Evaluate risk of occurrence of these shocks

- Detect transmission of shocks throughout the financial sector

As an example, financial sector weakness, monitored by market data, may amplify risk of transmission of an exchange crisis. Three categories of FSI identify conditions of nonfinancial sectors, monitor sectoral vulnerabilities originating in credit, liquidity and market risk and measure the capacity of the financial sector to absorb losses. The approach relates sectors: devaluation has a direct impact on the financial sector and indirectly on its non-financial clients.

The IMF uses a process of stress testing of financial systems to determine the sensitivity or probability distribution of FSIs to a series of macroeconomic shocks and scenarios. This process intends to anticipate potential vulnerability of the financial sector resulting from sector and macroeconomic shocks. The process computes elasticities of the financial sector as, for example, elasticity of bank capital requirements to macroeconomic shocks, to measure vulnerability of banks to risks or combinations of risks. There is interrelation between real and financial sectors. However, tests merely attempt to measure the impact of macroeconomic variables on the financial and banking sectors.

Based on FSAP experience, the IMF concludes that the impact of macroeconomic shocks on banking and financial sectors can be significant. The Fund considers five types of shocks:

- Credit shocks, in which the ratio of nonperforming loans depends on interest and exchange rates, terms of trade, growth of GDP and price of real estate assets
- Liquidity shocks, in which capital flight can trigger a run on bank deposits
- Interest rate shocks, with several types incorporating or not shifts in yield curves and spreads among instruments
- Exchange rate shocks, analyzing all types of effects on the financial sector of exchange regimes and markets
- Stock shocks, examining the impact of stock markets on bank capital[42]

The IMF uses multiple approaches in stress testing. There are different risk models: market (exchange and interest rates), credit and others (liquidity and operational). There are three types of tests: sensitivity of one factor, scenarios of multiple factors and extreme values or maximum loss. The scenarios permit use of variables such as prices, volatilities and correlations to measure relations among different asset classes. In the case of twin crises, it appears more appropriate to simulate the impact of worst probable events, or event test. For example, in Brazil in 1999, tests would simulate banks and corporations with a devaluation of 30 percent or more. However, stress testing for Brazil currently would have to simulate a

different type of exchange crisis. Various types of shocks can use individual market variables, such as interest rates, volatilities implicit in derivative markets or correlations implicit in financial models.

Scenarios can use historical and hypothetical distributions or generate them with Monte Carlo simulations. There is a critical choice of financial assets for simulation. Finally, there is aggregation of results to reach conclusions on the vulnerability of the financial system.

The main objective of system stress testing is to reveal behavior of the system under plausible shocks.[43] Tests provide authorities with the means to assess vulnerabilities. They complement tests by individual institutions, furnishing a uniform assessment of risks across markets. Systems tests reveal repercussions among multiple institutions. Potentially, tests can illustrate links between the financial sector and the aggregate economy. In practice, most system stress tests use a common scenario to simulate shocks for multiple institutions.

System stress tests can be useful in revealing vulnerabilities in balance sheets. There is significant academic and policy focus on the role of balance sheet effects in spreading a crisis in the external accounts of a country to the internal financial sector. System stress testing may uncover weakness of data and measures to obtain improved information.

The Federal Reserve Board evaluated internal models of VaR used by six large banks, all of which ranked among the ten largest dealers in global derivatives.[44] VaR models overestimate losses in the 99 percent confidence interval with resulting excessive estimates of capital requirements. In addition, there were losses higher than those indicated by VaR, concentrating in time intervals.

In twin crises, an event risk process, such as an exchange crisis with strong devaluation, would appear more appropriate to measure vulnerability. VaR would not capture this event characteristic of distributions with fat tails or atypical distributions, which are important in twin crises.

The Fund and the Bank analyzed the FSAP process, stress tests, standards and codes, for 28 countries, including 6 industrial countries.[45] The FSAP/FSSA process of the IMF includes the ROSC. The IMF created the Code on Good Practices in Transparency in Monetary and Financial Policies. The Basel Committee[46] contributed Core Principles for Effective Banking Supervision.[47] The IOSCO and IAIS elaborated standards and codes for securities and insurance and the OECD for corporate governance.[48] IMF missions under Article IV evaluate observance of standards and codes. Although their implementation is voluntary, deficiencies may worsen evaluation of vulnerability to crises by a member country.[49]

Amendment to the Capital Accord to incorporate market risk

In its Amendment of the accord to incorporate market risk, the Basel Committee defined market risk as losses in position on the balance sheet, or off the balance sheet, resulting from variations in market prices.[50] The Committee determined capital charges for market risk above those for credit risk. Risks subject to capital requirement include those resulting from instruments related to interest rates and stocks in the trading book and those originating in exchange risk and commodities throughout the bank.

The trading book consists of positions in financial instruments with the objective of realizing short-term profits between selling and buying price. Generally, but with differences determined by jurisdictions, these positions are marked to market. Capital requirements apply also to positions in currencies and commodities.

The Amendment introduced two methodologies. In the standardized approach, banks calculate risks in accordance with methods specified in the Amendment. In the internal models approach, banks would use estimates of risk of their own internal risk management models. Supervisors would approve the method used by the bank. To use this approach banks would have to meet a series of conditions. The specifications in the Amendment to compute the minimum capital requirement consist of the requirements of the Capital Accord. This would include obligations of debt and stock in the trading book and all positions in commodities plus market risks calculated by the standardized approach or by the internal models approach or by a mixture of both. It would exclude credit risks of the counterparty in derivative contracts traded among companies.

Capital as defined in the Amendment consists principally of Tier 1–equity capital plus reserves–and supplementary capital, Tier 2, as defined in the Capital Accord (see Chapter 6). Banks can use, when approved by supervisors, Tier 3 capital–consisting of subordinated short-term debt–but only for meeting market risk requirements. To qualify as part of Tier 3, subordinated debt must be convertible into permanent bank capital, being able to absorb losses from insolvency. At the minimum, it must have certain characteristics: subordinated, without collateral, fully subscribed, original maturity of two years, nonredeemable before maturity without approval by supervisors and including a clause that neither principal nor interest can be paid if the bank remains below capital requirements.

The Committee limited use of Tier 3 capital to 250 percent of Tier 1, that is, a bank must meet 28½ percent of market risks with Tier 1 capital not used to compensate other risks in the bankbook. It authorized substitution

of Tier 2 with Tier 3 even up to the limit of 250 percent as long as it does not violate requirements of the Capital Accord. In short, Tier 2 capital cannot exceed Tier 1 and subordinated debt cannot exceed 50 percent of Tier 1. The Committee left it to supervisors to determine criteria that Tier 1 capital be at least one half of total capital, that is, that the sum of Tier 1 and Tier 2 does not exceed Tier 1. Calculation of adjusted assets for risk is according to the following formula:

$$\text{Assets adjusted for credit risk} + 12.5(\text{market risk}) \qquad (3.2)$$

Where 12.5 is the inverse of the capital ratio of 8 percent.

The numerical example of the Amendment can be adapted as follows. Assume that assets weighted by credit risk total $7500. Capital requirements would be $600 = 0.08 × $7500, of which one half, $300, would have to consist of Tier 1 capital. If internal models measured market risks of $350, total market risk would be $4365 = 12.5 × $350. Capital charges for market risk would be $350, of which, say, $100 of Tier 1 and $250 of Tier 3, in accordance with the limit of 250 percent. The formula would be:

$$\frac{\$500 \text{ Tier 1} + \$100 \text{ Tier 2} + \$100 \text{ Tier 1} + \$250 \text{ Tier 3}}{\$7500 + 12.5(\$350)}$$

$$= \frac{\$950}{\$11{,}875} = 8\%$$

The Amendment conditioned use of internal models to strict general, quantitative and qualitative conditions. Supervisors would approve use of internal models if a bank complied with conditions. General requirements consist at the minimum of:

- Sound risk management systems implemented with integrity
- Adequate number of technicians qualified in use of sophisticated models in trading, control, auditing and support
- Models with validated performance and reasonable precision in measuring risks
- Stress tests in accordance with specifications in the Amendment

Supervisors determine if a bank can use internal models by compliance with rigorous minimum qualitative requirements. The bank must have a unit of risk control, reporting directly to senior management, being independent from business and trading units. This unit must have a program to systematically test models with past daily actual and hypothetical changes,

back testing.[51] The Board and senior management must be involved in the process of risk control. Managers with authority to fix limits, reduce risk or offset positions must examine daily risk control reports. The bank uses the results of the risk control process in the daily management of planning and surveillance of control of the risk profile. Accordingly, the bank uses the system of risk management jointly with the process of fixing position limits.

The bank applies a rigorous stress test process, acting rapidly to mitigate risks based on vulnerability analysis. Consequently, an internal document is prepared specifying policies, controls and process of risk measurement systems. External auditors then review activities of risk control of business and trading units. The bank's internal audit process carefully reviews risk measurement systems, thus complying with requirements specified in the Amendment.

Internal models of risk measurement must comply with requirements of specification of risk factors, or rates and prices that affect values of trading positions:

- Interest rates
- Exchange rates (including gold)
- Stock prices
- Commodity prices

While the Amendment permits the flexibility to use internal models, supervisors only approve them when banks comply with numerous quantitative requirements. Banks must calculate VaR daily, with the tail of losses at the 99 percent confidence interval, instantaneous price shocks in a holding period of ten days and observation period or sample of at least one year. Data banks must be updated every three months and always after important changes in prices. The Amendment permitted use of any model if it measures defined market risks. Banks can apply empirical correlations within broad risk categories using sound methods with integrity.

Option models must capture nonlinear characteristics of option positions, risk factors for volatilities, vega, and, eventually, apply ten-day price shocks. Banks must meet daily capital requirements based on VaR of the prior day or average VaR in the past 60 working days, multiplied by a factor. Supervisory authorities fix a factor of multiplication based on evaluation of the risk management process of the bank, but never less than 3.

Stress tests include a set of techniques used to determine vulnerability of a portfolio to macroeconomic changes or exceptional but plausible events.[52] Estimates of potential losses during market anomalies permit clearer identification of risks. Stress tests complement internal bank models used for capital allocation. Seasoned researchers and traders recognize that

historical data do not contain full information of probability of occurrence of extreme events.[53] Stress tests intend to measure portfolio performance under extreme market risk conditions in order to complement data analysis. The major financial practical principle consists of protecting capital without which an institution disappears. Stress tests measure significant impacts on capital of extreme events. The framework applies in general to twin crises. A trader constantly calculates capital stress resulting from the impact of unfavorable changes in market variables on portfolio value. A similar process applies to the financial sector of a country as a whole.

The Basel Committee on Banking Supervision underscored the need for stress tests in its Amendment to Incorporate Market Risks in 1996.[54] Stress tests to identify events and influences that can affect banks constitute essential ingredients in evaluation of a bank. The 1996 Amendment determined that banks using the internal models approach must have a "rigorous and comprehensive stress testing program."[55] Stress testing is essential for a bank to assess its capital position. The process would identify determinants of exceptional gains or losses that could prevent sound control of risks. It would include events with low probability in all types of risks–market, credit and operational. The process should consider positions with linear and nonlinear characteristics, such as options. Banks should use quantitative and qualitative stress tests that assess market and liquidity aspects. Quantitative stress testing can identify the capacity of a bank to absorb possible large losses, identifying measures to reduce risk and preserve capital. Assessment of stress testing is essential to bank management. Units engaged in stress testing must communicate results to senior management and, periodically, to the board of directors.

Banks provide the supervisors the test results of the highest losses during the supervisory period for comparison with the estimated required capital by internal measurement systems. Thus, supervisors can evaluate how many days of high losses VaR could detect.

Supervisors receive from banks portfolio stress simulations of scenarios. A class of scenarios would include historical episodes such as decline of the bond market in 1994. Other scenarios would capture the impact on portfolios of changes in volatilities and correlations, especially past extreme values. Finally, banks would develop their own stress tests, identifying adverse extreme events given portfolio characteristics. Emerging market crises constitute one of the most tested scenarios.

In addition, senior management periodically review the stress tests used to determine limits and policies by the bank's board. When tests show vulnerabilities, authorities expect that banks will take prompt measures to manage risks. External auditors and supervisors validate the internal

models when they comply with minimum requirements. Therefore, the internal validation process should function satisfactorily. A qualified unit independent of trading areas verifies the formulas used in calculations. Banks evaluate, and provide to external auditors and supervisors, results of back testing, comparing VaR with actual profits and losses. Data and measurement system processes of risk measurement are transparent and accessible to auditors and supervisors.

The Amendment included an example for capital requirements of option positions. The example considers a short European option–with exercise only at expiration–with underlying commodity, exercise price of 490, 12 months to expiration and market price of 500. Delta is the first derivative of the option price relative to the underlying, that is, change in option price resulting from change in the underlying, calculated at −0.721 by the Black-Scholes model. Gamma is the second derivative, that is, change in delta resulting from change in the underlying, calculated in this case as −0.0034. The formula option value is 65.48.

Formula (3.1) serves to compute capital charges:

$$dC = \Delta dP + \tfrac{1}{2}\Gamma dP^2 + \Lambda d\sigma \qquad (3.1)$$

$$\Delta dP = \text{price of underlying} \times \Delta 0.15 = 500 \times 0.721 \times 0.15 = 54.075$$

The following calculation, based on equation (3.1) above, provides the capital requirement for gamma:

$$\tfrac{1}{2}\sigma dP^2 = \tfrac{1}{2}(0.0034) \times (500 \times 0.15)^2 = 9.5625$$

Volatility, σ, the standard deviation of the underlying, is obtained by historical series or is implicit in option price formulas. Volatility in the example is 20 percent and assumes an increase of 25 percent, or 5 percent, which requires capital charges. Vega is the variation of volatility resulting from an increase in the price of the underlying. The formula calculated value is 168. Therefore, an increase of 1 percent in the underlying increases volatility by 1.68 = 0.01 × 0.00168. Resulting capital charge is:

$$\Lambda d\sigma = (\text{volatility increase})(0.01 \times \Lambda) = 5 \times 1.68 = 8.4.$$

In practice, banks, investors and financial institutions manage option positions instantaneously using more complex models and risk/return calculations. The example extracted from the Amendment ignores the continuing price decay of option value as time to expiration declines.

Generally, derivative positions are quite complex, combining various derivatives and cash instruments.

Stress tests of market risk in the FSAP

The objective of aggregate stress tests consists in permitting regulators to identify structural vulnerabilities and risk positions in the financial sector that may prevent its sound functioning.[56] The focus is on the potential failures in the market with liquidity crises.

Aggregation of numerous and diverse institutions constitutes a complex process in stress testing of the financial system as a whole.[57] Ideally, aggregation of individual stress tests of banks would constitute an appropriate process. However, tests used differ bank by bank in terms of methodology and models. In fact, aggregation of total risk of a bank encounters difficulties. When institutions have complex interrelated portfolios, aggregation can result in a nil net position while in reality there is a large gross position, with systemic potential risk.

The process ignores nonbank financial institutions, but they contributed systemic risks, as in the Asian crisis. When there are foreign banks in the internal market, risk measurement may become more complex. The head office may experience problems, causing difficulties in the local market or, on the contrary, the head office may provide guarantees to the subsidiary, reducing its risk. An international bank may globalize its risk management, as in the case of the Chase Manhattan Bank.

An alternative consists in obtaining portfolio positions of banks individually and of supervisors separately to conduct stress tests with common methods and models. This results in improved comparability and a uniform method. However, costs to the supervisor, of obtaining data and the required technical staff, may be burdensome.

Aggregating results of stress tests by individual banks provides better information on the vulnerabilities and risks of the banking system. Banks have more familiarity with their operations than outside experts and have a stake in the reliability of their tests. There should be a useful dialogue on tests between monetary authorities and banks. On their part, supervisors should maintain information as strictly confidential. Concentration of banking in Brazil, Mexico and Argentina permits monitoring by central banks by reviewing only a few institutions. Larger banks have the capacity to implement advanced processes.

Initial FSAP experience with stress tests used simple maturity gaps and repricing of assets and liabilities, without using duration. However, duration in bankbooks in local currency in Brazil, Argentina and Mexico

is not important because assets and liabilities are short-dated. In practice, terms of loans and deposits diminish during crises. Of 12 countries initially analyzed by the FSAP, data in 10 originated in individual institutions concentrating 50 percent or more of the banking sector. Only two countries used aggregate data of the financial sector.

Six countries applied duration gap, one country used an advanced VaR and there was no stress test of interest rate risk in the other. Eight countries used hypothetical increases of interest rates, three used parallel shifts of yield curves and two used increases in interest rates simulating a major shock.

Creativity in test design and construction of scenarios determines the reliability of stress tests. Concentration and advanced management in larger Latin American banks permits the use of complex test methods. Central banks should establish a dialogue with larger banks to conduct stress tests in hypothetical scenarios of emergency increases in rates, twin crisis and financial distress.[58] Results would strengthen analysis of economic policy, creation of a safety net for the banking sector and a background for consultations within Article IV.

Exchange risk affects values of assets and liabilities of a financial institution and off-balance sheet items. Risk can arise directly because of a net exchange position or indirectly in credit risk of exchange positions of debtors and counterparties. In hedged positions, the counterparty could fail to honor its commitment, a more likely phenomenon in a crisis. Local currency positions indexed to the exchange rate have exchange risk and must be included in testing. Banks must calculate net exchange positions following an internally accepted methodology such as that recommended by the Basel Committee on Banking Supervision. According to the Committee, a bank should calculate net exchange position summing the following items:[59]

- Spot net position (all assets less liabilities, including accumulated interest, denominated in the foreign currency in question)
- Future net exchange position (all receivable values less payable values in foreign currency transactions, including exchange futures and swaps in currencies not included in spot position)
- Guarantees and similar instruments that are collectible and that the bank may not recover
- Net future revenues and expenses not yet accrued, but with full hedge, controlled by the bank
- Any other item constituting profit or loss in foreign currency depending on accounting norms in different countries
- Net delta equivalent of total option book on foreign currencies

Delta is the first derivative of option price relative to the underlying, change in option price resulting from change in the underlying.[60] The net equivalent is the multiple of delta by the notional value in the contract, resulting in the price impact on the position by a change in the underlying. Management of derivatives requires complex concepts and techniques.

The process of stress testing examines shocks of the net exchange position by different exchange rates. Where there are large derivative positions using linear approximation by delta, there should be analysis with the second derivative, gamma, multiplying ½ of gamma by the square root of 8. Institutions with large positions should provide results of stress tests of exchange risk. Banks should update positions rapidly to permit evaluation by monetary authorities.

Only large institutions with systemic potential require exchange risk stress testing. Institutions other than banks with significant net exchange positions should also conduct stress tests. Debtors with liabilities indexed by exchange rates could create credit problems and there should be tests of their vulnerability and possible impact on creditor capital. Unavailability of data may prevent stress tests of debtors.

Stress tests of devaluation should include all relevant currencies. However, positions in dollars dominate exchange risk in Argentina, Brazil, Mexico and many Asian countries. Analysis of derivatives, such as options, must include volatility shocks, using the second derivative of option price sensitivity to changes in the underlying. Central banks should require sound models of exchange risk management by institutions that take positions in exchange derivatives. Combinations of derivatives and the underlying replicate cash flows that are quite different in sensitivity to exchange rate changes. Use of VaR models must include not only exchange rate shocks and volatilities but also correlations. Long Term's experience shows the possibility of changing correlations altering the risk analysis of complex positions.[61] In addition, explicit incorporation of correlations captures net effects of relations among different positions in the portfolio.

There are differences in data on exchange rates. Historical data and those obtained in the crisis experience of other countries can omit behavior during a future crisis, failing to reflect institutional and policy determinants. Hypothetical data may be associated with nil probabilities. However, use of scenarios can identify worst-case situations. The process could anticipate policies that would prevent adverse economic conditions restraining the illiquidity crisis and avoiding exceptionality. Authorities must repeat stress tests with scenarios periodically even in normal conditions so as not to create unfavorable expectations.

Monte Carlo simulations permit combination of many variables, including

portfolios of options and other instruments with nonlinear characteristics. However, they require advanced techniques that may be available only to larger institutions.

The Basel Committee recommended exchange rate changes of plus or minus 8 percent.[62] For a debtor country with loss of foreign private credit, stress tests must include scenarios of exchange crisis with strong devaluation. Similarly, volatility hypotheses must include changes that capture a possible external crisis. Fluctuations of 25 percent recommended by the Basel Committee can be lower than required. The Korean won devalued from 700 to 1800 during the initial period of crisis. Argentina experienced similar devaluation.

In the initial FSAP, the Fund tested the net exchange position of banks with 50 percent or more of deposits, assets and loans for 12 countries and aggregate data for 2 countries. In 10 countries, the Fund mission tested the impact on capital of an exchange rate shock, VaR was used in one country and in another there was no exchange test. The IMF tested scenarios of devaluation in eight countries and the available historical data in three.

When banks operate with derivatives, exchange stress tests must be careful in measuring the net exchange position. Monetary authorities must impose strict criteria of adequate information without errors in exchange positions of banks and financial institutions. Current precarious foreign credit conditions require elimination of any exchange risk surprise.

In mid 2002, the Executive Board of the Fund approved a new approach for evaluation of sustainability of external and public debts of countries.[63] The IMF will use this approach in diverse cases. Countries with moderate debt could identify vulnerability in time to take corrective measures. Those facing crises could evaluate policies to stabilize debts. Countries in default could choose alternative structures and levels of debt.

The Fund's approach consists of three levels. The first is a base scenario of macroeconomic forecasts, with specified parameters, which constitutes an understanding with the IMF of intended policies by the authorities. In the second level, tests of stress-with various assumptions of policy variables, macroeconomic events and costs of financing-determine ceilings of debt. In the final level, the IMF recognizes that evaluations of sustainability require appeal to market expertise. Therefore, the final product requires interpretation of the vulnerability of a country to crisis and not only quantitative techniques. Many will recognize here the process of decision in central banks. Currently, the Fund is still developing the approach, but it constitutes an important innovation.

The Basel Committee, credit risk models and the FSAP

The fundamental objective of credit risk models is to determine economic capital. Banks use reserves and loan loss provisions to compensate expected losses. Economic capital is a precaution against unexpected credit losses.

In fact, there are multiple reasons for using credit risk models:[64]

- Concentration and exposure limits
- Risk-based pricing
- Risk/return profiles of portfolio
- RAROC, risk-adjusted return on capital to evaluate performance of business lines and managers
- Economic capital allocation
- Validating loan loss reserves

Numerous changes in financial markets, occurring rapidly, require quantification of credit risk. Financial instruments are increasingly more complex. These new instruments have dynamic counterparty exposures that are different from traditional exposures in bonds and loans. Credit enhancement mechanisms are growing exponentially. In addition, these mechanisms are part of regulatory capital principles. Securitization is increasing liquidity of credit and derivatives permitting hedge of exposures. Trading and hedging require thorough analysis. New credit instruments use correlation estimates in credit quality migration. Matrices of credit quality constitute an essential component of credit risk models.[65]

The objective of credit models is a VaR credit measure that encompasses rating change and default risks.[66] Analysis of credit risk would assist managers to identify concentration risk and opportunities for diversification. Credit modeling can provide risk versus return profiles that can lead to optimization of risk taking. Concentration risk is an additional risk of a portfolio because of increasing exposure to a borrower or a group of similar borrowers, related by industry, location, etc. Limits on exposure are not as powerful as calculations of risk and return tradeoffs. Quantification of risks could provide useful input for rational allocation of capital by a bank.

A report by the Basel Committee analyzed risk models used by researchers, private vendors and banks.[67] The BCBS surveyed practices at 20 large international banks in 10 countries. It concluded that credit models provide banks with many advantages. Models centralize data on global exposures to analyze marginal and absolute sources of risk. Banks can classify, detect, measure and manage risk. An unexpected loss helps to reveal concentration risk. Models interact with business lines, credit quality, market risk factors and economic conditions. Banks may find information to determine reserves and economic capital. Models can lead

to improvements in risk and performance pricing, resulting in transparent decision processes. Supervisors may be able to relate capital requirements to perceptions of portfolio risks and concentration, a prime objective of Basel II. Models are flexible to changes in the economy and financial innovation, reducing the motivation for banks to engage in arbitrage of regulatory capital.

The Committee and the supervisors orient their activities by a constructive and progressive approach. They encourage development and use of improved processes of risk management to ensure sound bank administration and communication with the supervisors. Adequate practices of internal risk control, which banks feel they own, guarantee their proper functioning. Progressive elements consist of rewards in supervisory rules of using better methods, with institutions "migrating" from standardized methodology issued by supervisors to internal methods of risk control. The Basel Committee incorporates this progressive approach in the Amendment for market risks and in the New Capital Accord.

Allocation of economic capital for credit risk constitutes the general approach of credit risk models.[68] The process begins with the definition of a probability density function (PDF) relating a specific probability to every credit loss event.[69] The distribution exhibits leptokurtosis, that is, high probability of smaller losses and low probability of larger losses. The bank uses a credit risk model to estimate the PDF. The average of a PDF constitutes the expected credit loss, for which the bank makes loan loss reserves. Unexpected credit loss consists of the difference between the point in the extreme right tail of loss, for a predetermined cumulative probability of loss, and average expected loss. Allocation for unexpected loss consists of economic capital for credit risk. The credit risk model consists of policies and processes used by a bank to estimate the PDF.

There are two models, the default mode (DM) and the mark to market (MTM). In the DM, there is credit loss only if the debtor defaults in the time horizon.[70] Credit loss is equivalent to the credit position of the bank, or debt owed on the date of default, less present value of net future recovery, or cash payments less expenses of workout.

The present value of a loan is the credit position of the bank, that is, value in the books. Future value in the state of no default consists of the credit position at the end of horizon plus interest payments that occur. In case of default, there is adjustment of future value of a loan by:

$$1 - LGD \tag{3.3}$$

where *LGD* is the rate of loss in case of default.

In DM, the bank must estimate a joint probability distribution of three random variables for every category of credit: credit position, an indicator taking values from zero in case of no default and unity in case of default and *LGD* given default. The model estimates a PDF for every category of credit and for the bank as a whole.

In the approach of unexpected loss, there is the assumption that it is valid to approximate a PDF by families of distributions, such as beta, characterized by the average and the standard deviation. For every category of credit, the PDF provides an estimated default frequency (*EDF*). The average loss expected in the planning horizon is obtained by adding expected losses for all credit categories, *i*:

$$\mu = \sum_{i=1}^{n} EDF_i \, LEE_i \, LGD'_i \tag{3.4}$$

where *LEE* is loan equivalent exposure and *LGD'* the expected rate of loss in case of default.

Standard deviation, σ, is calculated by the formula:

$$\sigma = \sum_{i=1}^{n} \sigma_i \rho_i \tag{3.5}$$

where every term in the sum consists of the standard deviation of the category, σ_i, and the correlation with the portfolio as a whole, ρ_i. The larger the correlation among categories, the higher is the standard deviation of the portfolio.

EDF constitutes a critical input in any model. The credit department assigns an internal credit rating to clients, constituting the basis for calculation of the *EDF*. Banks also use external ratings by credit agencies and other vendors. Some banks generate a transition matrix, with lines in decreasing order of credit quality: AAA, AA, A, BBB, BB, B, CCC and columns from AAA to default. The intersection of a quality category, AAA, with another, AA, shows the probability of migration from one category to another, from AAA to AA. In the Default Mode, only the column of default is relevant.

MTM measures credit loss as the difference between the portfolios marked to market, or model, at the beginning and end of the planning period. The risk neutral value (RNV) approach postulates that there is default when the underlying value drops below the level required to service debt. It departs from the principle of discounting contingent payments:

State	Payment
No default	Value of contract
Default at time t	1−*LGD*

The Merton approach states that the valuation of the debt risk of the firm is equivalent to a put option on the value of the underlying firm's assets.[71] If asset value declines below outstanding liabilities, or default threshold, the firm defaults. Similarly, there are credit ratings thresholds for upgrades and downgrades of credit rating. The relation between the value of the firm and its credit rating and the correlations among firm values can generate a joint probability distribution. The value of a loan consists of the present value of a set of derivative contracts on the value of underlying assets of the debtor.

The rate of discount uses the term structure of interest rates without risk and measurement of risk neutral price.[72] Market risk premium related to default risk of debtor adjusts probabilities of default in every horizon. In the capital asset pricing model (CAPM) expected return depends on expected market return and correlation between the company and the market. Therefore, the price of loans in RNV incorporates *EDF*, *LGD* and the correlation between the risk of the debtor and systematic risk.

Professors Duffie and Singleton denominate DM credit models as reduced form models, following the convention in academic and industry research.[73] According to Finger, reduced form models obtain default probabilities with information from actual credit prices.[74] The concern is not to explain the causes of default likelihood but rather how markets assess individual credits. The usefulness of these models is in comparison of different instruments of credit risk. Reduced form models do not intend to explain why default occurs. In fact, the arrival of default is a "surprise." However, they rank risks across different types of credit risk.

The simplest case of reduced form models considers default as the first arrival time, τ, of a Poisson process.[75] The mean arrival rate, λ, or intensity, is constant. The expected time to default is $1/\lambda$ and the survival probability for t years, $p(t)$, is $e^{-\lambda t}$. Thus, time to default is exponentially distributed. There are various academic and industry tractable models of default intensity, surveyed by Duffie and Singleton.[76]

Duffie and Singleton denominate MTM credit models as structural models.[77] These structural models of credit risk relate the creditworthiness of a firm to its current assets and their evolution over time.[78] The models calculate the probability of decline of the value of the assets below the liabilities, over a specified time period, using the level of assets, the volatility of assets and the level of liabilities. The value of the equity of the firm is the value of the assets less the liabilities. The models establish a relationship

between the equity and credit markets where the path of the firm's assets determines the firm's equity and credit. Information in equity markets is more transparent and liquid allowing measurement and analysis of credit markets.

Two classes of successful structural industry models by Moody's MKMV and RiskMetrics are considered below after some required background. The departing premise of structural models is the seminal contribution by Fisher Black and Myron Scholes and Robert Merton.[79] Default at time T occurs when the value of the assets, $A(T)$, is below the value of the firm's debt, D, or $A(T) \leq D$. The market value of the firm's assets follows a log-normal diffusion process.[80] Thus, the firm's equity is a call option on the total assets, A, with strike value at the firm's debt, D. The Black-Scholes formula can be used to obtain the value of the firm's debt by deducting the option price from the initial asset value.

The log-normal diffusion process of the asset value follows:[81]

$$\frac{dAt}{A} = (\mu^a - \gamma)dt + \sigma^a dBt \tag{3.6}$$

where μ^a is the mean rate of return on assets, γ the proportional cash payout rate, σ^a the asset volatility and B a standard Brownian motion.[82] There are also first passage models in which default is triggered when assets cross a default barrier.[83]

Survival probabilities measure the likelihood of no default in a given time period. Default probabilities consist of one less survival probabilities.

Cox-Ross relied on the basic principle of arbitrage that two portfolios with the same payoff must have the same current price.[84] The Black-Scholes riskless hedge is preference free. That is, the instantaneous drift of the security's diffusion process is not a determining variable. Actually, the only determining parameters are the riskless rate and the instantaneous volatility of the underlying's diffusion.

Since the existence of the riskless hedge is independent of preferences, valuation can be made under the assumption of risk neutrality. In such a world, both the option and the underlying yield exactly the riskless interest rate, r. Specifically, the conditional expectation of underlying returns is as follows:

$$\mathrm{E}[S(T)/S(t)|S(t)] = \exp(r(T-t)) \tag{3.7}$$

where S is the underlying, T the index of continuous time at maturity and t the current time.

Let $h(S)$ be the boundary value at maturity, $\max\{S(T) - K, 0\}$ in the case of a call, K being the exercise price, or $\max\{K-S(T), 0\}$ in the case of a put, and $W(S(t), t)$ the current price of the option. Then,

$$E[W(S(T), T)/W(t)|S(t)] = 1/W(E[h(S(T)|S(t)]) = \exp(r(T - t)) \quad (3.8)$$

or

$$W(S, t) = \exp(-r(T - t))E[h(S(T)|S(t)] \quad (3.9)$$

where the expectation is with respect to the risk-neutral probability distribution of the stock price at time T given the stock price at time t.

A basic property of a price system should be the lack of arbitrage opportunities, or lack of "creating something from nothing." If there were arbitrage opportunities, investors would demand unlimited amounts of the arbitrage strategies and markets would not clear. An arbitrage opportunity is defined as a non-positive initial portfolio value, a certain non-negative terminal value and a positive terminal value with positive probability. That is, an arbitrage opportunity consists of:

$$\begin{aligned} & V(0) \leq 0 \quad Q\text{-}a.s. \\ & W[V(T) \geq 0] = 1 \\ \text{and} \quad & Q[V(T)] > 0 \end{aligned} \quad (3.10)$$

where V is portfolio value and Q a probability measure representing the common probability belief of all economic agents.

The fundamental theorem of Harrison and Kreps postulates that there are no arbitrage opportunities in simple strategies in a security price system if and only if there is an equivalent martingale measure Q^*.[85] Simple strategies are those that require trading only at a finite number of times. The restriction to simple strategies is designed to eliminate doubling strategies, as in Harrison and Kreps, which, as in roulette, could eventually result in winning if repeated an infinite number of times.[86] This can occur even if the time interval is small because of the assumption of continuous trading. The continuous rebalancing of the Black-Scholes riskless hedge is not a simple strategy.[87]

More general strategies are arbitrage free if a nonnegative wealth constraint is imposed.[88] Margin requirements and an integrability condition also serve the same purpose.[89]

In pricing, the intensity of reduced form models, λ, becomes a risk-neutral intensity, λ^*.[90] The Brownian motion of the log-normal diffusion process of asset value, B, becomes a risk-neutral Brownian motion, B^*.

Crosbi and Bohn provide the essence of the proprietary successful model of Moody's MKMV to measure expected default frequency (EDF).[91] Default risk is the uncertainty that a firm may not be able to service its debt and obligations. It is not possible to differentiate *ex ante* firms that will default from those that will not default. However, it is possible to make evaluations of the probability of default. Firms borrow with a spread over the default-free rate of interest to compensate lenders for the possibility of default.

There are three types of risks in a position on a single security. The default probability is the probability that the borrower or counterparty will not service its obligations. Loss given default is the proportionate loss in case the borrower or counterparty defaults. Migration risk measures the probability and change in value resulting from changes in default probability. There are two risks in a portfolio of securities. Default correlations measure the relation among the default risks of borrowers and counterparties. Exposure risk is the portion of the portfolio subject to risk of default by each borrower or counterparty.

There are three determinants of the probability of default. The market value of assets is an approximation of the future cash flows of the firm discounted by an appropriate discount rate. Asset risk measures the risk of the firm and its industry. Leverage measures what the firm must repay calculated by the book value of liabilities relative to the market value of assets. However, many firms continue to service their debts even after the book value of liabilities exceeds the market value of assets. Part of the reason is that some liabilities are of long terms. The default point is somewhere between long-term liabilities and current liabilities. The appropriate net worth of a firm equals the market value of assets less the default point. A firm defaults when its market net worth is zero.

Differences in default probabilities arise partly from differences in asset risk. For example, a high technology company shows substantially higher volatility of market asset value than a consumer goods company. Thus, the high technology company shows higher default probability than the consumer goods company.

Distance to default combines asset value, business risk and leverage into one measure of default risk. It relates market net worth to the size of one standard deviation in the movement of asset value:

$$\text{Distance to Default} = \frac{[(\text{Market Value of Assets}) - (\text{Default point})]}{[\text{Market Value of Assets}] \times [\text{Asset Volatility}]} \quad (3.11)$$

Distance to default provides the number of standard deviations of a firm's market value of net worth away from default. In the denominator, it combines three important credit determinants of the firm: assets, business/industry risk and leverage. The denominator incorporates effects of industry, geography and firm size implicit in asset value and volatility. The distribution of asset values or the default rate for a specific distance-to-default would permit computation of the default probability.

MKMV departs from the principle that market prices and financial statements are relatively efficient. That is, it is very difficult to beat the market consistently. Thus, their model uses market prices to determine default risk. Vasicek-Kealhofer developed a model to conceptualize and estimate the default probability. This model assumes that the firm's equity is a perpetual option. The firm defaults when asset value reaches the default point. MKMV uses a default data base to estimate an empirical distribution that maps the distance to default to a default probability.

MKMV uses the Vasicek-Kealhofer proprietary model to compute *EDF*, which is the probability of default during the next year or years. *EDF* uses equity prices and financial statements as inputs. Default is failure to service any scheduled payments, interest or principal. Calculations of *EDF* for five years provide a term structure of *EDF*.

There are three steps in the calculation of *EDF*. First, market value and volatility of equity together with book value of liabilities provide estimates of asset value and volatility. Second, asset value, asset volatility and book value of liabilities furnish the distance to default. Third, distance to default and the default rate for specific levels of distance to default permit direct calculation of default probability.

The model departs from the postulate that equity is a call option on the underlying assets of the firm. Thus, the market value and volatility of assets can be measured using an option pricing approach. Consider a very simple case of only one type of assets and one type of liabilities. Because of limited liability, equity holders have the right, but not the obligation, to pay off the creditors and assume control of the remaining assets of the firm. In this simple case, equity is equivalent to a call option on the firm's assets with strike price equal to the book value of the firm's liabilities.

The approach obtains asset value and asset volatility from option-implied values. In the simple case, there are two equations with two unknowns, asset value and asset volatility:

$$\text{Equity Value} = \text{Option Function}(\text{Asset Value, Asset Volatility, Capital Structure, Interest Rate}) \tag{3.12}$$

$$\text{Equity Volatility} = \text{Option Function}(\text{Asset Value, Asset Volatility, Capital Structure, Interest Rate}) \quad (3.13)$$

There are four critical determinants of default probability of a firm over a horizon, *H*: current asset value, distribution of asset values at time *H*, volatility of future asset values at time *H* and the level of the default point or book value of liabilities. Two other determinants are the expected rate of growth in the asset value over the horizon and the length of the horizon, *H*. The analyst determines *H*.

The default probability, *EDF*, would be simply the tail in the future distribution of asset values at and below the default point. This distribution is very difficult to measure. MKMV first measures the number of standard deviations of asset value away from default. It then uses empirical data to compute the corresponding default probability. The data base of MKMV contains 250,000 company years of data and more than 4700 cases of default or bankruptcy. These data provide a frequency table with which to map distance to default to probability of default.

A method to test *EDF* models is the power curve showing the tradeoff between defaulting firms to the proportion of firms excluded. The model is more powerful if it excludes proportionately more defaulting companies for a given percent of firm population excluded. At the extreme, if 100 percent of the firms are excluded there is no lending to defaulting firms. The power consists of excluding the highest percentage of defaulting companies for a given percent of excluded companies.

Gupton and Stein explain how Moody's KMV developed LossCalc™ to predict loss given default (*LGD*).[92] The set of data includes 3026 recovery observations of loans, bonds and preferred stock 1981–2004, with 1424 defaults of public and private firms. An error in *LGD*, 1 – recovery rate, is as damaging as an error in *EDF*. Accurate estimates of *LGD* improve allocation of economic and regulatory capital.

LossCalc conforms to Basel II requirements that *LGD* reflect cyclical variability and historical recovery. It includes time-varying factors and uses histories that are longer than the seven years required by Basel II. LossCalc uses two time horizons, immediate, for use in applications under one year, and one year, for applications of one year or more.

LossCalc uses nine explanatory factors, with low colinearity, to predict *LGD*:

- *Collateral and backing*: cash, assets and support from subsidiaries
- *Debt type*: loans, bonds, etc.
- *Three types of firm status*: leverage adjusted for credit cycle; relative seniority; firm-specific Moody's KMV distance to default

- *Two industry factors*: historical averages of industry recoveries; distance to default across many companies aggregated at the industry and regional level
- *Macroeconomy/Geography*: regional flags; distance to default for many firms aggregated at the regional and industry level

The MKMV distance to default public-firm model calculates the market value of the firm's assets and compares it with the book value of its liabilities. Information of equity markets and the firm's market value of assets provide signals of the market's evaluation of the future of the firm.

LossCalc transforms predictive factors into univariate factors. For example, leverage is more important to losses during contractions. LossCalc relates leverage to global corporate default rates. It aggregates transformed variables using multivariate regression techniques and maps the model output to historical *LGD*.

The recovery rate is measured as market value one month after default provided by bid market quotes. The rationale for this one month approach is to observe recovery after the market can evaluate post-default corporate information. A longer time period could result in quotes that are too thin but provides time for investors to dispose recently defaulted debt. The approach avoids difficulties of assessing post-default cash flows and valuing instruments that replace the debt.

Economic or risk neutral methods observe *LGD* by means of post-default debt prices or infer *LGD* from equity and debt prices. The method of implied loss given default estimates the default likelihood of the firm to select the *LGD* that best depicts the market price of the debt relative to model valuation. In liquid markets, it is possible to observe the market value of *LGD*. Many investors trade out of defaulted securities in approximately one month after default. Investors specialize in defaulted debt price according to expected recovery. LossCalc uses post-default market valuation to measure the recovery ratio. However, recoveries are not normally distributed. LossCalc uses a beta distribution to convert recoveries to a normal distribution.

The final output of LossCalc consists of a conditional estimate of prediction intervals (PI), showing a range where the actual value should fall in a specific percentage of the time. These prediction intervals can be used in a credit-VaR model. The range of PI indicates the uncertainty of the recovery rate process and the ability to realize the mean of the prediction. There is measurement of the accurateness of the mean recovery forecast. Thus, a 90 percent PI shows upper and lower bounds where the realized value will fall 90 percent of the time. In other words, the realized value will fall outside PI only 10 percent of the time.

Bank data do not include loans past due 90 days that are restructured or

"cured." MKVM finds that cured rates in banks range between 20 and 50 percent. LossCalc assumes a 100 percent recovery rate on the cured part of debts and applies the forecast of *LGD* to the remaining part, or one less cured rate. The net effect is:

$$\text{Aligned Recovery} = \frac{(\text{cure rate} \times 100\%) + (1 - \text{cure rate})}{\text{LossCalc Recovery Forecast}} \tag{3.14}$$

The objectives of model validation are to evaluate overall model performance, fit, reliability and robustness over time and credit cycles. LossCalc validates its model through the method of walk forward. It fits a model to a one time period and tests in a subsequent one from the past to the present. Thus, LossCalc does not test with data used to fit the model and validates over time and cycles. LossCalc provides lower mean squared errors of predicted and actual values than historical averages and tables of averages and higher correlations over two horizon periods, 1991–2001 and 1993–2004, for immediate and one year models.

The "power" of a model is its ability to rank higher than average losses versus lower than average losses. In practice, the power of a model consists of deviations from predicted and actual higher than average losses. Tests show that LossCalc is more powerful than tables of averages for both immediate and one year models.

An analysis of the CreditGrades™ model of RiskMetrics requires background on credit derivatives, the credit default swap (CDS) and collaterilized credit obligations (CDO). In a CDS, a buyer of protection pays a periodic fee to a seller in exchange for a payment in case of a credit event of a referenced credit. Some types of credit events include bankruptcy, merger, cross acceleration, cross default, downgrade, failure to pay, repudiation, restructuring and currency inconvertibility. Referenced credits could include a named issuer, a corporation, a private borrowing and a sovereign. The buyer pays a periodic annuity, A, to the seller. In case of a credit event, such as default, the seller pays typically the face value less the market value at default.

Duffie and Singleton identify two pricing problems.[93] First, there is the need of a price at origination, which consists of choosing A such that the market value of the CDS is zero. Second, the CDS changes value after origination because of movements of interest rates and credit quality, causing the need to find a mark to market price.

The pricing of CDS spreads requires various assumptions. One method prices spreads by means of arbitrage relative to a synthetic default swap, which consists of a long position in a default free floater and a short

position in a defaultable floater.[94] The synthetic default swap consists of shorting the underlying par note issued by the referenced credit for say, 100, and investing the 100 in a par default-free note, held to default time, τ, or maturity of CDS, T. The coupon on the defaultable floater equals the coupon on the default free note plus a spread, which on subtraction of the coupon on the default-free note provides the spread. Duffie and Singleton add a repo special and other transaction costs to obtain the all inclusive par spread.[95] Other methods could price directly by using an intensity model.

The Joint Forum of the BCBS, IOSCO and IAIS issued an important document on credit risk transfer.[96] A traditional CDO consists of a portfolio of credit exposures, segmented into tranches and transferred to an investor. A reference portfolio can consist of cash credit risk exposures, bonds or loans, or synthetic credit risk exposures, CDS. These traditional portfolios employ a securitization strategy similar to that of mortgage-backed securities and asset-backed securities. A new generation of portfolio products, single-tranche CDOs and nth to default basket swaps, requires more complex financial engineering techniques similar to those used in interest rate options and equity derivatives. Notional exposures are not useful as a measure of risk.

Duffie and Singleton distinguish between the cash flow CDO, paying the interest and principal of a collateral pool of debt instruments, and a market value CDO, paying in accordance with the mark to market of the pool.[97] The CDO distributes the interest and principal of the collateral pool to three prioritized tranches. The senior tranche resembles a short option on the performance of the CDO, with the value declining with increases in default correlations of instruments in the pool. The junior or subordinated equity tranche resembles a long call on the performance of the CDO, with value increasing with the default correlations of the pool. There is an intermediate or mezzanine tranche. Duffie and Singleton define the credit model problem as using the joint distribution of instruments in the collateral to measure the risk and valuation of the CDO.[98]

The hypothetical example of the Joint Forum consists of a synthetic CDO of $1 billion with three tranches.[99] The unrated equity tranche has the first $30 million of losses, the second tranche the subsequent $70 million and so on. The reference portfolio consists of 100 single-name CDS of $10 million each and average credit rating of single A. A bank could select the credits of the reference portfolio to hedge loans on its balance sheet, issuing such a synthetic CDO. An investment bank could create the synthetic CDO on behalf of an asset manager who chooses the reference portfolio based on fundamental credit analysis.

Commonly, the different investors acquire the three tranches. An

important feature of the synthetic CDO is to create products tailored to investor classes. In this example, the equity tranche pays LIBOR plus 12 percent and would be sold to an asset manager or a hedge fund. A regional bank seeking to diversify credit exposure may acquire the mezzanine tranche paying LIBOR plus 2 percent. Investors desiring low risk, low return may acquire the third tranche, which pays LIBOR plus 10 basis points.

In the example, the investors pay the principal amount. Defaults would reduce principal. Investors' principal would be deposited in a collateral account and invested in government securities or AAA debt. There are also CDOs with unfunded tranches, structured as swaps without initial payments. Investors receive spreads periodically and must make payments when their tranches default. These unfunded CDOs create counterparty risk.

If there are no defaults in the reference portfolio, there are quarterly payments in waterfall fashion, from senior to equity tranches. Suppose that there is a loss of 60 percent of notional value in one of the single name reference swaps, $6 million, corresponding to a recovery rate of 40 percent. This loss would cause writing down the principal amount of the equity tranche by $6 million. There would be no losses to the other tranches. However, the overall CDO mark to market value would decline because of the lower value of the equity tranche. The example illustrates credit transfer. Suppose that a bank was the counterparty of the single name CDS. The bank would receive a credit of $6 million on the CDS that would offset part of the loss on the credit. Investors in the equity tranche would bear that loss. Thus, the bank exposure to default is transferred to CDO investors.

There are two economic reasons for CDO markets. First, loans and bonds are relatively illiquid. Therefore, it is costly and difficult to create portfolios that meet the risk/return profile desired by investors. CDO technology is cheaper than creation of the portfolios by investors. Second, regulatory capital is typically above economic capital required by markets to take risk. Banks entered the market to reduce regulatory capital. Duffie and Singleton distinguish between balance sheet and arbitrage CDO.[100] A bank could enter in a CDO, or collateralized loan obligation, to remove assets such as loans from the balance sheet. The resulting securitization would increase the liquidity and value of those assets. An investment bank could issue an arbitrage CDO to realize part of the difference between the value obtained from management fees and sale of the CDO and the cost of buying the collateral assets in the secondary market.

Duffie and Singleton analyze three sources of illiquidity that promote or restrict use of CDOs: moral hazard, adverse selection and trading costs.

Moral hazard originates in the diminished incentive for asset managers to choose the highest quality of the collateral pool and for the trustee to enforce strict covenants.[101] A seller of a CDO can mitigate information asymmetry by concentrating positions of collateral with fear of adverse selection into smaller subordinate tranches. Trading cost motivation relates to adverse selection. The seller concentrates the more liquid assets, with lower trading costs, in senior tranches, and the less liquid assets in junior tranches.

There are three credit risk measures of a CDO:

- Sensitivity of the value of the tranche to credit spreads on the names in the reference portfolio
- Expected loss (EL) of the tranche from defaults in the reference portfolio up to the maturity of the CDO
- Unexpected loss (UL) or loss due to default say, one standard deviation above the EL of the tranche

There is also correlation risk in CDO tranches and their prices reflect expectations of investors of correlated defaults during the term of the CDO. Correlation risk is similar to business cycle risk. High correlation of defaults characterizes downswings of business cycles. There are business cycles models of credit risk such as the one used in Basel II. There is higher exposure of the equity and mezzanine tranches to recession.

The underwriter of a traditional CDO acquires and stores a portfolio of bonds, loans or credit default swaps and attempts to simultaneously, as possible, place the tranches-equity, mezzanine and senior-with investors. Unless the underwriter acquires all or part of the equity tranche, its risk is limited to the time from storage until sale of all tranches of the CDO. Because of the difficulty of finding investors for all tranches, underwriters began to offer single tranche CDOs. The Joint Forum of the BCBS, IOSCO and IAIS obtained information that single tranche CDOs account for a larger number of new placements.[102]

In a traditional CDO, a dealer would sell credit protection to buyers, such as banks, asset managers and hedge funds, by means of single name CDS, thus creating an exposure to credit risk. The dealer protects its exposure to default and changing spreads by buying credit protection from buyers of the tranches, which are effectively selling the credit protection to the banks, asset managers or hedge funds through the intermediation of the dealer. In a single tranche CDO, the dealer buys credit protection from investors only on one tranche. The dealer hedges its credit exposure by selling protection against default and changes in credit spreads through the CDS on the entire reference portfolio of the tranche. The required amount of hedge changes together with changes in credit spread, requiring changes in hedge ratios to prevent risk exposure. The single tranche CDO requires dynamic hedging

to maintain the proper amount of hedge that avoids risk exposure.

A single tranche CDO creates four types of risk that require dynamic hedging:[103]

- *Delta and model risk.* The dealer must calculate the deltas of each CDS in the reference portfolio, or change in position resulting from change in spread. These deltas are model dependent and thus create an additional model risk
- *Liquidity risk.* Deltas change over time requiring adjustment to positions. Trading costs may increase because there may be limited liquidity in the CDS market
- *Spread risk and jump to default Risk.* Small changes in CDS spreads or unexpected defaults require hedges that are complex in nature. Relatively large changes in credit spreads or unexpected defaults could cause difference in behavior of the tranche and the hedge position, what the market terms convexity or gamma risk. The Joint Forum of the BCBS, IOSCO and IAIS observed that the current practice of managing these risks is more an art than a science[104]
- *Correlation risk.* Pricing and hedging a CDO requires assumptions on correlations of various single name credits in the reference portfolio. There is a risk that the correlation assumption could be erroneous. Increases or decreases in correlation cause tightening or widening of credit spreads and corresponding profits or losses in the mark to market.

In the beginning of the CDO markets, collateral consisted of investment grade and high-yield corporate credits. More recently, there has been use of mortgage-backed securities, residential and commercial, as well as consumer loans, in response to lower yields of corporate debt. There have been also a few CDOs using private equity investments, hedge fund-of-funds and middle market loans to SME.

There has been also growth in credit index products. Two families of such indices are TRAC-X and iBoxx. These are broad indexes with segments according to geography (USA, Europe, Japan and emerging markets), investment grade/high-yield, sector (financials, industrials, etc.) and maturity (five/ten years). It is much simpler to create products with these indexes.

CreditGrades is a relatively new product of RiskMetrics, endorsed by three leading financial institutions, J. P. Morgan, Deutsche Bank and Goldman Sachs.[105] CreditGrades is a response to the need for stand-alone quantitative evaluation of credit risk. Part of this need is the result of the capital adequacy standards of Basel II. However, rapid growth of credit derivatives, such as CDS, and complex credit derivative products, such

as CDO, has been accompanied by growth in the number and diversity of players in credit markets. The credit market now includes not only banking institutions but also derivative traders, asset managers, hedge funds, insurance and reinsurance companies. The main objective of CreditGrades is to measure accurate credit spreads instead of default probabilities. The training data are market spreads and not actual defaults. CreditGrades intends to track credit spreads accurately, providing warning of a firm's credit impairment. Thus, CreditGrades provides measurements of credit quality that are complementary to other industry models. An important feature of CreditGrades is a pragmatic approach, with simple formulas using a few market observable variables. Sensitivities are easily derived. The objective of the model is to link equity and credit markets with a simple but robust framework.

There is an option-type payoff of equity value in liquidation, the maximum of zero or the excess of assets over liabilities. The discounted expected value of this future payoff is equity value, determined by an option pricing formula. Implementation of CreditGrades assumes that equity value is equal to assets less liabilities at all times, reaching a simpler relation between assets and equity.

The general principle of structural models has not changed, using equity markets as the main source of information. However, applications have changed together with the growth of derivative credit markets.[106] Initial uses of models centered on lending decisions based on estimates of default probabilities instead of providing pricing information. The paucity of credit pricing information prevented calibration and application of models to true credit prices. Growth, diversification and maturity of credit derivative markets placed different demands by practitioners. While the source of information continued to be equity markets, there was growing demand for indicative prices for credit. Product development changed toward providing over or under valuation of credit relative to peers and changes of credit conditions for firms.

Structural models relate essential firm characteristics to prices on diverse contracts:

FIRM CHARACTERISTICS	PRICES OF CONTRACTS
Asset value	Equity
Asset volatility	Equity options
Liability	Credit
Recovery rate	

The fundamental approach consists of estimating model input parameters to calculate model prices of financial instruments. The data consist of the firm's equity price, estimates of historical volatility, an assumption of recovery rate and estimates of the default par spread from the firm's balance sheet. CreditGrades provides asset volatility for calculation of the fair value of the CDS.

The market-based approach uses market prices of financial instruments to calculate model parameters that permit recovery of these prices. In this approach, the data consist of the firm's equity price and the price of an equity option at the money. The assumption of a recovery rate permits an estimate of debt per share. The model calculates the asset volatility that prices the option correctly and computes the fair level of the CDS.

CreditGrades assumes that the firm's asset value follows a diffusion process:[107]

$$\frac{dAt}{At} = \sigma^a dWt + \mu^a dt \tag{3.15}$$

where A is asset value, W a standard Brownian motion, σ^a asset volatility and μ^a asset drift.

The default barrier is the value of the firm's assets that remains after default. If L stands for global recovery value for debt holders and D is the debt-per-share of the firm, the multiple LD is the value left for debt holders after default. CreditGrades finds that the combination of a fixed default barrier and the pure diffusion process of asset value results in very low short-term spreads. The solution is to consider L as a random variable with mean L^* and percentage standard deviation ξ. The characteristics of L are as follows:

$$E[L] = L^* \tag{3.16}$$

$$\xi^2 = \text{Var}(\ln(L)) \tag{3.17}$$

$$LD = L^* D \exp(\xi Z - \xi^2/2) \tag{3.18}$$

Z is a standard normal random variable, independent of W, unknown at $t = 0$ and revealed only at default, τ. The survival probability at t depends on the asset value not hitting the default barrier, L^*D, before t. There is uncertainty about L such that the default barrier can be touched unexpectedly in the form of a "jump-like default event."

If $A(0)$ denotes the initial asset value, there is no default if:

$$A(0)\exp(\sigma^a Wt - \sigma^{a2}t/2) > L^*D\exp(\xi Z - \xi^2/2) \quad (3.19)$$

The model is driven by the distance between the asset value and the default barrier. CreditGrades uses the known distribution for first time hitting Brownian motion to obtain a closed form for the survival probability at time t. The model converts the survival probability into a credit price by introducing the risk free rate and the recovery rate for a specific class of debt, such as senior unsecured debt. L^* is the average over all classes of debt. Thus, the model provides a closed form to price CDS par spreads. The distribution for the first stopping time of Brownian motion permits a closed form of the full term structure of survival probabilities.

Calibration of the model results in a closed form expression of the survival probability in terms of observable variables. These variables are the initial stock price, the reference stock price, the reference stock volatility, debt per share, D, the average global debt recovery, L^*, and ξ, the percentage standard deviation of the default variable. The model obtains debt per share from financial statements. The global debt recovery, L^*, is estimated by the Portfolio Management Data and Standard & Poor's database. Historical databases yield estimates of 0.5 for L^* and 0.3 for ξ.

CreditGrades is supported by historical back testing over industries and ratings. There is support from additional research that includes comparison with credit analysis. The difference between the model spread and market spread is unbiased, independent of industry and rating and diversifiable because it is white noise.

Duffie and Singleton discuss integrated market and credit risk in portfolio measures such as VaR.[108] This process must include both default and fluctuation in credit quality. The analyst must consider sensitivities of all positions originating in market risk factors–prices, rates, volatilities, etc.–and specific fluctuations in counterparty credit quality. A risk model combining changes in a vector of market risk and a vector of counterparty credit quality, incorporating appropriate correlations, could measure the total risk of all positions. There are modeling hurdles because of the skewness and kurtosis of the probability distributions of asset returns. The expected third power of deviations characterizes skewness as the degree of negative and positive deviations from the mean. Models of stochastic volatility capture volatility skew. The expected fourth power measures kurtosis as the degree to which a distribution is thin or fat tailed. A jump process captures fat tails in distributions. A combined stochastic volatility jump diffusion model captures both features of the distributions.

The inputs of a model of integrating market and credit quality risk include:

- A sufficient statistic of credit quality and a corresponding survival probability to the VaR time horizon
- A vector of factors of credit quality fluctuation
- A vector of factors of market risk fluctuation
- LGD, loss given default, and the recovery rate, 1 – *LGD*, which could be random
- A default index equal to unity in default and zero in survival

Duffie and Singleton express the change in market value at the horizon of VaR as:[109]

Valuation of survival with the new market and credit quality risk factors +
Valuation associated with default – Current valuation

The default index is simulated with the survival probability when it is zero and with the recovery probability when it is unity. In case of unity, the model simulates *LGD*. In case of zero, the model simulates fluctuations in the vectors of market risk and credit quality. The above equation measures the change in market value. The model applies the process to all the portfolio positions with all counterparties, aggregating all individual portfolios to measure the total change in value. The simulation allows for correlations across all default indexes of all portfolios and of the market and credit quality risk factors. The generation of many simulations would generate a random sample, with which to estimate VaR and other risk measures. Duffie and Singleton consider alternatives to this Monte Carlo method to obtain measures of integrated market and credit quality risk.[110]

A rating category is a grouping of firms of similar credit quality. Consider a bond with rating BBB. The model requires a probability of credit rating migration at the end of a year. That is, there is a probability for the bond staying BBB, upgrading to a higher rating, downgrading to a lower rating or defaulting. There is a probability for every outcome in a year. CreditMetrics™ calculates credit transition matrices showing the probability of migration of a credit rating, up, down, equal or default. The model calculates the value of the instrument for all credit rating outcomes. Combinations of probabilities and values in one year constitute the probability distribution of the instrument. The model adds more instruments, obtaining portfolio values by adding values of instruments according to credit ratings. Joint likelihood, or probabilities, consists of probability for each credit rating category for one instrument with that of other instruments. This joint probability provides the distribution of value for a portfolio. In practice, it is only computationally possible to obtain the distribution of a portfolio by

sampling randomly across all possible joint-rating states.

CreditMetrics™ calculates two measures of risk from the distribution of a portfolio: the standard deviation and percentile level.[111] The standard deviation measures dispersion, in dollars, around the average value of the portfolio. Since the distribution is not normal, it is not possible to measure the downside tail in terms of numbers of standard deviations. The first percentile is the lowest value that the portfolio will attain 1 percent of the time. The model generates random scenarios according to the Monte Carlo method. Ranking these scenarios, the model calculates the first percentile.

CreditMetrics™ uses estimates for recovery rate by seniority class. These estimates provide a mean, or percentage recovery, and a standard deviation. In case there is migration to a category other than default, the model calculates the value at the end of the year for the new rating. The relation between firm value and credit rating correlations among firm values generates a joint probability distribution. The combination of the value of the instrument for all possible rating categories at year-end and the probability for each rating provides a distribution of the portfolio, with a mean and a standard deviation. The distribution also permits calculation of percentiles.

Banks can model future and present values of credit instruments by the "discounted cash flow methodology" (DCCF) or by" RNV. DCCF computes present value by discounting future cash flows using credit spreads of bonds having the same credit rating. The bank knows the current value of the loan and computes future value by the rating at the end of the period and the term structure of credit spreads of that rating. In case of default, the recovery rate provides present value.

There are benefits and disadvantages of DM and MTM. MTM has a more comprehensive multistate framework. However, DM is simpler. Much depends on the nature of the institution. If a bank has a practice of buy-and-hold, DM is probably better for its purposes. A bank that engages in pricing decisions of a portfolio of liquid credits may benefit from a model such as MTM that can calculate shifts in credit spreads.

DCCF and RNV discount future values to present value. These models differ in the discount factor that they use. DCCF uses nonparametric methods. RNV is structural, pricing all loans simultaneously in a unified framework. These two approaches will assign different values to the same loan.

Information asymmetry characterizes financial markets. Debtors have more information on their actual situation than their creditors. Similarly, monetary authorities have less precise information on the financial institutions they supervise. The distribution of returns of credit risk is also

asymmetric in normal times, with high probability of positive returns of small magnitude and low probability of returns of large negative magnitude. Credit risk modeling[112] consists of a very difficult process because of various forms of asymmetry–of creditors/debtors and creditors/monetary authorities and of probability distributions–together with insufficient data and infrequent observations.

To be sure, there has been significant progress in developing internal models of measuring and controlling credit risk. However, there are hurdles in credit risk models compared with market risk models.[113] Various conceptual methods require empirical validation. Thus, it is not possible to generate a regulatory standard based on credit models similar to that for market risk. Banks do not mark to market many credit instruments. Data are not available for sufficiently long periods, partly because default events are rare. Scarcity of data prevents precise measurement of parameters. Models use simplifying assumptions and proxies. Model validation of credit risk models is difficult because time horizons are longer, a year or more when compared with a few days for market risk models. Validation over many years would occur over different credit cycles. In contrast, validation requires only the past 250 working days for market risk. Capital accords do not use credit risk models because there is no industry standard.

Most FSAP reports examined credit risks of banks by the effect on capital of losses caused by changes in loan loss reserves. In two countries, the mission estimated regressions of the effect of macroeconomic variables on defaulted loans. In most countries, there were ad hoc assumptions on insufficient reserves or on the future behavior of nonperforming loans and the magnitude of macroeconomic shocks that could affect loan portfolios of banks.

In initial FSAP reports, ten countries used individual data for banks with 50 percent or more of assets, deposits and capital. In stress tests, the program reclassified liquid assets arbitrarily.[114]

Financial Sector Stability Assessment (FSSA)

A joint mission of the IMF and the World Bank prepared Mexico's FSSA based on work completed between March 1 and 13, 2000.[115] The mission included technicians from various participating institutions in addition to the Fund and the Bank, including: the Federal Reserve Bank of the United States, the European Central Bank, the Bank of Spain, the Commission of Securities of Spain, IOSCO, the United States SEC and the Federal Deposit Insurance Corporation (FDIC) of the United States. The IMF organized the

mission to prepare jointly a Report on Observance of Standards and Codes (ROSC) integral part of the FSAP-FSSA.

FSSA for Mexico acquires importance because it provides a report of a major emerging market country. It contains information on how an evaluation could proceed. In the spirit of evaluation of the IMF proposed by the G-7, it appears relevant to make some observations. The case of an individual country constitutes one of more than 100 reports elaborated by the IMF. Assumptions of stress tests of Mexico-devaluations of 20-30 percent and reduction of the rate of growth-may be appropriate for that country but probably not for others currently-with risk of exchange crisis and resulting decline of GDP. Hypothetical scenarios require imagination to reveal maximum loss resulting from twin crises.

FSSA discloses information with delay. The IMF disclosed Mexico's report in October 2001 based on work in March 2001 relying on preliminary data for 2000. Conservative hypothetical scenarios may hide larger risks. Analyses of the banking sector of Argentina at the end of the past decade showed sound recovery from the 1994 crisis and resistance to financial risks in part because of concentration in foreign banks. Naturally, they did not include major devaluation, a deposit freeze such as *el corralito* and *el corralón*, institutional crisis and threat of flight of foreign banks. Evidently, monetary authorities and banks of a debtor country can work together to improve advanced stress tests that may identify vulnerabilities, prevent crises and improve the financial image of the country.

Mexico's FSSA provided the following conclusions:

- The Mexican economy and financial system were strengthened because of implementation of sound macroeconomic policies, bank restructuring and closer ties with the American economy
- The banking system ceased to be a risk to the financial stability of Mexico but requires to widen loans to the private sector
- The nonbank financial sector is not likely to generate systemic risk in the near future
- Institutions facing difficulties find access to Bank of Mexico liquidity, especially through credit auctions
- Legal reforms and tight monitoring constitute the measures used by authorities to confront operational problems of development banks
- Supervision of financial sectors improved in recent years and authorities are initiating other required reforms
- There are ongoing reforms of the regulatory structure to attain international standards
- There is still need for improving transparency of monetary and financial policies even after significant progress

- The FSAP process occurred during major legal reforms of the financial sector

FSSA-Mexico analyzed financial soundness indicators (FSI) for banks. The ratio of capital to assets adjusted for risk increased from 2.7 percent at the end of 1999 to 8.6 percent at the end of 2000. Almost all Mexican banks meet minimum capital requirements of 8 percent of assets adjusted for risk. There were major improvements in the ratio of nonperforming loans to total loans, falling from 17.6 percent in 1997 to 8.5 percent at the end of 2000. In the same period, reserves for nonperforming loans increased from 60 to 115 percent.

The Tequila crisis of 1994–95 severely affected Mexico's financial sector. Assets of the banking system fell from 55 percent of GDP in 1994 to 37 percent in 2000. Credit to the private sector by banks contracted significantly, from 78 percent of bank assets, or 43 percent of GDP in 1994, to 22 percent of assets, 10 percent of GDP in 2000. Banking activity concentrated sharply with the share in assets of the five largest banks rising from 65 percent in 1994 to 76 percent in 2000. The foreign bank share rose from 24 percent of assets in 1998 to 50 percent in 2000 and 70 percent after the purchase of Banamex by Citigroup.

Interbank government debt and volumes in exchange markets increased after the crisis of 1994–95 as the government diversified its source of funding, reduced exchange positions and stabilized the economy. The authorities were able to lengthen the public debt maturity structure. In 2000, the government successfully issued bonds with maturities of two and three years. In the interbank market, transactions consist mainly of overnight sale and repurchase agreements. Volumes increased by 12 percent in real terms in 1998–2000 and 40 percent of transactions use government securities as collateral. Mexico's exchange market is one of the most liquid in Latin America with daily volumes of $7–10 billion of which 90 percent is in the spot market. Mexican banks participate actively in forward exchange contracts.

The IMF noted a significant reduction in contagion risks for Mexico. In the period 1/2/98 to 5/31/01, the correlation between EMBI+ for Mexico and EMBI+, or Emerging Market Bond Index of J.P. Morgan Chase, was: 0.87 during the Russian crisis of 7/20/98 to 11/24/98, 0.98 during the Brazilian crisis, from 1/6/99 to 5/7/99, 0.84 during the initial phase of the crisis of Turkey and Argentina, from 10/4/00 to 5/31/01 and only 0.21 at the time of the study. Naturally, there are multiple econometric problems of heteroskedasticity (conditional and not), endogeneity and simultaneous equations, autocorrelation, omission of variables and errors of measurement. There is no method that can correct for all these problems.[116] However,

adjusted correlations could change drastically and probably would not differ significantly from those measured in periods without crisis.

The various technicians of international institutions elaborated the ROSC of Mexico's FSSA. It included the following:

- Code of Good Practices on Transparency in Monetary and Financial Policies.[117] There were differences in various institutions with better compliance in transparency than in accountability of results. Coordination is deficient even in banks and securities. However, a centralized institution, the Committee on Coordination of Financial Institutions, is standardizing and rationalizing information requirements
- Core Principles for Systemically Important Payment Systems of the Committee on Payment and Settlement Systems (CPSS).[118] Mexico does not comply with the Core Principles of the CPSS but programs reforms. Regulatory structure is not complete and adequate and there are deficiencies in management and evaluation of risks
- Basel Core Principles for Effective Banking Supervision.[119] In general, Mexico improved quality of banking supervision. However, the mission concluded that there is need for improvements to comply with Basel Core Principles, obtaining a commitment by Mexican authorities to implement the principles
- IOSCO Objectives and Principles of Securities Regulation.[120] Mexico complies with basic principles in securities and insurance. There are deficiencies in corporate governance and autonomy of the National Commission of Securities and Banks and legal protection of its functionaries
- IAIS Insurance Supervisory Principles.[121] Mexico is making needed changes

Monetary authorities agreed with the ROSC. Technical consultations within FSAP reported improved continuing reform of the financial sector.

Economic performance of IMF programs

Bordo and Eichengreen compared financial crises in 1880–1913, when there was international mobility of capital, with the last 25 years. Incidence of crises increased from 4.3 percent per country per year in the historical period to 11.5 percent recently. In the same comparison, output drops increased from 2 to 3 percent in recent financial crises and 5 percent in twin crises.[122]

However, the growth rate of Korea fell 7 percent in relation to the five years before crisis, 8 percent in relation to the three previous years and 7 percent in relation to the prior year. Corresponding numbers for Thailand

are 13, 13 and 11 percent, respectively. Both countries adopted temporary financing programs of the IMF. In the recession of 1893 in the United States, which had adverse effects on Brazil,[123] the growth rate fell from 9 percent relative to the prior five years, 12 percent relative to the earlier three years and 14 percent relative to the prior year. During the Barings crisis in Argentina in 1890, equivalent declines are 17, 20 and 24.[124] Naturally, the IMF did not exist at that time.

There have been numerous criticisms of IMF programs. Eminent economists argue that stabilization policies deepened recessions in crisis countries.[125] Other eminent economists observe that existing technical knowledge does not permit successful intervention by the IMF, so that countries would adjust their economies better without official financing.[126] The impact of IMF programs on growth of GDP constitutes a fundamental issue of empirical and theoretical debate.

There is in this debate a counterfactual proposition that is difficult to specify theoretically and to measure empirically. It consists of the behavior of GDP growth in countries that adopted an IMF program in the case they had not adopted the program. In reality, there is no observation of behavior under the program but rather a sample of variables after effects of measures of conditionality by the Fund and numerous factors including exchange and financial crisis, other economic policies and effects of lags of independent variables on dependent variables. Neat separation of effects theoretically may prove far easier than empirically, especially cause and effect relations.

Economists estimate counterfactual effects of IMF programs by a common method denominated general evaluation estimator (GEE).[127] The specification explains growth of GDP as a function of policies without the IMF program, exogenous factors, balance of payments crisis and the IMF program. A policy reaction function estimates the counterfactual of policies that would have occurred without the IMF program. This reaction function relates the unobserved variable without Fund program and adjustments by authorities to deviations in output in the earlier period in relation to desired output. The method obtains a reduced form, inserting the policy reaction function in the equation explaining GDP growth. The coefficient of GDP with one period lag attempts to capture the effect of policies that would have occurred without an IMF program.

Bordo and Schwartz compared emerging market countries that received official financing from the IMF from 1973 to 1998 with countries in the same region that did not have an IMF program.[128] Financing data show that some countries–Argentina, Ecuador and Peru–received official financing almost perpetually. Fund financing increased significantly in the period: 10 times more in Mexico in the program 1994–95 relative to 1986, 160 percent in

Table 3.3 Results of Bordo and Schwartz

Variables	**With IMF**	**Without IMF**
GDP Growth		
Decline	lower	higher
Recovery	less rapid	more rapid
GDP per Capita		
Decline	strong	slight
Trend	stagnation	growth
Consumption as % GDP	decline ↦ slow recovery	growth ↦ decline ↦ recovery
Current Account Deficit		
% of GDP	increase ↦ decline	increase ↦ decline
Inflation	strong increase ↦ strong drop	stable
Growth of Money	strong increase ↦ strong drop	stable
Internal Deficit % GDP	increase ↦ decline	increase ↦ decline ↦ increase
Nominal Interest Rate	increase ↦ decline	stable
Nominal Exchange Rate	increase ↦ decline	stable
Real Exchange Rate	decline ↦ increase ↦ decline	stable

Source: Bordo and Schwartz (2000)

Indonesia, 25 times in Korea and 7 times in Thailand in relation to programs in the 1970s.

Table 3.3 shows the behavior of ten variables for countries in the same region in 1973–98. Performance of GDP growth and GDP per capita was worst in countries with IMF programs. Naturally, countries in crisis request Fund financing. Both groups of countries, with or without the IMF, reduced their current account deficits as percentage of GDP. Inflation was strong in countries with IMF programs and stable in the group without the Fund, with comparable behavior for money, nominal interest rates and real and nominal exchange rates.

Bordo and Schwartz used econometric methods relating a reduced form of target variables–GDP growth, current account, balance of payments and inflation rate–to economic variables–internal credit, fiscal deficit, exchange rate–and exogenous variables, such as foreign interest rates and deviations of targets from desired values, to test the counterfactual in IMF programs. Results suggest that Fund programs adversely affect output on first impact, but positively thereafter. Monetary policy explains inflation behavior. Results suggest that improvement in current account constitutes the main impact of IMF programs, with adverse repercussion on output.

Hutchison analyzed 461 stabilization programs of the Fund and 160 exchange crises in 1975–97.[129] Using GEE methods, Hutchison calculated that loss of output growth was 0.6–0.8 percentage points for every year of participation in a program. Exchange crises reduced growth by two percentage points for two years. Fund programs did not reduce or increase the impact of the exchange crisis on growth even after policy tightening. Evidence suggests that decline of growth occurred before IMF programs. Malaysia experienced strong declines of output similar to those of other countries in the Asian crisis of 1997–98 even without participating in a Fund program. Effects of decline of GDP growth in 67 countries in 450 programs were not very significant in terms of growth rates of emerging market countries. Actually, Hutchison's findings coincide with intuitive reasoning. Emerging countries, especially in Asia, grow at rates typically higher than in mature countries because of lower base, high returns of new technology and large capital inflow. Therefore, crises should show higher declines of output when all factors of rapid growth reverse abruptly.

Conditionality in IMF programs

IMF conditionality consists of commitments to implement economic policy in order to access financing.[130] Article I of the IMF agreement specifies that one of the Fund's main objectives is to provide financing temporarily based

on adequate safeguards to permit adjustment of balance of payments and avoid measures that may destroy national or international property.

There are differences in mechanisms that relate policies to financing, formulation of policy and monitoring and review of programs. The objectives of Fund financing consist of assisting a country to attain a sustainable balance of payments at a sustained and acceptable rate of economic growth without adverse effects on neighbors. There is a legal provision of conditionality in the "safeguard" of IMF resources in Article I and in Article V, Section 3. Article XXX(b) stipulates that a country can purchase values from the General Account in accordance with "terms" of decision. Therefore, conditionality must constitute part of the agreement between the country and the IMF.

Fund conditionality widened during programs in the 1990s. In transition countries in Eastern Europe and in the former Soviet Union, objectives of Fund programs consisted of guaranteeing members confidence in making long-term structural reforms by providing required balance of payments financing. Transition countries required reforms to widen their tax base after the collapse of the former centralized system. The philosophy was that reforms would generate resources to repay the IMF.

New forms of conditionality evolved in subsequent emerging market crises to face diverse vulnerabilities. Mexico showed fragility in public debt and in the banking system.[131] In Korea, Indonesia and Thailand, weaknesses in financial systems appeared during crises. The IMF found an adverse dynamic of public debt. Russia suffered a mixture of complex fiscal and structural vulnerability. Most criticism concentrated on details of conditionality in the case of Korea.

The basic philosophy postulated that the country "owns" the program and that the IMF introduces conditionality to guarantee sound use of Fund resources. Authorities of the country decide the program they want to follow, its implementation and the decision to request IMF financing. If the Fund desired to impose a program it would use leverage of conditionality, reducing country ownership.

The IMF conducts tests to determine if monitoring a structural reform is indispensable to program objectives. Performance criteria must be restricted to those required to evaluate implementation of the program to attain objectives.

Feldstein's critique of IMF programs departs from differences in recent emerging country crises. In earlier crises, Fund policy to alleviate the foreign debt consisted of devaluation and internal deflation to improve the balance of trade and the balance of payments. The measures originated in Keynesian theory of the balance of payments that culminated in the work of James Meade in the 1950s.[132]

Crises in the 1990s differed in the greater share of the private sector in the debt of emerging markets and its concentration in stocks, bonds and direct investment. According to Feldstein, the major causes of crises were deficits in the current account created by fixed but adjustable exchange rates, short-term debt in excess of reserves and banks weakened by high leverage and currency mismatches.

However, Feldstein notes that the IMF used the same set of measures in all cases: devaluation, high interest rates and tight fiscal policy. During experience in the 1990s in Eastern Europe and the former Soviet Union, governments requested advice from IFIs on how to reform internal structures. The IMF added numerous forms of conditionality in the Asian crisis that academicians and policy experts strongly criticized.

Feldstein warned about the precarious technical knowledge on the economy.[133] He reiterated that the conventional wisdom a few decades ago was to promote growth through import substitution. Economists advocated fixed exchange rates. Currently, the IMF proposes flexible exchange rates and economists defend policies to benefit from comparative advantages in international trade. Feldstein doubts whether economists in a future generation will accept the current economic policies promoted by the IMF.

Application of devaluation and deflation policies by the IMF was not adequate for the Asian crisis and, more specifically, in Korea, according to Feldstein. Korea's foreign debt was only a third of its GDP. High interest rates were unnecessary, simply contributing to deepening the crisis because won devaluation had increased significantly the local currency counterpart of foreign debts, causing Fisherian adjustment toward equilibrium. The IMF suggested rate increases to contain devaluation in Korea without it spreading to other countries in the Asian crisis. However, Feldstein argues that there is always an overshooting of exchange rates and return to a floor once the country recovers competitiveness. For example, the won increased from around 600 to 1800 per dollar at the peak, returning to around 1200 and trading at slightly below that level almost six years after the Asian crisis.

Because of criticism from all directions, the IMF restricted conditionality only to aspects related to functioning of the program during the implementation period, abandoning long-term structural reforms. There are doubts about abandoning conditionality. As shown in Chapter 6, consultations under Article IV include "voluntary" compliance with standards and codes that affect financial institutions, private and public, and corporate governance, accounting and auditing. The G-7 and IFIs camouflaged structural reform, focusing it on preventing vulnerability in domestic financial sectors.

4

Private Sector Involvement in Crisis Resolution

In G-7 meetings, since the Mexican crisis that resulted in the Rey Report[1] to the meeting in Halifax in 2002,[2] there has been emphasis on the recovery of private foreign credit for a country to receive official financing. Otherwise, official resources, of the IMF, World Bank, etc., would simply fall into a barrel without a bottom, providing only liquidity for capital flight of local and international investors trying to avoid exchange and local financial crises. Whatever the final verdict of academic and technical debate, the international financial community believes strongly in the possibility of moral hazard. This hazard consists of the breakdown of discipline in the calculation of risk by countries and companies in expectation that IFIs will rescue countries and their governments will prevent failure of certain entities. Moral hazard, whatever its merit or dimension, is a necessary assumption because it is part of the official doctrine. However, the G-7 may contribute to moral hazard by influencing the rescue of countries because of geopolitical interest.

The international official community determines case by case in a process of "creative ambiguity" which countries should receive financing. Currently, no country appears to be sufficiently large and systemic to merit bailout, especially if it confronts the international official community with significant divergence in conventional economic adjustment. Lack of expectation of the recovery of private external credit constitutes one such major divergence. A twin crisis, exchange and financial, is not sufficiently powerful currently to affect international markets. There is a new philosophy at the G-7 and the IMF. Perhaps no emerging country is too big to fail.

"Enronitis," originating in the sudden and unexpected failure of Enron, influences attitudes of the executive and legislature in the United States. The scandals of WorldCom, Tyco, World Crossing and others followed Enron. There is less tolerance in the G-7 with official aid to companies by

government. Prosecutors dispute cases against corporations and executives accused of allowing the wealth of investors, employees and retirees to be dissipated. Congress approved a new law of criminal corruption in corporations. Transparency became a key ingredient of G-7 doctrine. Because the IMF has usable resources of only $150 billion, the rescue of a large country or of a region would require resources from the United States Treasury and other countries. The G-7 would require a clear perception of mega systemic risk to engage in such a mega bailout. Such a rescue operation would conflict with the reiterated doctrine of limiting exceptional financing.

For some time, stock market declines originated partly in the scandals of accounting and corporate failures. There is nothing new relative to the end of booms in other historical episodes. However, "Enronitis" is still currently important. It would be extremely difficult to convince Americans to bail out an emerging country affected by inadequate domestic policies. There is high political capital in not providing support.

A debtor country must convince the markets that it will avoid a crisis in partnership with the international financial community. Failure to create this image may undermine confidence in the country, creating the expectation of an exchange and financial crisis. The IMF requires internal political consensus on its adjustment programs. Gaining access to private and official credit requires superior negotiating talent and experienced technicians. It may prove less difficult than obtaining the consensus of politicians and the population in the debtor country.

Current crisis resolution process consists of a sequence of:

- Adjustment of the economy under an IMF program
- Senior status to new loans by IFIs
- More junior status to Paris Club debt
- Residual financing by the private sector

It would be very important for a debtor country to contain the crisis only at the level of a temporary lack of liquidity to service debt, avoiding exceptionality. In this case, crisis resolution would require only restructuring of debts and rollover agreements of interbank credits, both with no loss of value.

The remainder of this chapter discusses individual issues in private sector involvement (PSI). It interprets doctrine and analysis by institutions, academicians and technicians.

Objectives of Official Financing, Moral Hazard and PSI

The concepts and philosophy of crisis prevention and resolution were structured at G-7 meetings and by the United States Department of the Treasury, IFIs–IMF, World Bank, BIS, G-10, and Multilateral Development Banks–and international financial forums–International Monetary and Financial Committee, Committee on the Global Financial System, Financial Stability Forum, IOSCO, IAIS and OECD. Academic scholars, policy experts in research institutions and officers of IFIs developed theoretical frameworks. These academic contributions organized policy discussion and proposals. In many cases, academicians joined official institutions, directly or as consultants. The IFA is the product of cooperative work by many institutions and individuals.

A twin crisis of balance of payments and the financial market typically originates in the reversal of capital flows. It resembles somewhat domestic bank runs. Central banks created safety nets to avoid the spreading of a banking crisis to production and employment. A difference in a country crisis is the lack of an international lender of last Resort (ILOR) similar to domestic central banks. Similarly, there are no international laws and courts of bankruptcy. There is no statutory cushion of economic and financial effects of crises. Bankruptcy of sovereigns is difficult to conceptualize. The similarity is that supervisors and regulators of the G-10 shaped doctrine.

Official doctrine consists of case-by-case crisis resolution, flexibly, with principles, criteria, tools and general lines of action. In practice, authorities treat each case differently. Even if there were a generally accepted theory of crises, it would be difficult to measure and forecast. The Rey Report involved the doctrine and experience of decades of resolution of crises by G-10 supervisors and IFIs. However, there is no consensus even on what was policy in these resolutions, what actually happened and what principles to infer for future crisis resolution.

Official doctrine resembles the process of creative ambiguity followed by the United States Federal Reserve Board in determining when to use the safety net to rescue a financial institution. The truly ambiguous criterion consists in rescuing banks that are big enough to cause problems in others and in the financial system as a whole, that is, banks with systemic potential. There is not a good theory, adequately tested, of what is systemic potential and much less, and more importantly, forecasts of how it will affect the rest of the economy. Technical challenges restrict designing an adequate policy of bailout and resolution. Central banks experience pressure from the executive, congress and society. Therefore, the decision on which institution to rescue depends on current economic and political factors.

During a recession, with unemployment, perception of bank size and systemic potential can be "smaller" than during expansion with growth and no inflation.

Current international economic conditions appear unfavorable for a crisis by a debtor country. Current thought appears to be much more careful, allowing a crisis to occur and a country to find its own equilibrium if international markets do not experience chaos. There does not appear to be a tolerance to commit immense resources to a country to maintain an unrealistic exchange rate or conflicting fundamental divergences with IFIs.

The basic official community doctrine is that financing should not prevent losses. The objective of programs is the efficient functioning of the international financial system. Key objectives are:

- Restrict size of packages of crisis resolution
- Reduce moral hazard
- Recover external feasibility of creditor country

There are allegations that funds consist of official contributions and ultimately from taxpayers, mostly from the G-7. Almost all countries contribute to the IMF. Rescue packages do not constitute gifts. Rather, they are loans that debtor countries usually paid back. Mexico, Brazil and most countries repaid their official liquidity financing in their various crises. IMF interest rates are not low, especially because they apply to sovereign loans with senior status. There is an argument that many programs could contribute to order in the international financial system with benefits to all countries. The objective of the IMF consists in part in recovering the external feasibility of solvent countries with temporary liquidity crises.

The debate on moral hazard appears quite important, especially because of its recognition and acceptance by the official community. As in most debates by economists, there is no generally accepted theory with adequate measurement. From a debtor's point of view, there is no time to prove that there is no moral hazard because its existence became official doctrine. The consequence of acceptance of moral hazard is significant prudence in financing, limits in its size and insistence on participation of the private sector, in sharing losses and providing funds.

In meetings in Rome in 2001[3] and in Halifax in 2002, the G-7 defined conditions of exceptionality for medium-term rescue by the official community. From the point of view of a debtor currently, exceptional financing, by any IMF facility, requires that:

- There is evidence that the country experienced a sudden loss of confidence, with adverse repercussions
- There is expectation of rapid correction of difficulties and recovery of access to private credit

- There are risks of contagion that can threaten the stability of the international financial sector

IMF programs must include medium-term evaluations of debt and balance of payments and expectations of recovery of access to markets. The IMF must monitor and evaluate private capital flows during implementation of programs. It must review its policy of lending in arrears. The Fund and the Paris Club must act jointly, guaranteeing participation of the private sector and ensuring comparability. All programs must be transparent with evaluation and monitoring ex post of the private sector participation.

In reality, reduction in the market price of of investors' assets caused capital losses. Therefore, investors were indeed involved in the crisis. Shrinking positions diminished capital that could leave the country, reducing pressure, but imposing high costs. The private sector always shared in costs of crises. However, banks cease rollover of interbank credit lines, allowing a rapid exit at face value. Bonds suffer capital losses but, conceivably, investors could redeem them at maturity with no loss of value but a temporary lack of liquidity. This is cold comfort for a holder of a long-term bond trading at a deep discount. Funds and securities companies carry bonds at market prices, realizing losses immediately. Investors who do not mark to market have the perception of erosion of their wealth. Funds, securities companies and investors realize their losses in many cases by offsetting their positions. Events such as the Argentine default create behavior of early exit from positions that become riskier. Both types of debt, bonds and credit lines, create major difficulties that can cause default.

Debt crisis causes a financing gap, defined as[4]:

Capital Outflow And Debt Service
Less
Reserves Available By The Country To Service Debt

There could be a financing gap even after generous financing by the IMF, Paris Club, World Bank and MDBs. Exceptional financing may be unfeasible politically and financially. In addition, it may be undesirable because of expectations that the bailout of creditors could cause moral hazard in international loans. Existence of a financing gap, limits in official financing and moral hazard of exceptional financing determine the need for participation of the private sector (PSI) in crisis resolution. Consequently, debtor countries should give priority to recovering the confidence of the international private sector. Official financing occurs currently almost simultaneously with PSI.

In the cases of insolvent countries, rapid resolution requires debt

reduction. Crisis resolution of solvent countries with a temporary lack of liquidity to service debt consists of restructuring and rollover of lines. Pure illiquidity with systemic potential requires bailouts and complex PSI.

Some of the most notorious cases of moral hazard occurred with savings and loans institutions (SLIs) in the United States in the 1980s. SLIs mismatched books with short-dated funding with CDs of long-term mortgages. Positively sloped yield curves ensured nearly certain profit in normal times. However, at the beginning of the decade, the FRB increased interest rates toward 20 percent with the objective of containing inflation, an unusual phenomenon in peacetime periods. Mortgage fixed rates for terms of 15 and 30 years were around 11 percent, while CDs of SLIs rose toward 20 percent when mortgage banks issued new CDs to repay maturing ones. The funding rate exceeded the investment rate, resulting in negative gross spread. SLIs began to operate with negative capital. Depositors maintained their deposits because of higher interest rates in SLIs guaranteed up to $100,000 by an implicit subsidy in deposit insurance. There were cases in which SLIs took large naked positions in futures markets, without thought for possible loss, since they already had negative capital, betting that speculation with luck and leverage could possibly recover the company.

There was moral hazard through the federal deposit insurance of depositors who received higher interest than normal. Similarly, there was moral hazard by SLI managers who speculated in markets based on the stability of deposits, at exorbitant rates but with little risk because of federal deposit insurance. Subsequently, the authorities socialized losses by a bailout that cost Americans 5–7 percent of GDP and years in prison for notorious managers.

Table 4.1 shows types of moral hazard. Debtor moral hazard in a twin crisis occurs when official multilateral and bilateral financing encourages debtors to follow unsound internal policies in expectation that they will not have to honor external liabilities. There is the moral hazard of domestic institutions when they believe that the government will rescue them from any crisis.[5] It may occur because a company considers itself too systemic to fail, receiving official financing, which constitutes de facto government control. Exchange rate policy can create a certain form of moral hazard by encouraging foreign currency debt in the expectation that gigantic international reserves and high differentials of domestic relative to international interest rate would support a subsidized exchange rate. In the case of devaluation, there could be the expectation that the government would take measures or would provide cash to avoid certain bankruptcies.

Creditor moral hazard occurs in bailout expectation motivating creditors to abandon market discipline in calculating risks and returns, increasing

Table 4.1 Types of moral hazard

Debtor	
	Sovereign
	Internal Institutions
Creditor	
	Official Financing
	Sovereign Aid

risk exposure to a country already too indebted and with unsound economic policies. Creditor moral hazard affects official financing because creditors originate mostly in the G-7. The Asian crisis of 1997–98 and the Russian crisis of 1998 influenced the debate on moral hazard. In these two crises, hedge funds and George Soros figured beyond their true relative importance in the markets. Soros's myths of infallibility, claiming gains such as in the ERM, but never losses such as in Russia and in high tech, distorted the debate. Economic journalists, and economists writing in newspapers, complained that the IMF mitigated the risks of Soros, without concrete evidence. In addition, there is no evidence that Soros had influence in the G-7 countries or at IFIs. On the contrary, the authorities in the G-7 and officers in IFIs distanced themselves from hedge funds and actually attempted to regulate and supervise their operations.

An important criticism is that bailout permits creditors to exit with no loss of value. Similarly, monetary authorities in creditor countries worry that their institutions could be vulnerable because of unsound international loans encouraged by bailout expectations. There could be another internal bailout of financial institutions. In addition, mega rescue packages would permit local investors to exit with less loss of value of their wealth in foreign currency than would happen at an exchange rate without a bailout.

Currently, official financing includes in its objectives the sharing of the burden of crisis resolution with the private sector. The official sector tries to prevent private creditors from transferring their losses to others, that is, to governments and the population in countries that ultimately provide the financing. On the other hand, there should not be help for debtors to pay debts that they could service.

The Russian crisis constituted a major event for moral hazard issues. The United States Treasury Secretary at the time, Robert Rubin, provided one of the most dramatic experiences.[6] The Secretary became concerned that investors were buying bonds at yields of 50–70 percent. He called a friend

in Wall Street and the reply was that certain investors believed that the IMF would bail out Russia because the country had 7000 to 12,000 nuclear warheads. Rubin concluded that investors should have the expectation that in such cases they would share in the cost of working out the crisis. However, yields of 50–70 percent in securities incorporate expectations of default and difficulty in recovering the principal. Securities priced the likelihood that bailout would not work.

Mussa states that there is exaggeration in the criticism of moral hazard in IMF programs.[7] When support of a nation follows the Articles of Agreement of the Fund, there is no guarantee of rescue of the borrowing country or its creditors. The IMF is transparent and accountable.

According to Lane and Phillips, the issue is not whether there is moral hazard in IMF financing but rather if it encourages imprudent creditor and investor actions that exceed the benefits of diminishing probability of crises and softening those that do occur.[8] Insurance contracts may encourage moral hazard by diminishing preventive actions against the insured event. For example, health insurance may discourage preventive medicine by policyholders, and car insurance may encourage reckless driving. According to Lane and Phillips, the IMF's insurance benefit would consist of the difference between interest rates for a country during crises and those in loans by IFIs.

There can be both creditor and lender moral hazard. During the Mexican crisis, moral hazard arguments suggested that the IMF provided liquidity to avoid loss of value to holders of *Tesobonos*. However, when IFIs provide full resources to cover a financing gap, all creditors benefit, not just a specific group. Exchange reserves are fungible and not typically earmarked for specific claims.

Rigorous analysis of moral hazard requires specification and test of a difficult counterfactual. If IMF financing were not available, there could be tough economic repercussions for the individual country, such as loss of output, inflation and deviation from the long-term growth path. In addition, there could be similar impacts on other countries because of disruption of financial markets. Economists would have to agree on a theoretical model of costs and benefits of moral hazard and specification of testable hypotheses. In practice, data reflect conditions of lending (or not lending), but they are not suitable for possible comparison of what actually happened and what would have happened.

Lane and Phillips raise the issue of whether IMF financing is sufficiently large to create moral hazard. Stand-By Arrangements are of the order of ½–1 percent of GDP. Because debt ratios of crisis countries are quite high, IMF financing may not be large enough for moral hazard. Lane and Phillips

show that IMF resources in Stand-By Agreements in the 1990s were around 12 percent of "gross financing needs." IMF financing is not sufficient to guarantee large debts. In fact, IMF financing is not sufficiently high to suggest safety of debt even in exceptionality.

Defense of the IMF because of its meager contribution relative to total financing raises other issues. Is the IMF effective in crisis resolution with limited resources? Even if it is effective with limited resources, an argument for moral hazard may still exist.

Expectation of success of an IMF program may erode market discipline, leading to excessive risk taking and crisis. In the absence of an IMF program, authorities and the private sector would be more careful because costs of imprudence would be much higher. It is possible to conceptualize that probability of crises and the magnitude of their impact would be lower if there were a true deterrent in the lack of a safety net.

Assuming a 5 percent rate of default, Rogoff calculates costs to taxpayers of shareholders of an IMF bailout.[9] He assumes that a country receives a loan from the IMF of 10 percent. This is lower than large bailouts such as Korea and Mexico, which received less than 5 percent. If the country accounts for 1 percent of world GDP, Rogoff argues that "the cost of the IMF loan subsidy amounts to only ½ of one 10,000th of global GDP. It is not exactly a crushing burden in a world where industrial countries are working toward an aid goal of 0.7 percent of GNP."

In fact, most countries repay their IMF loans. The cost of default to IFIs is so high in the form of loss of all credit that few countries have defaulted and no major country ever defaulted. The IMF granted forbearance to Argentina to avoid default. Taxpayer funds do not truly finance IMF bailouts because countries repay loans and rates are lower than alternatives during crises but still satisfactory.

Dooley defines moral hazard as the expectations by creditors that they will be able to sell their claims to the government at a favorable price at the time of sale.[10] There is a sequence of capital inflow and crisis based on the moral hazard concept. Because of insurance by government, expected yields on domestically issued liabilities rise relative to international yields causing capital inflow by sale of domestic liabilities to foreigners. The expected yield on domestic liabilities declines when marketable assets of government are approximately equal to contingent insurance liabilities. When liabilities exceed assets, a crisis occurs. Investors sell their insured assets to the government, depleting government assets. Dooley explains recent crises in emerging market countries based on this sequence.

According to Calomiris, IMF financing constitutes a threat to international financial stability.[11] The IMF's temporary liquidity assistance for balance of

payments resolution merely absorbs losses of banks and their borrowers in emerging countries and prevents losses of foreign lenders.

Calomiris affirms that bailouts redistribute wealth from taxpayers to oligarchs whose imprudent actions caused the crisis. He questions the success of the bailout of Mexico in 1995. Resolution of banking crises consisted of purchase by the government of more than $45 billion of bad loans from banks. Total bank restructuring cost Mexico 16 percent of GDP. Calomiris argues that this constituted a redistribution of wealth from taxpayers to wealthy corporations and individuals.

Another cost of default occurs by expectation of subsidy to risk. According to Calomiris, future gains from risk taking will be private, but the bailout process socializes losses to taxpayers. Liberalization of trade and capital markets in emerging countries occurred jointly with partnership between government and private business. As a result, political and economic interests distort the credit discipline of local banks.

Calomiris argues that the IMF and the United States have augmented moral hazard during the past two decades. Bailouts merely legitimized taxation of the middle class to repay official financing, which also protected the value of claims of foreign creditors.

According to Meltzer, moral hazard in IMF official financing promotes a larger financial crisis in the future.[12] The international safety net distorts risk discipline, encouraging excessive risk taking, by local and foreign banks. He argues that IMF financing creates a wedge between social risk, taken by the country, and private risk, taken by bankers. Mexico's repayment of the rescue loan encouraged the repetition of the crisis in the future. Realization of the costs in the Mexican crisis would have deterred markets from excessive risk taking induced by moral hazard channels.

According to Meltzer, borrowers and lenders must recognize the risks of imprudent financial decisions.[13] IMF conditionality should not substitute for true economic reforms. Official financing simply postpones required reforms. Meltzer argues that standards and codes, such as those proposed by the Basel Committee and other forums, should not be a substitute for market discipline. Moral hazard will disappear only if borrowers and lenders recognize the actual risks and costs of imprudence, the only effective form to avoid tragedies in emerging countries.

Dell'Ariccia, Schnabel and Zettelmeyer suggest a "weaker" hypothesis that expectations of IMF intervention reduce investor risk, which should reflect in EMBI+ spreads.[14] Impact on bond spreads currently affects a country's cost of repaying debt. They argue that beneficial effects consist of lower probability and economic costs of financial crises. Adverse effects consist of lower investor risk that corrupts market discipline. Empirical

analysis focuses on the disappearance of expectations of bailout after the IMF's abandoning of Russia in August 1998. These authors test for moral hazard before August 1998.

There are three testable implications in their model. For specific fundamentals, an increase (decrease) in perception of bailout reduces (increases) spread levels for each country, reduces (increases) response of spreads to changes in fundamentals and reduces (increases) spread differentials among countries. Eurobonds outstanding for Russia increased from US$4.6 billion in March 1998 to US$15.9 billion in July 1998. Although fundamentals deteriorated, investors oversubscribed new issues. Econometric results suggest that bond spreads became more sensitive after the Russian crisis. In addition, most countries experienced an increase in bond spreads. Investors began to focus on differences in country risk characteristics among countries.

Dell'Ariccia et al. conclude that the international safety net has risk-reducing effects for investors, a necessary condition for existence of investor moral hazard. However, a sufficient condition would require evidence that international official financing does not reduce economic risk, making crises less likely or less pronounced when they occurred. The argument in favor of large-scale bailout depends critically on lack of perception by investors of risk reduction resulting from official crisis financing. These authors argue that econometric analysis of the Russian crisis at least suggests that the international safety net does reduce investor perceptions of risk. However, they argue that there is still painful calculation of costs of market discipline and benefits of insurance to truly determine if a safety net should exist.

The realization of benefits from moral hazard appears somewhat difficult for fund managers, traders and bankers. In the case of bankers lending short-term lines, banks would appropriate the differential spread of the emerging country with weak fundamentals at maturity of loan. However, Korea in 1997–98 showed banks that moral suasion by G-10 central banks could result in banks lending funds for 1–3 years instead of a few months. When Brazil requested another IMF program in September 1998, banks reduced their exposures to Brazil in every conceivable form. Reserve loss and the safety net permitted all banks to escape without loss of value. Moral hazard could have occurred in the soft peg of the exchange rate with IMF support. The effects on bank stock during the crisis turmoil could be sufficient to destroy a banker's career, acting to mitigate moral hazard.

It is far more difficult and riskier to realize moral hazard gains in trading securities. If spreads were at relatively normal levels until the crisis erupts, traders would acquire bonds at lower yields than during the

crisis. When spreads widen significantly during crises, there are hardly any new placements, especially after Russian and Argentinean defaults. In fact, capital flows stop suddenly, a market phenomenon with interesting theoretical implications, which is analyzed in Chapter 5. A trader would be able to realize a yield pickup by acquiring the bonds before the crisis and either selling them to the government at the original yield or holding to maturity. In fact, traders offset positions rapidly to limit losses and avoid the chaos of restructuring. The essence of trading is marketability of securities, which a crisis jeopardizes.

It may be easier to expect success in buying bonds at absurdly high yields when the issuer has some 10,000 nuclear warheads. However, not even that market play worked when the IMF did not bail out Russia. Emerging market financing peaked at $350 billion in 1996 and reached only $112 billion in 2002, most of which was in the form of FDI. Crisis turmoil by itself, especially after Russia and Argentina, could have mitigated emerging market risk appetite and resulting moral hazard. In addition, after the Rey Report and various G-7 meetings beginning with Fukuoka in 2000, IFIs have insisted on sharing the burden of bailouts with the private sector. The Fund is creating a Sovereign Debt Restructuring Mechanism (SDRM) or a system for managing debt default by sovereigns.[15] These institutional changes also discourage adventures by financial institutions in pursuit of advantages from moral hazard.

Microeconomic analysis is persuasive. In fact, banks that are too big to fail optimize profits from the use of leverage. Safety nets can effectively erode market discipline causing excessive risk taking by both borrowers and lenders. At a minimum, safety nets should follow a principle that official institutions will not prevent all bankruptcies. Central banking becomes an art of deciding which institution or country is too big to fail based on imperfect knowledge of what the systemic repercussions are and how they affect financial markets and the real economy. Econometric measurements of moral hazard are only beginning and like most theoretical and empirical research they are still inconclusive. Currently, official institutions, national and international, are far more conscious of the political fallout of moral hazard. A country must implement domestic economic reforms and market discipline to escape crises and ignore the prospects of bailout by IFIs. A bailout package of $120 billion for a debtor country currently is quite unlikely.

Insolvency, illiquidity, Bagehot and PSI

The central banks' safety net finds support in the Bagehot principle[16] that monetary authorities should lend to solvent banks, which are temporarily illiquid, but no to insolvent banks. Cline postulates a Bagehot curve for emerging markets.[17] The vertical axis measures official international financing and the horizontal the probability of insolvency, from 0 at the origin to 1. Official financing would be very high in the case of no probability of insolvency, declining rapidly until no financing in the case of certainty of insolvency, or probability 1. This is an interesting conceptual framework of ideal weights of PSI in an IMF program.

According to Cline, the Bagehot principle explains the recovery of PSI in crisis resolution of lack of liquidity. In the Mexican crisis in 1994-95, IFIs determined official financing at $50 billion in part because of government obligations of $30 billion in bonds indexed to the exchange rate, *Tesobonos*, and reserves of only $6 billion. Realization of prospects of the rapid recovery of Mexico shows the nature of the case, a solvent country temporarily illiquid. The United States did not want to erode credibility of loan restructuring through Brady bonds and the North American Free Trade Agreement (NAFTA) recently initiated. For its part, Mexico did not consider a moratorium, as in 1982, because of the need for future capital flows to reap the benefits of foreign trade and investment that NAFTA generated. The Mexican economy recovered rapidly, with GDP growing at 5.2 percent in 1996 after declining 5.6 percent in 1995. Mexico repaid the official financing before its maturity.

Meanwhile, moral hazard resurfaced in the form of demands of a greater burden share of private creditors because there was no loss in Mexico. Mexico's case consisted of rapid recovery of access to markets. Private capital flows increased from negative $4.8 billion in 1995 to $13.6 billion in 1996, mostly because of direct investment and a small issue of bonds. Mexico combined official financing, changes in policy and recovery of access to private capital. It is a unique case because of NAFTA. In addition, Mexico implemented deep reforms of productive structures with a wide program of privatization. However, in contrast with Brazil, Mexico delayed internal bank restructuring, without yet fully recovering intermediation capacity.

The Asian crisis began in Thailand on June 25, 1997, when the new Finance Minister, Thanong Bidaya, discovered that exchange reserves were only $1.1 billion and not $30 billion.[18] In addition, the Financial Institution Development Fund of the central bank dissipated years of fiscal surplus in loans to finance companies, especially Finance One, the largest in the country. The central bank issued money to support the financial

institutions. On July 2, Thailand abandoned fixing its currency, baht, to the dollar, allowing the rate to fluctuate freely.

Thailand agreed to an official package of $17 billion, of which $3.9 billion came from the IMF and the remainder from multilateral banks and governments. Thailand's GDP fell by 10 percent in 1998 and the economy did not recover its earlier dynamism. The current account deficit dropped from 8 percent of GDP to a surplus of 13 percent in 1998.

Cline classifies PSI in Thailand as almost voluntary. It was limited to internal financial institutions. There were 90 institutions before the crisis, concentrating investments in financing durable goods and a margin for purchase of securities. The central bank suspended operations of 56 finance companies in the first two months of the crisis. There was restructuring of debts of finance companies to foreign creditors of $4.0 billion, or 6 percent of total obligations.

Russia constitutes an evident case where moral hazard may originate in geopolitics, a country too nuclear to fail. Investors in financial companies continued to allocate funds at high rates of return in a country with fiscal imbalance, capital flight, lack of property rights and institutions, no tradition in honoring financial, and even political commitments, traffic of influence, organized crime running certain types of business and corruption. The end of the former Soviet Union left Russia with GDP lower than Holland and less than one half of Brazil. The Soviet Union had first world weapons and a subprime emerging market economy.

In August 1998, Russia was the first major country in the 1990s to declare default. It devalued the currency, restructured unilaterally the internal debt, suspended and subsequently defaulted the debt of the Soviet Union and froze private sector payments of foreign debt and forward exchange agreements. The Russian shock caused an increase in emerging market spreads from 500 in mid 1998 to 1500 in August with the beginning of crisis. Sophisticated research concludes that if there was contagion from Russia to Brazil it occurred through the volatile emerging bond market.[19]

Negotiation with Russia was long and difficult. London Club meetings, including investment banks, continued until the beginning of 2000. Russia reduced the present value of Soviet Union debt by 30 percent. Inflow of private capital fell from $3.7 billion in 1997 to nothing in 1999 and less than $2 billion in 2000, most of which consisted of direct investment.

These three cases analyzed by Cline–Mexico, Thailand and Russia–illustrate combinations of official financing to a solvent but temporarily illiquid country. Mexico would be on the left of Cline's Bagehot line. According to Cline, official financing behaves like an inverted U, or $\cap$, rising during a crisis and decreasing during resolution. PSI behaves as a

normal U, falling with a crisis and increasing with resolution. Catalytic official financing consists in enlisting PSI and functions better during a crisis of liquidity. To preserve the internal economy, countries must avoid at all costs falling in exceptionality.

Official financing programs developed to compensate for alleged lack of participation of the private sector in rescue costs. However, the Brady Plan caused reduction of 40 percent of loans in the 1980s. Most debtor countries repaid official financing. Net capital flows to emerging markets in 1997–98 reached $87 billion and private sector flows $409 billion. In 1999–2000, after Russian and Asian crises, net official flows dropped to only $8 billion while private flows were $330 billion.[20]

Cline measures PSI excluding normal private financing.[21] According to Cline's estimates, since Mexico 1994 PSI in nine crises accumulated to approximately $240 billion. A broader measure of PSI would include spontaneous capital flows during crises. Cline estimates that in six major crises in 1995–99, private sector disbursements since the year of the crisis reached $117 billion, slightly higher than public sector disbursements of $113 billion. Cline measures new disbursements of PSI over a three-year cycle at $347 billion compared with public sector disbursements of $143 billion. Therefore, Cline concludes that PSI has been substantial, including Argentina.

Foreign direct investment (FDI) constitutes a key contribution of the private sector. FDI flows have been less volatile than other types of foreign investment. These flows are not easily reversible. Manufacturing investment occurs strategically for reasons of location. It typically involves some of the international company's technology. Business plans FDI for larger horizons and is more involved with the host country than portfolio investment.

FDI continued during three major recent crises: the Latin American debt moratorium of 1982, the Mexican crisis of 1994 and the Asian contagion of 1997.[22] All types of inward investment into Latin America declined during the debt crisis of 1982. FDI declined by 25 percent in 1983 relative to the average of 1980–82, and by 40 percent in 1984, the low point. Latin America did not attain the 1980–82 average again until 1988 and the inflow in that year was below 1981. Latin America's output stagnated in the 1980s. However, inflow of portfolio investment declined in 1983 to only 25 percent of the 1980–82 average. American firms in Latin America switched their sales from the domestic market to exports with ease and rapidity, another factor of FDI that contributed to adjustment of the external accounts.

In 1994, inflows of FDI in Mexico were twice as large as in the previous two years because of NAFTA. However, FDI inflows into Mexico declined

by 15 percent in 1995–96 but rebounded quickly and again reached the 1994 peak in 1997 and 1998. In 1994–98, FDI inflow into Mexico accumulated to $56.1 billion and portfolio investment to $15.8 billion. FDI continued after the crisis, affording Mexico a cushion for adjustment of the external accounts. The share of exports in sales of American manufacturing affiliates rose from 35 to 50 percent in 1994–96.

FDI to developing Asia increased tenfold in 1990–97, and continued to rise in 1997–98 such that by 1999 the inflow was 25 percent above the 1997 level. In contrast, net inflows of portfolio capital fell by more than 70 percent in 1996–97 and turned into a net outflow in 1998, for a total swing of 180 percent. Investment inflows other than FDI and portfolio shifted from an inflow of over $40 billion to an outflow of almost $40 billion in 1997 and $60 billion in 1998, for a swing of 250 percent. The switch to exports by American manufacturing affiliates also occurred in Asia.

If there is no perception of political disturbance, FDI may be opportunistic during crises. Depreciation of domestic currency makes local prices of assets very attractive. Long-term returns on capital may be higher than in the country of origin. Mexico, Asia, Brazil and other countries in financial crises had attractive investment projects and markets. Attractiveness of FDI constitutes an important country fundamental.

Changes in structure of participation of the private sector

According to data of the Institute of International Finance (IIF), 37 emerging countries owed $316 billion to private creditors in 1984. Of this total, these countries owed $284.9 billion, or 90.1 percent, to banks, and $31.1 billion, or 9.8 percent of the total, to other creditors. In 1996, total liabilities increased to $748.8 billion, of which $410.2 billion, or 54.7 percent, were owed to banks, and $338.6 billion, or 45.3 percent, to other creditors. Structural change is even more striking in large countries such as Brazil. In 1984, of a total debt of $84.5 billion, Brazil owed 94.4 percent to banks. In 1996, of a total debt of $177.7 billion, Brazil owed 71.2 percent to nonbank creditors. The same change occurred in Mexico. While debt to banks in 1984 constituted 93.4 percent of the total, in 1996 nonbank debt was 72 percent of the total.[23]

Table 4.2 shows a profound change in instruments, creditors and debtors of PSI. In the 1980s, large medium and long-term bank loans in syndication accounted for most debt. International banks funded in London at LIBOR and lent to Brazil medium and long-term, supplying the chronic financing needs of the country. New instruments consisted of securities issued in Euromarkets, interbank short-term credit, structured debt and derivatives. In an earlier regime, commercial banks were the creditors. Large and small

Table 4.2 Changes in instruments, creditors and debtors of PSI

	Instruments
Old	Loans in syndication
	Medium and long-term loans
New	Securities, Short-term Interbank Credit
	Structured Debt, Derivatives
	Creditors
Old	Commercial Banks
New	Large and Small Investors in Bonds
	Investment Banks
	Hedge Funds
	Mutual Funds
	Pension Funds
	Debtors
Old	Sovereigns
New	Sovereigns
	Increasing Share of Private Sector Companies and Financial Institutions

investors in bonds, investment banks, hedge funds and mutual and pension funds replaced banks.

Sovereigns were the most important debtors in the earlier regime. Currently, there are numerous local companies and banks seeking longer maturities than those available in domestic markets. In Brazil, part of the growth of Eurobond issues in the 1990s originated in exchange and balance of payments policy that encouraged foreign borrowing by the private domestic sector. An overvalued exchange rate required financing of the resulting current account deficit. Change in structure of instruments, creditors and debtors significantly changed PSI during crisis resolution.

Changes in participation of the private sector

Changes in structure of instruments, creditors and debtors caused equally profound changes in negotiation of private debts. It is useful to compare PSI in the 1980s with current practice, as shown in Table 4.3.

On August 20, 1982, the Secretary of Finance of Mexico announced that his country could no longer service its foreign debt. This was the beginning

Table 4.3 Changes in PSI negotiation

Old	New
• Small set of instruments, mainly bank loan syndication	• Heterogeneous securities, legally and economically without collective action clauses
• Small set of homogeneous creditors	• Thousands of heterogeneous creditors with regulation and supervision or with little or no regulation or supervision
• Accounting benefit of restructuring	• Portfolios marked to market daily
• Long-term loans with benefits of restructuring	• Difficulty in restructuring or rolling over short-term loans
• London club with tradition followed by Paris club	• Lack of formal forum or negotiation process

of one of the deepest crises in history, which involved other countries and banks profoundly. Foreign banks had huge positions in loans to emerging markets.

Banks based their credit decisions on emerging markets on the Wriston Doctrine, after Walter Wriston, Chairman of Citibank. According to this doctrine, a portfolio of loans to emerging markets mitigates credit risk because of diversification in debtors. Advised by technicians hired away from IFIs, the IMF and World Bank, and specializing in country risk analysis, Citibank, and other international banks, believed that an individual country may experience difficulties but not all countries simultaneously. Gesualdo Constanzo, an IMF officer, developed analysis of country risk at Citibank using forecasts of balance of payments. Wriston wrote in the *New York Times*, on September 14, 1982, that countries may experience decline in financing but they never bankrupt.[24]

In 1977, positions of the nine largest banks in the United States in nonoil producing emerging markets totaled 188 percent in relation to capital. Positions in Brazil alone totaled 42 percent of capital, in Mexico 33 percent and both countries combined 75 percent. In 1982, exposure of those nine banks reached 235 percent of capital, with 46 percent in Brazil, 44 percent in Mexico and 90 percent in both countries combined. The Wriston Doctrine collapsed with the nearly simultaneous moratorium of Latin America and the Philippines. The credit error consisted in financing unsound balance

of payments deficits, such as those of debtors in the late 1970s. Forecasts of creditworthiness of countries proved as shaky as forecasts of corporate clients, in part because of asymmetry of information but also because of difficulty in forecasting financial variables such as the balance of payments.

PSI during crisis resolution in the 1980s used three principles: share of burden, case-by-case treatment and flexibility. Workouts consisted of a combination of new money and forbearance, facilitating service of commercial bank debt, to solve liquidity crises of debtor countries. Banks reserved debt slowly. Subsequently, there was exchange of loans for bonds that a larger base of investors could acquire.

Professor Roubini recalls the difficulties in the workout of crises in the 1980s.[25] Restructuring committees represented many creditors to coordinate action. There were hundreds of banks with different interests. European and Japanese banks had less exposure than American banks and different accounting rules. Smaller banks had less exposure relative to capital, and collided with larger banks that had organized syndications. Committees had to convert non-homogeneous syndicated loans into more homogeneous instruments.

Relations with creditor banks and key monetary authorities were difficult. Even one of the largest creditor banks of Brazil tried to withdraw a safety net of short-term credit lines in late 1982, which would have deepened the moratorium of that country. The debt moratorium of 1982 was difficult to manage, as unexpected as the Asian crisis, and spread to multiple countries in two continents. Moreover, if loans were marked to market, the largest American banks, with exception of Morgan Guaranty, would have had negative capital. Minutes of the Federal Open Market Committee (FMOC) show the concern of the Fed, short-term measures to make quota changes at the Fund and distrust of a workable resolution:[26]

> *Chairman Volcker*: That comment doesn't go in this report. My only point is that it may clear the way for a more open discussion of the Brazilian problem. There was an article in The New York Times a day or two ago, which you may have seen, that is fairly accurate. That is going to burst upon the world's consciousness a little more fully in the next few days. The Treasury has provided $500 million to Brazil already and probably will do another $200 to $300 million very shortly to keep them afloat until the timing is right for them to go to the Fund and try to deal with the problem more openly, which is certainly going to have to be done. It is still a very uneasy situation. The IMF negotiations, on the other hand, are being speeded up, and

> that should be of some assistance. I think that will be resolved in the next month or so in terms of enlarging quotas in the special fund.... There is a rising sense of nervousness underneath the surface and I think a lot of it is related to a perception that Brazil is not doing very well. That perception has some foundations; I certainly [don't have] any confidence in the Brazilian situation. If they need more money, they are out of compliance with the [Fund requirements. They] must be able to make a Fund drawing on May 31 and aren't going to be able to make it through. There is some feeling that the Brazilians may not be the most avid people in the world in following through on the strong program.

In reality, Brazil adjusted rapidly and successfully. The current account deficit collapsed from $16.8 billion in 1982 to $6.8 billion in 1983 and nil in 1984. Growth of GDP was 0.8 percent in 1982, −2.9 percent in 1983, 5.4 percent in 1984 and above 7 percent in 1985 and 1986. Inflation remained at a high level. However, a major effort by the authorities reduced the deficit and subsidies significantly. Adjustment consisted of export growth and import restraint, resulting in an increase of the trade surplus from $0.7 billion in 1982 to $13.1 billion in 1984. Brazil used trade policy and exchange rates to benefit from growing world output and trade.

The debt moratorium of 1982 occurred at a trying moment for American monetary authorities. The Asian crisis and others in the 1990s occurred during relative prosperity of G-7 countries. The Fed had increased interest rates to two digits following inflation of two digits in the early 1980s. Numerous banks, corporations and countries were evidently "too big to fail." The financial institutions to enlist in PSI, large American banks, were almost in need of official financing because of negative net worth. Moreover, there was unemployment and recession in the United States with high inflation. Monetary policy was procyclical in the United States as in emerging markets in recent crises and in models of fear of floating of Calvo, Reinhart, Caballero and others. The Fed had erred in forecasts of recovery and inflation. How can the Fed determine which institution or country is too big to fail and when if it cannot predict the next three months? The comments at FMOC by John Balles, President of the Federal Reserve Bank of San Francisco, illustrate the difficulty of formulating policy with meager information:[27]

> *Mr. Balles*: a 16 to 17 percent level for the 3-month Treasury bill for this year and next year, we would show that Treasury bill rate coming down to about 9 percent in '82 and going down to about 7

percent in'83. As I say, God only knows which model is right but I wouldn't.

Benjamin Friedman interestingly analyzed the comparison of debt restructuring by banks and bond investors.[28] Economic default consists of an action by the debtor that results in reduction of present value of what it promised originally to creditors. It includes payment as agreed after the contracted date, reduction in the contracted interest rate or forgiveness of any part of the principal. There is a spectrum with repudiation of debt on the extreme left-hand side and formal restructuring on the extreme right. In some cases, lenders do not incorporate losses for accounting, regulatory and other purposes. The fiction of "no loss of present value" is an important feature of market practice.

Moral hazard originates more in creditor/debtor normal relations than in the IMF or other official lenders. Official financing can only exacerbate existing moral hazard. The main issue of moral hazard consists of the principle of no loss of present value. In practice, some nonperforming debts should default, some credit was unsound and, under certain circumstances, debt processes should cause real economic costs to creditors and debtors.

Consider Friedman's pure theoretical model with the following extreme assumptions for debt with full collateral:

- All loans consist of securities regularly traded in deep, wide and liquid markets without direct relation between specific creditors and debtors
- All creditors mark their securities to market price daily
- Debtors consolidate all obligations so that there is only one obligation per debtor
- Each debt consists of only one transaction, such as an independent project, without any possibility that the debtor will seek new funds in the debt market

There is default when net present value is lower than the value of the collateral because the debtor will try to abandon collateral while the creditor will try to obtain as much as possible of what the contract provides. Creditors absorb losses in their balance sheets marking to market price. The creditor will attempt to convince the debtor to honor the contract with threat of taking over collateral. The only incentive for restructuring by the debtor is to prevent loss of collateral. In this case, restructuring does not matter.

Naturally, emerging market debt is very different than the theoretical model. While a significant part of actual debt consists of securities, a part of public and private debt still consists of bank loans. Banks maintain much better and frequent contacts and information with debtors than investors in

securities. More information means less risk for the creditor and less cost for the debtor. An important part of crisis prevention consists of transparent disclosure of information and policies to eliminate asymmetry in financial markets.

Bank loan markets are not equivalent to wide and liquid markets of securities. Each bank evaluates risks in an individual fashion, without a unique and transparent measure to mark to market. In addition, banks are subject to capital requirements within the Basel Capital Accord. Therefore, bank credits without performance do not affect immediately or automatically bank balance sheets in a form relevant for capital requirements. Nevertheless, capital requirements adjusted for risk are typically higher for nonperforming loans. When a debtor does not pay timely, reduction of the value of the loan constitutes internal evaluation subject to opinion by regulators.

The largest American banks operated with negative capital after the crisis of moratorium in the 1980s, followed by real estate problems. Citibank even experienced control of its asset creation capacity by the Federal Reserve Bank, a sort of de facto intervention. The capacity of banks to create money by taking deposits, jointly with insurance of deposits and the ambiguity of too big to fail, permitted major American banks to survive until balance sheets improved with decline of interest rates in the 1990s.

When debts consist of bank loans, not marked to market immediately, restructuring reinforces control of the creditor on the value registered in the balance sheet. Control has value, as Friedman underscores. This control facilitates the accounting fiction that the loan maintained its original value even when a new loan replaced it and the debtor did not pay interest. The history of bank debt of emerging countries and its consolidation illustrates the process. Accounting fiction helps meet capital requirements. Therefore, banks have a strong motivation to prefer restructuring to default. The fiction of no loss of value has value in itself.

Clauses of cross default and accelerated payment can generate default. In contrast with the theoretical model, emerging market debtors need new money. Resolution of debt is essential to obtain new funds. Difficulties in rolling over trade finance lines deeply affect the overall economy, becoming not only an economic problem, but also a political one.

Banks changed the allocation of credit to emerging countries because of difficulties during the debt crisis after 1982 and losses by the Baker and Brady plans. Terms declined from medium and long to short, in order to stop rollover and exit without loss of value. The revocation of tax credits by creditor countries, an important source of profits for banks, and the Basel Capital Accord in 1988, contributed to the abandoning of syndications. In

Table 4.4 Types of official financing and PSI

Type of Crisis	Type of Financing
Insolvency	Debt Reduction
Impossibility of Debt Service	Restructuring without Loss of Value
Illiquidity with Important Systemic Bailout Repercussions	Complex PSI

view of the theory and experience of no loss of value, there is perplexity in retrospect that there was criticism of earlier concentration on bank loans and pleas for increasing securitization of debt as ideal for financing a country. Subsequently, governments encouraged the private domestic sector to raise funds abroad with issue of Eurobonds to maintain exchange rate policy and high external and internal deficits. As a result, emerging markets face a far more difficult negotiation with current creditors than in earlier times with commercial banks.

New process of negotiation with the private sector

As mentioned above, and shown in Table 4.4, the type of crisis determines the process of combination of official financing and PSI. Extreme cases of insolvency require debt reduction. While there is no theory that permits measurement of optimum size of debt, Argentina's debt was likely too large for the country's dimensions, such as GDP and foreign trade. This is particularly true for high rates of interest on foreign debt. The productive structure in Argentina is much more rudimentary than in Brazil or Mexico. Probably, recovery of Argentina will require definitive debt reduction, a process that is occurring on its own.

It would be important for a country to contain a crisis only in the second category in Table 4.4 of impossibility of debt service. In this case, a debtor country would only need restructuring of debt and rollover agreements of interbank lines, both without loss of face value.

It is rare to consider a country illiquid with major systemic repercussions. A large bailout of a debtor country currently appears improbable. If a crisis were not contained in the initial phase, a country would become illiquid, which occurs with loss of credit from the private sector. There would always be coordination of efforts and aid by the official community. However, the situation would worsen with production crises and unemployment because

of lack of imported inputs for industry and exports. If illiquidity continues in the medium term, the country could become insolvent because of the shrinking domestic productive sector, with extremely difficult recovery.

Table 4.5 shows different PSI alternatives used recently. There is not much experience of new crises, which began a decade ago with Mexico in 1994. At the same time, there are few crises and significant differences among them. In addition, crisis resolution by the international financial community consists of case-by-case treatment, principles, criteria and flexibility. There is wide room for maneuvering in how IFIs would treat a new case.

In the Korean Crisis of 1997, the Federal Reserve Bank of New York and the central banks of Japan, Germany, UK, France and others coordinated rollover of interbank debts by "convincing" private banks that not all could exit simultaneously and that there would be substantial official financing.[29] This constituted a quasi-coercive case. Korea had reserves of $5 billion and short-term interbank debt of $28 billion. Capital flows had reversed into a one-way outflow. Official coercion worked but the delay caused partial decline of the won from 600 to 1800, exacerbating the crisis impact. Eventually, banks restructured interbank loans in notes of terms of 1, 2 and 3 years, with spreads over LIBOR, maintaining the principle of no loss of value.

Brazil's case in 1998–99 could be classified in the table as a mixture of "voluntary with agreement." The IMF documented the rollover of interbank loans to Brazil. International banks ceased to roll over interbank lines to Brazil beginning in September 1998 because of doubts on economic policy, especially the exchange rate regime and management of the Central Bank of Brazil. In the second half of 1998, banks reduced lines by $5.7 billion. International banks with domestic operations in Brazil aggressively reduced both interbank lines and internal debt exposures by means of restructuring similar to that of Korea. Institutions shorted Brazil risk aggressively. Rollover declined to 20 percent in expectation of difficulties created by the change of the exchange regime. After devaluation on January 12, 1999, rollover increased to 60–70 percent, stabilizing at those levels after a strengthening agreement with the IMF and formalization of rollover agreement on March 31.

Subsequently, banks rolled most lines. With improvement in the management of Central Bank of Brazil by Armínio Fraga and disclosure of record profits by Brazilian banks, systemic fears disappeared. International banks increased interbank credit. Total exposure of international banks in Brazil fell by $10.7 billion in the second half of 1998. Brazil implemented

Table 4.5 PSI alternatives

Events
Short-term liquidity Crisis
Systemic Medium-term to Long-term Crisis
Insolvency
Types of PSI
Voluntary
Almost Coercive
Agreed
Coercive
Debts Included
Bonds
Short-term Interbank
Other Short-term
Creditor
External
Internal
Type of Adjustment
Rapid
Deep (Exceptional), Medium-term
Multilateral with IFI
Bilateral, Paris Club
PSI
Type of Negotiation
Market Consultation
Unilateral Debt Exchange
Formal Committees
Paris Club
Comparability from Paris Club to PSI
Reverse Comparability from PSI to Paris Club

monitoring of rollover of interbank lines and intercompany credit of great use in crisis resolution. Brazil aborted a crisis with adverse potential.

However, some banks reduced their exposures, with some shorting derivatives with the benchmark sovereign debt security, C-bond, as the underlying. The Brazilian crisis showed ingenuity by creditors in reducing exposure to Brazil risk. Hedging positions causes pressure similar in effects to capital flight. Therefore, banks can accentuate a crisis. There is a sudden reversal of capital flows. That is why IFA emphasizes consultation and exchange of information between creditors and debtors even in periods of market tranquility because it can be crucial during crises. Countries should avoid negotiations similar to those of Argentina that could impair their future credit. Policies that create doubts on domestic financial intermediation, as in the models of Caballero, restrict a country's growth potential and increase vulnerability. Recovery of credibility of credit and financial intermediation has high costs and takes long periods.

Experience shows that in a country with an open capital account, a mega rescue package must include all possible avenues of capital flight, an important lesson for crisis resolution incorporated in official G-7 doctrine. Emphasis by the G-7 on liberalization of capital flows, systematically reiterated, altered the mechanisms of crisis resolution. Nevertheless, the G-7 insisted over years that liberalization of foreign capital flows should be implemented with sound internal policies and strengthening institutions. In Brazil, the policy of encouraging dollar debt–together with institutional hurdles to exports with all types of tax, regulatory and labor market distortions–and high external and internal deficits converted capital liberalization into a future liquidity crisis. Brazil entered globalization with numerous internal distortions of competitiveness.

Rollover of short-term bank lines has been more or less voluntary. In Korea, monetary authorities of the G-10 participated actively in rollover because of systemic fear, which may not occur in other cases. An important concern of the monetary authorities of the debtor is the effects of the crisis on its financial institutions. In Korea, loans with less than one year in maturity received a sovereign guarantee. It is difficult to visualize a similar program currently because of aversion of multilateral institutions to mega rescue packages.

In the case of weak fundamentals of the debtor country, Roubini suggests stronger policy adjustment.[30] The IMF would provide substantial financing with strong conditions on policy adjustment. PSI would be soft, consisting, for example, of maintenance of interbank lines, as in Brazil in 1999. The debtor would eventually recover market access.

Roubini points out the discrepancy between theoretical models and

actual practice in the middle case of a combination of catalytic finance, some policy adjustment and PSI.[31] Theoretical research shows that only corner solutions would result in equilibrium: full bailout in a liquidity crisis with rapid recovery of access to private credit or full PSI in cases of insolvency. Models suggest that in the middle case there could be multiple equilibriums.[32] If there is incomplete PSI, all private creditors may want to exit simultaneously, consuming reserves and official financing. The middle case is precisely the most important one because of the catalytic role of IMF financing. Roubini argues that moderate combinations of PSI and catalytic financing do work in practice, as shown by the cases of Korea and Brazil in 1999.

Actually, Brazil's experience in 2002–3 constitutes another example. Combination of an IMF program and sound policy by a new administration avoided another international crisis. Brazil had unsound fundamentals in the form of: high debt relative to GDP, large fiscal deficit with institutional distortions, substantial foreign capital requirements, failure to roll over interbank lines, lack of access to foreign credit and distrust of a new administration that in earlier political opposition criticized IMF programs, advocating renegotiation of foreign debt. However, Brazil turned a large current account deficit into a surplus in less than two years, generated a primary surplus higher than the initial IMF program and regained interbank lines and foreign credit. This example is consistent with Roubini's defense of a degree of constructive ambiguity in determination by IFIs of proper weights of PSI.

Securities markets, as suggested by Friedman's analysis, present greater difficulties. Restructuring of sovereign bonds occurred recently in Pakistan, Russia, Ukraine, Ecuador and Argentina.[33] It is a desperate measure of last resort. Initially, the debtor requires new money to avoid restructuring. For this purpose, it must convince creditors that the sovereign is solvent having temporarily insufficient liquidity. The debtor must encourage the new creditor with better conditions than those of earlier securities, thus diluting older creditors. Restructuring begins with market sounding followed by unilateral exchange of securities.

In Mexico in 1994, there was sufficient multilateral financing to permit exit without loss of value of investors in *Tesobonos*, adjusted by devaluation. The episode resembles current internal debt adjusted by dollar exchange rates. Devaluation can constrain public accounts and create expectation of possible default of internal debt.

At the extreme, Roubini points out to cases in which there are major policy failures, substantial debt service obligations with loss of market access and exit of short-term credit lines.[34] These cases are quite difficult to solve.

The country must implement deep policy adjustments and even structural change to eventually recover market access. Official financing should be normal but not at the exceptional level. After all, there are no guarantees of rapid recovery of market access, a basic condition for exceptionality. PSI may become semicoercive. Roubini classifies Pakistan and Ukraine in this category.

The extreme case is an insolvent country. Roubini classifies Russia, Ecuador and Argentina in this category. IFIs should not provide official financing before default. However, it is quite difficult to anticipate this situation clearly, as in the case of Argentina. In fact, if there were perfect anticipation, default would occur earlier. The debtor country suspends payments on its external liabilities. Debt reduction is unavoidable. In fact, debt, as in Argentina, may simply be excessive relative to about any measure such as GDP or trade. Critics argue that the IMF should have forecast Argentina's road to default. IMF financing before default simply contributed to a greater loss of output for Argentina. However, the IMF argues that the institution simply treated Argentina much the same as any other member.

Sequence of negotiation of PSI and dispute with the Paris Club

In earlier times, countries negotiated bilateral debts within the Paris Club only after approval of a formal IMF program. After agreement with official creditors in the Paris Club, countries negotiated bank debts in another informal group known as the London Club. In practice, none of these clubs ever existed. They consisted of an informal process followed in all cases. However, the Paris Club granted comparability of treatment to debts negotiated in the London Club. The process consists of pure comparability from the Paris Club to the London Club. There was never reverse comparability, that is, initial negotiation at the London Club followed by comparability by the Paris Club.

Table 4.6 shows the difference in the sequence of negotiation in the earlier regime and in the new. Both begin with an agreement with the IMF. The G-7 has reiterated that the IMF, according to Article I, constitutes the major international vehicle for crisis resolution and macroeconomic consultation.

A significant part of divergence on PSI concentrates in dispute over the Paris Club. In practice, the Paris Club is now an integral part of country risk analysis. When there is a high ratio of Paris Club debt to total foreign debt, there will be high expectation of significant, complex and probably coercive PSI, causing depreciation of securities issued by the debtor.

Table 4.6 Changes in sequence of negotiation

Sequence	Earlier Regime	New Regime
I	IMF Program	IMF Program
II	Paris Club	Unilateral Bond Exchange
III	London Club with Comparability	Paris Club without Reverse Comparability

Paris Club negotiation occurs after formal official financing agreement. Current account crises generate a financing gap. Official doctrine consists in not providing all required funds through multilateral financing. The private sector alleges that the Paris Club decides how much will be paid in cash to official creditors, redistributing the residual among private creditors. In reality, countries tend to interrupt service of bilateral debts quickly because there is nil retaliation.

The actual process consists of the sequence of:

- Adjustment of country under the IMF program
- Senior status for new loans by IFIs
- More junior status of debts in the Paris Club
- Residual financing by the private sector

The Paris Club restructures only debt flows, arrears and debt maturing in the "consolidation period," that is, during agreement with the IMF. Accordingly, the Paris Club operates with the "Houston conditions" for poor countries, allowing restructuring of debt for 15 years with a grace period of 8 years. After agreement in 1992 with Argentina, the grace period declined to 2-3 years, with payments increasing in steps to facilitate the viability of the debtor.

The Paris Club operates with normal conditions with countries such as Brazil and Toronto conditions for very poor countries, reducing net present value of debt by a third. Generally, the Club offers term and rate conditions much better than the private sector, restructuring existing debt stocks for all maturities. Its debt acquires senior status because of its more generous conditions. In fact, Paris Club debt is junior in relation to private sector because debtors interrupt payments more rapidly and there is no risk of litigation or other retaliation. There is no risk of litigation or penalties in arrears of bilateral debt.

Significant controversy occurred in Russian debt restructuring with

the private sector, which preceded Paris Club negotiation. The private sector complained of lack of reverse comparability, that is, concession of comparability by Club debt relative to agreement between the private sector and Russia. Comparability is difficult because of differences in conditions between bilateral and private debts. Similarly, there does not appear to be any interest in changing the actual process in response to private sector criticism. However, IFIs consult regularly with the private international sector to ensure PSI.

Loss and recovery of market access

The International Monetary and Financial Committee of the IMF determined that the PSI approach should depend on evaluation by the Fund of payment capacity and recovery of private market access by the country.[35] In some cases, the Committee found that catalytic official financing would permit the country to recover external private credit rapidly. In other cases, to avoid problems of coordination of creditors, the rescue program would depend on voluntary cooperation by the private sector. In extreme cases, complex solutions would be necessary, including debt restructuring, because catalytic financing may be insufficient to recover private sector credit in the medium term. The Executive Board instructed the Fund to evaluate determinants and the pace of access to the private market.[36]

The Fund identified three causes of loss of access to private credit markets:

- *Changes in international capital markets.* Assets in emerging markets show sensitivity to conditions in international financial markets. Shocks of interest and liquidity, conditions of stock markets and high yield bonds, changes in exchange rates, growth of world output and trade, wars, commodity prices and other variables affect volumes and prices in emerging markets
- *International crises.* There is theoretical and empirical debate on the propagation of international crises to and among emerging markets.[37] Whether by traditional, fundamental contagion–which always exists because of fundamental linkages of trade and investment–or by pure contagion–significant factors above fundamentals–crises in one country may have repercussions of regional or even global dimension
- *Liquidity and solvency.* Economic factors and internal policies may cause adverse expectations of lack of liquidity and insolvency. Creditors reduce their net risk position to a country in various forms. Common factors of twin crises alert markets: high internal and external deficits, burdensome service of internal and external debt, leverages and

Table 4.7 Determinants of recovery of market access to private credit

Important:
•Improvement in external conditions
•Credible adjustment policies
•Structural reforms, including privatization and entry of foreign banks
•Transparency and availability of resources for external payments and feasibility of debt
•Fund approval of programs
Others:
•Financial innovation
•Strong relations between creditors and debtors
•Prior significant participation in international capital markets
•Role of investors and other market segments
•Risks and returns of competitive assets

Source: International Monetary Fund (2001f)

mismatches of terms and currencies in balance sheets of government, companies and individuals and exchange rate policy inconsistent with macroeconomic policy and variables

Research on market access by the IMF uses the experience of six major emerging markets and four other important ones. The set of ten countries accounts for 75 percent of EMBI+, the Emerging Market Bond Index of J.P. Morgan Chase. The sample of reaccess to markets includes the Mexican crisis 1994–95, Asian crisis 1997–98, Russian crisis 1998, Brazilian crisis of 1998–99 and the increase of interest rates in the United States during 1999–2000.

Table 4.7 lists determinants of recovery of access to markets found by the IMF. An improvement in external conditions favorably affects volumes and prices of emerging market assets. However, for an individual country, formulation and implementation of an adjustment program with international credibility constitute an indispensable factor in recovery of external credit. Initial results of adjustment improve credibility of authorities and positively impresses creditors and investors. Success in exchange rate flexibility in Brazil in 1999 calmed markets and facilitated access of the country to external credit.

Structural reforms may precede the crisis, but diminish its intensity and pave the road of recovery of market access. Privatizations in Mexico and

Brazil eliminated heavy burdens in budgets and in public management. Recovery of banks earlier in the 1990s limited the Brazilian crisis of 1998–99 to credibility of the exchange rate regime. In fact, solidity of internal banks after exchange rate fluctuation constituted an important factor of recovery of credibility in exchange rate policy because it diminished the likelihood of a twin crisis. There was still weakening of bank clients indebted in dollar-denominated obligations.

Transparency of availability of resources to pay external obligations constitutes an essential factor of access to international markets. Debtor countries need a negotiating team in contact with private markets and the official community showing that financing resources are sufficient for all obligations. Any expectation of default could cause sudden abandoning of country risk positions throughout all channels. Information reaches prices of financial assets much more rapidly currently than in the 1980s when most credit consisted of bank loans.

Implementation of a Fund program, and its endorsement, are essential to recovery of external private credit. Strict compliance with and approval of Fund commitments are a necessary condition to prevent crisis and recover private credit. Approval by the Fund increased in importance after the Argentinean crisis because it showed that there is no longer a guarantee of approval of a country's policies.

Various innovations in financial engineering help some countries to recover access. Put options, swaps and bonds with collateral in the form of export receipts constitute some examples. However, they may increase costs of future transactions.

Constant relations between creditors and debtors are extremely useful. Contacts must begin in periods of market tranquility to create required relations with a wide base of creditors, which is useful in periods of difficult negotiation. Relations acquire larger dimensions in countries that have large foreign credit requirements.

Sector crises can cause serious difficulties. Weakness concentrates in debts by government and corporations in foreign currency. Banks appear solid economically, but may face major difficulties with their internal debtors in crises. Stress tests must identify vulnerabilities in advance.

Rapidity of recovery of access to external credit depends in large part on the nature of the crisis. The Bagehot curve of Cline suggests that the larger the probability of default, the lower the probability of recovering access to private credit. If the country contains the crisis merely as one of temporary lack of liquidity, recovery of private sector credit may be fast. A country may face lack of liquidity resulting from reduction of external

credit. However, its real sector economy and exports could respond rapidly to financial stability.

Spreads in recovery of private sector credit are higher and terms lower. Many countries prefer to fund initially with lower terms that typically pay lower interest than longer terms. However, this practice could cause concentration in short maturities.

IIF principles for participation of the private sector

There is debate on the convenience of predetermined rules on PSI in international crisis resolution. Cline mentions several possible rules such as: limit of IMF financing to two or three times a country's quota; restructuring by private creditors after Paris Club restructuring; new money contribution by private creditors; no net payments when there are official loans, etc.[38]

Cline underscores the problem of intertemporal inconsistency. Predetermined rules can restrict future behavior even when their adoption may be advisable presently. On the most important aspect for a major debtor, creative ambiguity appears better than definition in dollar terms of which institution or country is too big to fail. Such a definition at the national level would encourage mergers and acquisitions until only a few banks existed. At the international level, it would encourage moral hazard for certain countries. Precise definitions of which country is too big to fail would determine which countries do or do not receive sovereign loans. If a set of rules favored default by sovereign, there would be rapid failures of countries, followed by nil capital flows to emerging markets.

The Institute of International Finance (IIF), which represents private sector creditors, issued a set of Principles for Private Sector Involvement in Crisis Prevention and Resolution, outlined in Table 4.8.[39] The IIF departs from the proposition that private sector investors and creditors do not desire official bailout and expect to accept the burden for the consequences of their decisions. Official institutions have the authority and capacity to provide financing to countries for prevention. Part of this principle consists in strengthening the domestic banking sector to prevent costs of an internal financial crisis during tightening external liquidity. Principle 2 affirms that sound policies depend on the solidity of the political system at its highest levels.

Principle 3 supports efforts by the IFIs and professional organizations to implement standards and codes within Article IV consultations by the IMF. Chapter 6 covers these issues in detail. The private sector affirms that countries with access to foreign capital must comply with standards of data dissemination by the IMF and IFI, properly harmonized, especially

Table 4.8 Principles of the Institute of International Finance for crisis prevention and resolution

I. Vulnerability Reduction and Building Market Access
1. Sound macroeconomic policy and structural reforms
2. Solid political leadership
3. Transparency, standards, codes and strengthening relations with investors
4. Encouragement of private capital flows and rapid response to capital outflow
II. Response To Deterioration of Confidence
5. Rapid response to signs of reduction of market access
6. Initiation of intensive consultations with investors and creditors under market stress conditions
7. Follow approaches centered on country issues
8. Calibrate official financing to circumstances
9. Cooperate with private sector in case of debt restructuring

Source: International Institute of Finance (2001).

in relation to foreign debt. The international official community and IIF agree on two-way contacts between creditors and debtors for crisis prevention efforts and to improve rapidity and effectiveness of resolution of crises that do occur. IFIs and emerging countries should develop and implement standards for effective dialogue between creditors and debtors.

Principle 4 suggests the need for a more favorable environment for foreign investment. In the case of capital outflow, authorities must act rapidly, detecting policies that cause difficulties and taking reversal measures.

The second group of principles deals with response of countries to loss of confidence in the market. Principle 5 postulates that a country should act decisively when it discovers signals of loss of access to the external private market. The country should not delay reversal measures, which may become increasingly costly.

Principle 6 advises immediate consultations with investors and creditors when external accounts suffer stress. Communication of information and policy can help identify measures of cooperation that stabilize markets.

Principle 7 constitutes adoption of approaches focused on country needs. The IIF suggests voluntary approaches in recovering private sector short-term credit. The process of adjustment should adapt to a country's characteristics.

The IIF suggests that IFIs should calibrate official financing to case circumstances, which is Principle 8. The Fund must consult with the private sector when debt is too burdensome. In these cases, official financing must be flexible, being capable of changing in accordance with evolution of conditions. Finally, Principle 9 proposes cooperation approaches in the case of wide restructuring of debt with the private sector. The IIF monitors capital flows to emerging markets and conditions in major countries.

Collective Action Clauses (CACs) and sovereign debt restructuring

There is substantial academic and technical research on CACs in bonds issued by emerging countries. CACs have become official doctrine. The Rey Report discussed CACs and the G-7 incorporated them in meetings as official doctrine.

The IMF followed on a request by the G-7 and produced a proposal, elaborated by Anne O. Krueger,[40] First Deputy Managing Director of the IMF, including CACs in bond contracts. Krueger's objective consists in providing incentives to guarantee orderly and rapid restructuring of non-sustainable sovereign debts. That work summarizes numerous efforts within the IMF.

Sovereigns issue debt in multiple legal jurisdictions, with diverse instruments, acquired by various types of creditors. Lack of CACs that provide for effective negotiation may obstruct restructuring of debts. Therefore, restructuring could proceed very slowly with significant uncertainty, deepening the liquidity crisis and loss of market value of debts and having adverse effects on debtors and creditors.

CACs consist of contractual clauses of:

- Collective representation, with procedures to organize and designate a representative to negotiate with the debtor
- Qualified vote by majority, permitting changes in bond conditions without unanimous approval of the creditor to prevent minority bondholders from frustrating an agreement that benefits the majority
- Sharing by Investors, determining that investors share resources obtained in litigation, reducing the incentive to litigate by individual investors

There was preference for issue of bonds with CACs in the New York jurisdiction after the first issue by Mexico in March 2003.[41] Analysis by the Fund of yields of Mexican bonds did not show an increase in spread because of CACs. Brazil followed Mexico with four issues with CACs. These new issues include restructuring by the majority of bondholders. Bonds with CACs account for 90 percent of sovereign issues in 2004 and 40 percent of

outstanding bonds from emerging markets. This change originates in issue of bonds with CACs under New York law. Issue of bonds with CACs has become standard practice.[42]

There could be high costs for creditors and debtors because of the lack of an effective process of restructuring by countries that implement sound adjustment programs. The sovereign may lose all reserves, creating worse problems. Without a process of majority voting, restructuring may delay the return of the debtor to normal conditions. Expectation that minority groups of creditors can delay restructuring prolongs negotiation and may even block it. There would be greater uncertainty of recovery value. The SDRM (Sovereign Debt Restructuring Mechanism) intends to protect the rights of the creditor and the value of assets. The legislature of members would have to approve legal reforms of the Fund. The G-7 has endorsed such legal changes.

Benefits to debtors consist of dealing with unsustainable debt burdens more expeditiously, avoiding higher economic costs. Creditors would obtain an agreement before total loss of reserves by the debtor, avoiding litigation that would reduce their rights. The creditor could make decisions with knowledge of the restructuring process and the recovery value of debt. Both creditors and debtors would benefit from a collective process. The SDRM would be voluntary and invoked by the debtor. It would not prevent other negotiations between creditors and debtors.

The SDRM would function within a legal framework to permit a majority of creditors to approve mandatory restructuring agreement for all, including the minority. A majority vote would include all creditors and not only owners of a given debt instrument. This would simplify the process and guarantee fair treatment to all. The SDRM has foundations in bankruptcy regimes and bond contract clauses that permit restructuring by the majority of holders.

The proposal of majority action, protecting assets and payment capacity of debtors during negotiation with creditors, would work best when supplemented with:

- Mandatory stay of litigation by creditors after suspension of payment by debtors
- Mechanisms of protection of creditors during litigation stay mechanisms
- Concession of seniority status to new money by private creditors

The claims process and resolution of disputes would function uniquely. Major decisions would originate in the agreement between the debtor and a qualified majority of creditors. The Articles of Agreement of the IMF would

need amendment to make mandatory to all creditors an agreement between the debtor and a majority of the creditors.

Economists disagree on convenience of CACs. There were recent debt restructurings of bonds without CACs by the process of sounding markets followed by unilateral exchange of bonds. There would be significant difficulty in meeting representatives of thousands of creditors, especially because most are not original buyers, such as "vulture funds," which purchased the bonds at nil prices to sell them at any capital gain.

There is conflicting empirical evidence.[43] Almost 75 percent of all international bonds issued by sovereign debtors, or quasi-sovereign, excluding Bradies, which had a different origin, follow formats and laws of New York, Germany and Japan, where CACs do not exist. However, there is a sufficient number of bonds with CACs, before and after various market events, to analyze empirically the impact of CACs on costs and benefits of contracts. It is possible to avoid modeling bond yields over time by focusing analysis at a point in time. Primary data require estimates of demand and supply of bonds, resulting in estimation that is more difficult with suspect results.

A summary of IMF research is as follows. There is no evidence that use of English law, a proxy of CACs, increases costs of debt for issues with low ratings. An econometric relation between English law and costs of debt, both for issuers of low and high ratings, shows inverse association, but not significantly different from zero. Results coincide with the impression in financial markets that most market participants do not know the legal documentation of bonds they sell and buy. The study concludes that the lower costs of restructuring related to CACs are of the order of magnitude of costs of higher moral hazard. Data included 2452 bonds and notes at floating rate issued in international markets between January 1990 and August 2000.

Bossone and Sdralevich defend creation of incentives for functioning of the SDRM. They depart from the principle of avoiding breakdown of market discipline that default is costly, guaranteeing that creditors and debtors may reach voluntary agreement. There should be an increasing structure of costs from voluntary PSI to default, with the SDRM constituting an intermediate alternative between the two.[44]

Sovereigns do not have liquidation value in bankruptcy. Creditors would exit if markets were liquid with many creditors and no capital controls. Costs of default in terms of loss of present value constitute the only way to force creditors not to exit. Value from SDRM should reward voluntary PSI to mitigate moral hazard of creditors and debtors, but must be sufficient to prevent exit of creditors.

Loss of default for the sovereign includes deteriorating reputation, loss of access to market and economic, political and social tension. Creditors suffer losses in recovery value and a disorganized process of bankruptcy. There are indirect systemic losses. *Ex ante*, losses must be high to contain moral hazard of creditors and debtors; *ex post*, losses should be high to stimulate voluntary PSI. Default costs of the sovereign may exceed those of the SDRM and losses of creditors should be higher under the SDRM than in voluntary PSI.

Bossone and Sdralevich identify three possibilities. By Krueger's suggestion, there should not be official financing in the SDRM to pay creditors of restructured debt. In another possibility, official financing after the SDRM would be equal or less than that existing before it. The third possibility consists of legal restriction by which creditors cannot recover more than their last offer before the SDRM.

The IIF elaborates principles to ensure that emerging countries maintain access to private international credit.[45] The principles have four categories:

- Transparency and disclosure of information
- Dialogue and cooperation between creditors and debtors
- Good faith during debt restructuring
- Fair treatment to all participants

Roubini argues that while official policy of the G-7 is not to engage in large bailouts, there is an actual practice of bailout because of political motivation.[46] There is still substantial ambiguity in defining too big to fail. The G-7 and IFIs have not yet solved the option between the contractual solution, CACs, and the statutory solution, the SDRM.

Roubini affirms that bond restructuring is feasible. In several cases–Pakistan, Ukraine, Ecuador and Russia–debtors successfully restructured bond debts with hundreds of thousands of creditors. These countries avoided an exodus of creditors by unilateral suspension of payments. Thus, analogy with corporate bankruptcy may not be meaningful because it is difficult to assign assets of a sovereign in litigation. There are also many reasons why holdout by "vulture" bondholders–who acquired bonds at deep discount to sell them at a profit–may not be a major problem.

According to Roubini, the SDRM may take a long time to implement because it requires legislation in major countries. CACs could also experience delay because it will take substantial time before all bonds in a restructuring have CACs. The current practice of vague unilateral restructuring will continue to be actual practice.

Professor Ricardo J. Caballero argues that reform of the IFA concentrates currently in a proposal by the IMF to use the American bankruptcy code–Chapters 9 and 11—and another proposal by the United States Treasury

to incorporate CACs in bonds.[47] These proposals are applicable to illiquid and bankruptcy-equivalent countries. The proposals do not consider the more common problem of capital flow reversals requiring internal "precautionary" recessions faced by most emerging countries.

Caballero's analysis departs from the fact that financial intermediation permits companies to bridge to the future declines in their income with debt. This is the case of long-term projects with sound cash flows when they encounter recession.

A comparison with the impact of the Asian crisis on Australia and Chile motivates discussion. Both countries suffered decline in demand by Asia for their commodities with a resulting deterioration of terms of trade. However, Australia had a type of "insurance" in the form of its prime credit rating. Instead of engaging in a precautionary recession, Australia increased the current account deficit from 2 percent of GDP to 6 percent and loosened monetary policy. In contrast, Chile had a current account deficit of 6 percent of GDP. As conditions deteriorated, foreign banks withdrew their credit. Chile had to reverse the current account deficit into a surplus and tightened monetary policy. Chile experienced decline of expenditure by 15 percent relative to trend. Caballero estimates that Chile's adjustment was ten times more painful than what it would have been if it had "insurance" similar to that of Australia. The proposal by Caballero would eliminate procyclical monetary policy in emerging countries during crises, a weakness deriving from his analysis of the dual liquidity economy.

According to Caballero, precautionary recessions resulting from sudden stops in capital flows constitute the origin of crises of illiquidity and country-equivalent bankruptcy. IFA should stop crises before they grow into more disrupting extremes.

The proposal of Caballero is a contingent instrument similar to collateralized debt obligations (CDO). Bonds could incorporate long puts varying according to the characteristics of a country with underlying such as price of copper for Chile, coffee and high yield spreads for Brazil, oil for Mexico, oil and high yield spreads for Russia, price of semiconductors for Asian tigers, etc. There would be senior tranches that insurance companies and global pension funds could acquire. Insurance has an added advantage. It could prevent expectations from moving the economy toward a perverse equilibrium of insolvency.

IFIs would assume an initial role in developing such a market of contingent CDOs of emerging countries. They could invest in the subordinate tranches of emerging countries' CDOs. The bulk of investment in CDOs would be by the private sector, satisfying PSI in requirements of avoiding moral hazard. Caballero summarizes three benefits of his proposal: emerging

market crises would abort before leading to illiquidity and bankruptcy, there would be fewer and less damaging precautionary recessions resulting from sudden stops and PSI would be high.

Caballero admits the need to develop domestic financial institutions with institutional reform. The emphasis of his proposal is to prevent emerging crises from becoming as profound as the recent case of Argentina.

5
Choice of Exchange Rate Regime in the IFA

If an investment bank changed accounting practice by transferring depreciated securities from the trading portfolio—marked to market daily—to the investment portfolio-valued at historical purchase price-auditors would complain and the bank would face difficulties in completing its audit. The international financial community and private creditors audit debtor countries constantly. Debtor countries with flexible rates cannot fix their currencies currently without risk of a loss of market confidence and resulting pressure on capital flows.

The fixed exchange regime with occasional readjustment, soft pegs, without definitive theoretical and empirical verdict of its role, is present in all twin crises-Mexico 1994-95, Asia 1997-98, Brazil 1998-99 and Russia 1998. Soft pegs in debtor countries following flexible exchange rates would create a significant lack of confidence, lagging exports and foreign investment, anticipating imports and dividend remittance and encouraging short positions on country risk-from short positions on derivatives of sovereign bonds to black market foreign exchange. Recovery of private sector credit would be quite difficult.

Hard fixes are at the other extreme of the spectrum. There are proposals to use the exchange rate as a nominal anchor of inflation, to break expectations and lower internal inflation toward international inflation. Two possibilities are the currency board and formal dollarization. Debtor countries do not have sufficient reserves to back their monetary base, in the case of the currency board, or to buy the monetary base with reserves, in the case of dollarization. In addition, experience in Argentina shows the social cost of exogenous shocks in the world economy, which occur with some frequency. Argentina spent half a decade in recession and exploded socially and politically. A superfixed exchange rate may not be feasible in a country with large dimensions and social inequalities. It would be

extremely difficult to explain a new, complex regime to a population distributed over a large geography. At any rate, there may not be enough reserves to implement a hard fix.

Some countries may only have the alternative of maintaining the current regime of exchange rate fluctuation with inflation targets. The theoretical model has specification to allow for exchange pass through to inflation.[1] A debtor country would continue to enjoy exchange rate credibility to recover and maintain private external credit.

Economists defend vigorously, theoretically and empirically, alternative exchange rate regimes that may be more suitable for avoiding twin crises in an emerging market. Unfortunately, there is no definitive theoretical argument or empirical verification. There is no intention here to provide a survey essay such as those of Harry G. Johnson because of the vast literature on the subject. The more modest objective is to provide material on certain issues that are relevant to the current policy choices-bipolar view, optimum currency areas (OCA), exchange anchor of inflation, sudden stop, balance sheets of government, corporations and individuals, hard fixes, fear of floating and fluctuating exchange rate regime with inflation targeting. The objective is to sample the state of the art to verify the proposition that in the case of some debtor countries, currently, it may be best not to alter exchange rate regimes.

Bipolar view

Emerging market crises in the 1990s had common origins and policy responses. Brazil's case in 1998–99 is similar to those of Mexico,[2] Argentina, Asia[3] and Russia.[4] Exchange rate regime constituted a common denominator. Countries fixed exchange rates at a rigorous level, as in Argentina, or adjusted periodically, as in Brazil, Mexico and Asia.[5] However, important work on sudden stops and fear of floating reveals that coincidence of exchange rate regimes does not identify the culprit. Identification of common aspects is still useful.

Relatively free capital flows and excellent economic perspectives during the boom in world trade and output attracted large volumes of foreign resources, both direct investment and portfolio, permitting stable exchange rate regimes. Portfolio investment-in stocks and debt both sovereign and private-contributed to sharp increases in stock markets. Imprudent fiscal policy caused large public deficits. Contrary to common perception, there were significant potential future deficits in Asia, implicit in future bailouts of local banks induced by governments to lend to unsound projects.

Probably, there was an undocumented process of moral hazard.

Overvalued exchange rates encouraged foreign currency indebtedness by corporations and local banks. There was an implicit promise that the government would maintain the credit subsidy in the form of stable exchange rates. In the case of devaluation, there was an implicit belief that authorities would rescue certain debtors from default or illiquidity because of their relative magnitude, too big to fail, or by manipulating political influence. However, other authors believe that stable exchange rates would promote internal debt markets. Countries would be able to attain prosperity with low inflation and efficient capital markets.

At a point in time, country risk evaluations deteriorated. Heavy internal and external deficits and low quality of public policy raised serious doubts on the continuity of the process. Capital flows reversed direction when foreign and local investors "ran for the exits." Devaluation proceeded on enormous leverage, both in foreign and local currency, causing inflation and increases in interest rates. In most countries, with the exception of Brazil in 1998–99 because of rapid containment and sounder banks, effects of devaluation on interest rates caused internal financial crises, affecting banks directly through their net exchange positions or indirectly through those of their clients. Twin crises, or a combination of exchange and local financial crises, caused violent declines of output and employment.

Debate evolved toward two avenues within efforts of strengthening the new architecture of the international financial system. Various sectors of the official community agreed on the bipolar view. Countries should adopt exchange regimes with credibility. It resembles accounting rules. Auditors penalize frequent changes in accounting. Similarly, auditing of countries by the official community and private creditors advises against unsustainable exchange rate regimes because regime change, many times predictable, requires bailouts. The bipolar view recommends super fixed rates, hard pegs, or free floats. A current of official thought concludes that soft pegs cannot succeed. There is active debate on exchange rate regime.

Other authors and countries, such as Chile, focused on different prevention policies. Capital controls, such as in Chile, could prevent crises. It would be difficult currently to implement capital controls in Brazil and Mexico because of their foreign capital needs, dimensions and stock of debt.

The technical literature on emerging markets considers choice of exchange rate regime as of major importance. There is probably more research on exchange regimes than on all other subjects of international macroeconomics combined. In fact, Stanley Fischer chose the subject of exchange rate regimes when the association of economists in government invited him to lecture at their meeting. In a similar situation, former Secretary Lawrence Summers partially concentrated on the same subject.

Stanley Fischer summarizes recent experience with exchange rate regimes as follows.[6] In major international capital market crises–Mexico 1994, Asian crisis 1997, Russia and Brazil 1998 and Argentina and Turkey 2000–there was some form of fixing of exchange rates. Countries that did not fix exchange rates–South Africa and Israel 1998, Mexico 1998 and Turkey 1998–did not experience crisis. Based on this experience, Lawrence Summers argued that in economies with international mobility of capital the choice of appropriate exchange rate regime is at one of two corners: either in the corner of flexible exchange rates or in fixed exchange rates with commitment to abandon an independent monetary policy.[7]

The two-corner or bipolar solution consists of hard fixes–currency board and dollarization–on the extreme left of the spectrum and free floats on the extreme right. There are numerous alternative regimes between these corner regimes. Moving from the left-hand corner to the right there are regimes of soft pegs, tight band, wide band and managed float. John Williamson, of the Institute for International Economics, proposed BBC: bands, baskets and crawls.[8] In fact, many Asian economies still prefer managed exchange rate regimes. In certain official international sectors, there are doubts over the feasibility of soft pegs and managed floats.

Fischer softened the bipolar view as follows:[9] "The right statement [of the bipolar view] is that *for countries open to international capital flows, (i)* pegs are not sustainable unless they are very hard indeed; but *(ii)* that a wide variety of flexible rate arrangements are possible; and *(iii)* that it is to be expected that policy in most countries will not be indifferent to exchange rate movements."

Qualification of the bipolar view occurred in part because of the theoretical and empirical proposition of "fear of floating,"[10]contributed by Guillermo A. Calvo and Carmen Reinhart. These authors argue that perfect fluctuation occurred only in the G-3, with interruptions, and truly only in textbooks. The G-3 countries occasionally manage their currencies–dollar, yen and deutsche mark. Calvo and Reinhart differentiate what countries pretend to do and what they actually do in practice.

According to Calvo and Reinhart, fear of floating in an economy with capital mobility originates mainly in lack of credibility. Authorities implement exchange rate targets instead of targets of inflation. Accelerated depreciation of currency destroys credibility of authorities that also avoid depreciation because it jeopardizes the country's competitiveness. In practice, because of fear of floating, countries do not follow freely fluctuating exchange regimes but rather a managed float, which is equivalent to a soft peg. There is much more in the contribution by Calvo and Reinhart considered in a separate section below.

Professor Peter B. Kenen analyzes the bipolar view as part of the evolution of the international financial system.[11] The Bretton Woods system of fixed but periodically adjusted rates prevailed in the 1950s and 1960s. Inspiration of this system originated in the experience with volatility of free exchange rates during the period between the two world wars, which influenced Keynesian international macroeconomics. Changes in the early 1970s with more flexible rates constituted a transition toward stable exchange rates, with readjustments, and a more symmetric process of adjustment of the balance of payments. Subsequently, the Fund's Articles of Agreement were modified to include flexible exchange rates, but every country could choose the exchange rate regime it found to be most adequate to its conditions.

Theory postulates that the monetary market determines the nominal exchange rate while markets for goods and services determine the real exchange rate. The nominal exchange rate can restrict and improve monetary policy. Liberalization of capital flows influenced feasibility of exchange rate regimes. The bands of the European Monetary System collapsed, first with the lira and the English pound and, subsequently, with other currencies in 1993 after devaluation of the French franc.[12] Subsequently, exchange crises occurred in countries with free flows of capital and fixed exchange rates such as Mexico and Argentina 1994, Argentina since 1998, Russia and Brazil 1998–99 and the Asian Five 1997–98.

According to Kenen, after crises in the early 1990s, the binary approach postulated that countries should choose between flexible rates and immutable fixed rates.[13] The exchange rate ceases to be a policy variable because authorities cannot fix it if they are going to change it in the future. Fixing rates immutably requires institutionalization, perhaps by legislation. Kenen warns that countries can change their laws. Immutable fixing requires statutory dollarization or a monetary union.

Theory of Optimum Currency Areas (OCAs)

Mundell introduced OCA theory, in an effort to clarify the process of adjustment under flexible exchange rates.[14] Mundell noted that the argument in defense of flexible exchange rates proposes that depreciation substitutes unemployment when there is an external imbalance and appreciation substitutes inflation when there is surplus. There are resulting doubts if all currencies should be flexible. More generally, an optimum currency area is a geographic dimension where exchange rates are fixed. The OCA intends to determine what should be the optimum dimension of a currency area.

A single currency assumes a single central bank and, thus, elastic supply of money between regions. However, in a currency area with more than

one money, no central bank can increase its liabilities more rapidly than other central banks without losing reserves. There is a resulting difference in the channels of adjustment.

Suppose that the world consists of two countries, Canada and the United States, each with its own money, divided into two regions, the east producing automobiles and the west producing lumber, and that the exchange rate between the two countries is flexible. If there were an increase in productivity in car manufacturing, there will be excess demand for lumber with inflationary pressure in the west and excess supply of cars with unemployment in the east. Central banks can avoid unemployment in the east by increasing the money supply or restrain inflation in the west contracting money. Therefore, both countries can prevent unemployment, with inflation, or they can control inflation, with unemployment. It is impossible to control simultaneously unemployment and inflation. Flexible exchange rates do not adjust the balance of payments between regions, even if they can do it for the countries, not being superior to a common currency or national currencies connected by fixed exchange rates.

Assume a monetary reorganization such that there are only two currencies, the dollar of the east and the dollar of the west. Under fixed exchange rates with rigidity of prices and wages, decline in demand in the east causes unemployment and increase in demand in the west causes inflation. Increases in prices of lumber will alleviate part of the adjustment through variations of terms of trade. However, if the central bank of the west contracted money supply to control inflation, it will pass adjustment to the east in the form of deflation and unemployment. Mundell concluded that inflation control policy in surplus countries generates recessive tendencies in the world economy under fixed exchange rates and more generally in a currency area with many different currencies.

Under flexible exchange rates between east and west, excess demand for lumber would not cause inflation in the west or unemployment in the east. The dollar of the west would appreciate in relation to the dollar of the east guaranteeing balance of payments equilibrium, while central banks would implement monetary policies to maintain stability of effective demand in terms of currencies and, therefore, employment and stable prices. Mundell concluded that the case for flexible exchange rates is robust for regional currencies, but not for national currencies. The OCA is the region.

Keynesian theory postulates that prices and wages are rigid and that capital mobility does not have sufficient dimension to affect functioning of internal policies. In this set of assumptions, the nominal exchange rate determines the real rate, which in turn determines the current account balance.[15] The government may use the exchange rate to determine the

external balance, or current account level, and monetary and fiscal policy for internal balance, or level of employment compatible with stable prices. With low capital mobility, an exchange rate managed periodically, or a flexible exchange rate, result in the same mechanism of adjustment of external accounts by channeling relative expenditures to the domestic economy.

Assume two countries, 1 and 2, that experience change in expenditures from goods of 2 to those of 1, causing surplus in 1's current account.[16] There will be excess supply of goods of 2 and in its labor market and excess demand of goods of 1 and in its labor market. If prices and wages were flexible, there will be decline of prices of goods of 2 and of its wages and increase of prices of 1 and of its wages. Both economies would return to equilibrium. Under fixed prices and wages, flexible exchange rates could cause appreciation of the currency of 1, increasing prices of 1 relative to those of 2, which would change expenditures in favor of 1, causing return to equilibrium.

When prices and wages are rigid and the exchange rate fixed, displacement of labor from 2 to 1 would cause return to equilibrium in both markets. Therefore, perfect mobility of labor eliminates disequilibria and constitutes the main determinant in OCAs, which can contain many countries but only one labor market.

McKinnon[17] stated that a small economy could not depend on adjustment of the nominal exchange rate to recover equilibrium. Devaluation would cause internal inflation, decline of real wages and demands for nominal wage increases, affecting the impact of the nominal on the real exchange rate. The local currency would lose its properties of unit of measurement and value. OCAs should be sufficiently large to contain a large number of nontradable products to stabilize the purchasing power of money.

Kenen's contribution consisted in emphasis on internal diversification.[18] Exchange rate variations would occur less commonly in a diversified economy. By the law of large numbers, successes in foreign trade would compensate for failures. The required change in the real exchange rate for adjustment would be lower in a diversified economy because of stimulus by changes in relative prices of exported goods relative to import competing goods. Because of diversification, there is less relation between external and internal demand. For example, decline of demand for exports does not meaningfully affect internal investment.

An OCA assumes that macroeconomic shocks between regions that are optimum for the same currency are not asymmetric. Mundell's example of the east producing cars and the west lumber implies symmetric shocks. In case of asymmetry, a flexible exchange rate, under model assumptions,

would not promote adjustment between nations. Reorganizing the OCA in east and west would allow functioning of a flexible exchange rate between east and west. However, there would be problems between Canada and the United States as originally structured. A significant part of empirical OCA research concentrated on measuring the asymmetry of shocks.

In the case of a primary producing country, Kenen's analysis immediately implies that a flexible exchange rate would be ideal. This happened de facto in spite of the *de jure* gold standard in the coffee economy of Brazil in the nineteenth century and even during adjustment to the Great Depression of the 1930s.[19]

McKinnon pointed to a second version of Mundell relevant to OCAs.[20] The original work by Mundell departed from the assumption of stable expectations. Without mobility of factors and with asymmetry of shocks, the ideal exchange rate regime would be flexible.

Subsequently, Kenen noted that flexible exchange rates would be optimum for countries with little diversification. According to McKinnon, for Mundell and most economists in the 1960s, flexible exchange rates would constitute a smooth mechanism to stabilize the internal economy. Keynesians based their conclusions on assumptions of rigid prices and wages while Mundell added asymmetric shocks. An extra degree of freedom of flexible exchange rates would permit management of internal demand for full employment. Monetarist economists defended flexible exchange rates because they would provide the required degree of freedom for policies of internal price stability.

The "second" Mundell[21] pointed out that a common currency would mitigate shocks by diversification of financial portfolios and pooling of reserves. A country experiencing an adverse shock can mitigate its effects with a common currency with another member because both have bilateral invoices on production. After exchange depreciation under flexible rates, internal assets denominated in local currency would lose purchasing power in world markets.

There would be gains from a common currency resulting from diversification of financial portfolios. McKinnon notes that the euro allowed reduction of interest rates and longer terms for countries such as Italy, Portugal and Spain. Because of the Treaty of Maastricht, there was convergence of interest rates among countries that would subsequently join the European Monetary Union (EMU).[22]

There are doubts about monetary union that apply equally to dollarization. When a country joins a monetary union it abandons the capacity to issue money through its central bank. The issue of money is a form of taxation, known in the literature as seigniorage. The government issues money

through its central bank with which it acquires goods and services before the private sector. In the case of high public deficits and inflation, there is a gain in buying before the issue of money causes price increases. When a country eliminates its central bank issuing national money–replaced by the union's central bank or by the Federal Reserve in dollarization–it loses seigniorage. Analysis of advantages and disadvantages of monetary union depends on costs and benefits. Seigniorage constitutes an important cost.

Buiter analyzed costs and benefits of a monetary union between Canada and the United States, North American Monetary Union (NAMU).[23] Analysis extends easily to union with Mexico within NAFTA. Buiter considered two currency regimes. The first regime would continue the current Canadian flexible exchange rate with inflation targeting. The second would be monetary union with the United States. There are two possibilities of monetary union. In a symmetric monetary union:

- Canada would receive a proportionate share of NAMU seigniorage
- Financial institutions in both members would have the same access to the rediscount window of NAMU-FED, the common central bank
- NAMU-FED would act as lender of last resort for both countries
- NAMU-FED would conduct monetary policy of prices and production for NAMU as a whole

In the second possibility of a monetary union, Canada would adopt unilaterally the United States currency as means of payment, what Buiter denominates as an asymmetric monetary union. Canada would not receive any benefits of seigniorage or central banking as in a symmetric union.

Savings in transaction expenditures consist of costs of converting one currency into another, which disappear under a common currency. Buiter argues that if it were possible to create the world again, there would be only one currency. The costs of initial conversion to a single currency were more complex in Europe–where 11 countries joined in the EMU–than in Canada because potential members of NAMU know their currencies better. Greater transparency of prices and transactions in a single currency would constitute another benefit of union. Using estimates for EMU, NAMU transaction savings could be 0.5 percent of GDP.

Buiter considered three different methods to estimate seigniorage:

- First finite differences of monetary base relative to nominal GDP
- Nominal interest rate without risk for current period multiplied by ratio of nominal monetary base in prior period relative to nominal GDP in current period
- Inflationary tax measured as current inflation rate multiplying ratio of monetary base in prior period times nominal GDP

Seigniorage has been very low in Canada and the United States, but

certainly higher for Mexico, a country with higher inflation. Buiter estimates that seigniorage is at a maximum 0.28 percent of GDP, being lower in most estimates. Therefore, gains from monetary union appear higher if estimated correctly at 0.5 percent of GDP. If Canada could negotiate a share of total NAMU seigniorage based on its share in GDP and population it would gain more than currently. Seigniorage in the USA is much higher and growing. Legal and criminal (including terrorist) transactions around the world use American currency. Almost two thirds of currency issued by the US is overseas. It appears doubtful that the United States would share this part of seigniorage with Canada or Mexico, especially because of the difficulty in explaining seigniorage not only to a consensus of economists, including less interested economists, but also to the public and politicians.

Buiter criticizes OCA theory sharply, characterizing it as one of the low points of monetary theory after World War II.[24] Buiter claims that the main defect is confusion of nominal transitory rigidity and permanent real rigidity. According to this view, OCA theory attributes too much power to monetary policy in affecting real economic performance. He specifies assumptions within OCAs required for superiority to flexible exchange rates between two countries:

- High rigidity of nominal prices and wages
- Relatively low degree of openness to international trade of real goods and services
- High incidence of asymmetric shocks, specific to the country, in contrast with symmetric or common shocks and/or differences in national economic structures of mechanisms of transmission that cause symmetric shocks to have asymmetric repercussions
- Low mobility of factors of production, especially labor, among countries
- Lack of fiscal transfers among nations

None of the OCA arguments seems to invalidate microeconomic transaction gains in relation to seigniorage. Buiter concludes that a symmetric monetary union would be more advantageous for Canada than the use of the American dollar as a common currency for both countries because Canada could negotiate a share of seigniorage and other NAMU-FED advantages. Naturally, the political feasibility of NAMU lacks any relation to reality because it would require a complex political and legislative process. However, Buiter's exercise clarifies the less-well known aspects of dollarization proposals, which suggest entirely an unfeasible negotiation of seigniorage with the United States, a country that has discouraged use of its currency by others.

Empirical investigation of OCAs suggests that the criteria or preconditions

for a common currency area are endogenous.[25] According to theory, the larger the trade relations between two countries, the larger the potential gains of a common currency and the higher the probability that they will become members of an OCA. Joining monetary union has the cost of abandoning monetary policy for cyclical stabilization. Countries with symmetric cycles, or asymmetric cycles with mechanisms of transmission similar to symmetric cycles, would have a greater interest in currency union.

Frankel and Rose argue that simple analysis of data relevant to these two criteria can distort qualification of a country to join a monetary union because both are endogenous. Entry into a union can significantly increase trade relations among members. Rose used bilateral data for 186 countries, in a set of data with 300 observations, in which two countries use the same currency.[26] He measured a positive relation of monetary union with international trade and a small effect of volatility of exchange rates, even after controlling several factors. Statistically significant results imply that countries that share common currency experience three times more international trade than with different currencies. Therefore, currency union results in greater commerce among members.

Greater trade relations among union members can significantly affect the nature of economic cycles. Members can experience cycles differing significantly in nature than before union, partly because of changes in monetary policy, but also because of tighter trade relations. If demand shocks prevail over supply shocks, economic cycles tend to exhibit greater similarities in countries that strengthen trade relations. Frankel and Rose verified this proposition with empirical results.

Buiter and Grafe analyzed banking organization and exchange rate regime in Eastern European countries that intend to join the European Union.[27] In order to join EMU, accession countries have to meet Maastricht Treaty criteria:

- *Financial criterion*: ceiling of 3 percent of GDP on general public deficit and of 60 percent on general public debt
- *Interest rate criterion*: nominal interest rates of public debt around 2 percent of the average of three countries with lowest inflation
- *Inflation criterion*: annual inflation rate should not exceed 1.5 percent of average of three members with lowest inflation
- *Exchange rate criterion*: high probability that they must implement an Exchange Rate Mechanism II (ERM-II), maintaining the exchange rate in a band of 15 percent in the two years prior to entering the EMU, without using capital controls, exchange controls, etc.
- *Central bank criterion*: central bank must be independent of government

Buiter and Grafe point out that while national monetary authorities control individual criteria they do not control them simultaneously. For example, authorities do not control the real exchange rate when there are free flows of capital. The relative price of nontradables to tradables determines the real exchange rate. Fiscal and other structural policies can influence the real exchange rate, but it depends on productivity changes in Western Europe. The exchange rate criterion does not restrict the regime that precedes entry into the EMU. Fluctuations within a tight band can occur with managed rates, common fixed rate, currency board and unilateral "europeization."

Buiter and Grafe compare the currency board to flexible exchange rates as possibilities of regimes for countries in accession, that is, the extremes of the bipolar view, a credible fix and a perfectly free rate with inflation targeting. The objective is to integrate currencies in the EMU. Using OCA theory, flexible exchange rate prerequisites include price and wage rigidity, openness to trade, asymmetric shocks, diversification of productive structure, low mobility of factors and lack of fiscal transfers among nations. The authors conclude that the currency board would not attain Maastricht criteria without an unnecessary recession. The process of inflation targeting would permit compliance with criteria if exchange rates did not show significant volatility and interpretation of the exchange criterion could tolerate appreciation of the rate.

Eichengreen tries to solve the issue of whether Mercosul, a trade agreement of Argentina, Brazil, Uruguay and Paraguay, does or does not needs a common currency.[28] Mercosul's history shows significant policy fluctuation. Shortly after its establishment, Argentina created a currency board by the Convertibility Plan of 1991, lowering inflation and fixing the exchange rate. Argentina's real exchange rate was overvalued relative to that of Brazil, causing a large deficit in the bilateral trade account between Argentina and Brazil. In 1992, Argentinean authorities imposed trade restrictions. The Real Plan in Brazil in 1994 caused a decline of inflation and overvaluation of the Brazilian currency relative to the Argentinean. After difficulties in the bilateral trade account with Argentina, Brazil imposed trade and credit barriers to limit Argentinean imports. In the recent crisis, Argentina has used new trade and tax restrictions to prevent deterioration of its trade account with Brazil.

Eichengreen concludes that trade agreements survive disturbances such as those of Mercosul, with growing trade relations, but influenced by exceptional conditions such as a low initial level of trade, accelerated growth in the period after economic plans and growth of world output and trade. However, in 1998 Eichengreen foresaw the current difficulties, finding that the soundness of Mercosul would depend on the macroeconomic policies

and performance of members. There is a need to examine the possibility of convergence of macroeconomic and exchange policies. In fact, there have been proposals of a common currency for Mercosul.[29]

Eichengreen analyzed three points of view on the relation between exchange rates and integration of countries, relevant to Mercosul:

- The European Commission argues that volatility of exchange rates disturbs foreign trade and integration, making price comparisons difficult, requiring an expensive hedge and reducing intraregional trade. However, Mercosul can coexist with floating exchange rates, experiencing trade growth among members, but admittedly lower than trade among regions within countries
- Exchange rate volatility increases sectors of trade that antagonize powerful interests against trade agreements, creating a lobby for bilateral trade and tax measures, which has been the case in Mercosul
- NAFTA experience shows that exchange rate flexibility among members, Mexico, Canada and USA, can result in growth of trade. The success of a trade agreement is compatible with flexible exchange rates

According to Eichengreen, the choice of exchange rate regime and, therefore, a single currency, depends on the type of treaty envisioned by members. A trade agreement without tariffs among members, as in NAFTA, can coexist with flexible exchange rates. However, deeper integration as in the European Union, with open internal markets and wider competition across frontiers, encounters difficulties with exchange rate volatility.

Exchange rate anchor

Consider a country implementing inflation control. A key precondition is fiscal balance, that is, controlled public deficit. The nominal exchange rate could be an inflation anchor. Fixing the nominal exchange rate could establish a ceiling on tradable goods. Because of the historical identification of devaluation with inflation, fixing the nominal exchange rate would contribute to breaking inflationary expectations. The proposal of an exchange anchor became popular throughout Latin America, influencing stabilization programs in Argentina, Mexico, Chile and Brazil.

There are various difficulties with the exchange rate anchor. In practice, in Latin America, an argument that depends on controlling the public deficit as a prerequisite is suspect. That is, the government will fix the exchange rate with a large and growing fiscal deficit. To the extent that the deficit causes price pressure there will be a need to change the exchange rate regime with all resulting costs, among of which is a large trade deficit. Eliminating the trade deficit would conflict with fixed exchange rates, especially in countries

with diversified exports competing in world markets, such as Brazil and Mexico.

There would be a lag in the impact of prices on other economic variables even after eliminating the deficit. To the extent that increases in prices and wages in prior periods influence current price formation, there will be certain inflation, loosely called "inertial." Therefore, there will still be inflation after fixing the exchange rate, causing loss of competitiveness of exports and an incentive to imports and foreign indebtedness. Correction of problems would require a change in the exchange regime by devaluation. Therefore, exchange rate flexibility would have significant advantages over fixed rates, avoiding adverse effects and lack of credibility of the authorities because of the abrupt adjustment of exchange rates.

The anchor model hides an important assumption: a world of nearly perfect stability, without crises in other countries or exogenous shocks. Naturally, crises and exogenous shocks occur periodically. Relations in Mercosul between Brazil and Argentina clarify the difficulties of the anchor with almost laboratory controls. Mercosul functions, more or less, when there is no crisis in Brazil, in Argentina or in the rest of the world. The large number of possible events and their combination reduces the probability of a lack of exogenous shocks that could affect Mercosul. Devaluation in Brazil reduced exports by Argentina to Brazil. In any crisis, Argentina adjusted effective exchange rates with trade and tax instruments, thus failing to maintain the effective exchange rate legal parity relative to the dollar. The competitive devaluation around the world following the Asian crisis constituted an important factor in Brazil's exchange rate crisis, revealing weakness of policy in 1998 and devaluation in 1999.

Asia provides a typical case of exogenous shock. An important aspect of the external crisis consists of fixing the exchange rate relative to the dollar during a prolonged period. The Asian Five crisis countries–Thailand, Philippines, Indonesia, Malaysia and Korea–trade mainly within Asia and directly, and in competition, with Japan. Combined exports of East Asia and Southeast Asia totaled $789 billion in 1995, of which $175 billion was to Japan and another $305 billion within East Asia and Southeast.[30] Therefore, 54 percent of Asia's trade was within the region. Fixing exchange rates relative to the dollar benefited Asia while the yen revalued relative to the dollar. That is, after appreciation of the yen relative to the dollar, the Asian Five currencies fixed to the dollar devalued in relation to the yen, making those countries more competitive versus Japan. Thus, yen prices of the Asian Five declined. Devaluation of the yen relative to the dollar was a basic aspect of the external crisis. The contrary effect happened: yen prices

of the Asian Five increased. Japan became an important competitor at home and in other Asian markets.

The Asian Five operated with low profit margins and debt to capital ratios that reached 400 percent in Korea. A large oscillation of Japan's exchange rate had a major impact on the export profitability of those countries. To survive heavy leverage, the Asian Five needed accelerated growth of exports. Exports of the Asian Five grew at average rates above 12 percent in 1990–96. Feasibility of export activity with low profit margins and heavy leverage required rapid growth. Debt quality weakened with generalizing expectations of lower growth.

Any external shock, such as deterioration of terms of trade or reduction of capital flows, causes need for adjustment. In a fixed nominal rate regime, adjustment by tighter monetary and fiscal policies causes the decline of production and employment. The impact of adjustment on the internal economy magnifies when there are high fiscal deficits relative to GDP, as 7.4 percent in Russia and 8 percent in Brazil during the crises in 1998–99. Fixing the exchange rate in Argentina likely contributed to maintaining the economy in recession by half a decade. For outsiders, it is surprising how authorities persuaded the population to accept internal deflation, with its recessive implications, as the only avenue of adjustment given the untouchable nature of the exchange regime. Evidently, the population had not forgotten the consequences of inflation and its joint occurrence with devaluation.

The nominal exchange rate anchor of inflation creates a species of moral hazard. Exchange rate stability creates the illusion of absence of exchange rate risk. Foreign indebtedness increases without the full discipline of calculation of true risks and returns of foreign loans. A commitment to fixed rates generates the conviction that authorities will bail out debtors too big to fail and with political influence. In Brazil, and in other countries, authorities created the fear that devaluation would result in return of hyperinflation, creating an expectation that did not materialize.

Technically, the equilibrium exchange rate should eliminate the current account deficit when there is no internal inflationary pressure. In practice, any fixed nominal exchange rate must be identical to the equilibrium rate. Even in this ideal case, any displacement of equilibrium caused by an external shock, such as deterioration of terms of trade, would require compensatory adjustment of the nominal exchange rate to prevent a resulting current account deficit. However, the monetary regime fixed the exchange rate. Adjustment proceeds through quantity contractions of production and employment and not by changes in relative internal to external prices. Many economists dispute this proposition.

Economists have not been able to verify empirically economic theories and much less estimate equilibrium prices such as those of exchange rates. However, there are numerous efforts to measure overvaluation of currencies. Research on purchasing power parity gave way to econometric models that estimated equilibrium exchange rates with a single equation. Unfortunately, models do not agree, generally, on overvaluation for a specific country. The equilibrium exchange rate and the derived concept of overvaluation are still not operational for policy (and trading).

After the disaster with nominal fixed rates, there were attempts to rescue theory and policy with warnings that the fixed exchange rate should occur only during a brief initial period of the inflation control program. Benefits would consist of breaking expectations and placing a ceiling on tradables to limit domestic inflation by external inflation. In this change of course of the theory, the fixed anchor exchange rate should retire, like heavyweight pugilists, during the peak of success, when external accounts were in equilibrium, capital flows normal and inflation subdued. Much as freely fluctuating rates, this is just a theoretical assumption. Naturally, coincidence of internal and external equilibrium constitutes extremely rare behavior in practice, especially after emerging market twin crises requiring deep adjustment.

If there is an adjustment by tight monetary and fiscal policies, there is no need to fix the exchange rate. It appears more effective to assign flexibility of the exchange rate to attain external equilibrium and use monetary and fiscal policy to ensure internal equilibrium. However, the proposal of an anchor departs from the assumption that monetary authorities in emerging countries are not capable of designing and implementing sound policy. An anchor would force adjustment institutionally. If there is such an institutional weakness, a country could never abandon an anchor.

The theory of exiting a nominal exchange rate anchor postulates that the curve of private costs is positively sloped relative to time and that of private benefits negatively sloped.[31] The ideal timing for abandoning the anchor is at the intersection of the curves. However, there is a parallel curve of social costs above the private cost curve and another of social benefits parallel and below that of private benefits. Therefore, the ideal timing for abandoning the anchor would be at the intersection of the social cost and benefit curves, occurring before that of private curves. Here again abstract theory is not operational. There is significant difficulty in specifying when to abandon the anchor. The longer the period of fixed rates that authorities use to break expectations, the more difficult it is to abandon the anchor because of the accumulation of liabilities in foreign currency. Expectation of devaluation would eventually develop, compromising the exchange regime.

Theoretically, central banks would require a model of general equilibrium of the internal economy linked to one of the global economy. Estimation of the equilibrium exchange rate would permit fixing the nominal rate. However, after a significant exogenous shock it would be impossible to measure the equilibrium exchange rate again because the fixed exchange rate would prevent its measurement.

An anchor with slow devaluation, as in the Real Plan of Brazil, suffers from similar difficulties. Adjustment of a slowly moving exchange rate becomes a difficult art, requiring that authorities interpret the empirical behavior of numerous variables. Flexibility could reduce errors and their consequences.

Sudden stop

Guillermo A. Calvo and Carmen M. Reinhart developed the important analysis of "sudden stops" of international capital flows and their financial repercussions in a number of essays.[32] The name originated in an expression by a banker, that what hurts is not speed but a sudden stop, quoted by Dornbusch.[33] Abrupt interruption of capital flows forcing immediate adjustment of the balance of payments, with disastrous effects on output, characterized twin crises in the past ten years.[34]

Calvo departs from a basic identity of national accounts in a non-monetary economy:

$$KI = CAD \tag{5.1}$$

or capital inflow, *KI*, equals current account deficit, *CAD*. For both a monetary and nonmonetary economy:

$$CAD = Z - GNP = Z^* - GDP - NFTA \tag{5.2}$$

where Z is aggregate demand, Z^* aggregate demand of tradables, *GNP* gross national product, *GDP* gross domestic product of tradables and *NFTA* net transfer of factors abroad.

Capital inflow during a period, increase in *KI*, results in increase of the current account deficit, *CAD*. A sudden stop of net capital inflow consists of contraction of *CAD* and in most cases reversal to surplus, in a very short period. Decline of demand for tradables, without decline of output, can accommodate decline of *CAD*.

In practice, given an exchange rate, decline in demand for tradables occurs with decline of nontradables, $Z-Z^*$. In the flexible exchange rate

regime, the ratio of price of nontradables to tradables declines. Loans with a collateral of nontradables, such as real estate, experience debt service problems because of decline of value of collateral. There is an incentive to default when the collateral drops below the present value of loans.[35] The banking sector may experience stress.

Calvo postulates that the contraction effect of the current account on the economy will be more pronounced the higher the share of consumption goods in total expenditure and, especially, on aggregate demand for tradables. He assumes that consumption of tradables is more intensive in labor than investment in nontradables. This assumption originates in the productive structure in Asia of light consumer goods intensive in labor. The higher the share of consumer goods in tradables, the higher the reduction of nontradables resulting from lower demand for tradables. Therefore, the higher will be the devaluation or decline in price of non-tradables. Decline in price of nontradables depreciates loan collateral, such as real estate, deepening banking sector difficulties.

In a monetary economy:

$$KI = CAD + RA \tag{5.3}$$

where RA is accumulation of reserves per unit of time. Almost all results are still valid. In this case, reserve accumulation can accommodate a lower capital flow, which in practice rarely occurs, especially in emerging market countries.

The Fisherian transmission channel can create serious difficulties, according to Calvo and Reinhart. Financial contracts are contingent on a few states of nature, such as terms of trade, profits, demand, etc. Bank debt service occurs in installment payments. Analysis departs from an initial regime of fixed exchange rates with prices of tradables exogenous and constant over time. A sudden stop causes decline of demand and deterioration of prices of nontradables in relation to tradables.[36] Since the interest rate does not change during a sudden stop, real interest *ex post* paid by producers of nontradables increases, causing a higher number and value of past due loans. Devaluation softens the adverse impact because prices of nontradables need not fall. However, devaluation is less effective because of the widespread dollarization in emerging countries. There are dollar-denominated debts even in cases of light dollarization.

Loan maturity occurs before project completion. Interest rate increases on renewal of loans cause difficulties in companies and, consequently, in banks. Banks in difficulties reduce their loans so that even sound projects do not receive financing because of adverse selection.[37] Economic conditions

worsen without immediate hope for recovery because of a breakdown of financial intermediation.[38] Banks provided loans in the expectation of stability of relative prices of nontradables to tradables. Deterioration in the terms of trade, price of nontradables to tradables, generates nonperforming loans and bank difficulties. Calvo and Reinhart provide a link between exchange crisis and its impact on the financial sector through balance sheet effects.

Dollarization of liabilities, according to some arguments, originates in moral hazard partially caused by excessive confidence in the fixed exchange rate regime. Flexibility would cause better risk control discipline, avoiding the excessive indebtedness in the foreign currency. Professors Calvo and Reinhart dispute this argument. Most emerging markets begin from a situation of high dollar liabilities and there are few cases in emerging countries when exchange volatility does not create difficulties. Partial dollarization increases costs of exchange volatility, through the Fisher channel, that motivates the central bank to intervene in the market to avoid fluctuations of the nominal exchange rate, fear of floating, which in turn causes more dollarization of assets.

Traditional theory would advise a floating exchange rate for adjustment to real shocks and fixed exchange rates in other cases. However, shocks to emerging market countries originate in capital flows mixing real factors with others.[39] Fisherian analysis suggests a concern with relative price volatility and the real exchange rate and not only with output volatility.

Calvo and Reinhart criticize traditional theory that devaluation promotes external balance with few effects on output and employment. Consider an economy with two sectors, coffee and electronics. Productive resources, including labor, are not homogeneous, as in classical theory. In a short to medium-term period, coffee workers cannot transfer to production of TVs. If coffee price declined 20 percent, given wages, maintenance of coffee sector employment would require 20 percent devaluation. In turn, devaluation would cause excess demand in electronics and resulting inflation. Devaluation consists of a process of political conciliation among groups of diverse and conflicting interests. According to Calvo and Reinhart, a fiscal policy consisting of subsidies to labor could provide effects similar to real devaluation. Therefore, extra degrees of freedom claimed for exchange rate flexibility are fictitious or are attainable by fiscal policy.

Balance sheets of government, corporations and individuals

Analysis of balance sheets of the public sector, the financial sector and the private sector constitutes part of the foundation of the model of emerging

crises and international financial policy.[40] A policy implication of this analysis is that flexible exchange rates would protect an economy from foreign exchange exposures, softening external shocks. However, traditional emphasis on sound fiscal policy and, thus, government balance sheets, is still quite valid. In fact, there is no exchange regime that would protect an economy from balance sheet effects with weak fiscal and monetary fundamentals. Balance sheet analysis is becoming an extremely important element in crisis prevention. For this purpose, the Fund encourages timely disclosure of information needed for economic policy and to determine realistic prices of financial assets. Experience of many countries suggests prudence in dollarization of financial assets.

The literature on finance is revealing but abstract.[41] Practical experience also provides interesting insights. High leverages characterized emerging market crises. To be sure, high leverage occurred in mature countries, causing financial crises. For example, in the 1970s and 1980s, real estate in the United States used imprudent leverage resulting in banking difficulties. High tech "exuberance" in stock prices coincided with venture capital financing to projects without sound cash flow and eventual loss of investor resources. A similar phenomenon occurred in Japan, China and emerging Asia. Credit to emerging markets before the 1982 moratorium, based on the Wriston approach of diversification, consisted of excessive debt that would cause illiquidity during a market event.

The Asian crisis revealed dramatic leverage in corporations and real estate. Debt to capital ratios in the Asian Five exceeded 100 percent in all cases: 518 in Korea, 310 in Indonesia, 250 in Thailand, 160 in Philippines and 150 in Malaysia.[42] Excessive leverage and dependence on short-dated funds accentuated capital flight and rounds of devaluation. China and Japan also relied on excessive leverage. In fact, after every period of rapid growth or long prosperity, debt to capital ratios are commonly high. Enronitis is much more the consequence of a prolonged boom than widespread institutional weakness.

There are two types of social costs resulting from balance sheet deterioration because of excessive leverage. There are bailout costs of the banking sector and, in addition, loss of GDP that countries could have produced but did not because of the banking crisis. Measurements by the IMF are dramatic. Cleaning bank balance sheets had costs of 55 percent of GDP to Argentina 1980–82, 41 percent to Chile 1981–85, 15 percent to Mexico 1994–95, 31 percent to Uruguay 1981–84 and 17 percent to Venezuela 1994–95.[43] However, the list of costs includes mature economies: 5–7 percent to the USA 1984–91, 10 percent to Finland 1991–93, 4 percent to Norway 1988–92, 17 percent to Spain 1977–85 and 5 percent to Sweden 1991–93. It

is still early to estimate bank-restructuring costs to Japan, but 16 percent of GDP is only a minimum. Mismanagement of bank balance sheets is not a monopoly of emerging market countries. Many mature economies suffered similar episodes of exuberance–to borrow Greenspan's term for the high tech bubble–in bank loans. Weakness of balance sheets, and resulting adverse selection, magnifies vulnerabilities.

Capital is scarce in a developing economy. There are few sources of long-term capital. Because of these characteristics, corporate balance sheets show significant short-term debt to banks. Fiscal policy is limited and works slowly. Approval of fiscal measures by Congress is slow because of unpopularity of taxes and expenditure reduction. Tight monetary policy increases interest rates during the initial reaction to a crisis in an effort to prevent capital outflow and devalue the currency. Short-term debts in corporate balance sheets restrict tight monetary policy. Debtors try to influence government to avoid losses and even bankruptcy. Pressure builds on easing monetary policy and preventing unemployment. Eventual increases in interest rates deteriorate balance sheets, contributing to another round of capital flight and pressure on reserves and interest rates.

There is a period of exchange stability before a crisis. Forecasts extrapolate the past trends of stable exchange rates into the future. Loans in hard currency using extrapolations of stability of exchange rates are cheaper and with terms longer than in the local currency. Corporations carry heavy foreign currency debt. There are liabilities with costs in foreign currency mismatched with assets and revenue in local currency. Real estate loans were a shocking experience in the Asian Five.[44] Collapse of the local economy and asset values of corporations coincided with devaluation, strangling corporate balance sheets. High leverage in foreign currency magnified emerging market crises.

Bankbooks may contain mismatches that combine with leverage to create major difficulties. To the extent that banks hold long-term assets, repricing of funding at higher interest rates can cause funding losses. Bankbooks can have currency mismatches, which appears less probable. However, local banks can carry foreign currency debt causing exchange rate risk if not matched with assets denominated in a foreign currency.

Government can create net exchange positions that could compromise fiscal policy. Government and related entities contract loans in foreign currency to finance long-term projects, sometimes with the hidden objective of financing balance of payments deficits in the current account. Many governments also issue assets denominated in foreign currency to place them in local markets with the objective of diminishing fear of devaluation. Crises cause pressure on exchange rates. Every percentage point of

devaluation can increase the public deficit significantly. The internal debt consists typically of short-term securities. In short, balance sheets of government can incorporate sensitivity similar to that of corporations: devaluation and increases in interest rates increase the local currency counterpart of the deficit, causing pressure on government financing.

Balance sheet effects characterize financial crises in all types of countries in various historical periods. The world's two largest economies, the United States and Japan, which together produce 40 percent of global output, experience adverse balance sheet effects. The United States wasted 7 percent of GDP in a bailout of savings and loans institutions and Japan cannot help its banks recover. Leverage appears adequate and profitable until events reveal insolvency. However, highly leveraged balance sheets with complex mismatches constitute important determinants of the vulnerability of a country and of its response to crises. Authorities must devalue and increase interest rates to adjust the current account, but devaluation may bankrupt companies, cause unemployment and increase the public deficit. Balance sheet effects constitute a link between exchange and local financial crises.

Hard fixes

Proposals of hard fixes contemplate two regimes: currency board and dollarization. Alleged advantages consist of credibility, transparency, low inflation and monetary and financial stability. If there were a relation of country risk to exchange rate volatility, cost of loans would be lower. Capital flows and economic growth would increase. Financial intermediation would develop internally.

Credibility of hard fixes depends on various factors:[45]

- Budget balance, since deficits can increase demand, causing growing current account deficit. External adjustment would require contraction of income and prices, which would conflict with fiscal balance
- Lender of last resort function, provided by a central bank in other regimes, which authorities would have to delegate to other institutions
- Banking sector requires an uncommon soundness to avoid crises, which authorities can achieve with prudent supervision, high liquidity requirements in banks or entry of foreign banks in the internal market
- Currency board must maintain reserves in excess of the monetary base

If rigidity of prices and labor markets characterizes the internal economy, adjustment to external shocks under hard fixes would cause internal recession and unemployment. Mundell's OCA Keynesian model would suggest flexible exchange rates. Authors such as Calvo and Reinhart criticize the factor homogeneity implicit in those models, with their example

of *gauchos* and nuclear scientists (adapted to coffee workers and electronics workers above). Conciliation of policy required for devaluation would cause conflicts, suggesting hard fixes.

A currency board permits a country to retain its national currency but abandons the capacity to implement independent monetary policy.[46] Central banks normally increase or reduce their assets in local currency to manipulate domestic interest rates through bank liquidity. In the currency board, international reserves guarantee the monetary base. The monetary authority does not have assets in local currency to conduct monetary policy. The board has a legal commitment to exchange reserves in foreign currency for assets in local currency at a fixed exchange rate. Private domestic agents, and not the board, affect internal liquidity. Similarly, the board does not provide functions of lender of last resort.

There are two reasons to establish a currency board. Financial history suggests that a central bank constitutes a source of instability by financing public deficits. Therefore, automatic monetary policy by currency board mechanisms, without lags and in appropriate amounts, can substitute for precarious authorities.

The bipolar view provides the second reason. If a country desires a fixed exchange rate regime, it will require an institutional framework that has definitive credibility.

Dollarization has the advantage that there is no need for a new currency as in abandoning the currency board. The board allows for receipt of interest on reserves. Dollarization requires purchase of all national money with reserves, with the country not receiving interest.

Haussmann argues that there are no capital and long-term debt markets in emerging countries with a troubled financial history.[47] Because of exchange crises, interest rates are high and show high volatility. Dollarization *de jure* permits development of internal financial markets by eliminating exchange rate and inflation uncertainties. Economic growth without inflation would strengthen.

Feldstein pointed out an important problem of the currency board.[48] Domingo Cavallo, the architect of Argentinean policy, remarked that he never envisioned the currency board as policy forever. Argentina should await the opportunity of stability of its currency to abandon the currency board without difficulty. Feldstein foresaw disastrous consequences in a freely convertible currency if markets anticipated abandoning the Argentinean parity of one to one relative to dollar. Both expectation of the abandoning of the currency board regime and formal legal repudiation caused an unprecedented crisis with strong devaluation in a country heavily indebted in contracts indexed to the dollar. Output declined sharply

under three different presidents in a few months. Feldstein concluded that interpretation of experience suggests that any fixed but readjustable exchange rate regime, including the currency board, eventually results in an exchange crisis.

For Feldstein, dollarization, as in Ecuador, suffers from serious difficulties. Because of structural differences in the dollarized country relative to the United States, a rate of the dollar relative to other currencies that results in equilibrium for the United States causes a deficit in the dollarized country. Interest rates of the dollarized country, adjusted for risk, are identical to those in the United States, and adjust automatically or by policy of the monetary authorities to influence cyclical changes in demand. The dollarized country must abandon the safety net, not being able to create dollars. Thus, authorities do not have instruments to stop runs on banks in expectation of interruption of conversion of bank "deposits" in foreign currency.

According to Feldstein, a country can use five measures to avoid an exchange crisis:

- Float the exchange rate to prevent overvaluation of currency
- Maintain high international reserves
- Maintain reserves in excess of short-term foreign currency liabilities
- Strengthen the internal banking sector
- Restrict excessive debt in foreign currency, principally by the private sector

After a troubled financial history, Argentina adopted the currency board in the Convertibility Plan of 1991 designed by Minister Domingo Cavallo.[49] Inflation collapsed, disappearing in 1996 and reverting to deflation in 1999–2000. Economic growth accelerated 1991–94. However, alleged contagion from the Mexican crisis of 1994–95 caused an internal banking crisis with output declining by 2.8 percent in 1995. Argentina's economy recovered again in 1995–96 to fall in recession in 1998–99, during the Russian and Brazilian crises. Finally, the economy exploded as few countries in crisis, with frequent changes of president and other authorities. During the ten year period of a currency board, Argentina was in recession for practically half the time. Meanwhile, the rest of the world experienced high growth in output and trade except for recession in 1991 in the United States and with delay in Europe.

It does not appear that Argentina reaped the alleged benefits for hard fixes. An alleged benefit would be that elimination of exchange rate risk by creating the currency board would lower country risk, reducing costs of loans and stimulating faster economic growth. In reality, exchange rate risks with high volatility continued through the currency board.[50] Differences

between interest rates of interbank deposits in Argentina denominated in pesos and in dollars measure country risk. These interest rate differentials jumped to 1400 basis points after the Mexican crisis and reached substantial levels in various periods. Spreads of EMBI+ for Argentina rose to high levels with high volatility. One benefit of the currency board would have been the development of internal debt markets with low and stable interest rates. High interest rates with significant volatility, exploding after every exogenous shock, characterized the currency board.

Hard fixes would immunize countries from international crises. Edwards found significant difficulty in creating an appropriate counterfactual. One of many hypotheses could measure contagion by Argentina with and without the currency board. However, theoretical and empirical analysis would encounter major hurdles of specification and measurement. Nevertheless, a shock of one standard deviation of risk spreads for Latin America would cause a significant impact on internal interest rates in Argentina. That country has perennially been in the list of suspicion of contagion, creating the impression that economic conditions and institutions would cause a crisis even without problems in other countries. That is, Argentina did not experience contagion but rather domestic problems. Argentina was always included in the list of countries with probable overvaluation.

Deficits in Argentina rose to high levels. External financing of deficits contributed to foreign debt levels that were probably unsustainable for Argentinean dimensions. Hopeless deficits originating in pensions and structural problems of provinces constitute a factor of increase of country risk. It is valid to speculate that Argentina could stabilize its economy without the currency board by controlling its fiscal shortcomings. Similarly, Buiter's critique of OCA theory on excessive attributes of monetary policy appears relevant in that long-term fiscal disequilibrium results in the lack of control of monetary policy. The currency board framework postulates a budget balance for success, a condition that Argentina never meets.

The currency board and dollarization regimes intend to replace weakness of internal monetary institutions with the automatic mechanism of interest rate increases that guarantee internal and external adjustment. The social costs of adjustment can be expensive, as shown in Argentina. Hard fixes depend on fiscal balance. However, fiscal balance as precondition for anything in emerging countries is not a realistic expectation.

Fear of floating

The bipolar view debate was enriched with the proposition of fear of floating by Calvo and Reinhart.[51] These authors contend that perfectly

flexible exchange rates exist only in the G-3, with interruptions, and then truly only in textbooks. Even the G-3 occasionally manages currencies. There is a significant difference, according to these authors, between what countries intend to do and what they actually do in practice. According to the classification by the IMF, 97 emerging markets fixed exchange rates in the 1970s, 39 in the 1980s and 11 in 1999. Calvo and Reinhart argue that nearly all emerging markets fixed exchange rates in one form or other.

Fear of floating originates in the lack of credibility in an economy with capital mobility. The exchange rate, and not inflation, constitutes the target of the monetary authority in emerging countries. Rapid depreciation of currency undermines the credibility of authorities that, on the other hand, avoid revaluation because it lowers competitiveness. In practice, because of fear of floating, countries cannot permit flexible exchange rates, implementing instead a managed float equivalent to soft pegs.

Calvo and Reinhart point out other causes of fear of floating besides credibility. Rapid depreciation or devaluations with recessions characterize the history of emerging countries. Trade invoices are in dollar values. Default and generalized difficulties of debt characterize exchange rate adjustments. Devaluation creates unfavorable expectations of a country's credit quality, limiting access to markets. The pass through of devaluation to internal prices is stronger in emerging market countries than in the G-3. There is a tendency to fix a ceiling on exchange rate depreciation because of lack of credibility and other factors.

There are various implications to test the theory. Exchange rate volatility should not be high, but volatility of reserves and interest rates should be high in case of fear of floating. If authorities avoid depreciation, the exchange rate would fluctuate in tight bands. However, if authorities used monetary policy for an exchange rate target, interest rate volatility should be high. In addition, there would be positive covariation between interest rates and exchange rates. Management of reserves to restrain exchange rate pressure would result in high volatility of reserves. Consequently, covariation of reserves and the exchange rate would be negative. Volatility of base money should be high. Price decline would cause pressure on the exchange rate if the country exports commodities. There would not be compensatory depreciation of the exchange rate. Authorities would use higher interest rates to maintain the exchange rate within target levels.

Calvo and Reinhart tested implications of the theory of fear of floating with a sample of 39 countries between January 1970 and November 1999 that included 154 exchange systems. They concluded that there were managed floats similar to soft pegs in most alleged regimes of free floating.

The authors conclude that fear of floating had adverse consequences for

emerging countries. Managed floats increased dollar liabilities that result in bank and corporate failures when exchange rates depreciate or devalue. Policies can also be procyclical. High interest rates restrict internal economic activity causing economic contraction. High volatility of interest rates in emerging countries with managed floats prevents efficient allocation of resources.

Work by Caballero and Caballero and Krishnamurthy identifies two important characteristics of emerging markets: weak links with the private international financial sector and underdevelopment of the domestic financial sector.[52] Caballero distinguishes between international financial liquidity that borrowers in the emerging market can pledge in intermediation of loans and domestic financial liquidity that borrowers can use as collateral in domestic loans. Because of fear of floating on mismatched balance sheets, once a sudden stop occurs, the monetary authority prevents adjustment via exchange rates with adjustment by increasing interest rates. That is, monetary policy during sudden stops is procyclical. In addition, the government cannot fund in international markets and increases its funding in the domestic market, further magnifying the squeeze on domestic activity. During the sudden stop, there is relatively little international financial liquidity. Domestic borrowers do not have "insurance," that is, they do not have credit to bridge their projects to the future. There is a decrease in prices of nontradables used as collateral in local loans. There is further deepening of the domestic crisis. Moreover, adverse selection prevents the economy from recovering.

Caballero proposes that central banks avoid defending currencies during sudden stops with higher interest rates. The policy should begin during booms of foreign financing. The central bank should acquire abundant international financial liquidity with issue of bonds. Ideally, the exchange rate regime should be a flexible exchange rate with medium-term inflation targets on nontradables and active management of reserves. During sudden stops, the central bank would provide international financial liquidity, contributing to smoothing the impact of the crisis. In addition, policy would be counter cyclical, avoiding increases in domestic interest rates, which would require tolerance with the inflation target. Success of this policy in practice requires a credible and autonomous central bank. In the long term, structural change would consist in deepening the financial sector.

Fluctuating exchange rate with inflation targeting

A floating exchange rate allegedly would not function in emerging countries because of high exchange rate volatility resulting from exports of commodities and light manufactures. In addition, there are no reliable institutions to formulate and implement monetary policy in the inflation targeting process. According to the theory of fear of floating, there would merely be a managed float with adverse effects on the economy.

The argument of lack of institutions for most countries of Latin America does not have merit in all countries at all times. The Banco de México [53] and Banco Central do Brasil[54] implement regimes of a fluctuating exchange rate with an inflation targeting processes. Results approximate the state of the art in these fields. Chile pioneered it even earlier.

One case, that of Brazil, illustrates how inflation targeting with flexible exchange rates (IT) functions in an emerging country. Brazil implemented its inflation target framework in mid 1999, less than six months after floating the exchange rate on January 15, 1999, by a central bank board that took office on March 4. Designers of the framework recognized that the quantitative input in the form of economic models was only a guide to organize judgments for policy decisions.[55] An immediate problem of the new board of the BCB was inflation resulting from depreciation of the real from 1.21 per dollar before floating to 1.91 on average in February. Wholesale prices rose 7 percent in February and consumer prices increased 1.4 percent.

The main objective of IT was to create a monetary anchor of inflation. Separately, authorities tightened fiscal adjustment and wages in the public sector. The BCB created a research department focused on IT consisting of 14 members. The research department established key relations with the Monetary and Exchange Affairs Department of the IMF and with the Bank of England.

Brazil adopted IT with Decree no. 3088 on June 21, 1999. The National Monetary Council sets inflation targets based on a proposal by the Minister of Finance. Accordingly, the BCB has the responsibility to implement policies to attain targets. It meets targets when inflation in the calendar year falls within tolerance intervals. When the BCB does not meet targets, it sends an open letter to the Minister of Finance explaining the reasons why it failed to meet the target, specifying measures to maintain inflation within tolerance levels and the period of time required to complete adjustment. Consequently, the BCB will issue a report on inflation explaining IT, monetary policy and inflation outlook. The National Monetary Council

chose a broad measure of consumer prices, IPCA, as the reference index for IT.

Brazil established a Committee on Monetary Policy (COPOM) on June 20, 1996, to set interest rates and determine guidelines of monetary policy.[56] The objective was to provide greater transparency to monetary policy with a process similar to the Federal Open Market Committee of the United States and the Central Bank Council of Germany. In 1998, the Bank of England established its Monetary Policy Committee. Decree 3088 of June 21, 1999 established "inflation targets." COPOM sets the target for the average rate on overnight sale and repurchase agreements, Selic, that the BCB will maintain in the period between meetings. However, COPOM issues a bias for that rate allowing the President of the BCB to change it at any time between meetings.

COPOM meets every month according to a calendar of meetings announced at the end of October of the prior year. The members include the President of the BCB and its eight directors. On the first day of meetings, chiefs of various departments make presentations on the domestic economy with evaluation of trends and expectations of inflation and macro variables. On the second day, members of COPOM make suggestions on monetary policy and the level of interest rates. Once COPOM makes a final decision on Selic and bias, if any, it provides a note to the press and informs of the decision through the information system of the BCB. COPOM releases minutes eight days after the meeting. COPOM publishes a quarterly *Report on Inflation* in Portuguese and English, which is a highly useful source of information.

The BCB consulted the Bank of England on the quantitative framework for IT. There were four relations in the initial framework:

- An equation with output gap as a function of its own lags, real interest rate and real exchange rate
- A Phillips curve with the rate of inflation as a function of its own lags and leads, output gap and the nominal exchange rate with long-term neutrality condition
- A relation of the interest differential of foreign and domestic interest rates with the expected rate of devaluation of Brazilian currency, the real, and risk premium
- Interest rate rule

An important issue in the case of Brazil is the pass through of exchange rates to domestic inflation. The BCB started with four alternatives in its simulation kit. Belaisch finds weak response of inflation of consumer prices to exchange rate volatility in Brazil.[57] Pass-through in Brazil is consistently low. Depreciation in 2001–2, originating in the decline of international

capital flows and domestic events, failed to affect inflation. Moreover, pass-through is rapid, lasting two quarters. Estimates show that 6 percent of an exchange rate shock passes to consumer prices within one quarter and 17 percent after a year. Prices of tradables do show pass through, with 30 percent in a quarter and 100 percent after a year.

Belaisch explains low pass-through in terms of a few factors. Firms prefer to lower margins to maintain volume instead of passing on costs to consumers. Brazil has a diversified economy with numerous import-competing goods. Nontradable prices and wages adjust slowly. Brazilians believe depreciation to be transitory.

Fraga and Goldfjan depart from the principle that inflation control is the target of monetary policy.[58] There is one instrument, monetary policy, for one target, inflation control. Economists tend to agree that monetary policy cannot influence long-term output, determined by factors of productivity, including technology. Fixing or soft peg of the exchange rate, as in Brazil before 1999 and in Argentina in the 1990s, can act as an anchor of inflation, as discussed above. Many central banks use interest rates as the instrument of inflation control.

Brazil implemented inflation targeting in less than six months after fluctuating the exchange rate in 1999. The government announces inflation targets for the current and future years. Transparency is critical to inflation targeting to avoid creation of adverse expectations. The central bank releases detailed minutes a week after meetings to decide interest rate policy. It also provides quarterly inflation forecasts. In Brazil, the central bank surveys expectations of 100 market participants and publishes the results.

Inflation targeting requires advanced technical input. However, Brazil blended technical excellence with seasoned market experience to take decisions that mark central banking from 1999 to 2002 as an important event. In that period, Brazil recovered from an exchange crisis resulting from the soft peg in 1998–99 and steered out of the loss of market access during the election of 2002. Small deviations from policy could have caused fluctuations in confidence and an external crisis.

During the period of inflation targeting in 1999–2002 relative to earlier practice in 1994–99, volatility of inflation, quarter on quarter, declined from 0.9 to 0.4 while volatility of output decreased from 3.2 to 1.5. Average inflation in 1996–99 before inflation targeting was 10.3 percent, declining to 5.8 percent during inflation targeting 1999–2002. Growth of GDP increased from an average of 2.0 percent before targets to 2.4 percent after targets, and the domestic interest rate declined from 35.4 to 18.0 percent. Inertial inflation, or carryover from past periods, declined from 0.6 percent per month to 0.4 percent. Moreover, Brazil managed to recover from one crisis

in 1999 and to avoid another crisis in 2002, without major disruption of the economy and institutions. Maintenance of confidence in the process is essential to maintaining inflation under control, in turn critical to avoiding crisis in Brazil.

There is no theoretical and empirical verdict on the advantages of a fixed rate exchange regime versus flexible exchange rates with inflation targets by monetary authorities. Historical debate focused on elasticities in international trade and the role of speculators in exchange hedge markets.

Professors Guillermo A. Calvo and Frederic S. Mishkin raised the debate to a high point–although they have assumed different views–underscoring the key importance of institutional weaknesses and required reforms in emerging countries.[59] The choice of exchange rate regime is less important than institutional reform to strengthen and protect countries from fragilities that cause exposure to twin crises.

Fiscal fragility characterizes emerging countries. Lack of responsibility in expenditures and taxes generates the possibility that the national currency may lose its property as a unit of measurement. There would be a flight to substitute assets such as foreign currency, causing an exchange crisis. There is no long-term mismanagement of monetary policy without a continuing public deficit that authorities finance with money creation. The highest priority of economic policy is fiscal stability, acting on both expenditures and revenues.

Fragility of financial institutions and imprudent supervision and regulation prevent exchange stability in any regime. An unsound financial system restricts monetary policy in the form of increases in interest rates. Control of monetary authorities by the government generates serious problems of moral hazard, creating conditions for an international financial crisis after any exchange market event. The Asian crisis of 1997–98 is quite revealing. Moral suasion by governments induced financial institutions to lend to unsound projects, thus creating a fiscal deficit in the implied subsidy of future bailout of financial institutions. Adverse selection undermines financial intermediation, preventing recovery of the economy.

Impaired credibility of monetary institutions deepens financial crises. Perceived risks of deposits in the national currency may rise because of deterioration of the image of banks, causing substitution of national currency. Unsound leverage generates a link between the exchange crisis and the international financial sector, preventing effectiveness of monetary policy.

Dollarization of liabilities magnifies the vulnerability of the internal financial sector to crisis of the balance of payments. Loans in foreign currency may appear attractive initially because of longer maturities and

deceiving lower rates. However, effective rates in the national currency depend on the stability of the exchange rate. In most crises, there were significant exchange exposures in balance sheets of government, companies and individuals. When the balance of payments deteriorates, there is no way to avoid an internal financial crisis. Countries must avoid excessively leveraged mismatches in currencies and terms.

Exposure of capital flows to sudden stops increases the propensity of emerging countries to twin crises. Prudence in internal leverage should parallel prudence in foreign indebtedness. Most countries showed large trade and current account deficits before crises. Countries must follow open trade policies, increasing the competitiveness of their activities in global markets.

These five fragilities of emerging countries restrict application of flexible exchange rates with inflation targets. They also restrict use of super fixed exchange rates. Debate focused constructively on problems that affect both regimes. However, Mishkin argues that flexible rates with inflation targets perform adequately in at least two emerging countries, Chile and Brazil. Chile is the older and more successful case. Between 1991 and 2002, Chile lowered inflation from 20 to 2 percent while the economy grew at an average annual rate of 6 percent. Chile implemented flexible rates with inflation targets together with fiscal discipline, in the form of a surplus of 1 percent of GDP, strengthening prudential supervision and regulation of the financial system, with an autonomous central bank. Nevertheless, there was still some "fear of fluctuation," confirming the approach of Calvo–Reinhart that pure fluctuation occurs sporadically in G-3 currencies and maybe only in textbooks.

Brazil differs significantly from Chile, partly because of its continental dimensions with an internal productive sector that competes in the world trade of manufactures and semimanufactures. In addition, Brazil implemented the exchange regime after financial turbulence and devaluation in 1999. Brazil had large twin fiscal and balance of payments deficits while leveraging mismatches in budgets of government, companies and individuals. The exchange regime functioned adequately since the beginning and even during presidential elections in 2002, coinciding with a major reduction in flows of capital to emerging countries. Moreover, the regime performed soundly in the transition to a new administration. Because of large public debt and leveraged mismatches in balance sheets, there is still a future test if the regime will tolerate another round of substantial depreciation after 2004.

Edwards argues that Mexico constitutes a good example of how to implement a fluctuating exchange rate regime.[60] The regime evolved from

a fixed rate with periodic adjustment, a crawling peg, in 1995,[61] after the Mexican crisis, to a dirty float in 1996 and free floating in 1997. There was no dramatic fluctuation except during the Asian crisis of 1997–98, when the rate reached 10 pesos per dollar in October 1998, above 8 before the crisis.

Edwards compared the peso/dollar exchange rate with fluctuating currencies relative to the dollar such as the deutsche mark, yen, Australian dollar, Canadian dollar, New Zealand dollar and the French franc relative to the deutsche mark. Comparison of volatilities does not show that the Mexican peso was more volatile than other currencies in 1997. In 1999, peso volatility fell to an intermediate level of the group of fluctuating currencies. Edwards concludes on these data that Mexico does not show more volatility than other countries.

Debate focuses on the reaction function of the Banco de México, especially if the exchange rate constitutes the target instead of inflation. The Banco de México affirms that in 1995–99 monetary policy fixed levels of base money on a daily basis at the beginning of the year in accordance with the official inflation target. Announcement of changes in cumulative bank reserves signaled changes. The suspicion is that the Banco de México influenced the exchange rate because there were few changes in policy, in particular none in 1997.

Edwards argues that data show the existence of a reaction function relating the events in the exchange market to fixing of liquidity by the Banco de México. Empirical research shows that the Banco de México tightened base money after certain peso depreciation. However, analysis of data shows only a response of monetary policy to changes in the exchange rate but not support of a predetermined level.

The Banco de México was successful in implementing an augmented Taylor rule including a compensatory policy of exchange rate pass-through to inflation. There was no target of a specific level of the exchange rate, that is, fixing the rate. However, analysis of data alleges that the Banco de México used daily decisions of monetary policy to stabilize the exchange rate.

Empirical research by Edwards shows that Mexico implemented monetary policy in accordance with exchange market events. However, there was no evidence of fear of floating. Correlations between the peso/dollar rate and nominal interest rates of 28-day Treasury bills, CETES, showed strong relation only in some periods. Between November 1997 and May 1998, during the Asian crisis, Mexico showed behavior similar to Australia with a devaluation of 15.4 percent, but stable interest rates, with the correlation being close to zero. There is positive correlation between interest and exchange rates during the Russian crisis in 1998, which occurs

when a monetary authority is sterilizing the impact of depreciation on domestic inflation.[62]

Schmidt-Hebbel and Werner analyzed inflation targeting with floating exchange rates in Brazil, Chile and Mexico.[63] All three countries implemented "dirty" floats, Chile in 1990 and Mexico and Brazil in 1999. All three countries are highly vulnerable to large external shocks and show high volatility of exchange rates.

These authors used a control group of 11 countries implementing floating exchange rates with inflation targeting. All three Latin American countries were closer to target than the control group. In all cases, volatility of output fell after inflation targeting: Brazil 2.8 to 1.8, Chile 6.2 to 3.1, Mexico 3.9 to 1.7 and the control group 3.1 to 2.9.

Calvo and Reinhart argued that exchange rate volatility relative to either volatility of interest rates or volatility of reserves was lower in emerging countries than in industrial countries with floating regimes. Schmidt-Hebbel and Werner qualify for the existence of structural differences among countries: exposure to financial vulnerability, magnitude and frequency of shocks, trade structure, openness and international financial integration. They proposed to measure the evolution of volatility of exchange rates in each country before and after the float to control for structural differences. Results are more conclusive for Mexico and Chile than for Brazil. However, they conclude that absolute exchange rate volatility for the three Latin American countries was lower than for Australia, Canada and New Zealand. Inflation targeting caused a shift of adjustment via the exchange rate instead of interest rates.

The cornerstone of the argument of fear of floating is currency exposures in balance sheets. It is difficult to conceive an economist, and much less a politician, proposing devaluation in Argentina when nearly all liabilities were denominated in dollars. Because of sensitivity to depreciation, authorities could use monetary policy, via increases of interest rates, or reserve management, via reduction of reserves, to arrest depreciation. Fear of floating could lead to large reserves, interest rates increases to prevent depreciation and active intervention in exchange markets. It is critical to measure the pass-through of depreciation, directly by increasing inflation or indirectly because of deterioration of balance sheets. Schmidt-Hebbel and Werner found low pass through in Chile and Brazil.

The effects of depreciation on interest rates are not strong in Brazil, Mexico and Chile. Chile and Mexico did react to fear of floating during emerging market crises but the effects of depreciation diminished. To be sure, all three central banks intervened in exchange markets. In Brazil, the government issued dollar-denominated debt to provide a hedge

because of insufficient credibility of large volumes of hedge issued by the private sector. However, central banks announced and disclosed details of the intervention. Moreover, they sterilized the impact on monetary policy. Schmidt-Hebbel and Werner are careful to warn that results are still preliminary because of the limited period of observation. Evidently, there is no exchange regime that is stable if a country has large external and internal imbalances together with leveraged mismatches in balance sheets of government, companies and individuals. There must be prudence in avoiding this perverse set of vulnerabilities.

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Basel II Capital Accord, Core Principles, Standards and Codes

The yearly G-7 meetings gave impulse to the view that deepening twin crisis could originate partly in deficiencies of internal financial institutions in emerging countries. In a relatively short period, various institutions generated core principles for strengthening standards and codes with corresponding methodology for evaluation.

Table 6.1 shows major institutions active in strengthening the financial system. The Basel Committee[1] contributed the Capital Accord, an Amendment to include market risk, the New Capital Accord, in process of implementation, the Core Principles for Effective Banking Supervision and its corresponding Methodology. Extensive consultations with specialists and supervisors in multiple countries contribute to generating guidelines. Principles remain at a general level to obtain consensus that would lead to implementation by many countries. Regulators issue principles with methodology instructing how to evaluate them in practice.

International institutions of insurance and securities issued standards, codes and their respective methodologies. The Joint Forum extended work to financial conglomerates, compiled standards and codes and compared them for three groups–banks, insurance companies and securities companies. The Committee on Payment and Settlement Systems issued core principles of systemically important systems and recommendations for settlement of securities systems, jointly with IOSCO.

The IMF initiated a process of standardizing and disseminating data, standards for transparency in fiscal, monetary and financial policy and criteria for management of public debt and international reserves. Other institutions, such as the World Bank and OECD, and international associations of accounting, developed standards and codes on corporate governance, accounting, auditing and insolvency.

Table 6.1 Institutions of strengthening financial standards and codes

Basel Committee on Banking Supervision (BCBS)
•Capital Accord (1988) http://www.bis.org/publ/bcbs04a.htm
•Amendment of Capital Accord to Incorporate Market Risks (1996) http://www.bis.org/publ/bcbs24.pdf
•New Capital Accord (2004) http://www.bis.org/publ/bcbs107.htm
•Core Principles for Effective Banking Supervision (1999) http://www.bis.org/publ/bcbs61.htm
•Methodology of Core Principles (1999) http://www.bis.org/publ/bcbs61.htm#pgtop
•Principles for the Management and Supervision of Interest Rate Risk (2004) http://www.bis.org/publ/bcbs108.pdf
International Organization of Insurance Supervisors (IAIS)
•Insurance Principles, Standards and Guidance (2003) http://www.iaisweb.org/358compilation_documentwithrevision53.pdf
International Organization of Securities Commissions (IOSCO)
•Objectives and Principles of Securities Regulation (2003) http://www.iosco.org/pubdocs/pdf/IOSCOPD154.pdf
Committee on Payment and Settlement Systems (CPSS)
• Core Principles for Systemically Important Payments Systems (2001) http://www.bis.org/publ/cpss43.htm
•Recommendation for Settlement Systems of Securities (2001) http://www.bis.org/publ/cpss46.htm
The Joint Forum (BCBS, IOSCO, IAIS)
•Supervision of Financial Conglomerates (1999) http://www.bis.org/publ/bcbs47.htm
•Core Principles Cross-Sectoral Comparison (2001) http://www.bis.org/publ/joint03/htm
International Monetary Fund (IMF)
•Special Data Dissemination Standard, SDDS (1996) http://dsbb.imf.org
•General Data Dissemination System, GDDS (1997) http://dsbb.imf.org
•Code of Good Practices on Fiscal Transparency (1998) http://www.imf.org/fiscal

(Table Cont.)

International Monetary Fund (IMF)
• Code of Good Practices in Transparency in Monetary and Financial Policy (1999) http://www.imf.org/monfintransparency
• Criteria for Management of Public Debt (2003) http://www.imf.org/external/np/mfd/pdebt/2003/eng/am/120903.pdf
• Criteria for Management of International Reserves (2001) http://www.imf.org/external/np/mae/ferm/eng/index.htm
World Bank
• Principles and Criteria for Effective Systems of Insolvency and Creditors Rights (2001) http://www.worldbank.org/ifa/ipg_eng.pdf
Organization for Economic Co-operation and Development (OECD)
• Core Principles for Corporate Governance (1999, 2004) http://www.oecd.org/document/49/0,2340,en_2649_37439_31530865_1_1_1_37439,00.html
International Accounting Standards Committee (IASC)
• International Accounting Standards (2002) http://iasc.org.uk
International Federation of Accountants
• International Standards of Auditing (2002) http://www.ifac.org
Financial Action Task Force on Money Laundering
• Forty Recommendations of FATF on Money Laundering (1996) http://www1.oecd.org/fatf/
• Recommendations on Terrorist Financing (2002) http://www1.oecd.org/fatf/SRecsTF_en.htm

IMF consultations under Article IV of the IMF developed Reports on Observance of Standards and Codes (ROSC). Technicians of cooperating institutions join IMF missions and evaluate institutions. Results constitute part of the Financial Sector Assessment Program (FSAP). This is one of the most important documents on evaluation of a country by the IMF, with copy to its Executive Board. In theory, observance of standards, codes and core principles is voluntary. In practice, divergence of internal institutions from accepted practice by the international financial community could cause hurdles in official financing during crises of liquidity and insolvency. A major effort to unify standards and codes of the G-10 countries was an important consequence of emerging market crises, in particular the Asian crisis 1997–98.

This chapter considers standards and principles developed by

international institutions. Choice of subjects and their interrelation is practical, to show some major programs and their relevance, but not exhaustive, because of lack of space.

Basel Capital Accord

Basel is the location for the headquarters of the Bank for International Settlements and of the Basel Committee for Banking Supervision, which developed the Accord with two objectives.[2] One was to strengthen the stability and soundness of the international financial system. The second objective was to promote a fair and consistent standard applicable to banks in many jurisdictions that would decrease a source of inequality in competitiveness among international banks. Convergence to a global capital standard would attain the objective of equality in competition.

The Basel Capital Accord stipulated minimum capital requirements, which authorities could increase if necessary. The Accord considered only credit risk, suggesting that national authorities incorporate interest and investment risk to determine required capital. It warned that capital ratios constituted only one criterion of banking soundness. Authorities must consider nonperforming loan reserves and asset quality.

Basic capital consists of core capital, equity and disclosed reserves. The Committee adopted this concept because it is common to all countries, convenient to find in published financial reports, important in profit margins, indicative of capacity of a bank to compete and used in capital evaluation around the world.

The Committee determined that capital be divided into two tiers, 1 and 2. Tier 1 consists of core capital, equity plus disclosed reserves obtained from retained profits after taxes. Tier 2 consists of supplementary capital up to the value equal to core capital. Supplementary capital consists of:

- Nondisclosed reserves originating in profit and loss account and approved by supervisors
- Reserves originating in revaluations
- General reserves and reserves originating in loan losses
- Hybrid capital instruments (such as preferred stock)
- Subordinated debt with a minimum original term of five years up to 50 percent of core capital

The Accord simplified risk weights applied to assets in only five percentage categories: 0, 10, 20, 50 and 100 percent. Weights can be zero or low for government debt: 10 percent for all securities or 10 percent for maturities of less than one year and 20 percent for more than one year.

Weights for banks with maturity up to a year were 20 percent, for all

jurisdictions. Debts of banks over one year received 20 percent weight for banks originating in the OECD and 100 percent for banks outside the OECD. The Committee decided to delegate to local authorities determination of weights for national public sector entities (PSE), choosing among 0, 10, 20 and 50 percent, but 20 percent for those originating in the OECD members. Weights for commercial and public enterprises were 100 percent.

There were weights for all groups of assets of banks. The sum of all asset values by their respective weights constitutes bank assets adjusted for (credit) risk. Dividing capital as defined by the Basel Committee by assets adjusted for risk yields the capital standard. The minimum capital requirement by the Capital Accord is 8 percent of assets adjusted by risk, of which at least 4 percent consists of core capital, or Tier 1. The Capital Accord is one of the most prestigious standards in the world. Banks and supervisors in many countries adopted Basel I.

New Capital Accord: Basel II

The Basel Committee announced the Capital Accord in 1988 with an implementation date by the end of 1992. In 1996, it published an amendment to include market risk.[3] The Committee issued consulting work for the New Accord in June 1999 and a second set in January 2001 with a deadline for comments by May.[4] It issued a third consultative paper in April 2003.[5] In addition, it conducted three quantitative impact studies (QIS).[6] The BCBS reached agreement on Basel II at the May 2004 meeting.[7] Finally, it published Basel II, or Framework, in June 2004.[8]

Central Bank Governors and Heads of Banking Supervision of the Group of Ten countries endorsed Basel II in June 2004. The BCBS expects member countries of the Group of Ten to proceed with the implementation of the New Capital Accord. The Basel Committee favors implementation as of year-end 2006. Nevertheless, implementation of more advanced approaches will require further QIS or parallel calculations and may not be available until year-end 2007.

The BCBS expects that Basel II may not be a priority for some countries outside the G-10, which may still benefit from the framework to strengthen their financial systems. The central banks of the G-10–Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States–established the BCBS in 1975. Thus, Basel II will be the standard for countries contributing over two-thirds of world output and for banks accounting for over 75 percent of global banking assets.

The dual objective of Basel II is to strengthen domestic and international

financial stability while at the same time preventing capital requirements from creating competitive disadvantages among banks in various jurisdictions. Since the Capital Accord in 1988, financial institutions have innovated significantly in quantifying and controlling financial risk. Basel II incorporates this reality and intends to promote sounder risk management processes in financial institutions. An important principle in Basel II is to relate capital adequacy regulation to actual financial risks. The New Accord can incorporate changes in risk management through its more advanced approaches to credit, following the industry dynamically. However, some features of the 1988 Accord still remain: the regulatory capital ratio of 8 percent of risk-weighted assets, the 1996 Market Risk Amendment and the definition of eligible capital. Most of the innovation of the New Accord is in the denominator or calculation of risk-weighted assets.

The Committee created an Accord Implementation Group (AIG) to foster consistency in implementation of Basel II. The AIG also serves as a forum for exchange of information on approaches to implementation. This group also bridges communication between the industry and supervisors.

The Capital Accord focuses on a single measurement of risk, credit risk, while the New Accord emphasizes internal methods of banks, reviews by supervisors and market discipline (or transparency in disclosure). The original Accord consisted of a unique standard, applicable to all, while the new standard incorporates flexibility, a menu of approaches and incentives to improve risk management. Original structure resembles a wide brush, while New Accord incorporates greater risk sensitivity.

The New Accord consists of three pillars:

- Pillar I: Minimum Capital Requirements
- Pillar II: Process of Review by Supervisors
- Pillar III: Market Discipline

A method of menus considers each category of risk:

- Menu of Approaches to Measure Credit Risk
  - Standardized approach (modified version of existing Capital Accord)
  - Foundation approach based on internal ratings
  - Advanced approach based on internal ratings
- Menu of Approaches to Measure Market Risk (unaltered)
  - Standardized approach
  - Approach of internal models
- Menu of Approaches to Measure Operational Risk
  - Approach of basic indicators
  - Standardized approach
  - Internal approach of measurement or advanced management approach

The New Accord seeks an appropriate capital approach based on sensitivity standards of risk and internal measurement by banks. New forms to treat credit risk and specification of capital requirements for operational risk constitute the most important changes in capital requirements. The standardized approach, foundation and advanced internal-ratings based (IRB) provide avenues for treating credit risk.[9] The objective is to encourage banks to improve management and measurement of risk, to apply most advanced techniques for risk sensitivity and to determine adequate capital.

The objectives of the New Accord consist of:[10]

- Promoting safety and soundness of the financial system, maintaining existing minimum capital requirements
- Strengthening equality in competition
- Providing a more extensive approach to risk
- Implementing approaches to capital requirements that incorporate sensitivity to degree of risk and bank activities
- Focusing on banks with international operations but applicable to different levels of complexity and sophistication

Because the three pillars constitute an interrelated package, the New Accord requires compliance with all three pillars for definitive implementation.[11] Partial implementation of the pillars would compromise the safety and soundness of the financial system. Supervisors must observe at least Pillar I of minimum capital requirements. As in the Amendment for market risk, the Basel Committee provided an evolutionary process in Pillar I to guarantee sound prudential requirements compatible with incentives and sensitivity to risk. Banks that comply with specified minimum requirements could use risk-sensitive methodologies in calculating regulatory capital.

The New Accord explicitly incorporated more risk elements, quality of debtor credit, structure and maturity of transactions and concentration of obligations. In the internal ratings approach banks progressively use, after complying with minimum requirements, a wide spectrum of internal risk measurements.

Pillar I: Minimum Capital Requirements

The BCBS intends that supervisors apply Basel II to international banks on a consolidated basis. Entities will include a holding company within a banking group to encompass the risk of the entire banking group or entity engaged in banking activities. Supervisors will apply the approach at all levels of a banking group on a consolidated basis. Supervisors will also

assure protection of depositors by requiring stand-alone capitalization of individual banks.

Consolidation includes securities companies, majority owned or controlled by banking groups. For the purposes of capital adequacy, supervisors will deduct equity, regulatory capital, assets and liabilities of nonconsolidated majority-owned securities and financial subsidiaries. There will be similar deduction of significant minority investments in banking, securities and financial entities. Supervisors will also deduct equity and regulatory capital investments in insurance subsidiaries. In certain cases, supervisors may recognize "surplus capital" of a majority-owned or controlled insurance entity. There will be similar deductions for investments in commercial entities above certain materiality levels. Deductions of investments will be at the rate of 50 percent from Tier 1 capital and 50 percent from Tier 2 capital.

Basel II retained the capital ratio and the definition of capital of Basel I. The minimum capital requirement ratio continues to be 8 percent of risk-weighted assets. The following formula measures bank capital ratios:

$$\frac{\text{Total Capital (unchanged)}}{\text{Credit Risk + Market Risk + Operational Risk}} = \text{Capital Ratio (8\%)} \quad (6.1)$$

The denominator of minimum capital requirement consists of three components:

- Average weighted sum of risk for all assets
- Plus 12.5 times sum of capital charges for market risk and operational risk

For example, if a bank has $875 of assets adjusted for risk, a charge of $10 for market risk and $20 for operational risk, the denominator of the ratio of minimum capital requirement equals:[12]

$$\text{US\$875} + [(\text{US\$10} + \text{US\$20}) \times 12.5] = \text{US\$1250}$$

Work by the Basel Committee concentrated on the denominator. Tier 2 capital cannot exceed 100 percent of Tier 1 capital. There were some minor changes. Basel II does not allow inclusion of general provisions (or general loan-loss reserves) in Tier 2 capital. Rules for these provisions depend on calculation of expected loss, EL, a subject covered under the approach below.

The consultations and work constitute one of the most important contributions made to banking supervision, attempting to incorporate practical and technical knowledge of authorities, specialists, academicians

and bankers. The BCBS will review capital ratio calibration before implementation of the framework. It will consider a scaling factor at the time of implementation, perhaps 1.06, to maintain the aggregate level of minimum capital requirements.

Basel II also imposed a three-year transitional floor of capital, based on the 1988 Accord, for banks using IRB for credit risk or the advanced management approach (AMA) for operational risk. If the floor is higher than the calculated capital, banks must add 12.5 of the difference (1/8). The calculation of the floor is as follows:

$$\begin{aligned}\text{Floor} = {} & (\text{adjustment factor})(8\% \text{ of risk} - \text{weighted assets} + \\ & \text{Tier 1 and Tier 2 deductions} - \text{general provisions} \\ & \text{recognized in Tier 2})\end{aligned} \tag{6.2}$$

The adjustment factor is 95 percent at year-end 2006 (or parallel calculation), 90 percent at year-end 2007 and 80 percent at year-end 2008. The calculation of capital is as follows:

$$\begin{aligned}\text{Calculation} = {} & 8\% \text{ of total risk} - \text{weighted assets} - \\ & (\text{general provisions–expected loss}) + \\ & \text{other Tier 1 \& Tier 2 deductions}\end{aligned} \tag{6.3}$$

Banks must add 12.5 times excess of floor less calculation. These transitional floors may prove to be difficult to implement and the BCBS advises that supervisors may apply bank-specific floors flexibly. The objective of the floors is to ensure adequate capital during transition.

The New Accord calculates assets adjusted for risk by two methods: standardized and IRB. The major change in relation to the existing Capital Accord consists of a greater diversification of risk. Originally, the Basel Committee considered as criteria for sovereign assets: the IMF's data dissemination standard, the Basel Core Principles of Effective Banking Supervision and 30 principles of securities regulation by IOSCO. The committee preferred ratings published by credit export rating agencies, encouraging larger number of countries with recognized external evaluation.

The committee advises that supervisors should not permit banks to use risk weights based mechanically on external evaluations. Both supervisors and banks have a responsibility for evaluating methods used by external credit evaluation institutions and quality of ratings. The New Accord determined criteria for eligibility of ratings. Supervisors should avoid criteria to reduce capital requirements that are inconsistent with risk management.

Pillar I: Standardized Approach

The standardized approach intends that banks calculate regulatory capital in accordance with the state of the art in risk management.[13] The objective is to avoid complexity while introducing greater differentiation in banking risk components, including techniques of risk mitigation.

The new approach considers the same asset categories–sovereigns, banks and corporations–but eliminated the origin in the OECD. Table 6.2 shows risk weights. The standardized approach uses external credit assessment for support. This approach basically consists of a revision of the 1988 Accord to improve measurement of risks of assets. National supervisors may apply a lower risk weight to bank exposures to their sovereign (or central bank) denominated in local currency and funded in that currency. Supervisors may approve country risk scores prepared by export credit agencies (ECA) that publish their scores and subscribe to OECD methodology, or ECAs participating in the "Arrangement of Officially Supported Export Credits." Claims on the BIS, ECB and European Community may receive 0 percent weight. Public sector enterprises (PSE) may receive weights according to options 1 or 2 for banks, discussed below. There could also be a domestic supervisor decision to treat PSEs in the same way as sovereign of PSE origin. Multilateral development banks (MDB) will receive weights under option 2 for banks except 0 percent for MDBs with high ratings satisfying the criteria of the BCBS, on a case-by-case evaluation.

Basel II has two options for claims on banks. Option 1 assigns banks a risk category one level below that of the sovereign of the country of establishment. However, there is a cap of 100 percent for unrated countries and sovereigns rated BB+ to B−. Option 2 uses external credit assessments of the bank. There is a short-term option of weight of 20 percent for an original maturity of the claim of three months or less. There is similar treatment for securities firms if supervisory and regulatory frameworks are similar to those of Basel II. If frameworks are different, securities firms will receive the same treatment as corporations.

Corporations and insurance companies receive the same treatment in accordance with external ratings. These types of claims cannot receive treatment that is superior to that of the corresponding sovereign. Basel II also provides risk weight of 75 percent for claims included in a regulatory retail portfolio. The criteria for including claims in this portfolio are: exposures to individuals or small business, type of loans (revolving credits, personal term loans and leases and small business credit), "granularity" or risk-reducing diversification and low individual value.

Table 6.2 Weights for sovereign, bank, corporate and short-term risk

	AAA to AA−	A+ to A−	BBB+ to BBB−	BB+ to B−	Less B−	No Rating
Sovereigns	0%	20%	50%	100%	150%	100%
Banks I	20%	50%	100%	100%	150%	100%
Banks II	20%	50%	50%	100%	150%	50%
Short Term	20%	20%	20%	50%	150%	20%
Corporates	AAA-AA−	A+- A−	BBB+-BB−	< BB−	not rated	
	20%	50%	100%	150%	100%	
Short Term	A-1/P-1	A-2/P-2	A-3/P-3	Others		
	20%	50%	100%	150%		

Source: Basel Committee (2004c).

There will be a risk weight of 35 percent for mortgages on residential properties occupied or to be occupied by the borrower or rented. Supervisors must ensure that there is sufficient margin in the mortgages. National supervisors may increase the risk weight in accordance with past experience of default. The BCBS determined that commercial real estate lending have a risk weight of no less than 100 percent because of troubled past experience.

The BCBS determined that for all loans past due more than 90 days, except certain qualifying mortgage loans, there will be the following risk weights:

150%	specific provisions < 20% of loan outstanding
100%	specific provisions ≥ 20% of loan outstanding
100%	specific provision ≥ 50% with supervisory discretion to reduce to 50%

Basel II also has higher weights for higher risk categories. These weights could exceed 150 percent. It includes claims rated below B− on sovereigns, PSEs, banks and securities firms, claims on corporations rated below BB− and past due loans. In additions, securitization tranches with ratings between BB+ and BB− will have risk weight of 350 percent. Supervisors may also apply weights of 150 percent or higher to risks of venture capital and private equity investments.

Basel II converts off-balance sheet items with credit conversion factors (CCF). Commitments with original maturity of less than one year have a CCF of 20 percent and those over one year of 50 percent. Lending of

bank securities or posting of securities as collateral by banks have a CCF of 100 percent. There will be a 20 percent weight for credit originating in the movement of goods. Basel II maintained other CCFs in the 1988 Accord.

Basel II provided six criteria to qualify an external credit assessment institution (ECAI). National supervisors will determine if an ECAI meets these criteria. Approval of ECAI should be a public process to ensure credibility. Supervisors will assign ECAI assessments to the risk weights in the Basel II framework. There should be consistency in this assignment with the criteria used in Basel II. In a case where there are two assessments by different ECAIs, the bank will use the higher risk weight. If there are three or more risk assessments, the bank will use the higher of the two lowest assessments.

Basel II treats short-term assessments as issue specific, that is, for use only in reference to the rated facility. The claims are mostly on banks and corporations as, for example, issue of commercial paper. There are various techniques of credit mitigation (CRM) available to banks. There may be first priority claim on collateral in cash or securities and guarantees by a third party. Banks can also net loans against deposits by the same counterparty and can buy credit derivatives to hedge exposures. There must be "legal certainty." All documentation of the technique of CRM must be legally binding and enforceable in relevant jurisdictions. Moreover, banks must monitor the transactions to ensure legal certainty. Many CRM techniques create other types of risk: legal, operational, liquidity and market. Banks must have strong methods to control these risks.

Basel II allows use of a simple approach similar to the 1988 Accord, applying as risk weights to the collateral those of the counterparty for the collateral, with a floor of 20 percent. A comprehensive approach permits fuller deduction of collateral against exposures. An example illustrates the flavor of Basel II. Consider use of collateral as CRM. A "haircut" is a reduction in the value of collateral to allow for possible fluctuations in its market value. For example, in a reverse repurchase agreement, the financing entity reduces the principal of the security, a haircut, because if the counterparty defaults and price declines, the market value of the security would be lower than the principal. Banks must use haircuts to adjust both the value of the exposure and that of the collateral in CRM. That is, CRM must adjust by volatility both exposure and collateral. In cases other than cash, adjustment by volatility will increase the value of the exposure and reduce the value of collateral. If there is currency mismatch, banks must adjust exposure and collateral for fluctuations in exchange rates. In the case of an exposure with eligible collateral, the formula for calculating exposure after risk mitigation is:[14]

$$E^* = \max \{0, [E \times (1 + He) - C \times (1 - Hc - Hfx)]\} \quad (6.4)$$

where:
E^*: exposure after risk mitigation
E: current value of exposure
He: haircut appropriate to the exposure
C: current value of collateral
Hc: haircut of collateral
Hfx: haircut for currency mismatch of exposure and collateral

Fluctuations in market valuations should not reduce capital requirements. The reverse haircut increases the value of the exposure, $E \times (1+He)$, and the haircut reduces the value of collateral, $C \times (1 - Hc - Hfx)$. The risk-weighted asset amount for the transactions with collateral is equal to the exposure value after risk mitigation multiplied by the risk weight of the counterparty.

The new approach introduced a type of weights for banks, line Banks I in Table 6.2, lower in one degree to that of sovereign of origin. It stipulated a ceiling of 100 percent for credits lower than B−. The second bank type, Banks II, directly uses ratings by agencies for a specific bank, applying weight lower in one degree for terms of three months or lower with a minimum of 20 percent.

The last line of the table shows weights for corporations, including insurance companies. Weight of 150 percent applies to ratings of BB−. The standardized approach specifies weights for retail assets, debts guaranteed by real estate or commercial purposes, higher risk categories and other assets and off-balance sheet items.

Pillar I: Internal-Ratings Based Approach (IRB)

The committee developed an approach based on internal ratings (IRB) that reflects a bank's individual risk profile.[15] It developed IRB for use by more sophisticated banks, but believes that the number and type of qualified institutions will increase. Every category consists of three elements:

- Risk components, for which the bank must use its own estimates or those of supervisors
- Function of risk weight that transforms risk components in weights to adjust assets
- Minimum requirements for banks to be eligible for IRB

The Basel Committee developed IRB based on best existing practices in risk control. Table 6.3 shows the process followed by IRB. Banks classify their debtors by risk categories. They estimate a probability of default, with

Table 6.3 Process based on internal ratings (IRB)

Debtor Risk
Classification of debtor in credit risk categories ↓ ↓ ↓ ↓ Estimates of probability of default for each category, *PD* ↓ ↓ ↓ ↓ Estimate of percentage of loss given default, *LGD* ↓ ↓ ↓ ↓ Estimate of exposure at default, *EAD*
Estimate of expected loss, *EL*: $EL = EDF \times EAD \times LGD$ where *EDF* = expected frequency of default, derived from *PD* Classification of exposures to risk by categories (sovereigns, banks, corporations, etc.)
Risk components, using standardized parameters or internal estimates
Right weight function to estimate capital requirements, *K*
Risk-Weighted Assets = $K \times 12.5 \times EAD$
Special requirements for specialized lending
IRB
Foundation
Percentage of loss given default determined by supervisory rules
Limits on collateral
Advanced
Percentage of loss given default determined by bank but complying with rigorous requirements
No restrictions on allowed categories of collateral
Guarantees And Credit Derivatives
Foundation
Uses methods similar to standardized
Advanced
Bank can adjust risk category of a guaranteeing entity and probability of default

Source: Basel Committee (2004c, 2001g, h).

higher precision in some banks. It is more difficult to estimate percentage of loss given default.

The risk components of IRB are: probability of default (*PD*), loss given default (*LGD*), exposure at default (*EAD*) and effective maturity (*M*). Table 6.4 shows risk components. In some cases, banks may have to use a measure of risk component provided by supervisors. In others, banks may use their own internally generated measures. An essential element of IRB is calculation of unexpected losses, *UL*, and expected losses, *EL*. The framework uses risk-weight functions to calculate capital requirements for *UL*.

Banks must classify banking-book exposures into classes of assets with different risk profiles: corporate, sovereign, bank, retail and equity. Banks must have consistent methods for classifying assets showing supervisors the soundness of these methods. Basel II provides precise definitions of these asset classes and their subclasses.

There are three basic elements for each asset class in IRB. Risk components are parameters, provided by banks or by supervisors. Risk-weight functions transform risk components into risk-weighted assets and capital requirements. In both the foundation and advanced approaches, banks must use risk-weight functions published in Basel II to calculate capital requirements. Basel II specifies minimum requirements for a bank to use IRB for a specific asset class.

There is a foundation and an advanced approach for corporate, sovereign and bank exposures. Under the foundation approach, banks provide probability of default (*PD*), but must use supervisory estimates of the other risk components, *LGD*, *EAD* and *M*. In the advanced approach, banks must calculate effective maturity, *M*, and provide their estimates of *PD*, *LGD* and *EAD*. However, there are five subclasses of specialized lending in corporate lending: project finance, object finance, commodities finance, income-producing real estate and highly volatile commercial real estate. Banks that do not qualify for the corporate foundation approach for specialized lending must use five supervisory categories. Banks that qualify to provide their own *PD* for specialized lending may use the foundation approach for all classes of specialized lending except highly volatile commercial real estate. There could be approval by national supervisors of a foundation approach for highly volatile commercial real estate. Similarly, banks that qualify for the advanced approach in corporate lending may use the advanced approach for specialized lending and may use an advanced approach for highly volatile commercial real estate on approval by supervisors.

Table 6.4 Risk Components of Basel II

Probability Of Default, *PD*	
Corporate and bank	Greater of *PD* of internal borrower grade or 0.03%
Sovereign	One-year *PD* of internal borrower grade
Default borrowers	100%
Loss Given Default, *LGD*	
Foundation Approach	Corporates, sovereign, banks: senior, 45%; subordinated, 75%
	Additional eligible collateral: receivables, specified commercial and residential real estate Methodology similar to comprehensive approach to collateral in standardized approach
	Guarantees and credit derivatives follow standardized approach
Advanced Approach	Supervisors may allow banks to use internal estimate of *LGD* for corporate, sovereign and bank exposures. *LGD* is percentage of *EAD*
	May adjust *PD* or *LGD* to reflect risk mitigating of guarantees and credit derivatives or use foundation approach
Exposure At Default, *EDA*	
On Balance Sheet Netting	Loans and deposits same as standardized
Off-Balance Sheet Items	Foundation. Instruments and Credit Conversion Factors, CCF, same as standardized except: CCF of 75% for Note Issuance Facilities, NIF, and Revolving Underwriting Facilities, RUF
	Advanced. Banks may use own estimates of CCF except when 100% under Foundation
	Derivatives (FX, interest rate, equity, credit and commodity) on the basis of replacement cost plus potential future exposure
Effective Maturity, M	
	Foundation: 2.5 years for corporate exposures except 6 months for repos
	Advanced: M is the greater of one year plus remaining effective maturity in years but less than 5 years. Effective maturity is by definition the sum of all cash flows (principal, interest and fees) weighted by time relative to the sum of all cash flows: $\sum t \times CF(t)/\sum CF(t)$ where *CF* is cash flow

Source: Basel Committee (2004c, 62-68).

In retail exposures, banks must furnish their own PD, *LGD* and *EAD*. There is no differentiation in foundation and advanced approach in this category. There is a market approach and a *PD/LGD* approach for equity exposures not held in the trading book. Banks that use the advanced approach for other exposure classes can use the *PD/LGD* approach for equity exposures. There is a foundation and an advanced approach for qualifying corporate receivables but no difference in approaches for retail receivables.

Basel II has specific guidelines on implementation of IRB. The framework specifically rules out application of IRB in a class of claims to lower capital charges. A bank that applies IRB to part of its holdings must implement it throughout the entire banking group. The Committee recognized that a bank may not be able initially to implement IRB simultaneously throughout all asset classes and banking units.

Supervisors may permit implementation of IRB in phases. A bank could start by implementing IRB in banking units within the same business unit. It would then move to extend IRB throughout business units in the same banking group. In a third phase, the bank would move from the foundation to the advanced approach in certain risk components. Banks must develop plans of implementation and share them with supervisors. Banks must not use intragroup transactions to reduce capital charges. A bank that adopts IRB for any of the asset classes must adopt it simultaneously for its equity exposures. Supervisors will approve return to the standardized or IRB approaches only in exceptional circumstances.

The transition period for parallel calculations is three years. Banks must have a minimum of two years of data for implementation of Basel II, increasing by one year for each year of the transition period.

Basel II provides risk-weight functions for three types of retail exposures: residential mortgages, qualifying revolving retail exposures and other retail exposures. Formulas use *PD*, *LGD* and *EAD* as inputs but do not have a specification for effective maturity, M. Banks must provide estimates of *PD* and *LGD* for every pool. They may adjust either *PD* or *LGD* for guarantees and credit derivatives. There are rules for *EAD* similar to those of corporates, banks and sovereigns.

The Basel II framework uses risk components–*PD*, *LGD*, *EAD* and, in some cases, *M*–to calculate risk-weighted assets. A formula obtains a correlation, *R*, using probability of default, *PD*. The framework specifies some cases in which there must be a maturity adjustment. A third formula derives the capital requirement, *K*, from the cumulative normal distribution and the inverse normal distribution, using *LGD*, *PD*, *R* and, when appropriate, *M*. Finally, there is a simple calculation of Risk-Weighted Assets, *RWA*:[16]

$$RWA = K \times 12.5 \times EAD \tag{6.5}$$

Table 6.5 shows some risks weights for unexpected loss calculated by Basel II risk weight functions. Calculations assume *LGD* of 45% and maturity of 2.5 years. There appears to be lower risk weights for residential mortgages, which has been a factor in commentary on Basel II, discussed below in a separate section. There is an evident sensitivity to probability of default, *PD*.

The framework has market risk capital rules for equity exposures in the trading book. Banks may opt for a "market-based" approach or a *PD/LGD* approach. The market-based approach has two choices: simple risk-weight method or an internal models method. The simple-risk-weight method requires a weight of 300 percent for equities publicly traded in a recognized security exchange and 400 percent for all other holdings.

Cash and derivatives are acceptable to offset equity positions as long as they have at least one year of maturity. Maturity mismatches have the same treatment as corporate exposures. IRB banks may use VaR models of the 99th percentile, with a one-tail confidence interval of the difference between quarterly returns and a risk-free rate. The bank multiplies the capital charge by the inverse of 8 percent, 12.5, but capital charges cannot be less than a risk weight of 200 percent for publicly traded equities and 300 percent for others.

The *PD/LGD* approach for equities is similar to that for corporates, banks and sovereigns. However, banks must use an *LGD* of 90 percent to derive risk weights for equities.

Basel II has specific rules for treatment of expected losses and provisions. Banks calculate expected losses as:

$$EL = PD \times LGD \times EAD \tag{6.6}$$

for all exposures of classes (corporates, sovereign, bank and retail) not in default. Specialized lending may be subject to slotting criteria of risk weights ranging from 5 percent to 625 percent. Banks using the *PD/LGD* approach can calculate expected loss of equities by the formula above. There is no contribution to expected loss from securitization exposures. Expected loss is zero for all other exposures.

Basel II includes the following in total eligible provisions attributable to exposures under IRB: specific provisions, partial write-offs and portfolio-specific provisions (e.g. country risk or general provisions). However, eligible provisions do not include specific provisions for equity

Table 6.5 IRB risk weights for unexpected loss

PD	Corporate	Residential Mortgages	Other Retail	Revolving Retail
0.03%	11.30%	4.15%	4.45%	0.98%
5%	112.27%	82.35%	125.45%	103.41%
10%	146.51%	113.58%	142.69%	158.47%
20%	188.42%	140.62%	189.41%	222.88%

Note: LGD = 45%, Maturity = 2.5 years, Turnover for corporates = €5 million
Source: Basel Committee (2004c, 197).

and securitization exposures. Supervisors must evaluate if expected losses reflect market conditions before they allow banks to incorporate into Tier 2 capital the excess of total eligible provisions over expected losses.

Banks must fulfill various requirements to enter and continue to use IRB (Table 6.6). Basel II focuses on a bank's ability to rank and quantify risk. The process must be consistent, reliable and validated. Banks must have internally consistent methods to differentiate and quantify risk. Requirements apply to all asset classes and to both foundation and advanced approaches. Basel II provides detailed principles of minimum requirements. Supervisors must adapt these principles to the realities of their institutions.

Table 6.6 Minimum requirements for IRB entry and use

a. Significant differential of credit risk
b. Integrity and comprehensiveness in designing ratings
c. Monitoring of rating systems and processes
d. Rating system criteria
e. Estimate of probability of default, PD
f. Systems and data
g. Use of internal ratings
h. Internal approval and validation
i. Corporate governance and validation
j. Disclosure (under Pillar III)

Source: Basel Committee (2004c, 81-112, 2001g, 2001l).

Treatment of operational risk is an important innovation of Basel II. Operational risk can originate in external events or failures of internal processes, people and systems. It includes legal risk but excludes strategic and reputation risks. The framework provides three incremental methods to calculate capital charges for operational risk: basic indicator approach, standardized approach and advanced measurement approaches (AMA). Basel II encourages banks to upgrade toward AMA.

The basic indicator approach computes capital charges as an average of 15 percent of annual gross income over the previous three years. The formula excludes years in which gross income is zero or negative. Gross income is net interest income plus noninterest income. The Committee estimated the 15 percent from the relation of operational risk in the industry to gross income.

The standardized approach to operational risk classifies bank activities into eight business lines. For each business line, the approach provides the ratio of industry operational risk relative to industry gross income. These ratios range from a low of 12 percent for retail brokerage to 18 percent for corporate finance. The capital charge is the average over three years of the maximum of zero and the weighted sum of a business line times its corresponding ratio of operational risk to gross income. There is no limit on offsetting positive capital charges in one business line with negative capital charges in another. However, total negative capital charges are zero.

A bank can use AMAs depending on qualifying criteria: involvement of board of directors and senior management in oversight of operational risk management, sound system implemented with integrity and sufficient resources for the approach in major business lines. The supervisor will monitor the AMA process by a bank for a period to determine if it is credible and appropriate. There are detailed qualitative and quantitative requirements.

A bank must seek expert opinion to use external data in scenario analysis of exposure to high-severity events. Internal data, extending back five years, provide measures of internal loss. In addition, the bank must evaluate the business environment and internal controls that could affect its risk exposure. This requires necessary anticipation of problems that could occur and that may not be captured by data. Basel II allowed use of insurance as a risk-mitigating technique of operational risk but to a limit of 20 percent of capital charge for operational risk under AMAs. The framework sets specific qualifying characteristics of insurance policies. AMAs are somewhat flexible in that a bank can choose partial use of AMAs for various parts of its operations by complying with certain requirements.

Basel II refined the definition of the trading book. The trading book is

Table 6.7 Treatment of securitization exposures

Requirement	Banks must hold minimum capital against all securitization exposures
Examples	Investment in asset-backed securities, provision of credit risk mitigants, retention of subordinated tranche, extension of liquidity facility or credit enhancement
Deduction	50% from Tier 1 and 50% from Tier 2
External Credit	Must meet operational requirements:
Assessment	Encompass entire amount of credit risk exposure
	Eligible ECAI recognized by national supervisor
	ECAI must have expertise in assessing securitizations
	Consistent application of external credit assessment across a type of securitization exposure
	CRM to a specific special purpose entity must use the risk weight of the external credit assessment
Standardized	Standardized approach to underlying securitized exposure requires standardized approach under securitization framework
	Risk weight is amount of position times risk weight in tables, with CCF for off-balance sheet following specified criteria
IRB	Banks approved for IRB of underlying exposure must use IRB for securitizations
	For rated securitization exposures banks must apply Ratings-Based Approach calculating risk-weighted assets as amount of exposure times risk weights in tables
	When no external or inferred rating is available, banks must apply the Supervisory Formula, multiplying capital charge by 12.5 derived from five bank supplied inputs, or the Internal Assessment Approach, which uses credit quality of securitization exposures applied to asset-backed commercial paper subject to requirements

Source: Basel Committee (2004c).

a collection of positions that the bank intends to trade or use as a hedge of other exposures in the book. Financial instruments in the trading book must not have restrictive covenants and the bank should be able to hedge them entirely. There must be frequent and accurate valuation of these financial instruments and active management of the portfolio. Financial instruments include cash instruments and derivatives. Trading intent consists of

holding positions for short-term resale with the objective of benefiting from short-term price movements or arbitrage. Basel II has specific criteria for inclusion of exposures in the trading book: clearly documented strategy, clearly defined policies, procedures and monitoring for active management of the portfolio.

The framework detailed guidelines for prudent valuation. Banks must have and maintain adequate systems and controls. There should be daily marking to market at transparent closing prices. When mark to market is not feasible, banks may mark to model prudently. Supervisors should evaluate mark to model prudence. There should be independent verification of prices and validation of models. Banks must have procedures for determining valuation adjustments and reserves. In addition to capital charges for market and specific risk, banks must calculate counterparty credit risk for over the counter derivatives, repos and other transactions in the trading book. There are specific rules on the treatment of credit derivatives.

Basel II has a specific framework for treatment of capital charges for securitized exposures.[17] Table 6.7 summarizes the securitization framework. Banks that use the IRB approach for underlying exposure must use the IRB for securitized exposure. Basel II has very specific provisions for this growing segment of banking activities. The insurance industry transfers risk through reinsurance. Banks and securities firms transfer risk through securitization and derivatives. Securitization of credit by banks has grown rapidly and is an issue on how banks use capital adequacy standards.

Pillar II: Review Process by Supervisors

The objective of the second pillar is to ensure that banks maintain adequate capital relative to risk and that they develop and use better risk management practices. Capital does not substitute for adequate internal controls and risk management methods. The Basel Committee has provided major contributions to supervisory guidance, in particular the Core Principles for Effective Banking Supervision. Pillar II of Basel II provides an additional four principles of supervisory review.

Principle 1 states that banks require a process to assess the adequacy of their capital in relation to risks and a strategy to preserve that capital. This process requires that banks determine the stage of the business cycle, conducting stress tests, rigorous and forward looking, which identify events or changes in market conditions that could have adverse effects on the bank. A sound process requires board and senior management oversight. Rigorous risk management would result in sound capital assessment. In an increasingly sophisticated financial market, banks must identify, quantify

and evaluate all risks: credit risk, operational risk, market risk, liquidity risk and other less quantifiable risks such as reputation and strategy. Sound management requires careful monitoring and reporting of risk exposures. Banks must have an effective structure of internal control review.

Principle 2 requires that supervisors evaluate internal capital adequacy assessments, strategies by banks and their compliance with regulatory capital ratios. Moreover, supervisors must take corrective action when unsatisfied with the process.

Review by supervisors of adequacy of risk assessment is essential but supervisors should not function as bank management. Review could combine on-site examinations or inspections, off-site surveillance, interaction with management, review of auditor work related to capital requirements and periodic reporting. Evaluation of capital adequacy should include analysis by the bank of the impact of unexpected events on capital. Complexity and sophistication of the stress test should be proportionate to bank business. Supervisors should examine the quality of bank information and reporting and compliance with minimum standards and qualifying criteria for various approaches.

Principle 3 specifies expectation by supervisors that banks maintain capital above minimum regulatory ratios. Moreover, supervisors should be in a position to request that banks maintain capital in excess of minimum requirements. Supervisors must analyze if strict compliance with Pillar I is sufficient for the peculiarities of their financial markets. They should encourage banks to exceed minimum requirements. Banks that desire higher external ratings to attract capital would maintain standards above the minimum. A buffer above minimum protects institutions and the system from unexpected events. Supervisors can rank banks as, for example, well capitalized and adequately capitalized, to encourage standards above the minimum.

Principle 4 is a sort of a preemptive strike. Supervisors should intervene early to avoid capital from falling below what would be required by the bank's risk profile. In addition, supervisors should have the authority to impose remedial action to maintain and restore capital. There are numerous available measures of monitoring and requesting immediate subscription of capital.

The framework also considers special issues during review by supervisors. When supervisors find that interest rate risk positions of banks threaten capital, they should demand reduction of risks, increase of capital or a combination of both. If standardized tests of an increase of 200 basis points in interest rates result in a decline of 20% of the sum of Tier 1 and Tier 2 capital, supervisors should monitor the bank closely.

Supervisors must assess if banks have sufficient capital under Pillar I and if results of stress tests of credit risk of Pillar I comply with IRB minimum requirements. Supervisors should review results and quality of these stress tests. In the case of a shortfall, supervisors should require reduction of risks and/or additional capital/provisions to ensure that capital is sufficient for regulatory ratios and recalculated stress tests.

Banks must use the definition of default of Basel II, Table 6.8, to estimate PD and EAD. However, supervisors will provide guidance on how the definition relates to their jurisdictions. Supervisors must require banks to have appropriate policies and procedures to control "residual risks,"such as inability to seize collateral, delinquency by a guarantor to pay and inadequacy of documentation.

Risk concentrations are typically the major cause of difficulties in banks. Banks must have adequate processes to identify, measure, monitor and control risk concentrations. Banks must consider these concentrations in their assessment of capital adequacy within Pillar II. Supervisors must assess the quality of processes by banks on risk concentration and their consideration on capital adequacy, reviewing also stress tests.

According to Basel II, the supervisory function must be transparent and accountable. There must be close and continuing dialogue between banks and supervisors and among supervisors in different jurisdictions for cross-border supervision of large banking organizations. The home country supervisor is responsible for the consolidated review and the framework of banks in its jurisdiction. The host country supervisor may accept the process of the home country supervisor if its meets the host country requirements.

Pillar III: Market Discipline

Asymmetry of information of creditors and debtors, companies and investors and monetary authorities and financial institutions constitutes an important foundation of financial theory and policy. Surprises of distorted information generate adverse market events, such as lack of reserves and insolvency of banks in the Asian crisis and, more recently, accounting revaluations of Enron, WorldCom, Adelphia, etc. Financial markets are efficient in their function of intermediation when savers and investors have access to complete and transparent information.

The Basel Committee designed Pillar III to complement the minimum capital requirements of Pillar I and supervisory review process of Pillar II. Banks must have a formal disclosure policy, approved by the board of directors, covering types of disclosure and required internal controls. Market discipline is a disclosure by banks of significant information to

Table 6.8 Definitions in Basel II

Default: bank concludes that obligor will not pay credit obligations in full without action by the bank to realize security or obligor is past due more than 90 days in credit obligations
EAD: exposure at default is the expected gross exposure of the claim on default of the obligor

market participants.[18] This disclosure would allow market participants to assess risk of banks and their capital adequacy. Market discipline is part of the role of supervisors to ensure sound and safe markets.

Supervisors have authority to obtain information from banks in the form of regulatory reports. In some jurisdictions, supervisors may disclose all or part of this information to the public. There is a range of mechanisms available to supervisors to enforce disclosure: moral suasion, reprimands and penalties. The framework provides another alternative. Supervisors may deny lower risk weights or more advanced approaches to banks that do not provide sufficient disclosure.

The Basel Committee has an ongoing dialogue with accounting authorities to conform Pillar III to accounting standards. The Committee may eventually alter disclosure requirements in accordance with accounting developments. Banks may have to meet accounting and listing requirements of disclosure and should describe the difference with requirements under Basel II and where to find additional information.

Content of disclosure must meet criteria of materiality: a bank must decide if omission or misstatement could alter economic decisions by a user of the information. A "user test" is if the user would consider an item in question as material. In general, banks must disclose information on a semiannual basis, with some exceptions. On a quarterly basis, banks must disclose Tier 1 and total capital adequacy ratios and their components. Banks should disclose material information as soon as possible and never after national legal deadlines. General qualitative information on risk management objectives and policies, reporting system, definitions, etc. can be published annually. Banks must balance the need to disclose meaningful information and protection of proprietary and confidential information. Basel II provides disclosure requirements in tabular form.[19]

Implementation of Basel II

The Committee obtained results of the Quantitative Impact Study 3 (QIS3) from 365 banks, 188 in 13 countries of the G-10 and 177 in an additional 30 countries. The BCBS classified banks in two groups.[20] Group 1 consists of internationally active banks with capital exceeding €3 billion. Banks in Group 2 are smaller and in many cases specialized. There are major changes of maximum and minimum values of capital requirements. In advanced IRB, changes in capital requirements vary between 46 and −36 percent. Changes in allocation of retail risks and operational exposures explain a significant part of changes in capital requirements. Quality of data constitutes another important source of changes. The BCBS informed banks of data requirements only two months before the study. In addition, banks face great difficulty in obtaining adequate data on collateral. Variations among banks also originate in a failure to meet standards of the BCBS to measure PD, LGD and EAD.

QIS3 revealed large changes in capital requirements resulting from Basel II. An important objective of Basel II consists in preserving competitiveness of capital. In practice, banks concentrate on various activities. QIS3 showed large changes in capital requirements for major banks that qualify for the advanced IRB. Basel II will reduce capital for retail by 50 percent, in large part because of reduction by 60 percent of capital required for mortgage loans. In contrast, exposures in stocks require an increase of capital of 114 percent. Depending on the mix of activities, banks could increase or reduce their competitive position in financial markets.

The EU Commission prepared a proposal of new directives of capital adequacy rules to conform to Basel II.[21] The EU postulates that a single financial market in the European economy is essential to its competitiveness by lowering capital costs to companies. The Commission identified various shortcomings of the 1988 Capital Accord. Risk measures became inadequate over time, allowing for capital arbitrage. The 1988 framework did not provide for effective risk mitigation techniques. It also ignored operational risk, which is growing in importance. The older Accord did not take into account specific cooperation among supervisors, supervisory rules and market discipline. The standard became inflexible to significant advances in risk management and supervisory tools.

The Commission issued three consultative papers in November 1999, February 2001 and July 2003. In addition, it has conducted continuing dialogue with stakeholders since November 2002. The Commission also published papers on technical issues such as real estate, covered bonds, expected and unexpected losses and collective investments. The

Commission found significant support for changes in capital adequacy regulations. Therefore, the Commission presented a formal directive for change to the European Parliament.

The Financial Stability Institute (FSI), jointly with the BCBS, sent a Basel II Implementation Assistance Questionnaire to 115 non-BCBS worldwide.[22] A total 88 non-BCBS jurisdictions intend to implement Basel II, which together with 13 BCBS member countries raises the total prospective Basel II jurisdictions to 101. These jurisdictions intend to implement Basel II by 2007–9. This would include approximately 5000 banks that control almost 75 percent of banking assets in 73 jurisdictions. Implementation by foreign-controlled branches or local branches of foreign banks appears to be an important factor of worldwide implementation of Basel II.

The response to the questionnaire shows that foundation IRB is likely to be the most common method for estimating capital requirements for credit risk, followed closely by the standardized approach. Banks with approximately 50 percent of banking assets in Asia, Latin America, Africa and the Middle East intend to use the foundation IRB. Although some banks intend to use the advanced IRB method, it is not likely that they would account for a significant share of non-BCBS banking assets. In the long term, there are incentives for banks to move to the advanced IRB method. After 2010, approximately 30 percent of banking assets in Latin America, non-BCBS and Africa will follow the advanced IRB.

Responses indicate that banks with the highest share of banking assets in non-BCBS jurisdictions will be applying the basic indicator approach. A smaller number of banks intend to follow the standardized or alternative standardized approach and very few the advanced measurement approaches (AMA). In Latin America and Africa, only 30–50 percent of banking assets may follow AMAs.

The major challenge seems to be Pillar II, the Supervisory Review Process. Acquiring new resources and/or upgrading existing resources constitute a major hurdle. There appear to be difficulties in implementation of IRB methods, validation of IRB systems for capital and coordination of home and host supervisors on cross-border implementation.

In regards to Pillar III, various jurisdictions have already promoted transparency and market discipline. A major challenge is conforming supervisory disclosure with international and domestic accounting standards. There are also "culture" issues of convincing banks to disclose required information. In Latin America, Africa and Asia, there are issues of complying with disclosure without revealing proprietary and confidential information.

There are few jurisdictions with internal plans to implement Basel II.

There will be Basel II training for approximately a quarter of supervisory staff in responding countries, a total of 9400. The FSI, in coordination with the BCBS, will assist supervisors with Basel II. It will provide this assistance on a regional basis.

A study of Accenture, Mercer Oliver Wyman and SAP commissioned by FT Research surveyed 100 of the top 200 leading global banks.[23] European banks are more advanced in implementing Basel II than those in the United States and Asia. The combination of Sarbanes-Oxley and Basel II will cause significant change in organization and corporate governance. There will be increasing competition in retail banking and major changes in corporate, emerging markets and specialized lending. More rational allocation of capital and risk-sensitive pricing will benefit banks. Banks believe that expenditures of implementing Basel II may be lower than anticipated because of more efficient use of systems. However, expenses will still be high. More than 75 percent of banks in Europe, North America and Australia plan to use IRB by 2007 and advanced IRB by 2010. However, less than 50 percent of banks plan AMAs by 2007 but 70 percent plan to adopt them by 2010. Banks still require major efforts to implement Pillars II and III.

The study by FT Business Research concludes that risk may drive value in banks under Basel II. Banks may improve asset allocation, loan pricing and structuring. Underwriting may become faster, cheaper and better. Banks could maximize the value of their balance sheets with risk management of credit and asset/liability management. However, successful banks must find a balance between sophistication and pragmatism to really reap benefits.

The BCBS convened a working group of non-G10 supervisors to analyze implementation of Basel II.[24] The IMF and World Bank will not conduct financial sector assessments using Basel II in countries that did not choose the standard. These assessments will continue to focus on Principles for Effective Banking Supervision of the Basel Committee. Some countries may not have the resources to implement Basel II by the desired timetable. However, the working group believes that those countries may benefit by adopting some of the supervisory and market discipline aspects of Basel II even if they do not adopt immediately the capital regulation standard.

The working group concluded that individual country supervisors must conduct a study of the costs and benefits of implementing Basel II, not only for banks but also for supervisors. In most countries there will be additional costs of human resources, information technology, outside consultants, training, etc. The structure and sophistication of banking systems significantly determine options for supervisors. No doubt, there would

be a gain in moving banks toward more sophisticated risk management. Nevertheless, supervisors must incorporate domestic characteristics in the movement toward improving risk management and, thus, financial stability. There are additional costs to supervisors and banks, which they must balance with expected benefits.

An important suggestion by the working group is for some individual countries to conduct a local quantitative impact study similar to QIS3. Such a process would reveal critical information about the impact of Basel II on banks, creating an important dialogue with supervisors. It would also serve to disseminate knowledge of the characteristics of Basel II. In addition, banks would find motivation to improve their risk management.

Data collection and evaluation constitute a departing step for Basel II. Banks would be able to identify key risk drivers. Development of systems would improve the ability of banks to quantify risks and analyze them in the progressive sophistication encouraged by Basel II. Both internal and external sources of information would improve. Classification of data would motivate risk differentiation inherent in sound credit decisions.

The working group considered practical aspects for implementation of Pillar II, ordered by its four principles. Principle 1 requires that banks have a capital adequacy assessment process. Banks must assess their capital adequacy in relation to their risk characteristics. They must have a strategy to preserve capital levels. Pillar II considers many risks that Pillar I does not consider such as: credit concentration, interest rate in the banking book, liquidity, business, etc. Dialogue is essential to conform to Pillar II.

Principle 2 requires that supervisors review and evaluate capital adequacy assessments by banks. Supervisors must evaluate if banks have sound capital strategies and processes to comply with regulatory capital standards. Supervisors must be transparent in communicating to banks required improvements and should have legal avenues to strengthen risk management and risk controls. Principle 3 requires that supervisors have the authority to demand capital in excess of regulatory ratios, expecting that banks shall exceed minimum requirements. Finally, Principle 4 postulates that supervisors should have the authority to prevent capital from falling below a minimum corresponding to the risk characteristics of a bank. Supervisors should be able to take remedial actions for capital restoration.

According to the working group, supervisors should engage in productive dialogue with banks toward implementation of Pillar III. This dialogue would map additional disclosure requirements. It would also identify regulatory and legislative changes.

Issues of Basel II

KPMG International views Basel II as revolutionary for banking and not merely a regulatory affair. Improved risk management and lower capital requirements constitute key objectives of the Basel Committee.[25] Improvement of risk management, information systems and other aspects of compliance will not be sufficient to attain this objective. Basel II requires sound business strategy and corporate governance. Banks will have to link regulatory capital to economic capital throughout the company. Thus, banks will have to allocate capital throughout the company to the best risk/return opportunities. Moreover, Basel II significantly alters how banks report to supervisors, Pillar I, and to the public, Pillar II.

The differential impact of Basel II constitutes an important concern for KPMG. Capital requirements for the industry as a whole may not change significantly. However, a bank with sound collateral and a prime business portfolio may experience lower capital requirements. On the other hand, a bank with a buy-and-hold credit strategy, inadequate collateral and weak risk management may experience higher capital requirements. There could be possible advantages for prime mortgage banking, exposures with collateral and/or hedge, small and medium size business and entities with high ratings.

According to KPMG, banks focused on market share and expected return as risk factors. Basel II forces banks to concentrate on risk/return because of allocation of economic capital based on risk. Banks will require high quality and high frequency data to implement Basel II. More importantly, banks need to change toward a risk culture and a strict code of ethics.

According to Kupiec,[26] the Accord of 1988 encouraged arbitrage of capital requirements. Large banks grouped and sold higher quality loans in a security, securitization, keeping in the books loans of lower quality.

In the proposal of the New Accord of January 2001, banks would have an incentive to use the standardized approach for credits rated lower than BBB of Standard & Poor's, that is, below investment grade, because the foundation IRB would result in much higher capital charges. More sophisticated banks would concentrate their portfolios in credits with rating of BBB or more because of lower capital charges.

The New Accord intends to promote migration of banks to the advanced IRB. However, concentration of better banks on BBB or better credits would reduce their profitability, especially because of costs of meeting the new requirements. Banks working under the standardized approach would concentrate their operations on credits of lower quality without incentive to migrate to IRB with lower profitability. Kupiec underscores the necessity

to calibrate during consultations in order to avoid concentration of less sophisticated banks in credits of low quality.

Kupiec uses the implicit subsidy in leverage by the central bank's safety net. If a bank were too big to fail, in creative ambiguity, the safety net would protect leverage. Maximization of bank returns consists in obtaining maximum net profit from leverage while controlling risks, which is using capital in its most profitable form. The Capital Accord of 1988 with less sensitivity to risk encourages banks to sell credits of better quality through securitization, using leverage in those of lower quality, but higher return, that remain in the balance sheet.

Claessens and Embrechts analyze the New Accord in relation to credits to emerging markets.[27] They define risks as follows:

- *Country risk*: risk of losses in an individual country subject to control by the government, but not by a corporation or individuals
- *Transfer risk*: risk that government may take measures, because of financial reasons or others, to restrict remittance of payments by debtors in the country to creditors abroad
- *Collective risk of debtor*: risk of events in the country that influence adversely the loan portfolio, such as twin crises
- *Sovereign risk*: risk that government defaults on its obligations

Claessens and Embrechts conclude that liberalizing trade and capital flow changes the concept of country risk for banks. Transfer risk declined because of its higher costs in the form of loss of external capital flows, loans, direct investment and foreign trade. If a government imposes barriers to transfers of internal debtors to their external creditors–an event of transfer risk–the country will experience a sudden stop of external flows with profound impact on domestic production and employment.

Collective credit risk of a debtor country emerged in the form of twin crises, exchange and financial, sometimes in the same region or of various countries simultaneously. Higher correlation among assets can require more economic and regulatory capital.

Transfer risk effects on banks are large and sudden. In contrast, credit-evaluating agencies reduce country credit quality in small steps, after recognition by markets. Reduction of rating in one full move appears preferable to a gradual approach.

These authors derive calculation of expected transfer loss, *ELTR*, within the approach of economic value of capital that banks use to manage credit risk:

$$ELTR = PTR \times TEAD \times TLGD \tag{6.7}$$

PTR is the probability of transfer risk
TEAD the exposure to default in transfer risk
TLGD the loss given default in transfer.

There is a classification of assets in subclasses of differentiated risk. Risk categories by country and partly past experience in restructuring sovereign debt provide the input for calculation of loss in a transfer event. Risk is reduced by shorter terms, export financing, cofinancing with multilateral institutions and denomination in local currency. Banks used all these mitigation methods after the debt crisis of the 1980s.

The European Commission of the EU contracted Price Waterhouse Coopers Risk Management and the National Institute of Economic and Social Research to conduct a study on the impact of Basel II on the financial sector and economy of the EU.[28] This study concluded that Basel II, as in CP3 and the Madrid agreement, would reduce the capital of the EU financial system by 5.3 percent. The calibration effort is to limit the decrease to 5 percent. The range of decrease for countries in the EU is from a decline of 10 to 2 percent.

Individual institutions will experience different impacts on capital requirements. Banks concentrating on retail exposures and SMEs will have lower capital for credit risk. However, capital requirements for operational risk may compensate for these declines. In addition, Pillar II provides an opportunity for supervisors to avoid a decrease in capital relative to what would be necessary for financial stability. The study concludes that there would be a reduction in required capital by financial institutions in the EU of €80–100 billion that would translate into an annual gross after tax benefit of €10–12 billion for Europe's 7750 banks. Regulators, supervisors and rating agencies do not desire reductions in capital requirements. The study also concludes that there would be minimal impact on lending to emerging markets.

Another consideration of the study was the possible gains of the EU economy resulting from more efficient allocation of capital by financial institutions. Long-term effects are difficult to measure. The study concluded that there could be an increase of 0.07 percent of EU output in the long term. A bias in favor of larger relative to smaller financial institutions is another concern in the EU. Larger institutions could adopt early advanced IRB methods, gaining advantage over smaller firms that would have proportionately larger costs of implementing Basel II. Advanced methods in Basel II generate fears of mergers and acquisitions. However, the study of Price concluded that Basel II may not have significant impact on competitiveness of smaller institutions. Some smaller firms, such as

specialists, may find it less costly to adopt advanced methods than large banks with international operations. In addition, smaller institutions, such as savings banks in Germany, are developing cooperation in systems that would permit hundreds of smaller institutions to adopt advanced IRB. Acquisition of smaller firms by larger banking groups could be costly and difficult to harmonize in the same risk management approach.

EU banks are not likely to decrease their competitiveness versus American banks because regulators in the United States will not apply the framework to more than 20 banks. American banks following Basel II are the only ones that will truly compete with the EU institutions. However, there is concern that national supervisors within the EU may focus differently on Pillar II, creating uneven competition. Trading book rules are the subject of complaint by investment firms and banks that fear increases in capital requirements.

The study of Price concluded that the cost of implementing Basel II in the EU could reach €2–3 billion in 2002–6. Large banks could spend €80–150 million individually. There would also be major expenses by supervisors on systems and human resources. However, the study concludes that Basel II should have an overall positive effect on the EU. Macroeconomic effects may be neutral to slightly beneficial. The major benefit from Basel II would be enhanced financial stability resulting from risk-sensitive capital allocation and supervision. However, there is still uncertainty about the impact of Basel II in accentuating business cycles through the financial accelerator.

American authorities found significant difficulties in implementing Basel II in more than 8000 American banks.[29] The Comptroller of the Currency, John Hawke, argued in Congress that financial institutions in the United States face a challenging task in implementing Basel II. [30] Deadlines of the BCBS should be a means for a purpose and not the purpose itself. American regulators require sufficient time to understand the impact of the proposal on general capital levels of financial institutions. They must evaluate effects of competition on capital, costs and obstacles before adopting the new capital standard. Hawke testified in Congress that the OCC has exclusive regulation of capital of national banks. The Agency will not implement a final version of Basel II before conducting required studies of cost/benefit and impact analysis. The OCC must consider all comments submitted during the notice process. If the consultation process results in a need for revisions, regulators will not implement the standard without changes.

The statute governing administrative procedure, 5 U.S.C. 551, requires that agencies regulating banks publish a notice and request comments from all interested parties on any proposal to approve and implement regulation.

The statute requires that agencies consider comments fully before adopting a definitive capital regulation. In July 2003, American banking agencies issued an advance notice of proposed rulemaking (ANPR) requesting comments on proposals of revision and aspects of regulation of capital related to Basel II. The ANPR detailed proposals of revision and requested information and comments on costs, obstacles and implications of competitiveness in national and international markets for banks of all sizes. After receiving comments, American banking agencies evaluated complete costs analysis, issuing a notice of proposed rulemaking (NPR).[31] Once again, banks and interested parties will have an opportunity to make comments before final revision of capital regulation.

After the meeting of the BCBS in January, American supervisors will conduct another QSI, to evaluate clearly the effects of the Basel proposal.[32] American agencies will issue another official NPR before deciding definitively.

American regulatory agencies and Congress disagree on Basel II. Michael Oxley, Chairman of the Committee on Financial Services of the House, criticizes the length of time, over a year, taken by agencies to evaluate the impact of Basel II on American banks.[33] The Federal Reserve promotes the New Accord while the Comptroller of the Currency, which regulates thousands of banks with national charter, criticizes it. The FDIC, insuring bank deposits, argues that Basel II could reduce capital requirements of banks, reducing effectiveness in avoiding bank failures.

American banking agencies will apply Basel I to all institutions with federal deposit insurance. However, they will apply Basel II only to internationally active banks that compete in world markets. Other institutions can opt voluntarily to follow Basel II per request and approval by their major federal supervisor. In addition, the text and structure of revision of capital regulation in the United States may differ from Basel II. Agencies will adjust their revisions according to regulatory, statutory and accounting structures and practices in the United States. American agencies will issue notice and request for specific aspects of Basel II-advanced IRB approach for credit risk, AMA for operational risk and approach of internal models for market risk. Only advanced banks, approximately 10 in the United States, have the capability of implementing these sophisticated aspects of Basel II.

Hawke praised the conceptual framework and effort behind Basel II. However, he observed that most of Basel II was not tested in practice. The OCC is concerned about unanticipated consequences of Basel II in reality. Use of internal measurements of risk would constitute a discrepancy with the way American banking agencies structure regulation and conduct supervision. Confidence in internal measurements, in an evolutionary

environment of credit modeling, requires objective standards that ensure systemic consistency in their application.

Strengthening capital competitiveness is an objective of Basel II. However, the OCC must evaluate whether implementation could affect equality of competition between national and foreign banks, between banks and other nonbanking financial institutions and between large and smaller to medium banks. The objective of evaluation is to prevent unanticipated consequences on equality of competition resulting from Basel II. The OCC argues that an international standard of capital faces immense obstacles in diverse regulatory structures, practices and institutions across many nations.

Further, the OCC disputes that the quantitative impact for the third phase of consultation is conclusive. Data do not provide reliable estimates of regulatory capital for banks subject to Basel II. Estimates for the United States vary from a reduction of capital of 36 percent and an increase of 43 percent. Data suggest that Basel II could result in reduction of regulatory capital. However, the OCC is not willing to allow reduction of capital without rigorous verification. The Agency believes that the BCBS should conduct another quantitative impact study or it will conduct its own.

Regulators will not implement the standardized approach in the United States. They believe that it would not differ significantly from current practice for American banks. Marginal changes would not be commensurate with costs of implementation. Agencies will not implement the foundation IRB.

According to the Vice Chairman of the FRB, Roger Ferguson, large banks measure and manage risks with criteria different than capital ratios in Basel I.[34] The main objective of Basel II consists in reconciling what banks do with what authorities desire. Basel II combines flexibility–allowing banks to use internal measures of risk to determine adequate capital–with comparability–so that internal measurements are consistent with the objective of capital competitiveness. In addition, a large variety of professional risk models prevents specification of a risk measurement that is adequately comparable to generate a capital regulation standard.

Authorization to banks to use flexibly their own risk measurement could prevent comparability among banks, resulting in an inadequate capital standard. At the extreme, a capital standard could be so inflexible that it would prevent authorities from comparing risk measurements throughout the banking industry. Basel II attempts to balance flexibility and comparability, resulting in strengths and vulnerabilities.

According to Ferguson, the complexity of Basel II constitutes a source of disagreement. The Fed will issue an NPR to standardize Basel II for American

banks. Use of mathematical and statistical models for measurement of risks, complex on their own, constitutes another source of friction. It would be difficult to ignore these methods simply because of their complexity. Another issue is capital competitiveness between large and small banks and between banks and nonbank financial institutions. Because of the safety net, agencies regulate banks more rigorously than insurance and securities companies. Basel II should not interfere with competitiveness of banks in internal and international markets.

Professor Duffie argues that risk models capture only default events.[35] Therefore, they do not measure risk of widening spreads of "collaterilized debt obligations"(CDO) relative to treasuries. Bank of America data measure growth of the nominal value of CDOs at 155 percent in 2003, reaching a value of $532 billion. In 2004, the industry estimates that $5000 billion of debt will have protection against default. This is a normal process of mitigation of risk by financial players.

American agencies will announce that they will require that American banks comply only with advanced parts of Basel II. This would include only 10 internationally active banks and another 10 that could adopt a new standard because of their higher sensitivity to risk. Only internationally active banks will adopt Basel II. In fact, the 20 banks that the Fed anticipates will adopt Basel II account for two thirds of American banking assets and 99 percent of foreign assets. The 10 proposed banks account for 95 percent of all international assets held by American banks. American authorities believe that banks in the United States are sufficiently capitalized and limited in their leverage. More than 93 percent of American banks have capital ratios adjusted by risk of 10 percent, or 25 percent more than requirements by Basel II. In addition, American banks disclose information, within the regulations of the Securities and Exchange Commission (SEC), fulfilling Basel II requirements. Imposing Basel II on all American banks would not improve bank management and regulation. Therefore, American policy would not prevent implementation of an international capital standard.

The financial consultants Mercer, Oliver and Wyman estimate that compliance with Basel II would cost larger banks between €100 and €200 million (US$177–234 million) in a period of five years.[36] Large banks with advanced measurement of risk require less capital, finding attractive acquisition of smaller banks because the consolidated institutions would show a higher return on capital. In addition, less capital would be required for some activities–mortgages, loans to large companies and leasing–while more capital would be required for others–project financing and loans to small companies. Banks abandoned certain types of business with lower return on capital, leading to mergers and acquisitions. Increases

in disclosure requirements by Basel II could also result in mergers and acquisitions because acquisition target companies would improve their disclosure. An international capital standard could also open the road to consolidation of banks across borders.

The EU determined that public companies prepare financial statements in accordance with International Financial Reporting Standards (IFRS), beginning December 31, 2005.[37] In individual countries, companies must comply with Generally Accepted Accounting Principles (GAAP). The International Accounting Standards Board (IASB) developed IFRS to improve comparability of financial statements among companies in the EU. Banks face a challenge in complying with Sarbanes-Oxley, Basel II and IFRS.

On July 30, 2002, the executive of the United States signed into law the Sarbanes-Oxley Act of 2002.[38] The law applies to public companies and their auditors. It significantly affected accounting and auditing of corporations. It created the Public Company Accounting Oversight Board. The SEC supervises and appoints members of the Board. This Board has broad powers of supervising and investigating audits of public companies. It also can impose discipline on companies and individuals for violations of laws, regulations and rules. The Board also has jurisdiction over foreign companies that prepare or furnish auditing statements of corporations that involve those registered in the United States. Sarbanes-Oxley significantly burdened accounting and auditing of public companies.

The Tower Group estimates expenditures of the global financial services industry on information technology, to comply with regulation, will reach close to $1 billion in 2004, increasing to $1.7 billion in 2006.[39] IBM developed systems and consulting to allow banks to computerize data gathering and processing to meet Basel II.[40] Collecting data at various points of origin takes only hours instead of weeks. Complying with Basel II would result in expenditures by European banks of $4 billion in the next two years. IBM estimated that 96 percent of problems of compliance with Basel II originate in data-identification, integration, processing and sophisticated analysis.

There are two original objectives in Basel II: match capital requirements with risks of activities of banks and maintain unaltered general capital of banks.[41] However, Basel II will alter capital competitiveness. Some banks, such as Deutsche Bank–with capital market activities and positions in industrial stocks–will have to increase capital by 30 percent–while others with residential mortgages may experience decline of capital requirements by 10 percent. In the UK, analysts argue that Basel II would favor HBOS in relation to Barclays. The BCBS can face another process of consultation. There are differences between European and American laws. While

American authorities can alter rules without a new statute, European authorities do not have that freedom.

The chief executive of the OCC stated in an interview that the recent QIS showed that some American banks could experience an increase of capital of 40 percent while others would have a reduction of 30 percent.[42] Morgan Stanley estimates that HBOS in the UK can experience a reduction of capital by 10 percent because of its mortgage activities. The merger of Halifax and Bank of Scotland created HBOS in 2001, the fifth largest bank in UK, with 22 percent of the mortgage market.[43] This is an important issue of implementation of Basel II in the United States.[44] In contrast, large banks with capital market activities, such as Credit Suisse, UBS and Deutsche, could have increases in capital of 20–30 percent because their business has more risk within Basel II.[45]

According to Hugo Banziger, chief credit officer of Deutsche Bank, data for the QIS are not reliable and in some cases merely estimates.[46] He argues that there is need for a fifth or sixth QIS to truly evaluate the long-term and cyclical impact.[47] Banks could reduce capital for credit risk, benefiting highest risk exposures. There could even be a significant reduction in capital.

Data constitute one of the major hurdles of Basel II.[48] Bank data are not precise and comprehensive. They do not have sufficiently long time series. Banks have data in multiple systems and countries. There is no solution for the issue of lack of information.

Basel II consists of recommendations subject to implementation by national authorities. These authorities in various countries could adopt rules that would prevent comparability of capital across borders. There is no consensus on how to compute economic capital.[49] Banks use CreditMetrics or MKMV, but there is no single robust model. According to research by SAS, only 17 percent of European institutions believe that they will comply with deadlines of Basel II.[50] This study used a sample of 95 individuals in 45 institutions in banking and finance.

Griffith-Jones et al. depart from the observation that capital flows to emerging markets and, especially, bank loans declined after financial crises.[51] However, a study by the OECD applied various assumptions to interest margins and bank flows, concluding that Basel II will have moderate effects on international capital flows to emerging countries.[52] Academic and policy literature underestimates risks during economic expansions and overestimates them during contractions. Griffith-Jones et al. fear that Basel II could reduce even further capital flows to developing economies because of higher costs of capital for loans to high risk institutions, which prevail in those economies. Use of market measurements for risk could accentuate

procyclical loans. The BIS is researching this issue.[53]

A significant part of job creation in the United States originates in small and medium companies. American legislators worry increasingly about possible deterioration of credit to smaller companies within Basel II.[54] There are thousands of small and medium banks in the United States. Legislators fear that Basel II could give greater competitiveness to larger banks in relation to smaller banks.

Basel II conflicts with banking realities in Asia. After the Asian crisis in 1997–98, credit managers in Asia focused on restructuring and recovery of problem assets.[55] Asian risk management systems for most banks are not developed. A major part of Asian banks could initially use only the standardized approach. Basel II would require high expenditures for Asian banks.

Strongin argues that the objective of Basel II is to match capital with business risk.[56] However, securities companies in the United States find a discrepancy between capital requirements and risks of their activities. The formulas of Basel II result in capital requirements for fundamental trading by banks and nonbanks without relation to historical losses or risk estimates by managers. Basel II treats the traditional risks of commercial banks with accounting different from mark to market by securities companies.

Professor Altman elaborates why authorities apply Basel II to only 20 of 8000 banks in the United States.[57] Basel II is complex and costly. There were few bank failures in the United States in the past 10 years because its banking system has adequate capital. Basel II proposes to add capital for operational risk in an arbitrary form based on variables that are difficult to measure. American authorities implemented a policy of rapid action and limits on leverage ratios when a bank's capital falls below required levels. Basel II does not mention if this policy works well in practice.

Nevertheless, Professor Altman disputes that authorities should apply Basel II to only 20 American banks. Many banks in the United States have deposits of $15 billion. They would qualify as very large institutions in other countries. Large American banks do not oppose Basel II because they anticipate less regulatory capital for credit assets. Basel II may have procyclical impact because of use of credit ratings and reserves for losses in case of default. During contractions, banks may provide less credit because of deterioration of credit ratings and losses given default, accentuating the credit shortage. During booms, banks may provide excessive credit when ratings improve and loss given default appears lower. However, the procyclical bias already exists in current regulation.

Andrew Crockett shows with two examples that the simplicity of Basel I generates distortions.[58] Sovereign debt originating in the OECD is without

risk while debt originating in other countries has a weight of 100 percent. Members of the OECD such as Korea and Mexico came close to default while members such as Singapore never had credit problems. Basel I treats credit to private risk as equivalent, which generates major distortions over the years. Basel II attempts to relate capital requirements to real risk. Naturally, there are complexities originating in the nature of financial business.

The Chairman of the Basel Committee and the Governor of the Bank of Spain, Jaime Caruana, believes that a New Accord is necessary because of a major evolution of methods for measuring and managing risk since Basel I in 1988.[59] Banks quantify market, credit and operational risk with more advanced techniques. In addition, there are new forms to transfer risk. The rules of Basel I became unrelated to current practice. The initial emphasis of Basel II was not on increasing capital but on strengthening world financial stability. The three pillars of Basel II aim to jointly promote stability.

Caruana disagrees with the view that Basel II would reduce capital flows to emerging countries because of its treatment of risk exposure. Basel II eliminated the zero weight to OECD risk, replacing it with risk weights to sovereigns and banks assigned by external credit ratings. Banks following IRB will use their own credit evaluation. According to Caruana, the argument that Basel II would increase pricing of credit to emerging countries requires empirical validity of the proposition that regulatory capital determines credit pricing. There is no empirical evidence that this proposition is valid. In practice, banks price loans in accordance with their assessment of economic risks of a borrower. Therefore, economic capital and not regulatory capital determines loan pricing. Banks must price loans on the credit risk of a borrower or incur risk of insolvency.

The Basel Committee also seriously considered arguments of procyclicality in banking behavior. Caruana addressed the argument that a ratings-based approach accentuates procyclicality in bank lending, especially in the case of emerging countries. Basel II intended to align regulatory capital with actual banking practice. Economic capital instead of regulatory capital determines bank behavior. Calculation of economic capital includes evaluation of lending risk. Basel II flattened risk-weight curves in the IRB approach to prevent small changes in credit risk causing large changes in capital requirements. The requirement to use stress testing in more advanced approaches to credit risk could change the impact of abrupt shocks on credit markets.

Another common doubt about Basel II is whether it applies to all banks and, in particular, to banks in emerging countries. Caruana argues that the menu approach of Basel II permits significant flexibility. In addition,

individual country supervisors have a wide range of action, permitting adaptation to local conditions.

Critics of Basel II deplore its complexity. Caruana argues that there are difficult choices between simplicity and comparability. In addition, there is another tradeoff between simplicity and risk sensitivity. Requests by banks and supervisors motivated much of the details in the New Accord. However, Basel II provides a simplified Accord with only 12 pages of text. Countries that do not desire to adopt complex options could use the standardized approach. Caruana dismisses the argument that changes in regulatory capital cause mergers and acquisitions in banking, referring also to research by the Fed. Hannan and Pilloff found that changes in regulatory capital or excess regulatory capital did not affect past merger and acquisition activity.[60]

The Chairman of the Basel Committee suggested a three-step process to implement Basel II: strengthening the supervisory framework, introduction of the three pillars and change from Basel I to Basel II. In the first step, a country would comply with the Core Principles.

New Accord and market risk

The Basel Committee issued a consultative document to complement the interest risk approach within Pillar II of review by supervisors.[61] Committee members approved by unanimity a set of principles of interest rate management shown in Table 6.9.

Table 6.9 Basel Committee principles for management of interest rate risk

Oversight by Board and Senior Management
1. Responsibility by Bank Board to approve strategies and policies of interest rate risk management, measures for implementation by senior management, monitoring and controlling of risk.
2. Responsibility by senior management of effectiveness in interest rate risk management, policies and processes for its control and available resources to evaluate and control risk.
3. Definition of individuals and risk management committees, ensuring separation of functions that avoid conflicts of interest. Establishment of functions that measure, monitor and control risks independently of decisions on positions, reporting directly to senior management and Board. More complex banks would create an independent unit.

(*Table Cont.*)

Adequate Risk Management Policies and Procedures
4. Consistency in processes and policies of interest rate risk with complex nature of these activities, consolidating appropriately affiliated institutions, recognizing legal and other obstacles to cash movements among affiliates.
5. Procedures and controls of introduction of new products, identifying their risks. Board or delegated committees would approve major risk or hedge proposals.
Risk Measurement, Monitoring and Control Functions
6. Establishment of systems of measurement of interest rate risk and evaluation of their effects, clarifying assumptions to risk managers and the bank.
7. Establishment and monitoring of operational limits and other measures that limit exposures in accordance with internal policies.
8. Measurement of vulnerabilities under stress conditions of markets, including violation of essential assumptions, to decide and review policies and impose limits on credit risk.
9. Adequate information systems to measure, monitor, control and report exposures, provided timely to Board and senior management and business line officers.
Internal Controls
10. Adequate systems of control of risk management, with periodic reviews and assessments in form available to supervisory authorities.
Information for Supervisors
11. Provide supervisors sufficient and timely information to evaluate interest rate risk, taking into account maturities and currencies in each portfolio of the bank, including off- balance sheet and other relevant items.
Adequate Capital
12. Maintenance of adequate capital for level of interest rate risk.
Disclosure of Interest Rate Risk
13. Disclosure to the public of level of interest rate risk and policies for its management.
Supervisory Treatment of Interest Rate Risk in Banking Book
14. Evaluation by supervisors and enforcement of required standard if necessary of incorporation in the banking book of internal systems of measurement. Banks would provide supervisors of results of internal measurement in the form of vulnerability of capital to standardized shocks.
15. Determination by supervisors if bank has adequate capital for risk exposures and required measures on the contrary to reduce risk, increase capital, or both.

Source: Basel Committee (2004a, 2001o).

There are 15 principles within 6 categories. The first category with three principles assigns the board and senior management responsibility for policy and management of interest rate risk. The second category, principles 4 and 5, specifies procedures and policies for management of interest rate risk. In this way, senior executives become responsible for discipline in design, implementation, monitoring and measures of adjustment by management of interest rate risk in the banking book.

The following categories, 6–10, treat processes of measurement of risk,[62] monitoring and controls. Many financial disasters occurred because of lack of internal knowledge of risk exposures, inadequate processes of measurement of risk or disinformation originating in lack of separation of functions of control and trading positions.

Category 11 places responsibility on the bank for informing supervisors. Deliberate disinformation to supervisors constituted another source of difficulty in specific cases. Principle 12 provides for maintenance of adequate capital, an aspect that supervisors monitor. The remaining principles, 13 –15, deal with incorporation in banking books of interest rate risk and its proper disclosure to inform market participants.

The Committee specified types of interest rate risks to be controlled:

- *Risk of repricing.* Risks originate in mismatches in banks of dates of repricing of rates of assets and liabilities, at fixed, flexible or indexed rates and in off-balance sheet positions. The most traditional example consists in funding overnight and lending at 90 days. If interest rates increase, net interest margin, rate of assets less rate of liabilities, would be negative, causing losses in bank portfolios
- *Yield curve risk.* Yield curves may change in slope and configuration. For example, if a bank were long in 10-year treasuries and short in 5-year treasuries, an increase in the slope of the yield curve would cause a decline in the value of the 10-year maturity of higher magnitude than the increase in the short 5-year maturity. An important consideration is that duration, or interest elasticity of bond price, increases with maturity. For example, depending on the level of yields and other characteristics–such as coupon, premium or discount and small interval of variation of a first derivative–a 30-year American Treasury could have duration of 13, that is, an increase of 100 basis points in yield is equivalent to a decline in price of 13 percent
- *Basis Risk.* This risk originates in imperfect correlations of yields paid and received, but with similar characteristics. Commonly, rates of hedging and hedged instruments do not correlate perfectly, causing basis risk
- *Options.* Many instruments contain implicit options that can cause rate risks in portfolios. Borrowers refinance mortgages in the United

States when rates decline, which corresponds to an implicit option of repurchase of the mortgage

Core Principles of Effective Banking Supervision

Supervisors and regulators enunciate principles in general terms with the objective of obtaining wide international approval. Article IV consultations evaluate standards by methodology based on technical criteria. Therefore, there is a set of Core Principles for Effective Banking Supervision and corresponding Methodology of Core Principles, both elaborated by the BCBS. The Core Principles constitute best practice in supervision and regulation. Most countries endorsed the principles and declared their intention to implement them.

Basel Core Principles consist of 25 principles within 7 categories.[63] The first principle includes five subprinciples so that there are effectively 30 principles. The Basel Committee developed the principles to guide effective review of banks by supervisors in accordance with best world standards. Naturally, at a country level, supervisors must adjust principles to a country's reality. Table 6.10 summarizes Core Principles.

Strengthening banking supervision constitutes a priority in the official community because of the accelerated effects of internal financial crises during international emergencies in the past ten years. Adoption and implementation of effective methods of adequate supervision constitute an important effort of crisis prevention.

The Committee encourages national authorities to take immediate measures to:

- Identify weakness in the supervisory system
- Correct most urgent weaknesses
- Require that authorities support measures of strengthening the financial sector, including implementation of core principles

The Committee determined that effective banking supervision requires a set of preconditions:

- Adequate and sustainable macroeconomic policies
- Developed infrastructure of credit culture, adequate laws with sound legal institutions, satisfactory accounting standards and payment and settlement systems
- Effective market discipline and adequate corporate governance
- Processes for rapid reduction of banking problems
- Safety net of monetary authorities to prevent systemic crises

There are several considerations in evaluation of banking principles. There must be access to information and entities of interest.[64] Analysis of

Table 6.10 Groups of principles for effective banking supervision

I. Objectives, Autonomy, Powers and Resources of Supervisors
6 principles treating responsibilities and objectives, resources, independence, legal systems, powers of enforcement, legal protection of supervisors and supply of information
II. Charters and Structures of Banks
4 principles on permissible activities, criteria and process of charters, review of transfer of property, acquisition and investment of goods
III. Regulations and Prudential Requirements
10 principles treating capital requirements, loans and investments, requirements of assessment of quality of assets and reserves and provisions, rules for limiting positions concentrated in one debtor or in groups of related debtors, loans to related entities, policies to identify and manage country risk and transfer risk, systems to measure, monitor and control market and other risks, systems of adequate internal control and rules to prevent fraud and money laundering
IV. Supervisory Methods
5 principles on supervision
V. Information Requirements
1 principle on reports of bank position and their disclosure
VI. Corrective Measures
1 principle to correct deficiencies with appropriate measures
VII. Offshore Banking Activities
3 principles

Source: Basel Committee (1999c, 1997d, 1997e).

compliance with any principle requires evaluation of diverse requirements such as laws, prudential regulation, supervisory criteria, etc. Identification of weaknesses in the system of banking supervision and deviations in relation to principles constitute the main objective of assessment. Compliance with a principle requires that no deficiencies remain. The assessment report must include deviations originating in nonbanking institutions acting in activities typical of banking, even without official supervision.

The IMF and World Bank have the responsibility for assessment and compliance with Core Principles in the Financial Sector Assessment Program (FSAP) within permanent consultations under Article IV.[65] Experience of work by the Fund and the Bank suggests need for more explicit assessment of preconditions for effective banking supervision in the FSAP. Article IV includes the precondition of macroeconomic stability. The FSAP must

assess preconditions of infrastructure and market discipline because of their implications for vulnerability of the financial sector.

However, preconditions of processes to treat problem banks and effectiveness of the safety net should constitute part of Core Principles.[66] Detailed assessment by the ROSC should include a significant section on compliance with preconditions. There should be independence of authorities and criteria on this respect. Supervision is unfeasible without independence. Supervisors should have protection from litigation even if they are accountable for their actions. Supervisory agencies require good governance.

There is need of good practices in classification of loans and provision. Profitability, capital and its soundness suffer from defects without more adequate assessment of assets and provisions. At national level, there are serious deficiencies in some key areas: credit and loan policies to affiliates, consolidation of accounts and their supervision.

The IMF and World Bank concluded that it would be possible to improve their own process of assessment. Methodology, technical assistance and the process would gain with greater transparency and criteria for evaluators and countries by the Fund and the Bank. There must be emphasis on implementation of Core Principles in accordance with their methodology, highlighting relations between assessment of sector and macroeconomic conditions.

Of 50 assessments of the Core Principles of Effective Banking Supervision conducted by the IMF and World Bank, 38 occurred within the FSAP. The Fund and the Bank evaluated 60 countries: only 5, 4 advanced and 1 in transition, complied with 26–39 principles. Five other countries, 2 advanced and 3 emerging, complied with 21–25 principles. Evidence is disturbing.

Emerging market countries do not comply with many principles. In the sample of 60, of 36 emerging countries only 4 complied with 16 or more principles and 16 with 5 or less. The Fund and the Bank found less favorable preconditions in emerging markets. The most important common weakness is lack of independence of banks and supervisors from political influence,[67] which appears critical in the current environment. Management of official banks or banks in difficulty show extreme lack of political independence. Approximately one third of countries showed weakness in basic principles.

Financial stability depends on many factors. Thus, it is difficult to relate it to adoption of standards and codes. Standards and codes do not constitute ends in themselves but rather only the means to promote sound financial systems, which in turn facilitate the financial intermediation that promotes

economic growth. Implementation of standards and codes only by itself does not ensure financial stability.

Sundarajan, Marston and Basu conducted empirical tests suggesting that macroeconomic and macroprudential factors influence credit risk and bank soundness.[68] Their results show nonsignificant influence of compliance with Core Principles of Banking Supervision on credit risk and bank soundness. However, compliance with these principles could have an indirect influence thorough their impact on the marginal effect of macroeconomic factors.

Comparison of standards for banks, insurance and securities

In addition to the Core Principles of the Basel Committee, the IAIS and IOSCO developed standards and codes for insurance and securities, respectively. The Joint Forum of the Basel Committee, IAIS and IOSCO extended analysis to standards for financial conglomerates, comparing also standards of banks, insurance companies and securities companies.[69]

Theory and practice relate banks to economic cycles and macroeconomics. Therefore, central banks developed safety nets to prevent systemic risk and financial turmoil resulting from bank crises. There is no similar belief that insurance companies constitute a source of financial instability that can affect the macro economy. However, aggregate economic conditions affect insurance companies. There is an apparent correlation between the macro economy and market "sentiment." Adverse economic conditions, or only unfavorable expectations, can cause drastic reductions in leveraged positions, in derivatives and in positions with high duration, resulting in declining prices of financial assets. In fact, insurance companies maintain positions with leverage and high duration that suffer major losses during macroeconomic adversity.

In short, assets and liabilities of banks, insurance and securities companies all show losses during adverse macroeconomic conditions. However, theory and practice attribute banks a greater relationship with the macro economy. On various occasions, as in distortions of accounting with Enron and other companies, the securities sector threatened to affect the macro economy through an alleged wealth effect of stock market holdings.

The central bank manipulates bank reserves as an instrument of monetary policy. The FRB, for example, analyzes economic conditions with the objective of controlling inflation, but also avoiding recession. The fed funds rate constitutes the instrument of monetary policy. The Fed does not control long-term interest rates directly, which may or may not respond to changes in fed funds rate. Long-term rates influence investment decisions.

Recession in the United States in 2001 originated significantly in the lack of

investment by the private sector. Investment responds to long-term interest rates. In 2001, the Fed used an imaginative form of influencing long-term rates. The treasury issues securities of various maturities, including 10- and 30-year bonds. Insurance companies, mutual funds, mortgage banks and many institutions use securities of very long-term maturity to manage assets and liabilities such as retirements and mortgages. Treasuries and mortgages constitute the largest financial market in the United States, with comparable maturities. The Fed announced that the Treasury would no longer issue 30-year bonds. As a result, demand for privately issued long-term securities increased, that is, prices increased, which is equivalent to lowering yields. The Fed reduced yields on long-term private securities, especially mortgages, with the policy of ceasing to issue a 30-year bond. There was a resulting run to refinance mortgages at lower rates. Millions of debtors experienced reduction in their monthly mortgage payments, increasing their disposable income, promoting maintenance of consumption. The impact on family budgets may have been stronger than a tax reduction. Similarly, the Fed reduced interest on long-term rates to influence corporate investment. Increases in disposable consumer income and reduction in costs of corporate investment constituted the Fed policy to promote the recovery of the economy.

The Joint Forum generated a matrix of comparison of basic principles for banks, insurance and securities companies. These three groups of principles recognize the key importance of preconditions. Only banks focus on adequate and sustainable macroeconomic policies. All three groups emphasize infrastructure.

Bank supervisors manage responsibility on functioning of markets, institutions and consumer protection. All three groups of principles treat protection of consumers and systemic stability in their major objectives. Bank principles emphasize systemic stability that also protects consumers. Insurance principles concentrate on protection of insured parties. Securities principles intend to protect investors, maintaining markets efficient, transparent and fair, with limited systemic risks.

All three groups of principles coincide on operational independence and sufficient resources of supervisors. Independence is important in all markets and even more in emerging countries. All protect supervisors from litigation. A possibility of prolonged and costly litigation discourages professionals from serving in temporary positions at low remuneration. Supervisors require sufficient resources to perform their duties. Argentina provides a recent example. Candidates for high-level economic positions demanded protection from legal liability as a condition to accept appointments.

Table 6.11 Summary of balance sheets

I. Banks	
Assets	Liabilities
• Loans	• Demand deposits
• Credits	• Other interbank short-term
II. Insurance Companies	
Assets	Liabilities
• Receivables originating in securities and purchase and resale agreements	• Technical reserves • Short positions
• Receivables from clients with larger collateral than nominal value	• Obligations in short positions • Debt without collateral short and long term
III. Securities Companies	
Assets	Liabilities
• Receivables with collateral of securities	• Payables originating in short positions
• Financial instruments at market price	• Sales and repurchase of securities

Supervisors in all groups of principles receive powers for correcting deviations. However, IOSCO emphasizes ample powers to legal enforcement of violation of laws by individuals and entities. In the United States, the Securities and Exchange Commission (SEC) initiates criminal actions against violations of laws. Judicial processes are open to the public. In contrast, bank and insurance supervisors conduct their inspections confidentially, believing that disclosure could prevent functioning of measures to correct deviations.

Table 6.11 shows a very simple summary of balance sheets of banks, insurance and securities companies. These simplified balance sheet elements merely attempt to capture the nature of some activities of these institutions. Markets evolved toward concentration within a given activity in one firm and consolidation of many activities within conglomerates. Citigroup in the United States comprises commercial banking, investment banking, brokerage and insurance, which is a significant departure from the tight compartments created during the 1930s. J.P. Morgan Chase mixes commercial and investment banking. In Europe, banks constitute true financial conglomerates. Insurance companies, such as American International Group (AIG), operate globally in a large variety of activities, such as a bank in Switzerland, an airplane leasing company, private equity

funds, fixed income management, commodities, etc. Investment banks such as Goldman Sachs and Morgan Stanley operate in diverse financial areas. In short, identifying management of risks in a financial company is a complex process that is difficult to summarize completely in a schematic balance sheet.

There are some common ingredients in risk management in all three groups, among which are administrative processes and policies, quantitative measurement and evaluation of products and strategies, limits on positions, diversification and hedge. General corporate policies attempt to define the desired quantity of risk and processes for its measurement and management. In addition to identification and measurement of risk and its limits, financial entities establish procedures and systems of control, monitoring and information.

As in credit risk calculation, entities measure risk with estimates of exposure, probability of loss and its value that require statistical knowledge. They generate scenarios to identify risk profiles within a process of stress testing. Risk control units inform senior management and board of results. Managers issue policies limiting exposures to risk after identification and measurement.

Entities in the three groups use general methods of risk reduction. Diversification in various positions attempts to capture stability of correlations among financial assets, reducing probable risk. They mitigate risk with collateral–banks issuing securities with loans as collateral and all three engaging in repos and reverses. Insurance companies stipulate values for reserve in case of catastrophe. Banks transfer risks issuing securities with original cash flow of loans and all three types of entities transfer risks with derivatives.

Management internal controls (MIC) and management information systems (MIS) constitute indispensable ingredients in sound management of a financial entity carrying risk exposures.[70] Equally important, controls, generation of information and systems must be independent of business units and traders. Numerous disasters occurred because of distortion of controls and information, such as Baring Brothers and Kidder Peabody, which alerted to the need for rigor and independence.

The section above on the New Capital Accord discusses bank credit risk. Insurance companies have credit risk exposure in various ways such as lending on margin to clients, participating in contracts of derivatives, lending or borrowing securities and in repos and reverses. They mitigate risk using securities as collateral. They also face risks in positions in securities and reinsurance.

Market and liquidity risks affect securities firms because of constantly

marking positions at market prices. They must maintain positions because of the nature of operations of underwriting, trading and distribution. They do not intend to eliminate risks but only mitigate them. Similarly, banks manage positions marked to market price. Positions in securities by insurance companies can experience price risk, reducing their capacity to meet commitments.

All three groups of entities use statistical models to identify, measure and manage risks. They widely use value at risk, VaR. However, entities supplement it with scenarios and stress testing.

All three groups carry exposure of funding and liquidity risk. Because of market conditions or a sudden reduction in perceived confidence in its name, an entity may not obtain the funding required to meet its commitments. They mitigate this risk with alternative funding sources, contingency plans and stress tests.

Securities firms experience the risk of not financing their positions because of concentration on a few wholesale sources of funding in short-term transactions. Loss of a major funding source, because of a sudden interruption of credit, may force liquidation of positions at an inopportune moment, causing high losses. Banks finance medium and long-term loans with short-dated funds, with a resulting risk of liquidity at various maturities. They mitigate these risks with liquid portfolios and contingent financing lines. Insurance companies use prepaid premiums as source of funding, with little short-term financing, having greater exposure to price risks than to liquidity risks.

Banks, insurance and securities companies face risks of changes in long-term interest rates. Banks experience increases of refinancing of mortgages during lowering interest rates. Insurance companies maintain exposures to high interest rates in fixed rate contracts. Securities firms manage duration gaps of assets and liabilities with various methods.

Insurance companies experience exposure to a specific type of technical or underwriting risk. It consists of determination of prices of products and provision of adequate technical reserves. Supervisors developed rules to avoid deficiency of resources of insurance companies to honor their commitments. For example, after the episode of September 11, 2001, stock analysts rapidly calculated probable payments by insurance companies to evaluate if reserves would be sufficient to meet claims and thus forecast equity values in the insurance sector.

Insurance companies have premium and interest of investments to meet claims. In contrast with deposits in which banks guarantee only nominal value and interest, insurance contracts are specific, related to events and subject to payments in multiples of premium value. Management of

insurance companies depends on precision of actuarial calculations used to price products, provision technical reserves and reduce risk through reinsurance.

Risk of companies and their management determines types of regulation and basic principles of supervisors. The Basel Capital Accord, in a process of change to the New Accord, provides minimum capital requirements for banks. Every group has different sources of funds to meet risks:

- *Banks*: provisions for expected losses and capital for unexpected losses
- *Insurance companies*: technical provisions for claims or benefits of contracts
- *Securities firms*: capital to compensate losses

Securities firms determine their capital for countries outside the jurisdiction of the EU, by the liquid capital approach, and within the EU by the Amendment to the Capital Accord to Incorporate Market Risk. Insurance companies outside the EU use the capital approach based on risk and within the EU regime of solvency.

It is difficult to compare capital approaches. Banks can use historical costs, securities firms mark to market prices and insurance companies follow diverse criteria. Comparison of minimum capital requirements among these groups and what happens in practice does not permit conclusions. Insurance companies typically maintain actual capital several times in excess of the required minimum, while banks seldom exceed 150 percent of minimum capital requirements.

The Basel principles identify and describe credit, market, liquidity and operational bank risks. The New Accord, principles of market risk and the Amendment for market risk elaborate principles and risks. IOSCO and IAIS use relatively general criteria. IOSCO provides more detail on risk management, a process not too different from that of the banks.

Future claims constitute major risks of insurance companies in assets and liabilities. Almost every balance sheet of an insurance company and its management depends on estimates: prices of products, matching duration of assets and liabilities, currencies, interest rates, etc. The basic principles of the IAIS deal with tools that supervisors use for various balance sheet items. All three groups of principles coincide on the following tools:

- Capital requirements
- Sound practices of accounting and evaluation
- Limits of assets in positions
- Policies, processes and systems

All three groups agree on a need for internal controls. Entities are responsible for establishing controls and supervisors for inspection of their existence and maintenance. The three groups deal with limits of

concentration, but in different form. The Basel Committee is concerned with concentration in debtors and partially in sectors and geographic areas. Adequate diversification of investment portfolios motivates the IAIS. The objective of IOSCO consists of limiting impacts of large positions on markets.

The Basel Committee created the Capital Accord and a New Capital Accord. IOSCO agrees with the Basel Committee that capital requirements should depend on risks of entities. The IAIS recommends attention to size and complexity of insurance companies, in addition to risk, to determine capital requirements. While the Basel Committee generated a specific capital requirement, IOSCO and IAIS recommend that supervisors develop their own requirements without trying to establish a unique world standard.

The Joint Forum conducted a survey of 31 financial institutions in 12 jurisdictions. This survey revealed a move toward risk management on an integrated firm fashion and efforts to aggregate risks by means of mathematical models.[71] The motivation for these developments in banking, insurance and securities organizations is a desire to understand risks in order to determine capital requirements more precisely.

Many institutions have established dedicated risk management functions. The objective is to define and measure risks throughout the company and report to senior management. In many firms, there has been significant investment in central systems to measure risks within the entire firm. The structure has in some cases exposure limit systems and risk management committees. However, there are differences in the degree of centralization.

The main objective of aggregation is to obtain a value for firm-wide economic capital. This value would result from an effort to integrate multiple sources of risk. Economic capital would be the value required to absorb potential losses that could result from corporate risks. Some approaches use mathematical and statistical techniques to measure the probability of adverse events. Others use stress tests to measure the impact on capital of various scenarios or events. However, some firms do not believe that it is possible to arrive at economic capital for such diverse activities as banking, securities and insurance with multiple credit risks, market risks, insurance risks and operational risks.

There are various forms of risk aggregation in a complex financial firm such as: products and instruments of the same category, risk types and business or legal entities. A firm may measure market risk with VaR models or by means of stress tests or supplement one with the other. Insurance companies have used statistical methods to quantify risk but not necessarily in relation to the concept of economic capital. The objective is

to develop risk measurement that would optimize the risk–return profile of the corporation.

There is greater interest to integrate and aggregate risk measurement in firms that have more variable and complex risks. Management in these firms has a challenge to allocate capital and resources among activities with very different risk–return profiles. Identification and measurement of correlations among risk activities may optimize risk-return decisions. Imperfect correlations among risks may lower required capital estimates. A firm could plan its diversification with the objective of reducing its risks. Firms with less variable and complex risks may find it burdensome to invest in integration and aggregation, relying on existing methods. Correlations among risks may not be as important in capital and diversification decisions.

Supervision and regulation have interacted with these developments in integration and aggregation of risks in financially complex firms. Various regulatory initiatives originate in the difficulty to regulate and supervise vague differentiation among banks, insurance and securities. Supervisors are increasingly interested in risk management processes as essential to prevent financial problems in financial entities. In addition, supervisors are joining efforts in unprecedented form. Dozens of regulators may be interested in a large financial firm operating over multiple jurisdictions. However, countries have maintained the structure of functional regulators instead of a single regulator for financial markets. Information sharing is part of this system. Finally, financial regulators have strived to improve the sensitivity of capital adequacy to risks.

Core principles for insurance and securities firms

The IAIS departs from the principle that operations of an insurance sector must be financially sound to contribute to economic growth, efficient allocation of resources and mobilization of long-term savings.[72] Sound regulation and supervision of insurance should promote fair, stable markets, growth and competition while protecting policyholders. Insurers collect fees at the initiation of the contract and incur claims only if specified events occur. Risks originate on the liability side, called "technical risks," related to statistical calculations in estimating liabilities. On the asset side, insurers incur market, credit and liquidity risks from investments and mismatch of assets and liabilities. Supervisors consider all these risks.

Insurance core principles of the IAIS devote six principles to prudential requirements. As for all principles, the IAIS provides an explanatory note, essential criteria and advanced criteria. The first principle specifies that

supervisors require insurers to identify, assess and manage risks soundly. Insurers must be able to identify potential risks as early as feasible. There are risks peculiar to insurance, such as underwriting and assessment of technical provisions. However, there are risks similar to those of other financial institutions, such as market risk. The role of supervisors is to review and monitor controls used by the insurer to contain these risks. Individual insurers should use best practices and the responsibility rests with the board of directors.

A second principle stipulates that supervisors require that insurers assess and manage risks of their underwritings. Insurers must have methods to determine adequate premiums. Each insurer must have an underwriting policy approved by the board of directors. An insurer determines premiums using actuarial, statistical or financial methods. Inadequate premiums may result in understatement of liabilities with potential ruinous consequences. Insurers must identify and price embedded options, maintaining sufficient reserves. The board of directors must approve a reinsurance strategy commensurate with overall risk profile and capital.

In accordance with the third prudential principle, supervisors must require that insurers maintain standards in determining technical provisions and other liabilities. Supervisors must have authority to assess the adequacy of technical provisions and require their increase whenever necessary. Sound capital adequacy and solvency depend critically on identifying and quantifying potential obligations to establish technical provisions. Supervisors must use sound actuarial skills.

The fourth principle requires supervisors to maintain standards on investments covering: investment policy, asset mix, valuation, diversification, asset/liability matching and risk management. Investment risks could affect adequacy of technical provisions and the solvency margin. Insurers must identify, measure, report and control investment risks. Supervisors must be able to assess standards and potential impact of investment policy on adequacy of technical provisions.

A fifth prudential principle determines that supervisors require insurers to use standards on derivatives. These standards cover restrictions, disclosures, internal controls and monitoring. The IAIS would prefer use of derivatives for risk mitigation. Supervisors must assess that insurers can identify, measure, monitor and control derivatives risks.

The final prudential principle stipulates that supervisors require insurers to comply with the prescribed solvency regime. In addition to capital adequacy, insurers must have forms of capital as a cushion for significant unexpected losses. Protection of policyholders requires sound technical provisions. However, insurers must also hold capital to absorb significant

unforeseen losses arising from unidentified risks.

The objectives of IOSCO's 30 principles of securities regulation are to protect investors, maintain fair, efficient and transparent markets and reduce systemic risk.[73] IOSCO believes that full disclosure is a major means to protect investors from misleading, manipulating or fraudulent practices. Insider trading, front-running or trading ahead of customers and misuse of client assets prevent markets from calculating risk/return and abuse investors. Disclosure requires internationally acceptable accounting and auditing standards. Licensure and authorization of sufficiently capitalized individuals and firms prevent losses to customers. Investors should have courts or other means of dispute resolution to seek compensation for improper behavior.

Regulators approve exchanges, trading systems and trading rules to maintain fair markets. There must be access to market facilities, fair market prices and a proper price formation process. Regulation should ensure market efficiency such that prices reflect available information, permitting investors to calculate risks and returns. There should be transparency such that pre- and post-trade information is available in timely fashion.

Regulators can prevent financial failure of market intermediaries through capital adequacy and internal controls with the objective of preventing systemic repercussions. At the same time, regulation should not inhibit legitimate risk taking.

Systemically Important Payment and Settlement Systems

The governors of central banks of the Group of Ten (G-10) created a Group of Experts on Systems and Payments in 1980. G-10 governors established the CPSS (Committee on Payment and Settlement Systems) in 1990. The CPSS constitutes a forum where the G-10 central banks monitor and analyze developments in payments and settlements as well as cross border payment systems and in multiple currencies. The CPSS issued the Core Principles for Systemically Important Settlement and Payment Systems and Responsibilities of Central Banks, a set considered as best practice in this matter.[74]

The Core principles depart from the public objective of safety and efficiency in systems of payment, which are indispensable to the functioning of the financial system. Systemically important payment systems can constitute a channel of transmission of shocks through markets and national and international financial systems. Financial stability depends on payment and settlement systems that are safe and efficient.

The CPSS departs from the propositions that free markets are not sufficient

to guarantee safety and efficiency because operators and participants do not necessarily share in costs and risks. Incentives would not compensate for risks of own deficiencies or those of others and costs imposed on other participants. There is only one operator in many countries, generally the central bank, because of economies of scale. Central banks have an interest in maintaining and developing systems because of their responsibilities with financial stability, role in providing settlement accounts to participants and function of monetary markets as channels in transmission of monetary policy and trust in national currency. In short, there are differences between social and private costs and benefits suggesting intervention by central banks.

There are five risks in settlement and payment systems:

- *Credit risk*: risk that a participant cannot meet its financial commitment in the day or in the future
- *Liquidity risk*: risk that a participant cannot meet obligations in the day, even if it can meet them in the future
- *Legal risk*: risk that deficiencies in the legal system cause increases in credit or liquidity risk
- *Operational risk*: risk that technical problems of operation or errors cause increases in credit and liquidity risks
- *Systemic risk*: risk that failure of a participant to meet its obligations, or by the system as a whole, prevents other participants, or financial institutions in another system, from meeting their obligations at settlement. Systemic potential depends on size and nature of individual payments and their aggregate value

Table 6.12 shows the Core Principles of the CPSS. As in the case of other standards and codes, the FSAP process of the IMF and World Bank assesses compliance with these principles. They constitute an important part of the ROSC. The FSAP assessed 57 systems in 42 countries.[75] Some technicians in the FSAP are part of the staff of the Fund or Bank, but others originate in institutions cooperating with the program.

Compliance of emerging countries with CPSS principles is quite weak, especially in the most important principles: II (knowledge of risks), III (management of risks), IV (settlement during the day) and V (settlement during the day of the participant with the largest obligation). Most emerging countries lack a sound legal base for systems. Central banks do not comply with their responsibilities.

Part of the New Architecture consists in motivating regional efforts of prevention of crises. The Western Hemisphere Initiative (WHI) of payment and settlement systems, is under leadership of the World Bank and *Centro de Estudios Monetarios Latinoamericanos*, Center for Latin American Monetary

Table 6.12 Core principles for systemically important payment systems

I.Well-founded legal basis under all relevant jurisdictions
II.Rules and procedures permit understanding of impact on financial risks
III.Clearly defined procedures for the management of credit risks and liquidity risks, specifying responsibilities of operator and participants and providing incentives to manage and control risks
IV.Prompt final settlement on the day of value, preferably during the day and at a minimum at the end of the day
V.Timely daily settlement of multilateral netting in case of inability of settlement by participant with largest settlement obligation
VI.Settlement assets preferably claim on the central bank; other assets with little or no credit risk
VII.High degree of security and operational reliability with contingency arrangements for timely completion of daily processing
VIII.Practically and economically efficient means for making payments
IX.Objective and public disclosure of criteria with fair and open access
X.Effective, accountable and transparent governance arrangements Note: systems should seek to exceed the minima included in principles IV and V
Responsibilities of the Central Bank in Applying the Core Principles
A.Clear definition of objectives and disclosure of policies systems
B.Compliance with core principles. The central bank should oversee compliance with the core principles by systems it does not operate and it should have the ability to carry out this oversight
C.Oversight and authority of systems operated by third parties
D.Cooperation with other central banks and relevant domestic and foreign authorities

Source: Committee on Payment and Settlement Systems (2001g)

Studies, CEMLA–the institution of advice, training and disclosure of central banks of Latin America and the Caribbean.[76]

In April 2002, the Banco Central do Brasil (BCB) initiated a Reserve Transfer System (STR).[77] Brazil settles interbank transactions in real time, irrevocably and unconditionally in accordance with practice in other countries. Thus, there is reduction of liquidity and credit risk as well as systemic risk. The credit risk of the BCB diminishes because fund transfer requires existence of sufficient funds in the settlement account of a participant. Simultaneously, there is settlement in real time, transaction

by transaction, in federal securities in the Special System of Settlement and Custody (SELIC). Settlement occurs at delivery against payment.

IMF code of transparency in monetary and financial policy

The Fund elaborated standards of transparency in monetary and financial policy in cooperation with the BIS, Basel Committee, CEMLA, European Central Bank, IAIS, IOSCO, OECD and the World Bank.[78] Transparency consists of providing the public, in timely and accessible form, objectives of policy, their legal, institutional and economic framework and terms of responsibility of institutions, central banks and financial agencies. The code focuses on various aspects of central banks and financial policies of supervisory agencies:

- Clearness of functions, responsibilities and objectives
- Process of formulation and disclosure of policies
- Public availability of information
- Accountability by functionaries and institutions of measures and assurance of integrity

There are two premises in the code. Transparent disclosure of objectives of monetary and financial policy, and commitment by the authorities to attain them, improve the effectiveness of monetary and financial policy and efficiency of markets. Accountability of central banks and financial authorities for their policy measures ensures sound governance.

Transparency improves formulation of policy and contributes to sound formation of expectations. Investors and the public in general can better evaluate policies, reducing uncertainty. Accountability by authorities for their actions tends to reduce moral risk. There are exceptions when the exchange regime or other aspects of policy can suffer because of disclosure of details

The code of transparency does not substitute for other Core Principles of Effective Banking Supervision by the Basel Committee, of insurance by the IAIS, of securities by IOSCO, of payment and settlement systems by the CPSS or of accounting by the IASB. Transparency is a form of strengthening principles of good policy management.

Table 6.13 reproduces several of the principles of transparency in monetary policy. The first group treats functions, responsibilities and objectives of central banks. The objectives and institutional framework of monetary policy should be included in legislation and regulation. There is a need for specification of the role of government by the central bank, especially the Treasury, a serious source of problems in many countries.

The second group specifies disclosure of formulation and decisions

of economic policy. Inflation targeting and decisions in Committee on Monetary Policy (COPOM) of Brazil, and in Mexico and Chile, constitute a good example of transparency in the monetary policy process. The other two groups treat disclosure of standardized information and accountability of functionaries for their actions.

The IMF issued a Code of Good Practices in Fiscal Transparency, which an IMF mission evaluated in the case of Brazil.[79] The report, published with authorization by Brazil, commends the country for transparency and improvement in public finance. The Fund emphasized the Law of Fiscal Responsibility of May 2000 that fixed limits on sustainability in the medium term jointly with strict requirements of transparency. Equally, the IMF pointed out the importance of fixed strict rules in restructuring debts of states and municipalities. While the Fund suggested numerous improvements, the report exemplifies that it will not be difficult for Brazil to comply with standards and codes included in the ROSC.

Table 6.13 Sound transparency practices for monetary policy by central banks

I. Clarity of Roles, Responsibilities and Objectives of Central Banks for Monetary Policy

1.1 Legislative specification, public disclosure and explanation of ultimate objective(s) of monetary policy

1.2 Clear definition of institutional relation between monetary and fiscal operations

1.3 Clear definition of Agency role of central bank on behalf of government

II. Open Process for Formulating and Reporting Monetary Policy Decisions

2.1 Public disclosure of the framework, instruments, and any targets used to pursue the objectives of monetary policy

2.2 Public disclosure of structure and functions of monetary policy body meeting to assess underlying economic developments, monitor progress toward achieving its monetary policy objective(s), and formulate policy for the period ahead

2.3 Public, timely announcement and explanation of changes in the setting of monetary policy instruments (other than fine-tuning measures)

2.4 Periodic public statements on progress toward achieving its monetary policy objective(s) as well as prospects for achievement with arrangements depending on the monetary policy framework, including the exchange rate regime.

III. Public Availability of Information on Monetary Policy

3.1 Presentations and releases of central bank data meeting the standards related to coverage, periodicity, timeliness of data and access by the public of the International Monetary Fund's data dissemination standards.

IV. Accountability and Assurances of Integrity by the Central Bank

4.1 Officials of the central bank available to appear before a designated public authority to report on the conduct of monetary policy, explain the policy objective(s) of their institution, describe their performance in achieving their objective(s) and, as appropriate, exchange views on the state of the economy and the financial system

Source: International Monetary Fund (2000e).

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Conclusion

Debtor countries need to manage their external relations to prevent crises and find rapid resolution to those that occur, which motivates this long exegesis of official doctrine and practices by private creditors. It would be alarming to invoke crises in other countries, but debtor countries do have the risk of a sudden stop of external capital flows, or reversal of flows, which actually happened in Mexico in 1994–95, Argentina currently and in 1994–95, Asia 1997–98 and Russia, Brazil and LTCM 1998. Private creditors and investors must engage in due diligence when providing credit to countries, analyzing carefully vulnerabilities and their probable impact on the value of their assets.

In external crises, interruption of capital flows caused declines in output from around 5 to 10 percent or more, with resulting unemployment. In cases such as Mexico, recovery was very rapid, in less than two years. Asia and Russia experienced prolonged recovery. Argentina is still restructuring its debt.

National accounts, as Professors Calvo and Reinhart appropriately recall, suggest avenues of transmission and intensities of crises. For both a monetary and a non-monetary economy:[1]

$$CAD = Z - GNP = Z^* - GDP - NFTA \qquad (C.1)$$

where Z is aggregate demand, Z^* aggregate demand of tradables, *GNP* Gross National Product, *GDP* Gross Domestic Product of tradables and *NFTA* net transfer of factors abroad. Sudden stop forces the country to revert a large current account deficit, *CAD*, to zero, or as in the case of Thailand and others to surplus. Because of a typical lack of reserves, there is a contraction of GDP and a sharp deterioration of the terms of trade, price of nontradables to price of tradables. The currency devalues, an exchange crisis, and the decline of prices of nontradables causes reduction in the collateral implicit in internal debt contracts, which jointly with decline of GDP provoke an internal financial crisis. The professional literature denominates the set of adversities as a twin exchange and financial crisis. Adverse selection, with the resulting interruption of the intermediation function of financial institutions, prevents recovery of the economy.

The debt crisis in 1982 was profound relative to later crises because it involved all of Latin America and the Philippines simultaneously.

Negotiation was less complex because of the concentration of debt in banks. Nevertheless, exposures of large banks in crisis countries exceeded capital several times. In fact, banks operated during many years with negative capital, only that banks did not mark loans daily to market price.

The exegesis of official international financial doctrine shows major changes in dealing with crises in emerging markets. Cline points out adequately that there is always moral hazard, both in safety nets as well as in emerging market rescues.[2] According to Cline, what is important is not the mere existence of moral hazard but its true size.

The experience of leaders in Russia and Indonesia diminished future moral hazard. The depth and rapidity of a crisis originating in sudden stops of capital flows served to diminish even further moral hazard. No head of state would contemplate currently the possibility of economic mismanagement in the hope of an international financial rescue. That rescue could still be available, but to succeeding heads of state and in lower values. The Russian crisis of 1998 reduced expectations by private investors and creditors that there will be a bailout without loss of the present value of debts. There is not even a doctrine of "too nuclear to fail." Within countries, debtors learned difficulties created by leveraged mismatches of currencies and maturities in balance sheets. Banks in some internal markets returned to prudence in the management of financial risk.

However, the largest decline of moral hazard *ex ante* could originate progressively in meetings of the G-7 and resulting changes in current practice. The IMF experienced some of the syndrome of military operations, called mission building. After military victory, the occupation armed forces of the United States in Japan proceeded to rebuild the nation. The G-7 should avoid becoming a source of moral hazard by influencing what country is too big to fail in terms of geopolitical considerations.

The IMF widened conditionality in its initial experience with the countries in transition in Eastern Europe and the former Soviet Union. Countries requested that the IMF provide temporary liquidity as well as suggestions of how to execute the transition to a new economy and the resulting society. In the Asian crisis, the IMF included conditionality, such as the termination of Korea's chaebol, which caused pleas for the extinction of the Fund. More regrettable is the lobby in the United States Congress to tie labor clauses and protection of the environment to IMF programs. These clauses are discriminatory against emerging countries and of dubious advantage to the United States. Other forums deal with environmental and labor concerns. Conditionality changed toward the better, with the Fund requiring only measures and reforms relevant to the adjustment of the economy.

The G-7 and IFIs agree that rescue programs of countries must be limited

to avoid moral hazard. The exegesis of current creative ambiguity suggests that practically no country is too big to fail. Perhaps only Mexico and Russia may qualify. Contagion theory and measurement do not provide still final verdict. However, it does not appear that a debtor country crisis could cause difficulties in international financial markets. Only the debtor country is capable of influencing decisively its own immunity to a twin crisis. Internal measures in accordance with accepted doctrine by IFIs may result in catalytic official resources with which to persuade private creditors to extend credit again. There is no room for much divergence. In addition, as IFIs emphasize, neither financial institutions nor countries desire a bailout. The expected costs of rescue packages for countries and financial institutions must be sufficiently high to discourage any remaining moral hazard.

IFIs focused their efforts in the past ten years in prevention of crises and in resolution of those that occurred. The Financial Sector Assessment Program (FSAP) and the Financial Sector Stability Assessment (FSSA) constitute jointly the vehicle of surveillance of economies for crisis prevention. In many countries, tax, monetary and financial institutions are sound relative to requirements. However, there is vulnerability in many others. VaR appears somewhat less applicable to the reality of emerging markets in general because of the low duration of financial assets and jumps in variables. Private and official international institutions apply stress testing to emerging markets. A country should monitor its financial sector with these methods to eliminate doubts that may emerge and to engage in productive consultations. However, the major responsibility for stress testing should rest with individual financial institutions. Domestic bailouts and moral hazard eventually lead to country moral hazard and bailouts. Twin crises magnify the adverse contraction of output and employment through mismatches and leverages in balance sheets of the government, corporations and individuals. Results of various scenarios in stress tests could identify vulnerabilities, providing avenues of preventive policies. A country's public and private financial sectors should develop local talent to attain improvements relative to work by official missions.

The support of the international official community could permit a country to negotiate successfully and rapidly access to private sector credit. In this effort, the principles of the Institute of International Finance could be of significant value. With sound internal adjustment endorsed by IFIs, a country could recover access to markets voluntarily, the only truly permanent arrangement. Korea's case, with moral suasion by the G-10 central banks for maintenance of short-term credit lines, will be difficult to replicate in the future.

There does not appear to be a feasible alternative currently to a country already applying the regime of fluctuating exchange rate with inflation targeting. Most countries do not have sufficient reserves to pledge as collateral of their currencies within a currency board or to buy the entire money base and implant dollarization. Alternatives between hard fixes and fluctuating rates do not have support within IFIs, but are popular in some Asian countries. Because of recent experience in crises, return to a soft peg by a country with flexible rates could create vulnerability. To avoid asymmetry of information, a central bank should maintain the process of disclosing meetings and reports. Monetary and exchange policies must be transparent in accordance with international standards.

Standards and codes in a few countries are not too far away from best practice, especially taking into account a country's reality. However, IMF missions find substantial institutional weakness. Supervisors and regulators in emerging countries should ensure that banks maintain adequate capital ratios. Stress tests would suggest how to diminish vulnerabilities. Central banks should be sound institutions with technical staff for effective supervision and autonomy from the central government to diminish moral hazard. Supervisors and regulators must disclose data and policies. Monetary authorities should establish sound systems of payments and settlements, avoiding systemic vulnerabilities. Standards of accounting and auditing must follow international standards.

With sound conservative economic policy in expenditures and revenues, tight monetary policy during a crisis until reduction of the public deficit, disclosure and consultations with the official community and creditors, a country may contain exchange crises and prevent effects on the internal financial sector. There is a great reward in the form of self-sustained economic growth without inflation, bringing prosperity.

This book focuses on international supervision and regulation because a country cannot change the system. If it were possible to recreate the world, there would not be so many currencies and barriers to international trade. In the same way, international regulation, supervision and crises would be different. The Rey Report analyzed how regulation and supervision evolve in response to prior crises and events. The lack of theory, measurement and forecasting capacity limits significantly monetary authorities. The set of international financial rules resembles in complexity the 3.5 million words and 7.8 thousand pages of 26 U.S.C.–Internal Revenue Code, with arbitrariness, inconsistencies, differences in interpretation even inside the IRS and difficulty in understanding (http://uscode.house.gov/title_26.htm). The more important issue of what should be international regulation and supervision would require a treatise in several volumes.

Countries must improve their institutions and policies to avoid the complex process of rescue by IFIs. Professor Meltzer argues that creditors and debtors must recognize risks of imprudent financial decisions.[3] IMF conditionality should not substitute for deeper economic reforms. Official financing may postpone reforms. Meltzer contends that standards and codes, as those proposed by the Basel Committee and other forums should not be a substitute for market discipline of calculation of risk and return. According to Meltzer, moral hazard will only disappear if creditors and debtors suffer costs and risks of imprudence, perhaps the only way to avoid tragedies in emerging countries.

Institutional reform constitutes the vehicle to protect the internal economy, employment and production. The choice of exchange regime is secondary in relation to strengthening the economy from external shocks. Professors Guillermo A. Calvo and Frederic S. Mishkin identified five important vulnerabilities to crises in emerging countries and required reforms to strengthen their economies:[4]

- Fiscal fragility contained by parsimony in expenditures and tax reform to increase the tax base and ensure isonomy of exports
- Imprudence of supervision/regulation and weakness of financial institutions requiring autonomy and professionalism in monetary authorities
- Impaired credibility of financial institutions reversed with prudence in leverage and control of risks
- Dollarization of liabilities requiring prudence in leverage and mismatches in balance sheets of the government, companies and individuals
- Exposure to sudden stops of external capital flows avoided by parsimonious foreign indebtedness and microeconomic reforms that increase competitiveness in global markets

An interruption of external private capital flows resulting from confrontation with the international official community could constitute the highest vulnerability of a debtor country. A crisis of the balance of payments would spread to local financial markets, strangling production and employment. Microeconomic reforms and fiscal-monetary prudence would strengthen the economy, diminishing its exposure to twin crises. Opening the economy to world competition would ensure independence of the country from the "new architecture of the international financial system," allowing for improved control of its destinies. Similarly, IFIs should continue the effort to diminish moral hazard.

Caballero argues that the mere transfer of standards from more mature economies may not be sufficient to accomplish change in emerging countries.[5] The objective is to diminish an inferiority in financial intermediation.

Countries may have to capitalize on synergies of integration of financial markets. Moreover, the development of institutional investors may accomplish the actual implementation of standards and sound growth of intermediation. Caballero suggests that corruption does not fully explain banking problems in Mexico. Misinformation and lack of expertise because of an earlier period of nationalization of banks could be more important. He recalls the need to avoid collateral with macroeconomic risk, in particular, real estate. Some Asian countries revealed real estate assets in financial institutions funded with dollar-denominated debt with a soft peg of local currency to the dollar. Caballero suggests heavier weight of macroeconomic risk in VaR computations.

Standards, codes, and capital accords of best practice in financial institutions and corporations specify accountability of the board of directors and senior management for controls of risks and their impact on the net worth of stockholders. Similarly, the elected executive and Congress are accountable for risk control of a crisis and its effects on the welfare of the population.

Distinguished economists raise objections to inflation targeting. Professor Benjamin Friedman argues that there is no conclusive empirical verification of the benefits of inflation targeting for macroeconomic performance, in particular, when the country departs from a low inflation rate.[6] Friedman contends that inflation targeting does not contribute to transparency in monetary policy but rather results in opaqueness. The concentration of central banks on inflation causes atrophy of concern over the real economy. Central banks are not transparent but rather hide their true concerns and intentions on the real sector. The fear of floating model of Calvo and Reinhart adds the exchange rate as another actual but hidden target of central banks.

Professor Christopher A. Sims reminds that economists have a poor record in proposing simple nominal anchors that did not prove successful.[7] Some of these proposals divert attention away from the true causes of problems. A cynic would argue that the interest in inflation targeting is not because it constitutes a new, powerful method but rather because it provides an alternative for earlier failures such as the gold standard, monetarism and exchange rate anchors. Sims argues that coordination with fiscal policy is required for control of inflation by the central bank. This coordination depends on implementation of central bank independence. Inflation targeting may not be useful in countries that had difficulties in the past in controlling inflation. In countries with historical control of inflation, the inflation target may be less of a benefit than changes in policy and communication of the central bank with the public.

Professors Roubini and Setser provide interesting policy proposals on crisis management by IFIs.[8] They argue that the IMF has to treat crisis countries differently, conceptually and in programs. There are obvious cases of merit in assistance, such as Mexico and Korea, because of their ability to reduce deficits and debts. In those cases, the IMF should provide ample funds to bridge the countries to a situation of recovery of market access. At the other extreme, there are countries with excessive debt that matures rapidly, such as Argentina and Ecuador. Those countries must find an optimal way to reduce their debts. There are countries in the middle-such as Ukraine, Pakistan and Uruguay-that require a restructuring of debt maturity, maintaining low rates and avoiding debt reduction.

Professor Kenneth Rogoff, who directed the research department of the IMF, has proposed major restructuring of the World Bank and the IMF. Professor Rogoff proposes that the Bank close its lending windows through the IBRD and IFC.[9] He proposes restriction of the Bank to its "defensible aid core," or international development assistance. In addition, the development aid should be entirely in the form of outright grants in contrast with 70 percent in grants currently. Professor Rogoff argues that the lending capacity of the Fund, $150 billion, is enough to cause moral hazard but insufficient to resolve a major international financial crisis. He also believes that the Fund is too politicized to become a lender of last resort. Professor Rogoff concludes that the IMF should exit lending in the same way as the World Bank. The remaining role of the Fund would be coordination of global finance, technical advice and maybe providing debt ratings on demand by individual countries.

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Notes

Introduction

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