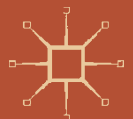


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THE EVOLUTION
OF CENTRAL BANKING:
THEORY AND HISTORY

Stefano Ugolini



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Stefano Ugolini

The Evolution of Central Banking: Theory and History

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To Marta, Sveva, Giacomo, and...

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In a sense, the present book can hence be said to be a "spin-off" of Norges Bank's Bicentenary Project. My long list of acknowledgements

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Toulouse
July 13th, 2017

Stefano Ugolini

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1

Introduction

Whoever wants to come to a good and sound conclusion must not make up his mind before paying attention to all arguments, or (as the say goes) “bring the verdict to Senate from home”; rather, while leaving his judgment pending and not leaning more in one direction than in the other, he must listen impartially to everything that is being said, scrutinize every opinion, and – dispassionately and unbiasedly – invoke and embrace God’s enlightenment.

Tommaso Contarini, *Speech to the Venetian Senate in Support of the Creation of a Public Bank*, 28 December 1584 (quoted in Lattes (1869, p. 118), my translation).

For nearly three decades to 2007, central banking around the world had experienced increasing convergence—both in the concept¹ and in the practice of it.² The so-called Great Moderation had created a world where “everything was simple, tidy, and cozy”³ for central bankers. The series of

¹ See, for example, Siklos (2002).

² See, for example, Bindseil (2004).

³ Borio (2014, p. 191).

financial shocks which has taken place since, however, has shaken all central bankers' certainties about their own missions.⁴ The large deployment of "unconventional" monetary policies seems to have postponed the tackling of a number of thorny issues; ten years into the crisis (as of this writing), there is still a sense of uncertainty about how the "new normal" will look like for central bankers once the "emergency" phase will come (if ever) to an end. *How will central banking be evolving in the future?* A number of important issues are currently open: among others, the future of payment systems, the development of macroprudential regulation, the possible disappearance of cash, as well as the status of monetary policy in a world with very low equilibrium interest rates. Underlying these specific issues, however, there exist two more fundamental questions.

The first one has to do with the relationship between monetary authorities and fiscal authorities. Before the crisis, the consensual "philosophy" held that optimal policymaking could be implemented only if the central bank was turned into a fully independent agency. In a sort of "Olympian isolation", central bankers would have been able to deliver monetary stability by focusing exclusively on macroeconomic variables and the management of expectations. Although this framework has not been formally changed yet, several substantial alterations have occurred since the crisis. On the one hand, central bankers have been thrown upon them the burden of *actively* defending financial stability, something that was previously understood to be extinguished for good by the "financial innovations" of the recent decades. On the other hand, the large-scale "unconventional" interventions have appeared to dangerously blur the lines between monetary policy and fiscal policy. Will the "new normal" be a return to the domination of Treasuries over central banks—as it had been the case before the 1980s?

The second and related, yet more subtle, question has to do with the legitimacy of central banks as organizations entrusted with the provision of crucial economic functions like financial stability and monetary stability. Today, central banks are independent agencies which make part of the public sector. Yet this particular institutional arrangement is actually very recent from a historical viewpoint—and potentially fragile. Other equilibria are arguably possible, ranging from complete "internalization" by the government to complete "externalization" to the private sector.

⁴Davies and Green (2010).

Will the “new normal” see the end of central banks as we have known them for some decades, or even the emergence of alternative solutions for the provision of financial and monetary stability?

These questions cannot actually be answered without a deep understanding of the long-term trends in the evolution of central banking. As it happens, central bankers have proved more eager to ask questions to the past,⁵ and demand for historical expertise has actually increased since the crisis. Unfortunately, history is often a less generous “teacher of life” than Cicero famously found it convenient to admit. To be sure, history is unable to provide readily applicable lessons to policymakers. Still, history can provide guidance (and most of all, a rich source of inspiration) to the designing of new institutional solutions—a field which is the domain of long-term dynamics *par excellence*. In order for this to be the case, however, the primordial precondition obviously consists of having a good understanding of such historical dynamics.

This book aims at providing a new and an innovative account of the long-term evolution of central banking. Despite remaining very valuable, the state-of-the-art literature was written in a different era in order to address different questions, and cannot thus offer fully satisfactory guidance to address the challenges we face at present. The rest of this chapter will show why this appears to be the case and propose a way forward to an improved understanding of this topical subject.

1.1 The Evolution of Central Banks

1.1.1 The Starting Point

For more than a generation, the literature on the history of central banks has grown in the shadow of Charles Goodhart’s masterpiece *The Evolution of Central Banks*.⁶ This book was written in the context of the “Austrian revival” of the 1980s, as a reply to the abrupt comeback of free-banking

⁵ Qvigstad (2016, pp. 124–155).

⁶ Goodhart (1988). The first edition of the book was published in 1985.

theories—summoned by the works of authors like Friedrich Hayek,⁷ Vera Smith,⁸ Lawrence White,⁹ and Richard Timberlake.¹⁰ In his concise yet forceful exposition, Goodhart dismissed these authors' contention that history provided evidence in favour of free banking. Quite to the opposite—he argued—history showed that the short-lived experiences of free-banking systems had displayed an unequivocal tendency to evolve into monopolistic systems dominated by a “central” intermediary. Then, Goodhart went on to show how these inescapable private monopolies “naturally” evolved into modern central banks. He argued that this happened through the private monopolists' gradual acceptance of their public responsibilities, in the field of financial stability, via the provision of lending of last resort. The first intermediary to have evolved into a modern central bank was the Bank of England, which in the second half of the nineteenth century gradually realized it had to stop maximizing its shareholders' profits and start taking care of social welfare.¹¹ In Goodhart's vision, then, lending of last resort was central banks' first and foremost mission, and the one that characterized their first emergence in England and their subsequent spread elsewhere. This function—he concluded—is something the private sector is clearly unable to provide and the one that ultimately justifies the need for central banks in developed financial systems. Once the Bank of England “learnt” how to behave like a modern central bank, the superiority of this solution naturally imposed itself in the rest of the world.

⁷ Hayek (1978).

⁸ Smith (1990). This book consists of Vera Smith's doctoral dissertation (supervised by Hayek); originally published in 1936, it only started to gain popularity after the author's death in 1976.

⁹ White (1989). This volume collects the essays the author had been publishing in the preceding years.

¹⁰ Timberlake (1984).

¹¹ In a nutshell: “*The crucial feature necessary to allow a Central Bank to carry out, in full, its various functions, e.g., of maintaining financial discipline, providing support at times of crisis, is that it should become above the competitive battle, a noncompetitive, non-profit-maximizing body. This was not generally recognized at the outset.* In the first half of the nineteenth century, the key feature of a Central Bank was seen to reside in its relationship with government and its privileged position as (monopolistic) note issuer: but in its banking function, it was often widely considered that it was, and should act as, just one competitive bank among many. This concept of a Central Bank's role was codified in the 1844 Bank of England Act. But this was, as argued above, an incorrect, indeed faulty, concept, and, I would argue, true Central Banking did not develop until the need for the Central Banks to be noncompetitive had become realized and established. *This metamorphosis occurred slowly and by trial, error, and debate in England in the last half of the nineteenth century, in some large part following the prompting of Bagehot.* It was a difficult transition [...]”: Goodhart (1988, pp. 45–46, my emphasis).

The Evolution of Central Banks has rightly been a deeply influential contribution.¹² Thanks to the author’s almost unique expertise in the theory, history, and (most importantly) *practice* of central banking,¹³ it has provided an authoritative blueprint for subsequent research in the history of money-issuing organizations. Goodhart’s effort, which we might legitimately define a “theory of history”, has thus been—and still is—an extremely useful and inspiring starting point for historical research.¹⁴ “Naturally” it cannot, however, pretend to be its ending point. As a matter of fact, there exist at least two main problems with this vision: the first one is methodological, while the second one is rather logical.

1.1.2 A Manifest Destiny?

Goodhart’s grand story has a distinguished line of ancestors. Albeit nourished by (then brand new) advances in information and agency theory, his contribution is firmly grounded in the traditional British narrative that has been continuously developed over the decades by British authors like John Clapham,¹⁵ Victor Morgan,¹⁶ Wilfrid King,¹⁷ Ralph Hawtrey,¹⁸ and Theodore Gregory,¹⁹ and which ultimately has its true originator in Walter Bagehot.²⁰ As Goodhart himself acknowledged, his account of English banking history is directly drawn from *Lombard Street*.²¹ Bagehot’s view, which later morphed into the well-known “British monetary orthodoxy”,²² is of course non-neutral, but the successive British scholars

¹² For a discussion of Goodhart’s contribution to the literature on the evolution of central banks, see Uittenbogaard (2015, pp. 11–29).

¹³ Goodhart had been with the Bank of England from 1968 to 1985 and has remained a prominent figure in central banking circles since: Goodhart (1988, pp. vii–viii).

¹⁴ See esp. the “universal” survey of central bank history provided by Capie et al. (1994), which remains a benchmark reference in the literature.

¹⁵ Clapham (1944).

¹⁶ Morgan (1943).

¹⁷ King (1936).

¹⁸ Hawtrey (1932, 1938).

¹⁹ Gregory (1929).

²⁰ Bagehot (1873).

²¹ Goodhart (1988, p. 46).

²² Fetter (1965).

that have built on this “orthodox” view have tended to stick very rigorously to it and to systematically ignore alternative ones (e.g. the still outstanding, yet largely forgotten, contribution by American economist Elmer Wood).²³

Yet, there is a fundamental reason for caution in treating Bagehot’s work as a secondary rather than a primary source. Although he is universally known by economists for his founding contribution to the theory of lending of last resort, Walter Bagehot was by no mean a pure theorist like some of its predecessors in the “hall of fame” of monetary thought (esp. David Ricardo). By contrast, he was an all-round intellectual, who displayed considerable interest in the history of institutions at large. Bagehot wrote extensively on the English constitutional order²⁴ and more generally on political and social change²⁵ and systematically applied an evolutionist interpretation to its objects of study; *Lombard Street* (a book dealing comprehensively with the history and politics of the English money market) was but the “financial appendix” of Bagehot’s evolutionist narrative. In view of his evolutionist approach, Bagehot has sometimes been described as a “Social Darwinist”; such a label is not, however, fully appropriate—not because Bagehot’s approach was inconsistent with Darwin’s,²⁶ but because it was Bagehot himself who exerted a decisive influence on Darwin, convincing the latter to extend his earlier zoological analysis to the human species.²⁷

As it is well known, the concept of “natural selection” is however one that generates a number of serious epistemological problems. The idea of the “survival of the fittest” has been most controversial in both the social and biological sciences, and is largely rejected today.²⁸ The very same caveats should apply, therefore, to the (way more restricted) domain of the evolution of central banks. As William Roberds and François Velde have argued in their recent survey of the history of early modern money-

²³ Wood (1939).

²⁴ Bagehot (1867).

²⁵ Bagehot (1872).

²⁶ Hodgson (2004).

²⁷ Cowles (1937). On the personal links between Bagehot and Darwin, also see Flandreau (2016).

²⁸ To be precise, Charles Darwin did not put forward himself this idea, which was rather coined in the social sciences by Herbert Spencer: Hudson (2000, p. 535).

issuing organizations, too restrictive an application of the evolutionary paradigm would lead to “teleological” accounts plagued by the “survivor bias”²⁹; such accounts would, indeed, prevent us from assessing properly the actual degree of optimality of the organizational solutions successively found over time.³⁰

1.1.3 Post Hoc, Propter Hoc?

The second problem raised by *The Evolution of Central Banks* is of logical nature. Goodhart’s “theory of history” is based on the crucial hypothesis that central banks chiefly developed to produce one single “public good”: financial stability, in the form of lending of last resort. Of course, this is the natural implication of Goodhart’s direct dependence on Bagehot. However, while lending of last resort is unquestionably one of the most important missions entrusted to central banks, it is in no way the only one. This point was made in the early 2000s by Curzio Giannini in his *The Age of Central Banks*.³¹ His work is the almost perfect “twin” of *The Evolution of Central Banks*: not only do the two books display a substantially complementary approach, but also their authors’ profiles share a number of similarities—as Giannini possessed, like Goodhart, an expertise in the theory, history, and practice of central banking.³² The main argument of *The Age of Central Banks* is that the most important feature of central banks is not lending of last resort, but issuing money. According to Giannini, the “dematerialization” of money initiated by the “invention” of banknotes called for new institutional solutions to a press-

²⁹The “survivor bias” is the error of taking into account only continued processes while ignoring discontinued ones.

³⁰“We are aware that blind forces are not at work here [in the evolution of central banking], but human beings grappling for solutions to problems they perhaps do not fully understand. Nor do we necessarily think that all hillclimbing algorithms find the global optimum: where one arrives often depends on initial conditions and on the path followed. [...] Central banking involves a sort of alchemy, and what we see in our history is a search for the right formula. We do not conclude that it has been found; if anything, we are left with a sense that the search continues”: Roberds and Velde (2016, pp. 19–20).

³¹Giannini (2011). The Italian version of the book had been published posthumously in 2004.

³²Giannini was with the Banca d’Italia from 1983 to 2003, when he passed away: Giannini (2011, pp. viii–ix).

ing social problem, that is, the provision of that “public good” that is monetary stability. This solution was the modern central bank, and it was first found in England, as this country was the cradle both of the industrial revolution and of constitutional government.³³

Putting side by side Goodhart’s and Giannini’s books is an instructive exercise. Both are “theories of history”. Both argue that central banks emerged as the solution to one specific issue, in one case of microeconomic nature (financial instability, to be solved through lending of last resort), in the other case of macroeconomic nature (monetary instability, to be solved through a socially acceptable money-creation mechanism). And both conclude that this superior solution was first found in England, from where it spread everywhere else in the world. Hence, the two accounts are (as said) absolutely complementary: in no way the one actually disproves the other. However, the potential coexistence of these two opposite yet complementary theories raises serious questions about their actual falsifiability: if none of the two is false, then which one is true? More generally, the comparison between Goodhart’s and Giannini’s stories reveals the limits of the logic they both share: that is, the idea of focusing on the evolution of a particular form of *organization* aimed at solving a given problem, rather than focusing on the evolution of the *solution* to that very problem. In what follows, I will call this logic an *institutional approach*.³⁴ This way of proceeding may be treacherous because it is particularly prone to the “post hoc, propter hoc” fallacy: as the focus is inevitably on the final outcome of a process rather than on the process in itself, there is the risk to establish dubious causal links between whatever chronologically precedes the analysed outcome and the outcome itself. And such risk is high-

³³ In a nutshell: “With the industrial revolution and virtually contemporaneous development of the representative state a structural split occurred. On the one side, as the economic circuit became increasingly complex it fuelled the social incentive to develop more flexible payment procedures. On the other side, under the new political and institutional framework monetary institutions could, for the first time, develop outside the control of the prince. Any attempt to move beyond commodity money, even in its most advanced form of coinage, must entail an intermingling of money circuit and credit circuit. [...] The intermingling of money and credit circuit thus set in motion a long and somewhat tortuous process of institutional adaptation centred around the figure of the central bank”: Giannini (2011, pp. xxvi–xxvii).

³⁴ The word “institutional” is used in economics with plenty of different meanings. Here I follow Merton and Bodie (1995) and use it merely as opposed to the word “functional”—with no other implication.

est when the outcome is a particularly complex one, which is precisely the case of the modern central bank—an object that remains, still today, extraordinarily difficult to define.

1.1.4 What Is a Central Bank?

Basically all the accounts of the history of central banks available to date have adopted (more or less consciously) the institutional approach. Because the object of analysis of this approach is one specific organizational form, the crucial question to which it is confronted is defining what a central bank actually is. Unfortunately, the question is far more complex than it might look at first glance. This is acknowledged by institutional historians themselves: as Charles Goodhart and co-authors put it, “defining central banking is problematic. In one sense, we recognize it when we see it.”³⁵ Yet, as sensible as this sorting criterion might sound, it can hardly play as guidance for a rigorous survey. Under this respect, linguistic evidence is of very little help either: when the term “central bank” started to be used in the early nineteenth century, it was originally employed to designate the headquarters of a multi-branched bank³⁶; only some decades later was it applied, by extension, to describe the position of the Bank of England.³⁷

In the light of these difficulties, different strategies can be tentatively adopted in order to establish what central banks really are and when they first appeared. The most basic one consists of saying that a central bank is an organization that has become a current-day central bank. If we apply this criterion, then we must conclude that the world’s first central bank was Sweden’s Riksbank (founded in 1668, i.e. 26 years before the Bank of England). However, the Riksbank is merely the oldest money-issuing organization to have survived without interruption until the present; in fact, the bank was neither the first money-issuing organization to have

³⁵ Capie et al. (1994, p. 5).

³⁶ See, for example, Joplin (1837, pp. 22 and 38).

³⁷ See, for example, Gilbert (1865, pp. 557–570). It is interesting to notice that even Bagehot makes use of the word “central bank” only twice in *Lombard Street*—and in both cases, with reference to the headquarters of a multi-branched bank, not to a bank of issue (Bagehot 1873, pp. 57 and 88–89).

appeared, nor the first organization to have looked like a twenty-first-century central bank.

A slightly more refined strategy consists of saying that a central bank is the kind of organization that Walter Bagehot talks about in *Lombard Street*. This definition “by authority”—which is the one endorsed by Goodhart—has become the most popular one among scholars.³⁸ If we apply this criterion, then we must conclude that the world’s first central bank was what the Bank of England became in the 1870s after listening to Bagehot’s teachings. Such a conclusion is no less problematic, though. First, the Bank of England started to implement lending of last resort before Bagehot taught it to do so, and other banks of issue also started to do the same at the very same time.³⁹ Second, as we have already pointed out, assuming lending of last resort as central banks’ defining mission is certainly not uncontroversial: for instance, Giannini agreed that the first central bank was what the Bank of England became in the second half of the nineteenth century, but for totally different reasons than Goodhart’s.⁴⁰

Yet another strategy consists of saying that a central bank is an organization issuing legal-tender fiat money. If we apply this criterion, then we must conclude that the world’s first central bank was not a *bank of issue* (i.e. an organization issuing banknotes) like today’s central banks and their direct progenitors, but a *transfer* or *giro bank* (i.e. an organization not issuing banknotes, but only credit on current account). This is what a number of scholars have maintained by ascribing this primacy to Amsterdam’s Wisselbank.⁴¹

The main challenge faced by all these definitions is the difficulty of arguing convincingly why one criterion should be superior to the others. Do banknotes deserve the status of money more than deposits, as Giannini and others argued? And should not other important factors,

³⁸ This is encapsulated by Grossman’s (2010, pp. 42–44) claim that before the 1870s central banks did not exist as “there was no accepted concept of a central bank,” and that only thanks to Bagehot “the modern concept of central bank began to gain widespread acceptance.” This idea is extensively enunciated by Capie (2002). Also see Siklos (2002, p. 10) and Davies and Green (2010, p. 11).

³⁹ Bignon et al. (2012).

⁴⁰ See Sect. 1.1.3.

⁴¹ See, for example, Kindleberger (1991); Schnabel and Shin (2006); Quinn and Roberds (2007). As we shall see, however, if we followed this definition, primacy should probably be ascribed to Venice’s Banco del Giro: see Sect. 5.2.1.

like the monetization of government debt, be taken into account? Because all these criteria have a purely *axiological* nature (i.e. they are mere value judgements), the controversy can never be solved. And indeed it is a very old controversy,⁴² which has been fought with all types of intellectual tools (including etymological ones),⁴³ but which is inevitably destined to remain inconclusive.

Therefore, the institutional approach appears to lead to a serious deadlock. Nonetheless, a way forward seems to exist. It consists of going back to basics: rather than focusing on the *organizations* created to solve a given problem, it consists of looking at the *solutions* themselves. In other words, rather than looking at the evolution of *central banks*, it is about looking at the evolution of *central banking*.

1.2 The Evolution of Central Banking

1.2.1 What Are Central Banking Functions?

The strategy proposed by this book in order to overcome the limitations of the institutional approach consists of adopting a *functional approach*.⁴⁴ This means taking as the object of analysis not an organizational form, but the functions that need to be provided (i.e. the solutions that need to be found), regardless of the organizations which provide them. The functional approach has two main advantages with respect to the institutional

⁴² See, for example, the eighteenth-century debate between supporters of banks of issue and supporters of giro banks: Gillard (2004).

⁴³ This concerns the origin of the word “bank” in English. According to the standard interpretation, “bank” would derive from the Italian equivalent for “bench”, meaning the counter over which medieval moneychangers used to deal their transactions: this would appear consistent with the idea that central banks were created to fix problems with the payment system. Such an interpretation, however, has been questioned by some, according to whom “bank” would rather derive from the Germanic equivalent for “cliff”, meaning the amount (the joint stock) of public debt handled by the institution—which would correspond to the Italian word “monte” rather than “banco”: this would appear consistent with the idea that central banks were created to monetize government deficits: Conant (1909, pp. 8–9).

⁴⁴ For a discussion on the application of the functional approach to the analysis of financial systems, see Merton and Bodie (1995). The functionalist approach to social systems has been particularly promoted by sociologist Robert K. Merton; it has been extended to financial systems by economist Robert C. Merton, son of the former.

one. First, it can be performed on an agnostic basis: functions do not necessarily need to be ranked, thus avoiding the trap of value judgements. Second, the crucial question to which this approach is confronted, that is, the definition of what a central bank is supposed to *do*, appears to be somewhat easier to address than the definition of what a central bank is supposed to *be*.

This point is explicitly put forward by a 2009 report by the Central Bank Governance Group at the Bank for International Settlements. The report first remarks that, theoretically, the question of the *objectives* of a central bank (i.e. what a central bank is supposed to be) and that of its *functions* (i.e. what a central bank is supposed to do) cannot be treated separately, as they are like “chickens and eggs”. But the report then acknowledges that “historically, however, it would seem that central banks have been understood more in terms of their functions than their objectives. Thus, older treatises on central banking had a lot to say about functions but relatively little about objectives; the same was the case for legislation. Even today, functions that are widely regarded as core elements of central banking are not always tied to statements of the relevant objectives.”⁴⁵ In practice, this means that while there exists a sort of “jurisprudence” of central banking functions, there is none of central banks’ “identity”. This makes the functional approach actually easier to implement.

To be honest, the definition of central banking functions is not fully uncontroversial either. Starting from Oliver Sprague’s early discussion,⁴⁶ many different lists of central banking functions can be found in the scholarly literature: some feature three, some five, some seven, some eight, some ten (plus) functions.⁴⁷ But not all of the proposed functions are equally rigorously defined, and “Occam’s razor” (the “law of parsimony”)⁴⁸ should be arguably set in motion in order to eliminate

⁴⁵ Central Bank Governance Group (2009).

⁴⁶ See Oliver Sprague’s chapter on central banks in the third (accrued) edition of Charles Dunbar’s *Theory and History of Banking*; Dunbar (1917, pp. iii and 85–86).

⁴⁷ A partial survey of the literature can be found in Singleton (2011, pp. 4–5).

⁴⁸ For a critical discussion on the epistemological relevance of “Occam’s razor”, see, for example, Walsh (1979).

redundant categories.⁴⁹ To keep things as simple as possible (and to avoid the risk of having to express value judgements), the best strategy probably consists of referring to current standards. Nowadays, central bankers agree in acknowledging that they are entrusted two main (possibly conflicting) tasks: securing *financial stability* and *monetary stability*.⁵⁰ The former task consists of the provision of the microeconomic central banking functions: the management of the payment system, lending of last resort, and banking supervision. The latter task consists of the provision of the macroeconomic central banking functions: the issuance of money and the conduct of monetary policy.⁵¹

1.2.2 The Roadmap

The rest of this book is organized according to this functional grid. First, it deals with the microeconomic central banking functions: Chap. 2 is about the management of the payment system, while Chap. 3 is about lending of last resort and supervision (for clarity's sake, I conflate here all the matters relating to the regulation of the banking system). Then, the book tackles the macroeconomic central banking functions: Chap. 4 covers the mechanisms allowing for the issuance of money, while Chap. 5

⁴⁹ For instance, Singleton (2011, pp. 5–11) finally proposes a list of nine functions (plus a tenth category of “other functions”). Some of these, however, are tailored to some peculiar twentieth-century condition that did not exist in other settings: this is the case of function number 9 (“participating in cooperative international agreements”), which was not an issue before 1914: Flandreau (1997). Some others can reasonably be merged: this is the case of function numbers 2 (“implementing monetary policy”) and 6 (“managing foreign reserves and exchange rate targets”), which can be seen as two aspects of the same function. As Singleton (2011, pp. 10–11) himself does recognize, redundancy gives scope for inconclusive discussions about which functions are core and which ones are peripheral.

⁵⁰ See, for example, Issing (2003).

⁵¹ Here I refer particularly (although not exclusively) to the list of central banking functions that the Federal Reserve understood (as of 1983) to have been entrusted by lawmakers since its foundation: “The Congress has over the last 70 years authorized the Federal Reserve (a) to be a major participant in the nation’s payments mechanism, (b) to lend at the discount window as the ultimate source of liquidity for the economy, and (c) to regulate and supervise key sectors of the financial markets, both domestic and international. These functions are in addition to, and largely predate, the more purely “monetary” functions of engaging in open market and foreign exchange operations, and setting reserve requirements; historically, in fact, the “monetary” functions were largely grafted on the “supervisory” functions, not the reverse”: Volcker (1984, p. 548).

covers monetary policy. Eventually, Chap. 6 wraps things together in order to distil some consistent messages.

As it will become clear in the course of the exposition, the separate treatment of the different functions is largely a heuristic device. By no mean I intend to argue that the four functions are *separable*—although in some contexts, as we shall see, some of them might actually have been separated for some particular historical reasons. As a result, many themes will resurface several times throughout the four main chapters. The idea is to provide, at each occasion, four different (but consistent) readings of the same phenomena. The great advantage of this type of structure is in that it allows for presenting historical phenomena under the light of four clearly separated streams of the theoretical literature. As economics expands rapidly with a mostly centrifugal trend, keeping a comprehensive eye on ever more remote lines of development has become an increasingly hard task nowadays. While this book obviously has no pretention to be exhaustive, it nonetheless aims at presenting some of the most relevant recent advances in an (as much as possible) accessible and consistent way. The ambition is to provide historians with an understanding of economic theory and to provide economists with an understanding of the past. Given the current divide between these two publics, the book must be interpreted as a genuine call for cross-fertilization.

Every chapter consists of a survey of the theoretical literature and a survey of the historical literature relating to the central banking function at stake. The surveys draw on different strands of research, including monetary macroeconomics, financial microeconomics, the theory of payments, public economics, as well as economic history, political history, and the history of economic thought. The two parts of each chapter are organized according to different criteria. On the one hand, the theoretical survey is voluntarily ahistorical; perhaps at the price of some loss of rigour from a philological viewpoint, this part aims at presenting the state of the art in the theoretical literature and how it relates to earlier contributions. On the other hand, the historical survey is broadly chronological, although different geographical areas are treated separately. Therefore, in reading each chapter, the reader will be confronted to a double journey: she will start from the current view on the topic, move backwards to

earlier ideas, and then move forward across the historical facts. While each part can be read separately from the others, the book has been conceived for being read as a whole. In particular, the historical stage will be set up thoroughly in Chap. 2, while subsequent chapters will be much more synthetic under this respect. This explains why the historical part of Chap. 2 has a different structure than the subsequent ones: that chapter will present a more complete chronological and geographical account, allowing to justify the stricter focalization of the subsequent historical analysis. By contrast, the historical parts of Chaps. 3, 4, and 5 will always follow the same structure, by treating first of Venice and its followers Amsterdam and Hamburg (fourteenth to eighteenth centuries), then of England and its Continental European followers (seventeenth to nineteenth centuries), and eventually of the United States (eighteenth to mid-twentieth centuries).

The idea of writing a survey on central banking along functional lines is not completely original. Actually, there exists at least one important precedent: the textbook first written in 1939 by Michiel Hendrik De Kock, the would-be long-serving governor of the South African Reserve Bank. As much as its author, this work was rather influential in the mid-twentieth century: it had four different editions until as late as 1974 and was translated into a number of foreign languages.⁵² De Kock was active as a writer throughout the time span in which central banks were being created one after the other: between 1921 and 1971, no less than 99 central banks were established around the world.⁵³ Such a “serial” production necessarily implied the existence of a common “mould”. This mould had been actually shaped in the early 1920s, at the time when British officials were struggling to secure the creation of a sterling-based gold-exchange standard. The establishment of this type of system necessarily implied the establishment of central banks to keep sterling reserves in the peripheral areas of the system. With this goal in mind, British money doctors (the most famous of whom being Otto Niemeier) started to travel the world with “almost missionary fervour”⁵⁴ in order

⁵² Botha (1975). Here I refer to the second revised edition: De Kock (1946).

⁵³ Botha (1975).

⁵⁴ Capie et al. (1994, p. 21).

to promote their “central bank kit”—which was, of course, modelled along the Bank of England. The missions of the 1920s probably go a long way towards explaining the success of this model: from that moment on, the “ideal type” of central bank had been (more or less) internationally established. In view of this all, the present book will stop at the point where De Kock started in the 1930s. Because its focus is on the evolution of the solutions provided to financial and monetary problems, the advantages inherent to the functional approach tend to falter as soon as these solutions “crystallize” around a single organizational form—which, indeed, actually happened in the 1930s. Historical surveys on twentieth-century central banking are available,⁵⁵ and the readers interested in knowing more about this period are advised to refer to them. The present book will rather focus on an earlier period, in which the solutions to the above-mentioned problems had *not* yet “crystallized” around a single organizational form. The chronological limits (excluding Antiquity and the early Middle Ages) and geographical boundaries (only including the Western world) of this survey have been entirely determined by mere feasibility criteria; my hope is that a similar approach may, one day, be extended to the periods and areas which were impossible to cover here.

The two available general accounts of the evolution of central banks (Goodhart’s and Giannini’s) aimed to sketch “theories of history”: starting from a theoretical model (a financial one in the case of Goodhart, an institutionalist one in the case of Giannini), they both tried to depict long-term evolutionary dynamics as determined by the mechanisms described by such model. To put it differently, both accounts used history as a tool to validate theory. This book will not aspire to do the same. Rather, it will try to use theory as a tool to understand history. For sure, this strategy will fall short of satisfying the most rigorous criteria of economic theorizing. I believe, nonetheless, it will be able to provide a richer source of inspiration for innovative thinking *in both history and economics*. This is my personal view of what cross-fertilization might (and should) mean. The reader will judge to what extent I have fallen short of fulfilling such an ambitious plan.

⁵⁵ See esp. Singleton (2011).

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2

The Payment System

Absent trade, a city would be like a house (or better, like a hovel) whose inhabitants have no acquaintance or knowledge of other people than themselves, and nations would be inclined to hate, to animosity, to war; because discord is often appeased, and breach of peace among sovereigns prevented, for the interest of trade and for the profit one gets from it [...].

Safeguarding trade, preserving business of every kind, without a transfer bank is not only unpractical and difficult, but impossible. *One has to make so many payments for the goods she sells and buys that, if everybody wanted to give cash on one side and get it from the other, the waste of time would be such that an overwhelming share of transactions would not take place.*

Tommaso Contarini, *Speech to the Venetian Senate in Support of the Creation of a Public Bank*, 28 December 1584 (quoted in Lattes (1869, p. 120), my translation and emphasis).

In its online *Glossary of Payments and Market Infrastructure Terminology*, the Bank for International Settlements' Committee on Payments and Market Infrastructures defines a payment system as “a set of instruments, procedures, and rules for the transfer of funds between or among participants”, clarifying that “the system includes the partici-

pants and the entity operating the arrangement.”¹ The payment system is therefore described not as a mere “physical” infrastructure, but rather as a sort of “ecosystem” allowing for the clearance of debts from one corner to the other of an economy. In dealing with ecological issues, the word “ecosystem” is often used both as a universal (*the* ecosystem) and as a particular concept (*an* ecosystem): all organisms on Earth will be part of *the* planet’s ecosystem, but each of them also participates into one (or more) ecosystems on a smaller geographical scale. Differently said, if we describe an ecosystem as a network of interactions among different organisms, the “global” ecosystem will consist of the aggregation of a number of smaller “regional” networks.² In dealing with economic issues, the same applies: different payment systems actually coexist (often concerned with transfers of different nature, like credit card networks, derivatives clearinghouses, or foreign exchange markets), but it is the interaction among all of them that constitutes *the* economy’s payment system proper. As hierarchies play a crucial role in networks, not all of the “regional” components will play an equally important role in the “global” architecture of the system. In the case of the payment infrastructure, the “core” of the system consists of the wholesale interbank network, to which “peripheral” components necessarily need to be connected in order to work efficiently.

This chapter will investigate the evolution of payment systems in the West since the late Middle Ages to today. It will start by analysing the particular nature of these “ecosystems” and the problems inherent to such a nature. Subsequently, it will review their long-term evolution in the light of the guidelines supplied by theory. It will show that modern central banks are only one of the many public solutions designed over time to face market failures in the payment sector, and that the emergence and development of this particular solution was the historical product of a number of technical and political factors.

¹ Committee on Payments and Market Infrastructures (2016).

² On the study of ecosystems as networks and the problem of defining the appropriate scale of analysis of ecological networks, see, for example, Ulanowicz (2004).

2.1 The Payment System: Theory

2.1.1 The Industrial Organization of Payments

According to an increasingly popular view among economists nowadays, payment systems fall into the category of *two-sided markets*. A two-sided market is a situation that may occur in a setting in which interaction between supply and demand takes place through “platforms” connecting end users on both sides. In this framework, the market is said to be two-sided whenever the volume of transactions is impacted by the way usage fees are distributed across end users.³

A classic example of a two-sided market is provided by shopping arcades. Shopping arcades are platforms intended to facilitate the interaction between sellers (shopkeepers) and buyers (shoppers). Building and entertaining a platform obviously has a cost, but such cost is generally unevenly distributed among end users: typically, shopkeepers will have to pay in order to access the shopping arcade, while shoppers will not be asked any direct fee. Now, imagine that the platform decided to modify the repartition of usage fees among users and started to charge an entry fee to shoppers in order to lower the fee paid by shopkeepers. At first sight, this might sound as good news for the latter. However, the introduction of an entry fee would strongly discourage shoppers, who would therefore naturally divert their shopping to other shopping areas whose access is less costly. As a result, the total value of the services provided by the platform would decrease not only for users on the demand side *but also for those on the supply side*. In fact, because the shopping arcade is now much less attractive for shoppers, it also becomes much less attractive for shopkeepers as well: as a result, although the fee the latter have to pay is lower than before, this lower fee is now less acceptable to them, as the value of the facilities provided to them has now fallen more than proportionally. Therefore, a wrong pricing strategy can be fatal to shopping arcades, as the volume of transactions can rapidly collapse. As this basic example shows, the choice of the appropriate business model is a vital issue for platforms that compete to attract users on both ends.⁴

³ Rochet and Tirole (2006).

⁴ Rochet and Tirole (2003).

This literature suggests that although two-sided markets have some special features of their own, nothing prevents them from being fully competitive. As in any other market, the sufficient condition for competition is *contestability*—that is, low entry and exit costs.⁵ In the example of shopping arcades, both shoppers and shopkeepers can quickly switch to an alternative platform if this is available or easily made available. As a result, two-sided markets do not seem to be in need of a specific treatment by regulators.⁶

However, payment systems bear some special characteristics that make them different from other examples of two-sided markets. One indispensable condition for payment services to be valuable to customers is *finality*. Finality means that the payment actually discharges the debt due by the payer to the payee.⁷ For instance, a payment card holder will be willing to adopt this means to pay for her purchases only as long as she is sure that her payment will definitely clear all her legal obligations towards the seller; if that were not the case (i.e. if the risk existed that the seller could either refuse the instrument or later claim that the debt has not been totally discharged), then she would definitely prefer resorting to another instrument. This means that in order to be valuable to customers, payment systems must not only be able to connect sellers and buyers (as in the shopping arcade example), but also to do so in a way that is compatible with legal standards. For instance, Bitcoin is hardly an attractive means of payment for retail consumers because it is not legally recognized as an instrument for discharging debt—that is, payment in Bitcoin legally amounts to barter.⁸ In practical terms, this means that payment systems (unlike shopping arcades) can hardly work in isolation. New payment systems can emerge and enter the industry only as long as their connection to the “global” payment system (the

⁵ Baumol (1982).

⁶ For a more nuanced view, see Rysman (2009).

⁷ Kahn and Roberds (2002).

⁸ Another way to state this concept is that, unlike in the case of barter, the price of the asset transferred in a final payment will not be subject to bid-ask spreads with respect to the unit of account. Millard and Saporta (2008, p. 35).

one that allows the final, legally recognized settlement) is provided.⁹ And at the core of the “global” payment system typically stands the only network that, for legal reasons, can fully guarantee finality: the wholesale interbank network.

Therefore, the interpretation of payment systems as two-sided markets is only useful for analysing payment systems from a microeconomic point of view: differently said, it is appropriate to understand how single providers of specific payment services (for example, payment card networks) should be managed and regulated.¹⁰ However, this level of analysis may not be fully appropriate to understand the working of the “global” payment system of an economy from a macroeconomic point of view. In fact, two-sided markets are modelled as *one-way networks*: the network connects two different types of components (in the example of payment cards, the shopkeepers who accept the cards and the shoppers who pay with them); interaction can only occur between components of different type, and it is always directed from one type to the other (from sellers to buyers). Yet, the “global” payment system (like the wholesale interbank network that stands at its core) rather presents the features of *two-way networks*: the network connects components belonging to the same category (agents/banks); interaction can occur between any component, and it may be directed both ways (agents/banks can pay and be paid at the same time).¹¹ In fact, *the* payment system of an economy (like the interbank network at its heart) shares the same basic features of classical network infrastructures like telegraphs, telephones, and railroads.

⁹The literature on two-sided markets has discussed at great length the question of mutual compatibility (or “interchange”) among “peer” systems (i.e. how entrants’ right to connect to incumbent networks can enhance competitive conditions in two-sided markets), and payment theory has remained focused on this issue (i.e. on the effects of interchange on competing payment card networks). At the same time, the question of the interchange between “dependent” and “independent” networks (i.e. of the linkage of each single retail payment system to the wholesale payment system ensuring finality) appears to have been overlooked. Rysman (2009).

¹⁰This is hardly surprising, given that this literature has originally developed precisely to analyse the economics of Visa and Mastercard: see, for example, Rochet and Tirole (2002).

¹¹On the definition of *one-way* and *two-way networks*, see Economides and White (1994).

One of the well-known properties of network infrastructure is that they are subjected to (direct) *network externalities*.¹² A network externality is a situation in which the utility derived by users from the utilization of a network is directly impacted by the total number of users that utilize the network.¹³ Network externalities are positive externalities: the bigger the network, the higher the consumption possibilities opened to consumers, the higher the utility they get in consuming it. Examples of network externalities abound in real life. Social networks like Facebook or Twitter are a straightforward one.

Direct network externalities have strong implications on the way the payment system is organized. Networks need to attain at least a minimum “critical mass” in order to be economically viable.¹⁴ Customers’ choices are dictated by their expectations: users will prefer to become affiliated to the network they expect to become the most popular. As it is often the case, *multiple equilibria* can occur: namely, in a given situation, the market can produce different outcomes because of differences in agents’ expectations only. If everybody expects one network to emerge as the most popular one, then it is optimal for each one to choose that network; if everybody expects another outcome, then it is optimal for each one to act in that other way. If externalities are large, equilibria can occur in which one only network survives. When such equilibrium is produced, entry into the market is hindered by the difficulties potential competitors find in reaching the “critical mass”: attracting a sufficient number of users to a new network implies substantial costs, which might prevent entrants from challenging the monopoly.¹⁵ The larger the externalities, the lesser the degree of contestability of the market: once a network has emerged as

¹²The *direct* network externality that characterizes two-way networks is defined as a general economy of scope in consumption: the addition of new participants creates additional consumption opportunities to all participants alike, hence increasing their welfare. By contrast, one-way networks are characterized by an *indirect* network externality: the addition of new buyers directly enhances the welfare of sellers, but only indirectly that of buyers (e.g. high attendance of a shopping arcade may benefit shoppers only as far as it attracts more shopkeepers to the arcade). Economides and White (1994).

¹³Katz and Shapiro (1985).

¹⁴Economides and Himmelberg (1995).

¹⁵Katz and Shapiro (1985).

the general “standard” for the whole economy, its monopolistic position might be difficult to displace in the absence of regulatory intervention.

2.1.2 The Payment System as a Natural Monopoly

Direct network externalities associated with two-way networks are demand-side effects. Although they may be conducive to extreme market concentration, the outcome need not be per se a natural monopoly.¹⁶ The concept of *natural monopoly* has to do with the supply side: it is defined as a situation in which “the entire demand within a relevant market can be satisfied at lowest cost by one firm rather than by two or more”—or differently said, the firms’ cost function is *subadditive*.¹⁷ This situation is typically, albeit not fully properly, associated to the concept of *scale economies*.¹⁸

As it turns out, however, the payment industry is prone to both network externalities *and* scale economies. Empirical analysis suggests that the average production cost for this industry does decrease as the level of output increases.¹⁹ Under this respect, the sector is not dissimilar from most classical network infrastructures, which are subjected to forces leading to concentration both on the demand and the supply side. Therefore, it seems legitimate to see the payment system as a natural monopoly.

Natural monopolies are one of the most extensively debated subjects in the literature on regulation. Actually, a natural monopoly may be conducive to *market failures*—that is, situations in which the “invisible hand” of the market fails to produce a socially optimal outcome. Market failures provide, indeed, an obvious rationale for intervention. Therefore, the first reason to regulate is that, as in any other case of imperfect competition, the monopolist can extract rents (charging prices that are higher than

¹⁶Liebowitz and Margolis (1994).

¹⁷Posner (1969).

¹⁸The concept of *scale economies* refers to the fact that average production costs decrease when output increases. Cost subadditivity has to do with the organization, not with the size of production. Scale economies are a sufficient, but not necessary condition for subadditivity. Baumol (1977).

¹⁹Bolt and Humphrey (2005).

production costs) at the expenses of consumers. Nowadays, the micro-economic literature is consensual in concluding that monopoly rents can be avoided by making sure that entry barriers are low: in a perfectly contestable market, a monopolist will actually behave as a competitive firm.²⁰ In the case of network infrastructures, government intervention should essentially be focused on creating the conditions for potential competitors to have a fair access to the incumbent network.²¹

If the arguments for intervention were limited to the need of keeping entry barriers low, the regulation of network infrastructures would just be a subcase of the more general principle of making markets contestable. Yet, there may be other compelling arguments for regulators to step in. Network infrastructures as telephones or railroads (and, of course, payments) are generally viewed as providers of *essential services*—namely, whose access at reasonable costs by *all* agents in the economy is considered as a strategic issue. The fact that some agents are excluded (either because they cannot afford the price or because they are located in a remote geographical area) may be socially suboptimal, as access to such services often has substantial positive effects in terms of economic efficiency. As a result, the need to ensure universal access to essential network infrastructures prompts government intervention under two respects: regulation of prices and subsidization of the coverage of remote areas, whose cost exceeds the profits. This kind of strategy is known as *cross-subsidization*: consumers in the busiest areas pay for the services more than their cost to the providers, but this allows consumers in the remote areas to pay less than the cost. Yet cross-subsidization would not occur in an unregulated market: without government intervention, providers of essential services would be “cream skimming”—only serving the customers and areas that can be profitably covered, while ignoring those whose coverage would be loss-making to them. In order to allow for cross-subsidization, the institution of a legal monopoly may be necessary.²²

Therefore, in the case of essential network infrastructures, there may be good reasons for making the natural monopoly *less* rather than *more* con-

²⁰ Joskow (2007).

²¹ Laffont and Tirole (1996).

²² Joskow (2007).

testable. But even within this restricted category of network goods, the case of payments may be seen as special. There is, indeed, a further factor that makes interconnection a particularly delicate issue for payment networks: *risk*. When a telephone or a railway system decides to add new links to its network by opening new lines, it exposes itself to additional costs, but it does not necessarily increase the chances of a disruption of the network. In the case of payment systems, by contrast, including new agents (especially if they are located in remote areas) may result in a substantial increase of the fragility of the network. Actually, whenever a member of the system fails to respect her engagement to pay, the system undergoes some stress; a local difficulty has the potential to propagate through the network (the unpaid payee may, in turn, become unable to pay her creditors) and degenerate into a systemic crisis. In order to prevent the occurrence of such a situation, the obvious solution consists for the system to implement a *monitoring* of its members. Because monitoring is about acquiring information and information is more efficiently collected in a centralized way, however, monitoring is again in itself a natural monopoly.²³ The provision of the monitoring function by a private monopolist is, of course, a possible solution. It does raise a number of questions, though: monitoring payment network participants is a highly sensitive task, which is potentially prone to conflicts of interests.

To sum up, the payment system is a particular type of natural monopoly that (probably more than any other natural monopoly) calls for a very specific treatment by regulators. There are four main reasons why this is the case. First, on the demand side, direct network externalities encourage concentration, and the demand for finality imposes interconnection with the system providing the legal standard. Second, on the supply side, economies of scale also encourage concentration. Third, from the point of view of the *social planner* (i.e. the policymaker aiming to maximize social welfare), the services provided by it are strategic and essential to the population. And fourth, its management implies the collection and treatment of sensible information, whose provision by the private sector may be problematic. While all this does not allow concluding that a state monopoly is necessarily the optimal way to manage at one time all these

²³ Rochet and Tirole (1996).

four issues, it nonetheless allows understanding why the different solutions adopted over time have displayed a certain tendency to lean towards this type of equilibrium.

2.1.3 A Tentative Solution: Clearinghouses

One possible solution to the issues raised by payment networks consists in the setting up of a clearinghouse by market participants. Clearinghouses are organizations that have originally been created with the aim of minimizing the use of cash within a given group of participants. For this reason, until very recently, they have constantly been organized according to the principle of *deferred net settlement*: payment orders are accumulated over a given lapse of time and then settled periodically (typically, daily) on a net basis.²⁴ User-owned clearinghouses are cooperatives aimed at settling the transfer of funds among their members. Important operators in the payment industry like Visa and Mastercard were originally organized according to this model, although they subsequently turned into incorporated public companies; the same also happened to a number of clearinghouses devoted to securities settlement, like the New York Stock Exchange (NYSE) or the National Association of Securities Dealers Automated Quotations (NASDAQ).

User-owned clearinghouses appear to present a certain number of advantages. First, as they face a different incentive structure than monopolist firms (they are supposed to maximize all users' welfare rather than the operator's), they are less likely to raise suspicions of noncompetitive behaviour.²⁵ Second, they are (according to a number of scholars at least) supposed to deliver effectively a self-regulation of the payment industry. Their alleged strength comes from the fact of not being a system that "divorces the authority for determining the system's behaviour from those who ha[ve] a self-interest in maintaining its integrity".²⁶ In order to protect themselves from fellow members' misbehaviour, all associates have an incentive to attach strict safety standards to membership. These typically

²⁴ For a useful overview, see Manning et al. (2009).

²⁵ Rysman (2009, pp. 136–137).

²⁶ Timberlake (1984, p. 15).

imply barriers to entry, threat of exclusion, and a continuous monitoring of payment flows. The result is a cooperative equilibrium: each participant's concern with limiting her own exposure to credit risk ends up producing, at an aggregate level, a socially optimal outcome.²⁷

The model of user-owned clearinghouses appears to have performed reasonably well in certain “regional” payment networks, for example securities or futures settlement mechanisms.²⁸ In the case of the “global” payment system (and specifically, of the wholesale interbank clearing), however, the model has proved substantially less performative. This seems to be tied to the fact that there are fundamental differences between the business of clearing transactions in securities and the business of clearing interbank payments. Such differences have an impact on the validity of the advantages associated with user-owned clearinghouses.

The first difference has to do with market power. Securities or derivatives can be freely exchanged over-the-counter (i.e. outside established clearinghouses). By contrast, in order to ensure finality, payments have to pass through the wholesale interbank clearing—unless, of course, the obligation is discharged directly in cash. This means that while securities or derivatives clearinghouses need to behave competitively, wholesale interbank clearinghouses may not necessarily do so. And in fact, empirical investigations suggest that members of a central interbank clearinghouse may have incentives to extract oligopoly rents from nonmembers.²⁹

The second difference has to do with risk management. Securities and derivatives trading is a business that allows for adjusting exposures in a fairly predictable way, as the time of the settlement approaches, thanks to a number of devices (limit positions, margin calls, and marking-to-market). In a wholesale interbank clearinghouse, by contrast, the nature of transfers is quite opaque, their timing fairly unpredictable, and their amount very volatile.³⁰ If it is organized according the principle of deferred net settlement,³¹ moreover, the wholesale interbank clearing-

²⁷ Gorton and Mullineaux (1987); White (1989); Dowd (1994); Kroszner (1999).

²⁸ Moser (1998); Kroszner (1999).

²⁹ Donaldson (1993); Moen and Tallman (2000); Jaremski (2017).

³⁰ Kahn and Roberds (2009, p. 13).

³¹ See Sect. 2.2.6.

house cannot operate with a *matched book*—that is, it cannot systematically offset a “short” position with a counterparty (the obligation to pay a given sum at given instant) with a “long” position with another counterparty (the right to be paid the very same sum at the very same instant). This implies that in the very short run, members can borrow without definite limit, thanks to the clearinghouse.³² The fact that participants have a potentially unlimited line of credit from the system on an intraday basis is, predictably, conducive to moral hazard.³³

Besides this very short-term problem, however, clearinghouses also suffer from a more fundamental issue stemming from the system of netting itself. Dubbed by some the “*in-concert overexpansion*” problem,³⁴ this issue questions more thoroughly clearinghouses’ actual ability to monitor their own members. In order to understand what the problem consists of, imagine you open a bank. You start collecting deposits from your customers, hence accumulating cash in your coffers. Because there is a good probability that depositors will not withdraw what they have been credited in their accounts within a fairly reasonable lapse of time, you will have no reason to keep all that cash idle in your coffers. Why not putting it to work? A good way to do so is opening an account to someone that has *not* previously deposited cash with you: a borrower. Sure, the borrower will want to spend what has been credited on her account, but probably not all of it. As a result, a reasonable amount of cash will remain in your coffer as a reserve to cover for the potential withdrawals of your accountholders (both depositors and borrowers). At the same time, borrowers will pay interests on the sum you have lent them. This will provide

³²Selgin (2004) rejects this conclusion on the grounds that clearinghouses need not necessarily work as *central counterparties* (i.e. as true intermediaries between members) that provide liquidity to participants. His point is relevant as far as the distributional effects of defaults are concerned (i.e. who bears their costs), but it does not seem to question the conclusion that clearinghouses may not effectively control risk-taking. In many cases, while clearinghouses do not directly lend, they nonetheless *guarantee* loans to members, hence facilitating credit without necessarily enhancing monitoring (see, e.g., Hoag 2017, p. 309).

³³“It is in the nature of lines of credit, however, that they are underpriced at the point in time in which they are utilized. Credit lines provide guaranteed access to funds at a prespecified rate that does not vary with the borrower’s *ex post* creditworthiness. Thus borrowers essentially obtain insurance against adverse shocks to their creditworthiness” (Lacker 2008, p. 70). In a similar vein, Kahn and Roberds (1998) talk about a “put option”. Also see Rochet and Tirole (1996).

³⁴Selgin (2001).

you with some nice resources to remunerate your depositors for their trust in you and (why not?) to remunerate yourself for the risk you are incurring into. The more you lend, the more profits you get for remunerating the (increasing) amount of risk you are incurring into: hence, you will naturally be tempted to continue expanding your liabilities by opening new accounts to new borrowers. There is, however, a limit to such an expansion. At one point, the amount of money that accountholders will be willing to spend will get so considerable that the amount of reserves left to cover potential withdrawals will become dangerously low. At this point, if you want to avoid running into problems (running out of cash to repay depositors), the expansion of your liabilities will have to cease.

Now, imagine that your bank starts participating into a clearinghouse with other fellow banks. Instead of having to keep a lot of cumbersome cash in your coffer, you will now make use of your balances with the clearinghouse: whenever one of your depositors will want to spend some of the money he is credited on his account to (say) purchase some goods, instead of giving her cash, you will transfer the sum to the account of the seller at another bank. In this new setting, payments will flow from one bank to another, and just netted in cash at the end of each day. The flow of payments from your bank to the others, however, will not often be in equilibrium, depending on the respective size of reciprocal flows. Imagine that you try to expand your liabilities in this new setting. As in the former case where your bank was in isolation, there will be limits to such an expansion: because your accountholders will ask you to transfer increasing amounts of money to other banks, your balances with the clearinghouse will tend to be systematically in deficit, and you will therefore be obliged to net the difference by systematically paying in cash. This is the so-called *law of reflux*.³⁵ According to the supporters of free banking, this is the mechanism that automatically makes the system self-restrain from excessive risk-taking.

There is, however, a crucial difference between the case of a bank in isolation and that of a bank participating to a clearinghouse. In the for-

³⁵The “law of reflux” was famously formulated by Fullarton (1845), but was known to earlier authors. According to Glasner (1992, p. 877, ft. 12), it is just a version of Say’s law: an excess supply of bank money implies no excess demand for real goods, but only an excess demand for cash to be exchanged against bank money.

mer, the bank always has to pay in cash the *absolute* amount of money outflowing from its accounts, thus effectively discouraging it from expanding its liabilities too much. In the latter, instead, the bank only has to pay in cash the *relative* amount of money outflowing from its accounts: as long as outflows are balanced by inflows (payments from accountholders at other banks to accountholders at your bank), no payment in cash will need to occur. Therefore, as long as all banks in the system expand their liabilities at broadly the same rate, none of them will experience an outflow of cash. The result is that the law of reflux will no longer be in operation: the incentive for banks to restrain from excessive risk-taking will therefore be considerably relaxed, with potentially high costs in terms of financial instability.

The “in-concert overexpansion” problem has long been acknowledged by economists—as far as we know, at least as early as during the 1825 London panic.³⁶ Supporters of free banking maintain that the argument is flawed: although the *average* amount of cash needed in daily clearinghouse settlements will not increase during a concerted expansion of liabilities, the *volatility* of such an amount will nonetheless actually increase, forcing banks to keep higher reserves anyway.³⁷ But this might not necessarily be the case. As long as the demand for cash by accountholders remains constant, the deficits of a bank will be nothing but the surpluses of other banks; this will make the latter well willing to lend their surpluses to the former. In view of this, clearinghouses early developed mechanisms to facilitate interbank loans to cover for short-term imbalances.³⁸ Banning such overdrafting facilities, or making them prohibitively costly, might appear to be a solution. It would, however, be a suboptimal solution: not only it would prevent the banking system from making an efficient use of its available short-term funds, but also it would provide distorted incentives to troubled banks.³⁹ The conclusion is that the clearinghouse mechanism alone cannot satisfactorily prevent risk-building in the banking system. As long as the demand for cash does not increase, banks will not have any incentive to refrain from expanding their liabilities “in concert”. This, however, will

³⁶ For a brief history of this critique, see Selgin (2001, pp. 295–296).

³⁷ Selgin (2001).

³⁸ See, for example, Hoag (2017).

³⁹ Rochet and Tirole (1996, pp. 846–847).

make them all (collectively) fragile in case of an unexpected spike in the demand for cash by the public. In such a case, all banks will find themselves in a difficult situation. All of them will be in need of cash, and none will be any longer eager to depart from it by lending it to fellow banks through the clearinghouse facilities. At this point, the general hoarding of cash will increase the likelihood of payment incidents. Absent a participants' willingness to lend to fellow members, the clearinghouse will be unable to prevent the situation from degenerating into a general panic.

In view of what precedes, we can conclude that there are good theoretical reasons for doubting that a user-owned clearinghouse is an optimal solution for managing the natural monopoly of payments. In order to be able to perform such a task more efficiently, clearinghouses should be improved under at least two respects. On the one hand, their monitoring functions should be strengthened: instead of bounding themselves to passively condition membership and preside over payment flows, they should take a more proactive stance to prevent risk-building in the system. On the other hand, their ability to facilitate interbank lending should be upgraded, in order to prevent the occurrence of major disruptions in the system. To sum up, clearinghouses should lose some of their automatic, market-based way of functioning in order to acquire a more discretionary, organization-based attitude. To put it differently, they should be transformed into something more akin to a central bank.⁴⁰ As the following sections will show, this very process gradually occurred in a number of historical contexts as a consequence of protracted financial instability.

2.2 The Payment System: History

2.2.1 The Reluctant Monopolist: The Venetian State and the Rialto Clearing

The debate between supporters and critics of clearinghouses as a way for organizing the natural monopoly of payments is one of the biggest controversies in financial economics, and one that has resurfaced periodically

⁴⁰Gorton and Mullineaux (1987).

over the decades. It raged particularly during the Reagan-Thatcher era, whose “Hayekian revival” brought back to fashion the old ideals of free banking.⁴¹ In large part, the discussion of the 1980s did nothing but resurrect the arguments formulated by liberal writers of the eighteenth and nineteenth centuries.⁴² What is less known, however, is that the latter already “stood on the shoulders of giants” themselves. As a matter of fact, the debate about the benefits and costs of free banking had already appeared much earlier, in late medieval Venice, and already featured by then some of the arguments that would become the leitmotifs of later discussions.⁴³ In view of this interesting coincidence, it is instructive to look at the Venetian case into more detail.

That the question of how to best organize the natural monopoly of payments first appeared in that context is, to be true, not a coincidence at all. As a matter of fact, late medieval Venice presented a number of features that made it much more modern than any other banking place of the time. These were not limited to the fact that the city was, by far, the leading trade centre of the Old World⁴⁴; under certain respects, Venetian banking remained uniquely modern long after the Republic had lost its commercial preeminence to other centres. Such modernity did not concern all aspects of banking: in certain domains, such as foreign exchange operations or international sovereign lending, Venetian bankers were constantly outcompeted by other Italian colleagues, who dominated such business on the European scale. Of the many great international banking houses of the late Middle Ages (e.g. the Leccacorvo of Genoa, the Ricciardi of Lucca, the Bonsignori of Siena, or the Bardi and Peruzzi of Florence), none was headquartered in the Adriatic city. But none of these famous companies really was a deposit bank: although they did accept deposits (mostly time deposits, though), they were more similar to investment funds employing their customers’ money into long-term interna-

⁴¹ See in particular Hayek (1978), Goodhart (1988), and White (1989).

⁴² This is not surprising, as the basis for the debate was provided by the survey of nineteenth-century debates compiled by Vera Smith, one of Hayek’s students and collaborators. See Smith (1990).

⁴³ Not surprisingly, these early Venetian debates were first discovered and circulated by scholars involved in the free-banking controversies of the nineteenth century: Lattes (1869), Ferrara (1871), and Dunbar (1892).

⁴⁴ Braudel (1982).

tional operations.⁴⁵ What made Venice exceptional was, indeed, the precociousness and extent of the development of its domestic deposit banking sector, as well as its related interbank clearing.⁴⁶

The early emergence of deposit banking in the Most Serene Republic was directly linked to its unique geographical situation. Completely cut off from a mainland of which it gained military control only at a relatively late stage, the city strictly depended on trade for its very survival. This very circumstance had three major implications that played a crucial role in boosting the development of a modern payment system. First, the Venetian economy precociously reached a degree of monetization unknown for centuries anywhere else. In order to economize on cash, already in the fourteenth-century orders-to-pay (a sort of cheques) and bank transfers had become standard means of payment even for the lower middle class.⁴⁷ Second, because of the high intensity of its commercial relations, Venice became the first financial centre to allow for continuous settlement of foreign exchange transactions.⁴⁸ Third, the city's exposure to the volatility of food supply (an extremely sensitive political issue, given the high correlation between famine and social unrest in the pre-modern world) prompted heavy government intervention on the grain market. The Grain Office and the Fodder Office (two divisions of the public administration) acted as intermediaries between the international and domestic markets: in order to stabilize supply to domestic consumers, they directly stocked grain in their own warehouses; with the aim of securing regular provisions, they offered floor prices to foreign exporters, who henceforth tended to prefer Venice to other outlets in which prices might have turned out more uncertain.⁴⁹ As a result, the relative size of the state with respect to the size of the domestic economy appears to have been extraordinarily high for late medieval standards.

⁴⁵ On the Leccacorvo, see Lopez (1979); on the Ricciardi, see Blomquist (1979) and Del Punta (2004); on the Bonsignori, see English (1988); on the Bardi and Peruzzi, see Hunt (1994).

⁴⁶ Mueller (1997, pp. 322 and 354).

⁴⁷ Mueller (1997, p. 24).

⁴⁸ Luzzatto (1954). This is important, because it means that also the clearing of interbank payments had to take place on a continuous (daily) basis, not on a one-time basis as in fairs. On the clearing mechanisms adopted in exchange fairs, see Börner and Hatfield (2016).

⁴⁹ Mueller (1997, pp. 134–135).

Despite the substantial role it played in the domestic economy, the Venetian government was hardly pervaded by an “extractive”, rent-seeking attitude. To the contrary, the ideal that inspired its policymaking for centuries was that, as far as possible, the state should *not* have substituted itself to private initiative in markets. After all, Venice was a republic firmly controlled by an oligarchy of merchants. It was run by those very businessmen who would have been substituted by the state if it had decided to do so. If the Republic had been obliged to monopolize the grain supply to the city, that had been because this used to be—more often than not—a loss-making business (warehousing costs being substantial, and retail prices of grain being subsidized for political concerns).⁵⁰ Hence, the government’s goal was not to seize monopoly rents, but rather to secure continuity in the provision of services that were “essential” to the survival of the domestic economy. In Venice, there were many such essential services: the supply of grain, the supply of salt, the melting and reminting of bullion, the production of galleys in the arsenal, the defence of trade routes, and, of course, the operation of the payment system.

The organization of banking in Venice was very dissimilar from any other place at the end of the Middle Ages. On the mainland, the word “banker” was synonymous to “moneychanger”. Typically organized in guilds, moneychangers did take deposits, but providing payment services was not their core business. For instance, in Florence (one of the most active international financial centres of the time) bills of exchange *had* to be paid in cash—suggesting that interbank clearing was not practised.⁵¹ By contrast, in Venice moneychangers were well present (they operated around Saint Mark’s Campanile), but were not considered as bankers. Bills of exchange were customarily made payable at the “banks” proper—namely, at the transfer banks (*banchi di scritta*) that operated on the Rialto Square and cleared payments with one another.⁵² The Rialto area, which

⁵⁰ Mueller (1997, p. 419).

⁵¹ The Venetian exceptionalism under this respect should not, however, be exaggerated: we know that at least in two other coeval financial centres, Genoa and Bruges, interbank clearing mechanisms did exist. De Roover (1974a, pp. 213–219).

⁵² Mueller (1997, pp. 29–32 and 322). Note that the clearing mechanism was a decentralized one, meaning that no distinct clearing organization (a clearinghouse proper) did actually exist. However, as all transfer banks operated in the very same place and their number was limited (less than ten), the actual clearing mechanism must have not been too dissimilar from a centralized one.

was the financial district of the city, was entirely owned by the state. The very benches on which transfer banks were allowed to operate belonged to the city and were only rented to them. For safekeeping purposes, bankers were allowed to make use the coffers of the Treasury in the adjacent Palazzo dei Camerlenghi. Their books, moreover, were considered as public records as authoritative as notarial instruments, could be consulted for judicial investigations, and were conserved for long even after they had gone out of business. This was due to the fact that Venetian law considered bank transfers as a legal way to discharge debt—that is, it granted full finality to this means of payment. Finally, bankers were not organized as a guild.⁵³ In sum, it is clear that since at least the fourteenth century, the Venetian state viewed the payment system as an essential service and was eager to provide a physical infrastructure to facilitate its activities. This notwithstanding, its operation was strictly out-contracted to privates.

Although we do not have much evidence on the emergence and development of the Rialto transfer banks, we know for sure that they repeatedly got into trouble between the early fourteenth and the late sixteenth century—as it often happens, crises have the positive externality of producing valuable (yet a bit biased) information for financial historians. In 1584, senator Tommaso Contarini estimated that “of one-hundred-and-three banks we remember having been founded in this city, ninety-six fell into troubles, and only seven succeeded.”⁵⁴ This claim, that seems to be more or less accurate,⁵⁵ is revealing of the general sentiment of instability that the banking business elicited in Venice. Depositors’ runs on transfer banks took place rather regularly, and they often ended up in a general suspension of cash payments by all Rialto banks.⁵⁶ And in fact, the debate on the benefits and costs of free banking first emerged there, in the aftermath of one of these crises, as early as in 1356. On that year, senator Giovanni Dolfin summoned his colleagues to address the problem by creating a public clearing organization working as a *currency board*: cur-

⁵³Mueller (1997, pp. 5–7, 36–37, 42, 45, and 71–72).

⁵⁴Lattes (1869, p. 124). Contarini does not mean that only seven banks survived (at the time of his speaking, there was none left), but that only seven banks went into voluntary liquidation without filing for bankruptcy.

⁵⁵Mueller (1997, pp. 122).

⁵⁶Mueller (1997, pp. 126–128).

rent accounts would be opened to depositors (including banks) against cash, and every unit of bank money had to be backed by a 100% reserve. The goal of the proposal was ostensibly to make sure that the payment system did not grind to a complete halt in the case of panics. Albeit rather conservative on the whole, Dolfin's proposal was nonetheless voted down by a large majority of his colleagues.⁵⁷

Eighteen years (and another crisis) afterwards, the Senate instituted a special commission to formulate proposals for banking reform. Three schemes were advanced. The first one, advanced by Michele Morosini, was a radical version of Dolfin's plan: a public currency board was to be created, but this time provided with monopolistic powers. It was a sort of extreme version of the "Chicago Plan" proposed more than 550 years later as a solution to the ailments of the American banking system⁵⁸: the new organization would have been the only one permitted to open current accounts and, hence, to make transfers. The second scheme contemplated the introduction of a ceiling on daily transactions per person; the third one consisted of a ban on the trading of the commodities whose price was most volatile. Unsurprisingly, the Senate took up the third option, which implied the least change with respect of existing arrangements; Morosini's plan eventually only had an impact on the utopian literature of the time.⁵⁹

Although the fifteenth century proved a period of expansion for the deposit banking business, it was still punctuated by recurrent, violent crises. The turnover of firms was sustained.⁶⁰ Moreover, the sector displayed a clear trend towards increasing concentration: the number of banks passed from eight or ten in the early fourteenth century to four in the late fifteenth century, less than three in the first half of the sixteenth century, and eventually one only in the third quarter of that century.⁶¹ The drivers of this phenomenon are not completely clear. They do not seem to have been tied to widespread moral hazard: bankers operated in a regime of unlimited liability, and bankruptcy law was harsh. Even the biggest scan-

⁵⁷ Mueller (1997, p. 112).

⁵⁸ Hart (1935).

⁵⁹ Mueller (1997, pp. 113–116 and 151–153).

⁶⁰ Ferrara (1871, pp. 442–443).

⁶¹ Mueller (1997, pp. 36–37).

dal in the history of Venetian banking, the fall of the house of Lippomanno in 1499, seems to have been caused more by bad luck than by misbehaviour.⁶² The causes of such an endemic financial fragility appear to have been structural: even relatively mild (for nowadays' standards) levels of leverage could prove fatal in a context of wide macroeconomic and geopolitical instability, and the system did not have any backstop to arrest a haemorrhage of cash.⁶³ As far as we know, Venetian bankers never attempted to create a coordinating mechanism facilitating interbank loans through a centralized, user-owned clearinghouse: the reason for this lack was maybe deep mutual distrust or perhaps the idea that such an arrangement would not be sufficient to sustain an aggregate shock anyway. A state-backed clearing organization like the one proposed by Dolfin in 1356 might have helped to address a panic by sustaining public confidence in the system and exceptionally allowing bankers to overdraw; because of its concern to keep the state at arm's length from private business, however, the Republic had not found it expedient to go that way.

When the last surviving bank, the Pisani-Tiepolo house, suspended cash payments in 1576, a bizarre situation occurred. First, the government tried to keep the bank afloat with a loan from the Mint; the bank agonized for yet some more years, until a final run definitively brought it down in 1584.⁶⁴ At that point, the Senate debated how to proceed in order to get the payment system out of the deadlock. The archives have bequeathed us the texts of two remarkable speeches that are probably representative of the positions advanced in the assembly. The first speech, by Tommaso Contarini, develops the criticism of free banking that would become great classics in the following centuries: deposit banking was an inherently fragile

⁶² Ferrara (1871, pp. 200–203); Mueller (1997, pp. 45–46).

⁶³ Sissoko (2007) builds a model to explain what she calls “the disappearance of deposit banks” in Venice, which she depicts as a process of disintermediation in the financial system. She argues that deposit banking disappeared because during the sixteenth century the revenues of typical bankers' assets decreased to the point of making the sector loss-making. This idea is in part historically grounded and may go some way in explaining why the banking business became less and less attractive over time. In her model, however, this conclusion stems from the assumption that bankers have to remunerate deposits competitively. In Venice, however, banks did *not* remunerate deposits, which were considered as a *costly* financial service provided to customers. On this point, also see Tucci (1991, pp. 311–319).

⁶⁴ Mueller (1997, pp. 126–127).

business, as the incentive structure faced by bankers encouraged the over-expansion of liabilities in good times and therefore inevitably produced costly liquidity crises in bad times. The second speech, by an anonymous senator, develops the defence of free banking that would be systematically repeated afterwards: creating a state monopoly of monetary issuance was an inherently inflationary choice, as the incentive structure faced by the government encouraged the overexpansion of money supply in good as in bad times.⁶⁵ In the immediate aftermath of the debate, the Senate decreed the foundation of a state bank, to be run by six magistrates. But opposition in the ruling elite continued to be so strong that the decree was withdrawn some months afterwards: the government came back to the traditional approach and invited applications from privates for opening new banks. But applicants failed to materialize, and the city was left in monetary disarray for more than two years. In view of the substantial costs of this situation for the economy, on 11 April 1587 a compromise was reached in the Senate. It consisted of the creation of a hybrid system: a public bank, to be run by a private banker on the state's payroll. Applications to this new position were invited, but all candidates failed to meet the senators' approval. After the failure of the interviews, the Senate tried once more to get back to the old, fully privatized system: on 26 May, a new call for the opening of private banks was issued. But once more, no one manifested interest. Having received a further confirmation that no alternatives existed, on 1 June the assembly reluctantly converged on the public bank solution.⁶⁶ The proposal was, however, further watered down: the position of banker was transformed into a three-year public concession. Operating under personal unlimited liability, the concessionary was required to close all positions (upon request, in cash) at the end of her mandate. In sum, the (actual, but not formal) monopoly of payment was well taken over by state, but it was still out-contracted to privates: the government was doing whatever it could

⁶⁵ This second speech has been traditionally attributed to Contarini himself on the sole basis of the fact that it follows the former's speech in the original archival source relating both. The idea that both speeches constituted a single rhetorical exercise by the same author appears, nonetheless, dubious. The two texts present not only mutually inconsistent arguments but also a slightly different style. The speeches are entirely reported in Lattes (1869, pp. 118–160). Note that Contarini himself would later become the concessionary of the new Banco della Piazza (Luzzatto 1934, pp. 47–48).

⁶⁶ Lattes (1869, p. 21).

to signal that, in substance, nothing had really changed with respect to the old private system.⁶⁷ An application to this newly created position was finally accepted by the Senate, and the new organization eventually started operations under the name of Banco della Piazza di Rialto.

Therefore, the gradual shifting of the Venetian payment system towards a state monopoly was fiercely resisted rather than fostered by public authorities. As late as in 1597, the Senate still hoped to revert to a fully privatized framework, as the opening of a new private bank was encouraged.⁶⁸ That the ingenious hybrid solution that had been found in June 1587 would eventually be outcompeted by a pure state monopoly, moreover, was an outcome that the government passively endured rather than actively promoted. In 1619 Giovanni Vendramin, a merchant that had made conspicuous deliveries of silver to the Mint, but had not been repaid on time, asked for the permission to mobilize its immobilized credits to the government by making them transferable on account to third parties. The idea was hardly innovative, as it had often been practised at the Grain Office and other government divisions since the thirteenth century.⁶⁹ The mechanism was simple: the government opened accounts to merchants and agreed to make the credit of one accountholder transferable on demand to another accountholder (i.e. assignable “in bank”); the amount would have continued to circulate, until the final repayment to the last bearer cancelled it out. This device allowed the creditor to liquidate his position quickly, cancelling out the risk of an immobilization; as the number of merchants making business with the state was conspicuous, it was relatively easy to find counterparties willing to accept payment in such transfers. In 1619, the government consented once more to this traditional procedure and created a new clearing mechanism (*banco del giro*) as the ones that had been previously opened in the administration’s books. The device was explicitly a temporary one, as the debt had to be extinguished (and hence, the accounts closed) within three years. As the trick proved very successful, however, the deadline was extended from year to year. When the War of the Mantuan Succession and the Great Plague

⁶⁷Luzzatto (1934, p. 46); Tucci (1991, pp. 320–322).

⁶⁸Lattes (1869, p. 22).

⁶⁹Mueller (1997, pp. 361–365).

erupted (1628–1631), the amount of money backed by the government's floating debt increased fivefold. By 1630, Vendramin's temporary device had already become *the* Banco del Giro, and its monetary issuance amounted to roughly the double of that of the Banco della Piazza.⁷⁰

The period of coexistence of the Banco della Piazza and Banco del Giro would provide for a wonderful case study on the dynamics of competitive networks. A priori, nothing (except, of course, network externalities) prevented the two payment networks from coexisting. From a legal point of view, the two were equivalent: both guaranteed finality of payments; bills of exchange had to be made payable in one of the two clearings⁷¹; the two were interconnected, as one's accounts could be converted in the other one's (although at a fully floating exchange rate, which might be interpreted as a sort of variable "interchange fee").⁷² From a qualitative point of view, the services provided by the Banco della Piazza were clearly superior: its accounts were backed by bullion and (to a certain extent) private commercial debt, while Banco del Giro's ones were only backed by the government's floating debt. And yet, the fact that exogenous events had dramatically increased the number of "captive" users of the latter eventually led to the demise of the former. In the course of the 1630s, the business of the Banco della Piazza collapsed, until in January 1638 a decree sanctioned its definitive closure.

Thus, after three centuries of financial instability, Venice ironically found itself stuck with the opposite of the ideal free-banking model which had constantly inspired its action: from 1638 until the fall of the Republic in 1797, the state fully "internalized" clearing services into a state monopoly of payments in its purest form. Of course, this did not eliminate instability, especially in wartime periods when the floating debt (and hence the nominal amount of claims on the Banco) increased substantially. But it was a different kind of instability: what accountholders were afraid of was no longer bankruptcy, but inflation. The risk of a complete disruption of the payment system, like the ones that had occurred so often until 1587, had by then been eschewed. In a sense, the history of

⁷⁰ Luzzatto (1934, pp. 51–57).

⁷¹ Luzzatto (1934, pp. 49 and 52).

⁷² Rochet and Tirole (2002).

the Rialto clearing might be interpreted as an illustration of *Wagner's law*: as the Venetian economy became more complex, the need to avoid disruptions in the provision of an essential network good became more pressing, and this fatally implied an accrued involvement of the state in the provision of such a good.⁷³ The irresistible rise of the state monopoly of payments in the Most Serene Republic will be echoed, some centuries later, by the experience of another country with an even more sceptical attitude towards government intervention—namely, the United States. But before we move to the New World, a look at what was happening elsewhere in the Old one is of order.

2.2.2 Fixing the Payment Infrastructure in Early Modern Europe: “Bank-Based” Solutions

The Venetian context was rather unique and had henceforth fostered the adoption of uniquely innovative solutions. That said, Venice was for sure not the only place in late medieval and early modern Europe where significant monetary experiments took place. As this section will point out, these experiments were rather dissimilar both in their form and in their substance, as each of them tried to address the problem of the provision of payment services within a different framework. We will distinguish between four categories of experiments, ordered according to their first chronological appearance: (1) public solutions for public payments, (2) private solutions for public payments, (3) nonprofit solutions for public and private payments, and (4) public solutions for private payments.

Public Solutions for Public Payments: The Aragonese Municipal Banks

Had it adopted Giovanni Dolfin's plan in 1356, Venice would have largely won the primacy in the establishment of public banks. But the Senate's resistance to direct intervention in the banking business prevented this from happening, and leadership in this particular category

⁷³ On the proper enunciation of *Wagner's law*, see Peacock and Scott (2000).

was eventually won by Barcelona. Founded in 1401, the *Taula de Canvi* also provided the model for a number of municipal banks created during the fifteenth and sixteenth century in the territories belonging to the Crown of Aragon (in Perpignan, Valencia, Vic, Tarragona, Girona, Majorca, Saragossa, Trapani, Palermo, Olot, Cervera, Lleida, Tortosa, and Messina).⁷⁴ These organizations were, under many respects, similar to the *Banco del Giro*, to the point that historians have often suggested that they provided the model for the latter.⁷⁵ And in fact they were purely public transfer banks, opening to the creditors of the municipal government current account credits that were transferable to third parties.

Similarities, however, seem to stop here. As we have seen, the prime mover of the Venetian administration had always been the preservation of the payment system—which was seen as an essential infrastructure for private business, esp. international trade—and not the monetization of government debt. This was due to the fact that, probably thanks to its market power, the government of the Most Serene Republic managed relatively well to pay for its purchases on dedicated current accounts, opened at its own traditional administrative divisions (like the Grain or the Fodder Office). Hence, the state was not under a particular pressure to interfere with the banking system and had generally tried to stay as much as possible detached from it. Also in the moments in which it had had some surpluses, the government had only seldom deposited funds with the Rialto banks.⁷⁶ Even though the *Banco del Giro* had actually emerged in connection to the management of the floating debt, its organization as a permanent and separate division of the public administration had been dictated by the desire to rationalize old mechanisms, not by the need of creating new ones.⁷⁷

This situation contrasted sharply with the one in which the municipal governments of the Aragonese towns (which enjoyed considerable fiscal autonomy with respect to the Crown) had found themselves at the end of the fourteenth century. For the management of their payment flows, these

⁷⁴Roberds and Velde (2016a, p. 25); De Simone (1993, pp. 25–26).

⁷⁵See, for example, Kohn (1999, p. 23).

⁷⁶Mueller (1997, pp. 435–436).

⁷⁷Luzzatto (1934, pp. 51–54).

administrations had traditionally resorted to the services of private moneychangers. As shown by the considerable hardening of bankruptcy laws throughout the century, however, safety had increasingly become a primary concern to them.⁷⁸ In the 1380s and 1390s, a number of bank failures had taken place, in which both the City of Barcelona (as a creditor) and the Crown of Aragon (as a debtor) had been involved. When in 1399 the royal representative in Barcelona invited the civil authorities to deposit their funds with one moneychanger by promising that the King would guarantee his liabilities, the City refused to comply.⁷⁹ It was in the aftermath of these events that a petition for the creation a public bank was addressed to the municipal council. The petitioners advanced three motivations: first and foremost, securing the safety of the “considerable” funds of the City; second, providing a facility to private depositors; and third, converting the City’s long (and high-yielding) debt into short (and low-yielding) one. In 1401, the *Taula de Canvi* (literally, “exchange bank”) started operating as the municipality’s own, independent moneychanger.⁸⁰

As said, the *Taula* was designed in a way that was broadly similar to the *Banco del Giro* and could have well played the role of clearinghouse for the Barcelonese banking system. And in fact, during its first years, it did start working in such a way. With the aim of protecting the Bank from potential instability, however, since the 1430s the City began to adopt a fluctuating policy towards private bankers, which ended up compromising its clearing functions. In 1437, in the midst of a “silver crisis” that was triggering cash hoarding throughout Europe,⁸¹ private bankers were accused of destabilizing the *Taula* by suddenly withdrawing coins in moments of tension. Had the Bank stuck to its formal obligation to back deposits with a 100% reserve, withdrawals would not have been a source of concern. But the rule had been largely violated: a number of accountholders had been allowed to overdraw heavily, and the coverage ratio had fallen well below one-third.⁸² As a preventive measure, the City decreed that private bankers should no longer bear an

⁷⁸ Sánchez-Sarto (1934, pp. 2–3).

⁷⁹ Riu (1979, pp. 147–148).

⁸⁰ Usher (1943, p. 269).

⁸¹ These monetary disturbances would also cause the demise of the banking office of the *Casa di San Giorgio* in Genoa in 1444: see [Private Solutions for Public Payments: The Genoese Banking Office of the Casa di San Giorgio](#).

⁸² Usher (1943, pp. 331–339).

account. In 1446, however, the municipality moved in the opposite direction: it tried to oblige bankers to use the Taula's facilities, by ruling that bills of exchange should be made payable in bank. But the Crown of Aragon questioned the lawfulness of this provision, which remained largely ineffectual. A period of confusion ensued, as the City repeatedly hesitated between a restrictive and a liberal approach towards private bankers. For many decades, arrangements in the one or the other sense were subsequently issued and repealed; all of them were, apparently, widely disregarded. In the meantime, the Taula lost its central role in the payment system; even tax receivers, who were legally required to keep their funds there, started to deposit them with private bankers instead. At the beginning of the seventeenth century, the Bank definitively restricted its operations to municipal payments and the collection of petty deposits by small savers.⁸³

Therefore, the Taula de Canvi was primarily intended not as a way to smooth the working of the payment system but as a tool to support the City of Barcelona in its tumultuous relationship with the Monarchy. The development of the clearing function of the Bank was compromised by the political will to keep it focused on the municipal business, and its very existence was put into question at least three times by heavy involvement in the financing of three major revolts against the Crown (those erupted in 1462, 1640, and 1713).⁸⁴

We are poorly informed about the other municipal banks created in the Aragonese realm, whose lives were more tranquil than that of their Barcelonese peer. All of them, however, appear to have been organized according to the same principle: focusing on the management of the municipality's cash flows and (accessorily) offering deposit facilities to petty depositors. As providers of these limited payment services—and despite a number of ups and downs—they seem to have performed reasonably well: some of them actually survived until the mid-nineteenth century, when they were absorbed or supplanted by the emerging regional networks of the Banco de España (Barcelona) and the Banco delle Due Sicilie (Palermo and Messina).⁸⁵

⁸³ Usher (1943, pp. 313–310).

⁸⁴ Usher (1943).

⁸⁵ Roberds and Velde (2016a, pp. 24–25); De Simone (1993, pp. 67–70).

Private Solutions for Public Payments: The Genoese Banking Office of the Casa di San Giorgio

For many centuries, Genoa was Venice's arch-rival in the fight for control of Mediterranean trade. Like Venice, Genoa was strategically situated from a commercial viewpoint: it was a naturally protected harbour, directly connected to the main trade routes linking Italy to Northern Europe. Unlike Venice, however, Genoa was poorly situated from a military viewpoint, as it was easily assailable from both sea and land. Moreover, like most other Italian city states (but unlike its Adriatic rival), the Ligurian capital was well connected to its mainland, and its political elite was dominated by feudal families with large autonomous possessions in the countryside.⁸⁶ This may perhaps explain why the search for a convergence of family clans' interests at the city level, which had remarkably succeeded in Venice by the end of the thirteenth century, spectacularly failed here.⁸⁷ Genoa's history was one of harsh civil unrest between independent factions that enjoyed considerable social, economic, and even military autonomy. After its major naval defeat to the Venetians in the War of Chioggia (1381) and the demise of its colonial empire, Genoa became "a mere territorial skeleton", that had "given up all claim to political independence, staking everything on that alternative form of domination, money".⁸⁸

In the context of this sort of "failed state", the solution that was found to manage the huge public debt inherited from the lost war consisted in privatization. The idea of swapping future streams of fiscal revenues against flows of cash was far from original: to the contrary, it was the standard way according to which taxes were farmed in the Middle Ages—as it had already been the case in ancient Rome. But Genoa implemented this on a grandiose scale, by stably providing a group of private creditors with the monopoly of tax farming and the management of the whole public debt. Founded in 1407, the Casa di San Giorgio was the first case of a privately owned chartered company to which sovereign competences

⁸⁶ Epstein (1996).

⁸⁷ Greif (1995).

⁸⁸ Braudel (1982, p. 35).

had been outsourced by the state on a stable basis. Niccolò Machiavelli (an ardent admirer of technocracies) famously called it “a state within the state” and praised its remarkable efficiency compared to the government’s inefficiency.⁸⁹ From a fiscal viewpoint, it was a tremendous success, which not only lasted as long as the Republic itself but also provided a model that was largely imitated throughout the continent.⁹⁰

Being the sole agency for the issuance and repayment of the large public debt, since its inception the Casa obviously became the biggest player in the domestic payment system. By the fourteenth century, Genoa had already largely developed deposit banking and interbank clearing.⁹¹ Had the Casa opened banking facilities, it would have naturally attracted depositors in view of the large number of payments associated to the government debt: differently said, thanks to network externalities, it would have spontaneously internalized the clearing function. This is precisely what happened during the first decades of its life, when the Casa actually operated a deposit business. Its books reveal that the activities of the banking office thrived from the very beginning. The services provided to bankers included not only clearing but also the right to overdraw substantially.⁹²

Starting from the 1430s, however, the “silver crisis” made San Giorgio run into the very same problems experienced by the Taula de Canvi: the increase in the market price of coins encouraged depositors to withdraw cash from the Casa.⁹³ The outflow was dangerous to its banking office, which apparently kept a very low coverage ratio; in order to stop it, the Company started to deliver coins at market price—hence depreciating the value of its bank money. A period of tensions ensued. The government asked the Casa to resume convertibility at par; in view of the losses that would have implied, in 1444 the Company decided to shut down the business altogether.⁹⁴ At more or less the same epoch, and despite the wide

⁸⁹ Fratianni (2006, p. 201). The quote is from Machiavelli’s *Florentine Histories* (published in 1532), book VIII. Also see Taviani (2015, pp. 243–244).

⁹⁰ Fratianni and Spinelli (2006).

⁹¹ Heers (1961, pp. 91–96); De Roover (1974a, pp. 215–217).

⁹² Felloni (1991, pp. 232–235).

⁹³ Aerts (2006).

⁹⁴ Felloni (1991, pp. 241–243).

institutional differences between San Giorgio and the Taula, Genoa found itself in the same situation as Barcelona: the public bank gave up all responsibilities over the wholesale payment system, only to refocus on the sole management of government payments. The political economy of this decision, however, was different in the two places: while in Barcelona the reconversion was motivated by the municipality's hostility towards bankers, in Genoa it was driven by the Company's refusal to comply with the demands of a government that was favourable to the bankers themselves.

The demise of its banking office in 1444 did not mean that San Giorgio completely stopped to provide payment services to the public. Following the principle of assignability "in bank" that was so popular in Venice, the Casa allowed the creditors of the state to transfer matured (but still unpaid) interests on government debt to the accounts of third parties; future revenues could thus be mobilized and used as means of payment until they were actually paid. The managers of the Company were willing to provide such a service as it did not entail any risk to them: credits were made payable in cash only as far as the government would provide the cash, while they remained inconvertible until then. We know that this device was widely used as a means for payment for petty transactions.⁹⁵ However, because the price of these inconvertible credits (called *moneta di paghe*, i.e., "coupon" money) fluctuated widely with respect to cash, and because the amounts issued were relatively small, they could not be used for clearing wholesale payments. The Casa was following a self-interested strategy: on the one hand, it was willing not to quit the deposit banking business; on the other hand, though, it was unwilling to bear the risk of losses in case the market price of coins diverged from the official one (as it had been the case during the "silver crisis"). Guided by these principles, between 1444 and 1675 the Casa multiplied the varieties of bank money it issued: it opened a number of deposit facilities for different types of coins (Genoese gold, Genoese silver, Spanish silver) that were only convertible in that particular coin. In the mid-seventeenth century, accounts at San Giorgio were kept in at least five different bank monies, each one with its own floating price.⁹⁶ While such deposit facilities were

⁹⁵Heers (1961, pp. 159–172).

⁹⁶Felloni (2006).

convenient to customers for safekeeping reasons, they could not be used as a practical means for clearing wholesale interbank payments. Dissatisfaction with this situation was repeatedly voiced to the civil authorities, until in 1675 the Republic finally imposed a general reform of San Giorgio's banking activities. Following the model of Venice's Banco del Giro, the Casa was now compelled to "merge" all of its different bank monies into one single general unit. As a compensation, the new Banco di San Giorgio received the monopoly of the clearing of large transactions, which were made (as in Venice) compulsorily payable in bank.⁹⁷

After almost three centuries of strong divergence, therefore, Genoa eventually partially converged towards the Venetian model of management of the payment system. The Casa di San Giorgio had proved an efficient private solution to the provision of fiscal services, but it also turned out to be a rather inefficient private solution to the provision of payment services. A privately owned company aimed at maximizing its shareholders' revenues, the Casa was reluctant to support the risks stemming from the operation of the payment system in an uncertain monetary outlook. One might wonder why such a major institutional failure could take place at the very moment in which Genoese bankers had become the leading financiers of Europe and had themselves developed the most sophisticated international clearing mechanism ever seen at the time—that is, the quarterly "Bisenzone" exchange fairs.⁹⁸ A tentative answer might be precisely that the international clearing acted as a substitute for the domestic one: unlike in the continuous Venetian clearing,⁹⁹ the bulk of Genoese wholesale payments might have actually been cleared in fair at a quarterly frequency. One might speculate that it was the decadence of the "Bisenzone" fairs in the late seventeenth century that finally led the Republic to bend San Giorgio's resistance to the reopening of a "general" bank. Whatever the case, Genoa's experience under-

⁹⁷ Gianelli (2006).

⁹⁸ The so-called "Bisenzone" fairs were invented by Genoese bankers as a substitute to the traditional fairs of Lyons, from which they had been expelled for political reasons. They were named after the town of Besançon where they originally took place, but they maintained the same labelling after their location moved first to Piacenza and then to Novi Ligure. Unlike traditional fairs, they were purely financial fairs, exclusively devoted to the clearing of international exchange transactions. On "Bisenzone", see Boyer-Xambeu et al. (1994); Pezzolo and Tattara (2008); Börner and Hatfield (2016).

⁹⁹ Luzzatto (1954).

lines the difficulties inherent to a privatised organization of the payment system. The same difficulties would resurface in England (a country that would explicitly imitate the Genoese example) two centuries later.

Nonprofit Solutions for Public and Private Payments: The Neapolitan Banks of Issue

Naples definitively joined the Crown of Aragon in 1442, nearly one century and a half later than Sicily. The capital of a fairly centralized kingdom encompassing the whole of continental Southern Italy, it was already a big city, and set to become one of the biggest metropolises of early modern Europe. Because of the huge role played by the Court in its financial life, since the fourteenth century its banking sector had been dominated by the government's foreign creditors—that is, the local branches of Florentine banks first and of Genoese ones afterwards.¹⁰⁰

The Kingdom of Naples holds a very peculiar record that no one has ever threatened to contend so far: as far as we know, it is the only country with a central bank originally founded by a saint. Its nineteenth-century monopolistic bank of issue, the Banco delle Due Sicilie, was the result of the 1808 reorganization of the seven banks of issue that had been in operation until then, the oldest of which (the Monte di Pietà) had been created in 1539 under the auspices of Saint Cajetan of Thiene.¹⁰¹ The fact that a saint promoted the foundation of charitable pawnbroking organizations was, per se, far from exceptional in Renaissance Italy¹⁰²; nor was exceptional the fact that such organizations issued deposit certificates that were transferable to third parties. What really was exceptional in the case of Naples, by contrast, is the fact that, in the second half of the sixteenth century, deposit certificates were declared eligible for tax payments. In view of important amount of payments generated by the state (the tax level being relatively high for those times), this strongly encour-

¹⁰⁰ De Rosa (1991, pp. 501–503).

¹⁰¹ De Simone (1993, pp. 23–25).

¹⁰² For instance, many of the “mounts of piety” of Central and Northern Italy were founded in the fifteenth century following the initiative of Saint Bernardine of Siena and Saint Antoninus of Florence. Gelpi and Julien-Labryère (2000, pp. 42–45).

aged their acceptance by the general public. In the following years, other seven charities were granted the same privilege.¹⁰³

The reasons why the Spanish Viceroyalty decided to confer such a high status to the certificates issued by local charities are the same that spurred reform in Venice, Barcelona, or Genoa: widespread banking failures inflicting losses to depositors¹⁰⁴ and problems with the circulation of coins.¹⁰⁵ The solution consisted in conferring to the eight nonprofit organizations an official role in public finance: each of them would be responsible for managing one particular stream of tax revenues and for managing the current accounts of the Treasury. But this role in public finance was coupled with a role in the payment system: each charity was allowed to operate a transfer bank and to issue certificates of deposit that were transferable to third parties by nominative assignment. The charities were independent organizations, but their banking operations were supervised by the state. While this joint management prevented excessive risk-taking at the decentralized level, it guaranteed to the government a role of coordination in the payment system. The arrangement appears to have worked effectively: before the Napoleonic Wars came to jeopardize the finances of the Kingdom, only one major accident occurred (one bank of issue failed in 1702) without entailing any loss for depositors. The reasons why the Viceroyalty opted for this particular institutional solution are not completely clear. One might speculate that the Spanish administration conceived of this strategy as a way to legitimize its monetary and fiscal action without, however, having to devolve competences to more politically insidious local partners like municipalities (as in the case of Barcelona) or private creditors (as in the case of Genoa). Charities were actually popular among all classes of the Neapolitan society, and hence more likely to generate trust: and in fact, they managed to be left unscathed even in times of political uprising against Spain—esp. during the very radical revolution of 1647.¹⁰⁶ The result was a stable equilibrium that allowed for an extraordinary development in the circulation of certificates, both in the capital and in the provinces.¹⁰⁷

¹⁰³ De Rosa (1991, pp. 500–501).

¹⁰⁴ Roberds and Velde (2016b, p. 339).

¹⁰⁵ De Rosa (1991, pp. 502–503).

¹⁰⁶ Villari (2006, p. 905).

¹⁰⁷ Roberds and Velde (2016b, pp. 484–487).

Public Solutions for Private Payments: The Transfer Banks of Amsterdam and Hamburg

Maintenance of an orderly coin circulation was difficult in late medieval and early modern Europe,¹⁰⁸ and especially so in fragmented polities in which minting rights were dispersed across a multiplicity of entities. This was particularly the case in the Holy Roman Empire and in the Low Countries. In the period of general currency disorder that characterized the fifteenth century,¹⁰⁹ a number of German cities tried to improve the state of domestic circulation by promoting the creation of exchange banks, either public or private. The primary goal of these banks was to check the quality of coins and convert them on demand into other coins. In many cases, they were only temporary solutions to momentary problems. For instance, in 1402 the City of Frankfurt created a municipal bank that would only operate during the autumn fair, thus providing a specific facility smoothing transactions among international traders attending to the event. Although some of these banks did develop lending and transfer activities, none of them apparently emerged as a stable pivotal player in the domestic payment system.¹¹⁰

At the very beginning of the seventeenth century, Amsterdam found itself heavily exposed to this old problem: systematic debasements by the 14 government mints and 40 private mints then operating in the Dutch Republic (not to speak of those operating in the Spanish Low Countries) were severely deteriorating the quality of the circulating means, hence compromising the development of its trade business. For this reason, in 1609 the municipality decided to create a municipal exchange bank (the *Wisselbank*) to withdraw the bad coins from circulation and replace them with good ones. At the same time, however, Amsterdam was facing another serious problem in its payment system: the widespread practice to pay bills of exchange not in cash, but through the assignment “out of bank” of other bills falling due by third parties.¹¹¹ Increasingly popular

¹⁰⁸ Sargent and Velde (2002).

¹⁰⁹ Aerts (2006).

¹¹⁰ Roberds and Velde (2016b, pp. 348–350).

¹¹¹ Quinn and Roberds (2009). On the practice of assignment “out of bank”, see Sect. 2.2.3.

since the late sixteenth century, this practice created serious inconvenience to trade: as no centralized mechanism for the payment of bills was in place, settlement was costly and risky to the bearer. Confronted with this “decentralization” of payments for the first time in centuries, in 1593 Venice had strongly intervened to reverse the trend by making bills of exchange compulsorily payable in bank.¹¹² In 1609, Amsterdam decided to adopt the same strategy and “augmented” its exchange bank by providing it with the monopoly of large settlements, thus creating a safe and centralized clearing facility for its banking system. The Wisselbank proved a reliable infrastructure that supported the rise of Amsterdam as the leading financial centre of the time, and for most of the seventeenth and eighteenth centuries acted as the pivot of the international payment system.¹¹³ The model of the Wisselbank was closely imitated by another emerging merchant republic, Hamburg, when it fell victim of the wave of debasements that ushered in the infamous “Kipper- und Wipperzeit” crisis during the Thirty Years’ War.¹¹⁴ Founded in 1619, the Hamburger Bank was equally entrusted with the monopoly of clearing for large transactions: as a result, it rapidly established itself as the centre of the regional payment system revolving around the Hanse town. Unlike the banks of Venice, Genoa, and Amsterdam, the Bank of Hamburg did survive the Napoleonic Wars; as in the case of Barcelona and Naples, it was eventually integrated into the emerging national payment system in 1876, when its business was absorbed by the Reichsbank.¹¹⁵

To sum up, this section has shown that during the late medieval and early modern period, recurrent problems with the payment system prompted governments to intervene in order to secure a smooth functioning of the payment infrastructure. These solutions varied substantially in their organizational form, according to the different institutional contexts in which they were designed. Most solutions appear to have been adequate, as they endured as much as the politics that had put them into place. During the Napoleonic Wars, however, all of them were discontinued, and a more standardized approach was adopted across Europe, inspired by the

¹¹² Luzzatto (1934, pp. 49–50).

¹¹³ Gillard (2004).

¹¹⁴ Schnabel and Shin (2006).

¹¹⁵ Roberds and Velde (2016b, pp. 350–353).

developments that had taken place in England during the eighteenth century. In order to fully understand such developments, however, it is necessary to go back to their roots in sixteenth-century Antwerp.

2.2.3 Fixing the Payment Infrastructure in Early Modern Europe: “Market-Based” Solutions

By the late Middle Ages, deposit banking had reached a considerable degree of sophistication in places like Venice or Genoa, and governments had aimed at preserving these “bank-based” (intermediated) payment solutions by fostering the centralization of clearing operations. Behind their intervention in the payment system was the conviction that “bank-based” solutions actually provided the only safe alternative to cash. As a matter of fact, in a world plagued by limited contract enforceability, “market-based” (disintermediated) payment solutions (i.e. the use of bilateral debt instruments as means of payment) worked poorly¹¹⁶ and did not guarantee finality.¹¹⁷ “Market-based” non-cash payment solutions worked reasonably well within restricted clubs of agents with high entry barriers (most notably, at fairs), but proved difficult to transplant satisfactorily on a larger scale.¹¹⁸ By monitoring debtors and insuring

¹¹⁶Contract theory argues that even in contexts of limited contract enforcement, repeated games should lead over time to an equilibrium that is equivalent to the one with full enforcement (see, e.g., Martimort et al. 2017). However, this conclusion is based on the hypothesis that the only risk to principals is that agents “take the money and run”. In early modern Europe, the problem rather consisted of the fact that agents would collude in paying with inferior (but not worthless) means of payment, as implied by Gresham’s law (see, e.g., Quinn and Roberds 2009). Collusive (rather than competitive) behaviour by agents would make principals’ threat of terminating future interaction (the “stigma” threat) basically toothless, thus leading to a suboptimal equilibrium.

¹¹⁷On the crucial role of *both* transferability *and* finality in allowing for the emergence of decentralized non-cash payments, see Kahn and Roberds (2007). Also see Sect. 4.1.3.

¹¹⁸The “market-based” payment system adopted in fairs is analysed by Börner and Hatfield (2016). According to these authors, this decentralized club system is efficient and superior to a centralized one (e.g. a public bank): this is the case in view of the fact that creditors have incentives to present to the centralized organization only bad-quality debt because of the “put option” problem underlined by Kahn and Roberds (1998). Note that in Börner and Hatfield (2016), the transformation of the centralized clearing organization into a sort of “bad bank” is only one of the multiple equilibria that can occur depending on creditors’ expectations. However, their game-theoretic model does not take into account the fact that the use of a centralized clearing typically entails lower transaction costs to creditors with respect to a decentralized one (e.g. because of the existence of search frictions in the latter). Lower transaction costs should work as a sufficient coordinating mechanism leading all creditors to prefer the centralized clearing.

payees, deposit banks provided a superior outcome that did make non-cash payments viable; in the absence of intermediaries, non-cash payments remained largely problematic and often inexistent.¹¹⁹

During the early Renaissance period, however, innovations aimed at overcoming the difficulties of “market-based” non-cash payments started to be adopted. The idea was simple and far from new: following the practices long established in Venice and Genoa, it consisted of making short-term bilateral debt assignable to third parties, thus allowing the creditor to use it as a means of payment. But while Venetian and Genoese organizations made debt assignable “in bank” through current account transfers, the innovation consisted in transforming it into a market-traded security. This was made possible by the introduction of the practice of “assignment out of bank”, which gradually transformed bills of exchange (until then, nonnegotiable certificates of short-term indebtedness) into fully tradable instruments. This practice had been known in Florence for centuries¹²⁰ and may have spread from there to England (where Florentine bankers were most influential) before the fifteenth century,¹²¹ but it only became standardized in Antwerp in the following decades.¹²²

It is significant that the emergence and development of the “assignment out of bank” occurred in places that were characterized by a relatively atrophic deposit banking business. In Florence, banks had always been similar to investment funds, and no interbank clearing apparently existed.¹²³ In England, deposit banking remained unknown before well into the seventeenth century.¹²⁴ In Antwerp, the development of deposit banks (yet largely practised in nearby Bruges in the late medieval period) had been jeopardized by regulation: at the end of the fifteenth century,

¹¹⁹ On the role of intermediaries in allowing for the emergence of markets in highly uncertain frameworks through risk-sharing, see Allen and Gale (2000, pp. 469–495).

¹²⁰ De Roover (1974a, pp. 219–221).

¹²¹ Munro (1991).

¹²² De Roover (1953, pp. 94–100); Van der Wee (1963, II, pp. 340–343).

¹²³ Goldthwaite (1985); Mueller (1997, p. 322). To be precise, the practice of the “assignment out of bank” was well known in Venice at least since the late fourteenth century, but it had been outlawed by the Senate first in 1421 and again in 1526, as it was seen as conducive to financial instability; the use of the “official” centralized payment infrastructure was encouraged with all possible means by Venetian legislators. Ferrara (1871, pp. 452–458).

¹²⁴ Richards (1929, pp. 20–21).

the Burgundian administration of the Low Countries had reacted to financial instability by banning deposit banking altogether, thus creating a shaky legal environment to the business.¹²⁵ When in the early sixteenth century the city started to thrive as an international commercial hub, traders found themselves faced with the lack of an adequate payment infrastructure as those existing in Venice or Genoa. Traders' spontaneous reaction consisted of the adoption of the Florentine practice: certificates of bilateral indebtedness started to be made "assignable out of bank". Legalized by Antwerp courts in 1507, this practice did not yet improve substantially the acceptability of "market-based" non-cash payments. In fact, assignability amounted to a complete discharge of all obligations: once the payee had accepted to be paid through assignment of a third party's debt, the payer was no longer responsible in case the original debtor defaulted. In an open environment as the Antwerp market (unlike in restricted "payment clubs" like the Genoese fairs), third parties were often unknown and could not be monitored by payees: as a result, mere assignment was ineffective in boosting payers' confidence in such payment instruments. A substantial improvement took place when, in 1537, emperor Charles V formally established that payments through assignment could be considered as valid only as long as the third party's debt was paid at maturity: legally speaking, assignment was "augmented" into proper negotiability.¹²⁶ In fact, Charles V's edict recognized the joint liability of all parties involved in the circulation of payment instruments, hence providing a solution to the informational problems left open by the mere "assignment out of bank".¹²⁷ Differently said, while the introduction of negotiability (and joint liability) did not transform payers into bankers (the final payment to the payee was still due by the third party, not by the payer), it created for them the same incentive structure to which bankers were subjected: in fact, it obliged them to play the role

¹²⁵ De Roover (1974a, p. 219). This traditional interpretation is contested by Aerts (2011), who presents evidence of deposit banking activities in sixteenth-century Antwerp. This, however, does not necessarily challenge the view that the deposit banking sector was underdeveloped in the city at the time it became the biggest trading centre of Northern Europe.

¹²⁶ Van der Wee (1963, II, pp. 340–343); Kohn (2001).

¹²⁷ On the informational properties of joint liability rules, see Ghatak and Guinnane (1999) and Santarosa (2015).

of insurers for payees, and (consequently) the role of monitors for debtors. In the following centuries, the “Antwerp custom” became the standard international practice for bills of exchange, allowing for their establishment as the conventional means of payment for foreign *and domestic* payments in the eighteenth and nineteenth centuries.

Therefore, the first viable “market-based” non-cash payment solutions originally emerged in a context in which the development of traditional “bank-based” solutions had been hindered by regulatory intervention. As soon as the principle of negotiability (and joint liability) was established in the Low Countries, it started to spread throughout Europe. Despite their immediate popularity, however, these “market-based” solutions appear to have remained inferior with respect to “bank-based” ones. The reason was twofold. First, the decentralized clearing of bills of exchange was obviously more costly (and unpractical) than the centralized clearing of transfers offered by the banking system.¹²⁸ Second, the decentralized monitoring of debtors lacked the broader view on overall payment flows (and hence, on the possible building-up of financial fragilities) that a centralized clearing system actually possesses.¹²⁹ This explains why, as we have seen, important financial centres like Venice and Amsterdam fiercely resisted the trend towards decentralization that the “Antwerp custom” was producing and thus tried to prevent a “debasement” of their domestic payment standards. By making bills of exchange compulsorily payable “in bank” (in 1593 and 1609, respectively), Venice and Amsterdam explicitly intended to create a cheaper and safer payment system than the one “out-of-bank” solutions would produce.¹³⁰ Other established financial centres (most notably, Hamburg in 1619 and Genoa in 1675) would subsequently follow them in pursuing the same goals with the same means.¹³¹

“Market-based” solutions thrived elsewhere, in contexts in which the creation of a centralized clearing organization was problematic. This was particularly the case in seventeenth-century England, a country plagued by both high political instability and a famine of cash.¹³² In the course of

¹²⁸ See Sect. 2.1.2.

¹²⁹ See Sect. 2.1.3.

¹³⁰ Luzzatto (1934); Quinn and Roberds (2009).

¹³¹ Roberds and Velde (2016b).

¹³² Desan (2014, pp. 231–245).

the century, English courts not only definitively recognized the principle of negotiability (and joint liability) of bills of exchange but also extended its applicability to payments between any private parties.¹³³ This means that the bill of exchange was transformed from an instrument for international interbank transactions into a means of payment for everyday domestic transaction.¹³⁴ Following these legal evolutions, the so-called inland bills first appeared and started to become popular throughout the country. Ideally, a system totally dominated by payments in bills would have been the exact opposite to the Venetian model: it would have been not only fully decentralized, but also disintermediated in the strictest sense of the word (everybody could have acted as her own bank).

But the English extensive approach towards the principle of negotiability also paved the way to the diffusion of another non-cash payment solution that prevented the domination of bills of exchange: banknotes. Banknotes are “hybrid” instruments in the sense that they present features of both “bank-based” (they are obviously issued by intermediaries, hence backed by banker-monitored debt) and “market-based” payment solutions (they are exchanged in a decentralized way without any control by the issuer). Already in sixteenth-century Italy (and especially in Naples), deposit certificates had started to be used as means of payment among privates. However, the circulation of such certificates remained under the indirect control of the issuing bank, as for safety reasons—to minimize incentives to theft—they needed to be nominatively assigned in order to be transferred to third parties.¹³⁵ As deposit banking started to develop in London in the second half of the seventeenth century, bankers (or “goldsmiths” as they were called at the time) became accustomed to issuing deposit certificates (“notes”), which were originally (as in Naples) transferable to third parties by nominative assignment. Towards the end of the

¹³³ Richards (1929, pp. 44–49).

¹³⁴ This amounted to a substantial evolution in the nature of bills of exchange, which had been originally conceived as an instrument for *international interbank payments*—although often used as collateral for domestic lending. De Roover (1953).

¹³⁵ De Rosa (1991, pp. 500–501): also see Sect. 2.2.2. The first bank to have issued freely transferable banknotes was apparently the Stockholms Banco (founded in 1657). However, the experiment was soon discontinued with the fall of the bank in 1664; the notes issued by the Riksbank (founded in 1668) in the following decades were at first transferable only by nominative assignment. Roberds and Velde (2016b, p. 466).

century, however, the practice of paying notes to the bearer without prior formal assignment became widespread. Although it took a number of decades before the principle became officially recognized by courts, this practice transformed deposit certificates into modern banknotes.¹³⁶ Readily exchangeable banknotes were an important innovation, because they married some of the advantages of “bank-based” payment solutions (easier monitoring of debtors, and finality) to some of the advantages of “market-based” ones (relative flexibility and anonymity).¹³⁷ De facto, the issuance of banknotes amounted to a securitization of deposits. It was also thanks to this innovation that “goldsmith” banking took off rapidly in the final decades of the seventeenth century.

Had each issuer only dealt with her own banknotes (as much as each issuer of bills of exchange only dealt with her own bills), the resulting payment system would have been a perfectly decentralized one. This, however, would have also hindered the appeal of banknotes to the public. And in fact, “goldsmiths” very early understood the advantages of the mutual acceptance of banknotes by all participants to the banking system. As much as Rialto bankers had needed a centralized clearing to liquidate their claims on other bankers’ deposits, City “goldsmiths” needed the same to liquidate the notes issued by other “goldsmiths” that they were used to receiving in payment. As a result, an interbank clearing system had spontaneously emerged in London already before the Revolution of 1688.¹³⁸ It was in this particular context that the Bank of England started its operations in 1694.

¹³⁶ Rogers (1995, pp. 173–177).

¹³⁷ Kahn and Roberds (1999) model the conditions under which banknotes should prevail on purely “bank-based” payment solutions (what they call “checks”). Their model assumes that “redemption” (i.e. the conversion of the instrument into cash, which necessarily occurs any time the instrument is exchanged in the case of “checks”, but *not* in the case of banknotes) implies the liquidation of the issuer’s assets and is costly to the payee. They conclude that when redemption costs are low, “checks” should prevail; conversely, when redemption costs are non-negligible (but not prohibitive), banknotes should prevail. This may explain why banknotes did not emerge in early modern city states (where payments occurred within a limited geographical setting, and redemption costs were hence negligible), while became popular in eighteenth-century nation states (where payments involved a wider geographical setting, and redemption costs were hence substantial). However, the model does not take into account the fact that redemption of “checks” does *not* necessarily imply the liquidation of assets, as the “check” holder may well maintain the sums deposited with the issuer as much as the banknote holder does (which was necessarily the case when monopolies of deposit banking existed, as in early modern Venice or Amsterdam).

¹³⁸ Quinn (1997).

2.2.4 The Creation of National Payment Systems: Europe

Unlike Venice's Banco della Piazza di Rialto or Amsterdam's Wisselbank, the Bank of England was *not* founded as an organization aimed at fixing the problems of the payment system. Its structure was, in fact, much closer to that of Genoa's Casa di San Giorgio: it was a private agency whose primary goal was of fiscal nature.¹³⁹ Like San Giorgio, since its very beginnings the Bank of England inevitably found itself playing a big role in the domestic payment system because of the huge amount of payments generated by public finance. Unlike in Genoa, however, this role was not played through the public's use of deposit facilities, but through the use of banknotes: as one of the Bank's founders and first directors, Theodore Janssen, wrote in 1697, "the Custom of giving Notes hath so much prevailed amongst us that the Bank could hardly carry on Business without it."¹⁴⁰ The privileged role of its notes in the domestic payment system was first designed in 1697 and then definitively established in 1708, when the Bank was granted the monopoly of joint-stock banking—thus making it the sole legal large-scale issuer of notes in England and Wales.¹⁴¹

The Bank of England was quickly integrated in the London interbank clearing: "goldsmiths" kept accounts with it (which they used in order to redeem the banknotes they received from their customers) and, in turn, had their own notes accepted by the Bank.¹⁴² Although for more than 150 years "goldsmiths" did not directly use their accounts with the Bank to clear the mutual debts they held on one another, they soon became accustomed to use Bank's notes as the ultimate means for settling residual claims after the clearing process had been completed. Therefore, for one century and a half, the Bank of England did not internalize the wholesale payment system (as the clearing organizations of Venice, Amsterdam, or Hamburg had done), but only played an indirect role into it by providing its final non-cash means of settlement. In the course of the eighteenth century, City

¹³⁹ Fratianni and Spinelli (2006, p. 263).

¹⁴⁰ Quoted in Clapham (1944, I, p. 3).

¹⁴¹ Clapham (1944, I, pp. 50 and 65).

¹⁴² Richards (1929, pp. 172–173); Clapham (1944, I, pp. 29–33).

bankers developed their own clearinghouse outside the Bank. Like the original Rialto clearing of the fourteenth to sixteenth centuries, the first London clearinghouse was a mere meeting place, in which bankers settled payments bilaterally according to the same procedures prevailing in exchange fairs.¹⁴³ Only since the 1820s it evolved into a user-owned clearinghouse (a bankers' club with barriers to entry), but it remained a very "light" organization whose rules were not even binding for members.¹⁴⁴ The role indirectly played by the Bank of England in the clearing process became increasingly important during the Napoleonic Wars, when the Bank first developed substantially its discount operations. Around 1805, bankers were allowed to net what they owed to the Bank with what the Bank owed to their customers that had accessed its discount window, thus reducing substantially the amounts of banknotes mobilized during the settlement process.¹⁴⁵ But the transformation of the London clearinghouse into a modern one only started half a century later, in 1854, when the Bank of England agreed to open a "clearing account" to it. The whole clearing process would now be finalized through the Bank's "clearing account", to/from which the sums owed by/to bankers would be transferred from/to bankers' particular accounts. At first, while the clearinghouse was allowed to collectively overdraw the "clearing account" (meaning that the Bank stood ready to lend to the whole banking system in order to avoid disruptions in the payment system), single bankers were not allowed to overdraw their particular account with the Bank, and were asked to settle the difference in banknotes. In 1860, however, the Bank allowed bankers to overdraw their particular accounts upon deposit of eligible securities, thus becoming the ultimate lender to each clearinghouse members. Finally, in 1864 the Bank officially joined the clearinghouse as a full member.¹⁴⁶

Only at the outset of these mid-nineteenth-century evolutions, therefore, London eventually found itself in a situation that was not unlike

¹⁴³ Martin-Holland (1910, pp. 268–269); Börner and Hatfield (2016, pp. 10–15).

¹⁴⁴ Martin-Holland (1910, pp. 271–276). It is noteworthy that applications for membership by joint-stock banks were systematically rejected between 1839 and 1854.

¹⁴⁵ Martin-Holland (1910, pp. 270–271).

¹⁴⁶ Martin-Holland (1910, pp. 277–278 and 281–282). The sums directly owed by the Bank to its accountholders, however, continued to be transferred bilaterally and not through the clearinghouse.

that of those places (Venice, Amsterdam, or Hamburg) that had established a monopoly of wholesale clearing in the early modern era: the de facto (albeit not de jure) internalization of its private bankers' clearing-house by the public bank. The process that had led to such an outcome bore similarities to what had happened in Genoa two centuries earlier: the private company to which the state had outsourced some of its fiscal prerogatives had inevitably taken a predominant role in the payment system, and despite some initial resistance to do so, the company had eventually assumed its public responsibilities in taking care of this crucial infrastructure. Of course, the Bank of England's reluctance to undertake such responsibilities can be understood as a question of incentive incompatibility: as the history of San Giorgio's first banking office had shown, the chartered company did not have any interest in providing possibly onerous additional services unless they were explicitly included in the charter's package. But it must also be understood in the context of the evolution of state organization since the eighteenth century: in a nineteenth-century territorial state, the domestic payment system was no longer akin to what it had been in early modern city states, as domestic infrastructures were now increasingly acquiring a nationwide dimension. England had been a forerunner in the emergence of a truly national payment system. By the end of the eighteenth century, London had already established itself as the place in which the national demand and supply of credit used to meet. The instrument through which capital flowed back and forth was the inland bill, and the place in which such flows crossed was the discount market around Lombard Street. English provincial ("country") bankers either bought bills payable in London or kept balances with London banks, which could be used to make/receive payments to/from third places.¹⁴⁷ Therefore, by the time of the Napoleonic Wars, the London clearinghouse already worked as the national clearinghouse, so that the Bank of England (originally a strictly London-based organization) indirectly played a crucial role in the national payment system.¹⁴⁸ This was first underlined in 1802 by Henry Thornton, probably

¹⁴⁷ King (1936, pp. 5–9).

¹⁴⁸ The national role of the Bank of England was also strengthened by the fact that the British government, unlike other European governments (e.g. the Dutch provincial governments), centralized all operations relating to the public debt in London. Van Bochove (2013).

the most acute nineteenth-century writer on monetary issues. Thornton noted that, as a rule, “country” bankers maintained their liabilities convertible into Bank of England notes, and in order to do so, they kept their reserves in balances or bills on London. This, he argued, created an integrated national system, to which the Bank provided the final means of payment.¹⁴⁹ The violent crisis of December 1825 showed the downsides of this spontaneously grown pyramidal system, which rapidly propagated the shock from two London banks to the large number of small provincial banks operating throughout the country, thus triggering the fall of a large number of the latter. With the aim of minimizing the risk of new disruptions in the domestic payment system, in the immediate aftermath of the crisis, the government allowed the Bank of England to open branches in the provinces and put vigorous pressure on its board to act accordingly. The government’s idea was that a nationwide system of Bank of England branches would terminate “country” bankers’ dependence on London bankers (as it would provide them with a local direct access to the final means of payment, viz., the Bank’s notes), provide the provincial public with safe deposit facilities, and make interregional payments easier and less costly.¹⁵⁰ Despite being aware of the opportunities offered by branching (an expansion of its discounting business and, thanks to this, of the circulation of its notes), the Bank also saw great risks (high costs, agency problems, and a potentially conflictual relationship with local banks). Its reluctance to venture into the provinces was only won by the government’s pressure, as well as by the threat of direct competition by new joint-stock banks, whose creation was now allowed in the “countryside”.¹⁵¹ Between 1826 and 1843, branches were opened in 14 English and Welsh towns, most (but not all) of which were active commercial centres. The first years of operation of the provincial branches were, on the whole, successful; during this period, the Bank seemed to be on the path of assuming direct responsibility for the management of the

¹⁴⁹ Thornton (1802, pp. 215–216 and 230–233). Also see Arnon (2011, pp. 108–111).

¹⁵⁰ Ziegler (1990, pp. 4–9). For instance, the Navy explicitly asked the Bank (which was the state’s exclusive treasurer) to open branches in the towns where the Naval Yards were located in order to facilitate payments to/from these state-owned plants. In 1834, the Bank partially complied by opening branches at Plymouth and Portsmouth.

¹⁵¹ Clapham (1944, II, pp. 102–116).

national payment infrastructure. These developments, however, were brought to an abrupt end by the adoption of Peel's Act in 1844.¹⁵² The reform had a twofold impact on the Bank's provincial network. On the one hand, because it set forth the principle that the newly created Banking Department of the Bank of England (which encompassed all of its lending operations) should work as a purely private firm devoid of any public responsibility,¹⁵³ the Act encouraged the Bank to focus on its more profitable (and less risky) lending business in London and to neglect discount operations in the countryside. On the other hand, because it established a rigid cap on the issuance of notes (but not on the creation of deposits), the Act deprived the Bank of the very means of expanding its discounts in the provinces, where deposit banking remained fairly underdeveloped with respect to the metropolis. As a result, after 1844 the Bank divested resources from its national network and returned to be exclusively focused on the London market, where the lending business could be conducted without issuing notes.¹⁵⁴ One might speculate that it was precisely the pressing need to encourage the substitution of notes with deposits that pushed the Bank to open a "clearing account" to the London clearing-house in 1854, thus taking the decisive step towards its assumption of a direct role in the wholesale payment system.¹⁵⁵ In the meantime, the room left open wide by the Bank's renunciation to develop a nationwide payment network was eventually filled up (as the Bank had correctly anticipated in 1826) by the newly founded joint-stock banks. In 1858, the so-called "country clearing" was opened within the London clearing-house. It allowed provincial banks to clear payments directly without the intermediation of London banks, thus paving the way to the creation of nationwide banking groups.¹⁵⁶ In the following decades, the inland bill

¹⁵² See the evolution of branches' discounts and deposits before and after 1844 in the Bank's balance sheet: Wood (1939, pp. 202–205).

¹⁵³ Fetter (1965, pp. 182–186 and 201–211).

¹⁵⁴ Ziegler (1990, pp. 31–74). The branches' discount and retail business would be partially revived in the 1890s, but only with the aim of increasing the Bank's strained profitability.

¹⁵⁵ "In consequence of the opening of this clearing account at the Bank of England, the use of bank notes in the Clearing House was entirely done away with – a great step in advance" (Martin-Holland 1910, p. 278).

¹⁵⁶ "The country clearing [...] more than all else has brought about the almost universal use of checks in England" (Martin-Holland 1910, p. 280).

market that had flourished in the late eighteenth and early nineteenth centuries gradually disappeared, as interregional payments were increasingly implemented through bank transfers.¹⁵⁷ The process came to its completion in 1907, when the London clearinghouse opened the so-called “metropolitan clearing”, which allowed the provincial branches of clearinghouse members to clear payments directly without passing from their headquarters. By that time, the local clearinghouses that existed in seven provincial towns had basically lost their reason for being.¹⁵⁸ On the eve of the First World War, England had eventually produced a nationwide “bank-based” payment system (with a wholesale clearing internalized by the public bank) and saw the disappearance of “market-based” payment solutions. While the Act of 1844 had indirectly obliged the Bank of England to internalize the central clearing mechanism, it had also prevented it from internalizing the peripheral payment network.

Most other countries displayed an attitude towards the creation of nationwide payment infrastructures that was closer to the one British authorities had adopted in 1826 rather than to the one they had adopted in 1844. Unsurprisingly, the country that embraced the most interventionist approach to the payment system was Napoleonic France. Since the foundation of the Banque de France, Bonaparte had made clear that he expected the organization to secure the implementation of payments in any town of relevance within all territories directly administered by France (including the annexed parts of Belgium, Germany, Italy, the Netherlands, and Switzerland). This was considered as important also from a fiscal viewpoint, as the payment facilities the bank was supposed to provide included the servicing of government debt—which was henceforth made much more attractive to peripheral investors. As a result, a vast network of correspondents was created since 1800, allowing for the transfer of funds (at a fixed fee) from one corner to the other of the country: correspondents kept accounts with the Paris headquarters, who acted as centralized clearing for the whole Empire.¹⁵⁹ The Bank also ventured into the creation of branches (it founded three discount offices and considered opening 12 more in

¹⁵⁷Nishimura (1971).

¹⁵⁸Martin-Holland (1910, pp. 283–287).

¹⁵⁹Prunaux (2016).

1808–1810), but enthusiasm cooled down as soon as the board was informed of the Emperor’s vision about credit, whose provision at fixed rates everywhere he considered as one of the Bank’s public duties.¹⁶⁰ After Napoleon’s fall, the Banque de France completely dropped its network in 1820, thus becoming a purely Paris-centred organization. In the following years, the unified national payment network was replaced by a number of regional ones, centred on a number of provincial banks of issue and only connected through the Paris discount market. This system was similar to the early English one: as much as the latter collapsed in 1825, the former collapsed during the 1847–1848 crisis.¹⁶¹ In the immediate aftermath, the Banque de France obtained the monopoly of the issuance of banknotes in exchange for the absorption of all regional banks of issue and the creation of a national network of branches.¹⁶² Not facing as severe constraints to the issuance of banknotes as the one the Act of 1844 imposed on the Bank of England, in the subsequent decades, the Banque de France accomplished this mission to such an extent that remained unrivalled elsewhere.¹⁶³ By providing uniform facilities for the discount and encashment of bills throughout the territory, the Bank allowed local banks to operate without having to depend on the Paris market: all interregional payments could now be cleared directly through the Bank’s provincial branches rather than through Paris correspondents. As a result, nationwide-branching deposit banks emerged during the Second Empire as a complement (rather than as a substitute) for the public bank’s infrastructure. The “bank-based” payment solutions supplied by deposit banks (transfers) competed with “market-based” payment solutions (bills), but the existence of the Banque de France’s facilities, that allowed to discount and cash bills payable in all towns where the Bank had a branch, made the latter more competitive than in England. This may explain why in France, unlike what had happened in England, the use of inland bills continued to thrive until the First World War.¹⁶⁴ But this does not mean that the Banque de France hindered the

¹⁶⁰ Ramon (1929, pp. 99–104).

¹⁶¹ Gille (1959).

¹⁶² Ramon (1929, pp. 194–199 and 221–231).

¹⁶³ Jobst (2010, pp. 131–138).

¹⁶⁴ Roulleau (1914).

emergence of an interbank clearing system. When the big deposit banks created a user-owned clearinghouse (*Chambre de Compensation*) in Paris in 1872, the Bank welcomed the initiative and accepted to intervene on the same foot as the Bank of England did in the London clearinghouse.¹⁶⁵ To sum up, after 1848 in France the public bank rapidly internalized the national payment system altogether, both at the central and at the peripheral level.¹⁶⁶ The result was that, at the beginning of the twentieth century, the *Banque de France* was by far the biggest bank in the world by assets, being more than twice as big as the Bank of England.¹⁶⁷

Most continental countries followed the French rather than the British approach. But as both the English and French experiences had shown, creating a national payment infrastructure posed a number of challenges that were not necessarily easy to solve. Under this respect, Belgium is a particularly interesting case in point. Here, rulers attempted twice to force the public bank to branch out the provinces. The first attempt took place in the 1820s under the impulse of William I of Orange, sovereign of the United Kingdom of the Netherlands. Concerned with the lack of unity of his recently created kingdom (which encompassed the whole of modern-day Benelux), William had asked the board of the *Nederlandsche Bank* (a joint-stock bank of issue founded in Amsterdam in 1814, after the collapse of the old *Wisselbank*) to create a nationwide network of branches, but his demand had been fully rejected.¹⁶⁸ As a reaction, in 1822 the King founded the *Société Générale* (a joint-stock company of which he personally owned most of the capital) with the aim of making it work as a public bank for the Southern part of the Kingdom. The board of the new company was not in a position to resist the majority shareholder's pressure; thus, as the *Banque de France* had done under Napoleon, it both created a network of correspondents and ventured in the foundation of a number of branches. As it had been the case for the *Banque de France*, the Bank of England, and the *Nederlandsche Bank*, also the *Société Générale* was very reluctant about the idea of branching: low

¹⁶⁵ Haristoy (1906, pp. 450–459).

¹⁶⁶ Andoyer (1907, p. 21).

¹⁶⁷ Ugolini (2016a).

¹⁶⁸ The *Nederlandsche Bank* staunchly refused to open branches in the provinces until it was obliged to do so by the Bank Act of 1864. Uittenbogaard (2015, pp. 93–96).

profitability, agency problems, and conflicts with provincial banks were seen as concrete risks. And in fact, discount operations in the provinces generated substantial losses for the Brussels-based bank. Once the political pressure by William I was removed when Belgium obtained independence in 1830, the *Société Générale* refocused on its Brussels business and, by the early 1840s, closed four out of five branches (only the Antwerp one survived).¹⁶⁹ But the company's reluctance to assume responsibility for the management of the national payment system was one of its opponents' strongest arguments when, in 1850, the proposal of creating a new monopolistic bank of issue was discussed and eventually adopted. Thus, the charter of the newly founded *Banque Nationale de Belgique* included branching as one of its main missions. In the following decade, the Bank established a dense network offering discount and encashment facilities in the provinces; to avoid the mistakes of its predecessor, it carefully designed some mechanisms to minimize agency problems that proved relatively successful in the long term.¹⁷⁰

The central decades of the nineteenth century (and especially the 1850s and 1860s) saw the establishment of nationwide branch networks by banks of issue in most Continental European countries. Established polities like France, Spain, Austria-Hungary, the Netherlands, as well as newly created ones like Belgium, Germany, and Italy, all started to conceive of the payment system as a no less strategic national infrastructure than the telegraphic and railway networks they were building at the very same time. Unlike in post-1844 England, the public banks of these countries were encouraged to take care not only of the central clearing but also of the peripheral payment network, which had remained largely underdeveloped up to that point. The later development of nationwide-branching deposit banks in these countries did not substitute, but only complemented for the role played by banks of issue in the system. Only in the late twentieth century, when the European banking sector would experience a remarkable acceleration of its concentration process, provincial branches would start to be felt as redundant (and eventually downsized) as in late-nineteenth-century England.

¹⁶⁹ Ugolini (2016b), pp. 142–145).

¹⁷⁰ Ugolini (2016b), pp. 145–151).

2.2.5 The Creation of National Payment Systems: The New World

In the opening of chapter III of *Lombard Street*, Walter Bagehot describes the way in which banking was, by his times, spontaneously emerging in British settlements overseas. “As soon as any such community becomes rich enough to have much money, and compact enough to be able to lodge its money in single banks – he writes –, it at once begins so to do. English colonists do not like the risk of keeping their money, and they wish to make an interest on it. They carry from home the idea and the habit of banking, and they take to it as soon as they can in their new world.” This—Bagehot implies—was not at all the way things went in the past, and not even in the present, on the European continent. Across the Continent, habits and laws had still not adapted to the advances of modern finance, and the public was still overwhelmingly attached to cash; English colonists, conversely, could just start organizing their settlements on the bases already provided by their motherland’s society.¹⁷¹

According to Bagehot, then, the divergence between the way payment infrastructures were evolving in the Old and New Worlds depended on the “primitive” habits of Continental Europeans, who were still excessively reluctant to depart from their gold and silver coins. One thing Bagehot omitted was that another reason why colonists could not be attached to cash was that, unlike in Europe (where large reminting campaigns had occurred in the early nineteenth century),¹⁷² cash was not easily available in most of the British colonies. Totally dependent on foreign supply as far as the provision of coins was concerned, colonists constantly faced the problem of a lack of means of payment.¹⁷³ As Adam Smith incidentally noted in a famous passage of *Wealth of Nations* (book I, chapter IV), in the eighteenth century commodities had to be used as media of exchange in some colonies (“dried cod at Newfoundland; tobacco in Virginia; sugar in some of our West India colonies”).¹⁷⁴ As much as fifteenth-century Europeans

¹⁷¹ Bagehot (1873, pp. 75–78).

¹⁷² Redish (2000); Flandreau (2004, pp. 2–6).

¹⁷³ Even gold-rich Australia was not allowed to mint coins locally until the mid-1850s, with the paradoxical result that an overabundance of gold bullion and a dearth of gold coins coexisted for a number of years. Torrens (1855).

¹⁷⁴ Smith (1776, I, p. 28).

had developed bank money in reaction to the famine of cash they were experiencing, eighteenth-century colonists (who settled across much wider territories and, hence, found transfers unpractical) developed the issuance of bearer instruments as a solution to the dearth of coins they faced.¹⁷⁵ In the beginning, paper instruments were issued by colonial authorities or even by private colonists. Banks of issue first appeared in the early nineteenth century, and flourished rapidly only after 1833, when British legislation first allowed for the emergence of joint-stock banks and branching.¹⁷⁶ Often referred to as “Imperial banks”, they were chartered banks of issue, extending large branch networks throughout their territory of competence.¹⁷⁷ Since their foundation, all of these banks kept offices in London which had access to the discount facilities of the Bank of England: hence, they were an integral part of the English payment system.¹⁷⁸ “Imperial banks” played a pivotal role in their colony’s payment system and participated to local clearinghouses.¹⁷⁹ Their market power met increasing criticism as colonies evolved into self-governing polities, and during the Interwar period new public banks of issue were founded in the Dominions with the aim of “nationalizing” this “privatized” payment systems dependent on the London wholesale market.¹⁸⁰

While all “white” colonies that remained under the British Imperial rule underwent a fairly similar evolution of their national payment system, the 13 colonies that revolted against it to become the United States experienced completely different developments, as they were not integrated into the

¹⁷⁵ This is consistent with the conclusion by Kahn and Roberds (1999) that non-negligible redemption costs should lead to the predominance of “banknotes” over “checks”.

¹⁷⁶ Baster (1929, pp. 1–13).

¹⁷⁷ However, in some colonies (Canada and Australia) local governments continued to issue banknotes directly. Plumtre (1940, pp. 172–175).

¹⁷⁸ Baster (1929, pp. 144–145). Imperial banks, like Scottish and Irish banks, were not admitted to the London clearinghouse, whose business focused on the clearing of checks drawn in England and Wales (Mathews, 1921, pp. 25–26). Nonetheless, the opportunity of being Bank of England customers (discounters and accountholders) provided them with a full anchorage into the English payment system.

¹⁷⁹ Note that the situation of Scotland and Ireland was not very dissimilar than that of British Dominions, as they were also an integral part of the English payment system. Both had few nationwide-branching banks of issue that participated into local clearinghouses; at both the Edinburgh and Dublin clearinghouses, members settled their balances in claims on London. Haristoy (1906, pp. 385–396, 440–443, and 501–502).

¹⁸⁰ Plumtre (1940, pp. 165–182).

English payment system in the course of the nineteenth century. Before the revolution, the pressing need for means of payment had been met by colonial authorities through the direct issuance of “bills of credit”. These were zero-coupon bearer bonds backed by some specific fiscal revenue; they were only redeemable into cash at maturity, but they were accepted at any time for tax payments. Hence, the bills of credit combined some of the different features that had characterized the instruments developed in the previous centuries: like the current account deposits created by the Banco del Giro in Venice, they could be transferred by creditors to third parties until the final redemption of the debt; like the certificates issued by Naples’ banks, they were backed by fiscal revenues and made eligible for tax payments; and like the banknotes issued by the Bank of England, they were transferable without nominative assignment. In view of their convenience in a context of cash famine, the bills of credit issued by each colony easily imposed themselves as popular means of payment within its respective territory. The system appears to have worked reasonably smoothly throughout the colonial period.¹⁸¹ After the Declaration of Independence, in 1775 the Continental Congress also started to issue bills of credit (known as “Continental dollars”) designed along the same lines. Because Congress did not have the power to levy taxes, however, its bills lost all of their value by 1781, while those that the former colonies (now turned into “states”) were continuing to issue depreciated much less.

With the aim of recovering its funding capacity in the final stage of the Revolutionary War, Congress tried a “paradigm shift” and fostered the creation of a bank of issue modelled along the Bank of England. This was the beginning of the long struggle between supporters of centralization and supporters of decentralization that has characterized the evolution of the American payment system until today. In 1782, the Bank of North America was founded in Philadelphia. It was intended to be a joint-stock company lending chiefly to the confederal government and issuing banknotes redeemable on demand against specie. In order to establish the circulation of the new banknotes, Congress asked the states to accept them in payment for taxes and not to charter other banks of issue before the end of the war.¹⁸² But as military pressure faded, states started to

¹⁸¹ Grubb (2003).

¹⁸² Wettereau (1942).

renege on their concessions; after the signing of the Treaty of Paris in 1783, four states chartered similarly designed banks of issue; in 1785, Pennsylvania suspended the Bank's charter, thus marking the death of the project. In 1787, a compromise was found at the Constitutional Convention: states would be prevented from issuing paper money directly, but allowed to charter banks of issue.¹⁸³ In this new setting, in 1790 the first secretary of the Treasury, Alexander Hamilton, revived the idea that had inspired the Bank of North America by proposing the creation of a Bank of the United States—a private company acting as banker to the Treasury, issuing convertible banknotes, and operating at the national level. As the Constitution provided legal tender status exclusively to precious metals, the bill was dubbed as unconstitutional by a number of representatives (led by James Madison), but was eventually by approved and countersigned by President Washington. The (First) Bank of the United States was thus chartered for 20 years and started operations in Philadelphia in 1791. Well before the Banque de France would start to create its first provincial network, and on a incomparably wider geographical scale, the (First) Bank of the United States opened eight branches, which provided discount facilities, implemented government-related payment services, and accepted banknotes issued by the banks chartered by the different states. Although it encountered the very same difficulties that all European banks of issue would face in the ensuing decades (high costs, agency problems, and conflicts with local bankers), the Bank appeared to be on the way to create a unified payment system for the whole of the United States.¹⁸⁴ By accepting state banks' notes through its fiscal activities and demanding their conversion to the issuers, the Bank actually played the role of interbank clearing organization. The provision of a national payment infrastructure, however, was not seen as a merit by the opponents of centralization, and in 1811 (under James Madison's presidency) they managed to outvote the renewal of the Bank's charter.¹⁸⁵

¹⁸³ Grubb (2003).

¹⁸⁴ Wettereau (1942).

¹⁸⁵ Timberlake (1993, pp. 4–12).

Just one year after the dissolution of the (First) Bank of the United States, the country declared war to Britain. In order to finance the so-called War of 1812 (actually fought until 1815), the federal government had to issue interest-bearing bonds (called “Treasury notes”) that were declared legal tender and were hence used by state banks as reserves backing their issuance of banknotes. During the war, the Treasury kept accounts with all state banks and accepted their banknotes in payment for taxes, thus acting as a central clearing organization.¹⁸⁶ But overissuance led to the suspension of convertibility by all state banks (except in New England, where political opposition to the war and to the related embargo had limited the absorption of Treasury notes). After the end of the conflict, it was no other than Madison himself that took initiative to propose the creation of a (Second) Bank of the United States, whose aim would be to coordinate the retreat of Treasury notes and put pressure on state banks in order to restore convertibility.¹⁸⁷ Chartered for 20 years and headquartered in Philadelphia, the new Bank established in 1816 was modelled after the one created in 1791. Because of its role as the government’s fiscal agent, it immediately took over the central clearing role from the Treasury; since the mid-1820s, it systematically presented state bank’s notes to their issuers for redemption into coins and sought to impose its own banknotes as the standard means of payment of the country.¹⁸⁸ Moreover, it branched out even more aggressively than its predecessor: it had opened 18 branches by 1817 and 26 by 1830. Given the huge geographical distances (in some cases, it took weeks for information to circulate between the headquarters and the peripheral offices), the branches’ business was particularly risky, and a number of serious accidents did actually occur¹⁸⁹; such business was, however, indispensable to the Bank’s business strategy, which consisted of acting as a market-maker for inland bills of exchange.¹⁹⁰ By the end of the 1820s, therefore, the (Second) Bank of the United States had succeeded in creating a national payment infrastructure on an impressively large scale. This was already a matter of

¹⁸⁶Timberlake (1993, pp. 14–19).

¹⁸⁷Wood (2005, pp. 127–130).

¹⁸⁸Catterall (1903, pp. 96–99).

¹⁸⁹Catterall (1903, pp. 376–403); Knodell (2016, pp. 28–65).

¹⁹⁰Knodell (1998, pp. 715–716; 2016, pp. 69–93).

reality at a moment when the Bank of England was only cautiously starting to branch outside London, the Banque de France had completely retreated to Paris, the Nederlandsche Bank remained unmovable from Amsterdam, and the Société Générale faced problems in opening offices a few kilometres out of Brussels. At that point, however, opponents of centralization seized the power in Washington. First elected president in 1828, Andrew Jackson declared war to the (Second) Bank of the United States. After sponsoring two Congressional inquiries on the constitutionality of the Bank, in 1832 Jackson vetoed the bill to recharter it and centred his campaign for a second presidential term on this issue. Once re-elected, in 1833 Jackson ordered the removal of the Treasury deposits to a number of state banks. The move preluded to the fall of the (Second) Bank of the United States.¹⁹¹

By the end of 1835, the Bank had closed all of its branches and liquidated its provincial business. The disappearance of the market-maker for inland bills entailed the disintegration of the unified national payment system; in the new decentralized setting, interregional payments became more expensive (and internal exchange rates more volatile) despite substantial improvement in communication technologies.¹⁹² The varieties of banknotes issued by state-chartered banks increased manifold, spurring the emergence of dedicated local “banknote markets” featuring specialized intermediaries (the “banknote brokers”).¹⁹³ But the logic of network externalities could not be resisted for long. In order to minimize the costs of interregional settlements, state banks throughout the country had to find a common “hub” through which payments to third locations could be cleared. As it had been the case for London in eighteenth-century England, the biggest banking place naturally emerged as the clearing centre for the whole country. In the early 1850s, the practice of keeping deposits with a New York City correspondent became commonplace for banks situated anywhere across the Federation. Faced with the difficulties in managing settlements in such a burgeoning environment (the number of banks in Manhattan had increased from 24 to 60 after 1849), in 1853

¹⁹¹ Timberlake (1993, pp. 33–46).

¹⁹² Knodell (1998).

¹⁹³ Rockoff (1991).

bankers agreed to create the first clearinghouse of the American continent.¹⁹⁴

This was the context in which the Civil War erupted in 1861. Like the War of 1812, the conflict had to be financed through the direct issuance of notes by the Treasury (known as “greenbacks”). But in contrast to the “Treasury notes” issued half a century earlier, “greenbacks” were not bonds accepted in payment for taxes, but inconvertible banknotes with legal tender power for all transactions. Originally thought as a temporary device, “greenbacks” would remain in circulation side-by-side with banknotes for more than one century. But banknote circulation was also deeply reformed, as supporters of centralization seized the opportunity offered by the Secession (which provided them with the majority of Congress) to restate the regulatory authority of the Federation over the banking system. Unlike in previous attempts at centralization (Hamilton’s in 1791, Madison’s in 1816, and another abortive project in 1841),¹⁹⁵ legislators did not however pursue the foundation of a Congress-chartered bank of issue. Instead, the National Banking Acts of 1863–1865 created a system of “national” banks (the National Banking System) regulated and supervised by the federal government, with the aim of providing a fairly uniform banknote circulation to the public and safe depository services to the Treasury. In particular, the reform made the issuance of banknotes by state-chartered banks prohibitively costly (by introducing a 10% tax), thus leading to its disappearance.¹⁹⁶ The fact that Congress opted for the establishment, at the federal level, of a *class* of privileged banks (rather than a *single* privileged bank, as it had been the case before) had durable consequences on the American banking landscape. It sanctioned the principle (unknown to Europe) that access to certain “national” payment facilities should not be open to all banking firms, but restricted to companies enjoying a particular status. The result was a multilevel banking system, in which interaction between the different levels would prove problematic in a number of instances. Because it prevented inter-

¹⁹⁴Gibbons (1858, pp. 292–296). The creation had already been proposed in 1831 by Albert Gallatin (then president of the National Bank of New York), but in vain. Cannon (1910, pp.151–153).

¹⁹⁵Timberlake (1993, pp. 68–71).

¹⁹⁶Timberlake (1993, pp. 84–88).

state branching, moreover, the Acts of 1863–1865 did not question the “privatized” national payment infrastructure centred on New York banks that had emerged in the previous decades. To the contrary, the reforms provided for an official boost to this system, as they formally established that claims on “central reserve cities” (New York being the only city granted with such a status in 1864) could be used by peripheral banks for backing their issuance of banknotes.¹⁹⁷ Moreover, by making the practice of accepting bills of exchange illegal to national banks, the Acts fostered the disappearance of inland bills, thus destroying the “market-based” payment solution for interregional transfers that may have competed with the “bank-based” solution provided by New York intermediaries.¹⁹⁸

Therefore, the reforms passed during the Civil War strongly increased the dependence of the American banking system on the New York inter-bank market, without per se improving the stability of the national payment infrastructure. Only after 1893, in fact, the volatility of internal exchange rates was eventually reduced, as New York banks started to act as market-makers for internal exchanges¹⁹⁹—something the (Second) Bank of the United States had already practised 70 years earlier. On the other hand, the systemic role of the New York clearinghouse became paramount. At the beginning of the twentieth century, the turnover of this clearinghouse was enormous by any international standard, even after correcting for the bigger size of the domestic economy. The fact was even more remarkable as more than 200 other clearinghouses operated in the country at the same time, many of which (contrary to their English provincial counterparts) with far from negligible turnovers.²⁰⁰ This shocked contemporary observers, who underlined that American clearinghouses had little in common with the organizations that bore the same name elsewhere. In any other country—it was said—clearinghouses (including the biggest ones, like the London one) strictly limited their operations to the mere clearing procedures. In the United States, by con-

¹⁹⁷ The reform, however, provoked a reshuffle in New York banking equilibria, as old banks were outcompeted by new national banks in the correspondent banking business. James and Weiman (2011).

¹⁹⁸ Jacobs (1910, pp. 4–6).

¹⁹⁹ James and Weiman (2010).

²⁰⁰ Jaremski and Mathy (2017, pp. 7 and 13).

trast, besides these basic functions there were many more unknown elsewhere, namely: “(a) the extending of loans to the Government, (b) mutual assistance of members, (c) fixing uniform rates of interest on deposits, (d) fixing uniform rates of exchange and of charges on collections, and (e) the issue of clearing-house loan certificates”.²⁰¹ The fact that American clearinghouses provided such services suggests that, unlike in Europe (where an important market for bills of exchange still existed and absorbed a considerable share of interbank transactions), in the United States all interbank transactions passed through this interface.²⁰² The New York banker and author of the reference work on the subject, James Graham Cannon, linked the development of these special functions to the circumstances of the Civil War. It was in the aftermath of Abraham Lincoln’s election—he wrote—that the New York clearinghouse first issued “clearinghouse certificates”, allowing members to overdraw their accounts against the deposit of illiquid securities. It was, again, during the conflict that the government resorted to the New York and Boston clearinghouses as coordination devices to raise extraordinary funding from local banks.²⁰³ In view of this, one might conclude that the provision of additional services by American clearinghouses was the direct consequence of the lack of a public bank injecting liquidity in times of crises: in order to supplement for this deficiency, these organizations had indeed started to develop themselves central banking functions.²⁰⁴ These remarkable developments, however, required a strongly cooperative attitude by all clearinghouse members, and this could only be attained within a very restrictive and cohesive environment. At the beginning of the twentieth century, indeed, only 45% of the banking companies operating in New York City were actually members of the clearinghouse. Nonmember banks could well indirectly access clearing facilities via the intermediation of a member,²⁰⁵ but the special services (and most notably, the “mutual assistance”) were exclusively reserved to members. While the clearinghouse’s provision of

²⁰¹ Cannon (1910, p. 11); Haristoy (1906, pp. 406–409).

²⁰² Hoag (2017).

²⁰³ Cannon (1910, pp. 11–12 and 80–83).

²⁰⁴ Gorton and Mullineaux (1987).

²⁰⁵ Cannon (1910, pp. 166–178). This situation was common for all other American clearinghouses: Jaremski (2017).

central banking functions strengthened the financial position of members,²⁰⁶ it did so at the expenses of nonmembers.²⁰⁷ The problem emerged spectacularly in 1907: during the panic, members mutually sustained one another through the issuance of “clearinghouse certificates” (a way to revive interbank loans through the mutual guarantee of all members),²⁰⁸ but let nonmembers deprived of any liquidity assistance and, consequently, more risky in the eyes of their creditors.²⁰⁹ It was precisely the general dissatisfaction with the clearinghouses’ performance in this crisis (during which the payment system was seriously disrupted because of the clearinghouses’ refusal to assist nonmembers) that paved the way to the creation of the Federal Reserve in 1913.

As its name clearly indicates, the Federal Reserve System was not at all conceived as a (Third) Bank of the United States. Rather, it was designed as a sort of “upgrade” of the National Banking System established by the Acts of 1863–1865. The idea consisted of creating 12 regional user-owned “clubs”, whose membership would be compulsory for national banks but only voluntary for state banks. Each “club” (called a Federal Reserve Bank) would be a fully independent bank of issue, with its own bullion reserve and its own discount policy; on top of that, the Board of Governors in Washington would only coordinate interaction among the 12 Reserve Banks.²¹⁰ The foremost priority of the reform was to create a unified national clearing system, definitively eliminating internal exchange rate variability and the risk of new disruptions. In the original reformers’ vision, the Federal Reserve System was supposed to attain universal membership (by encouraging all state banks to join one of the “clubs”) and to “internalize” the wholesale payment system (by absorbing clearinghouses and providing uniform clearing conditions throughout the country). However, the concrete implementation departed

²⁰⁶ There were distributional issues also among clearinghouse members, however, as not all members equally profited from such policies: in the case of New York, the national banks that had more aggressively developed the correspondence business were advantaged with respect to other members. James and Weiman (2011).

²⁰⁷ Jaremski (2017).

²⁰⁸ Hoag (2017).

²⁰⁹ Donaldson (1993); Moen and Tallman (2000).

²¹⁰ Timberlake (1993, pp. 219–234).

considerably from the original project under these respects. On the one hand, for a number of reasons, membership to the Fed remained fairly restricted: by 1920, less than 1500 of the more than 8500 state banks had adhered, so that less than 40% of banks and 60% of bank assets were included in the System.²¹¹ Low membership proved very problematic in the 1930s, as nonmember banks were (as much as nonmembers to clearinghouses during pre-war crises) excluded from assistance by the System.²¹² On the other hand, despite becoming fairly predominant in the clearing business (and thus providing for a non-negligible improvement in its efficiency), Federal Reserve Banks did not internalize the entire wholesale payment system. The Banks did join local clearinghouses and opened clearing accounts usable by Fed members, but nonmembers continued to be able to profit from clearinghouse facilities without necessarily joining the System as “interchange” was guaranteed by member banks. Lacking market power on nonmember banks, the Fed failed to produce fully standardized payment procedures despite its considerable efforts: most notably, the payment of checks at par value by the banks on which they were drawn could not be obtained by the Fed until the early 1980s, thus postponing the achievement of a completely uniform payment infrastructure.²¹³ Moreover, also at the national level the System did not work as a single organization: each Federal Reserve Bank was an independent company, and the balances held by each Bank on the other ones as a result of the clearing process had to be paid in gold on a daily basis. This means that the Fed as a whole worked as a sort of super-clearinghouse, whose exclusive members were the 12 regional Feds. Unlike in the pre-Fed New York clearinghouse, each regional Fed was only allowed to overdraw temporarily by borrowing from other Feds on a bilateral basis: multilateral interbank lending mechanisms did not exist, which exacerbated the risk of coordination failures. This is what happened in March 1933, when the Chicago Fed refused to extend loans to the New York Fed (whose gold reserves were being depleted by foreigners’ withdrawals), thus triggering the last and hardest wave of bank failures of the Great Depression. As a result of this dramatic episode, the

²¹¹ Calomiris et al. (2016).

²¹² Bordo and Wheelock (2013).

²¹³ Gilbert (2000).

Banking Act of 1935 provided the Board with full control over interregional accommodation through the management of a single joint account (the Single Open Market Account) hosted by the New York Fed.²¹⁴

The shortcomings in the design of the Federal Reserve System have often been pointed to as one of the main causes of the Great Depression. But the partial centralization enacted after the major 1933 crisis did not modify substantially the architecture of the national payment system: membership to the Federal Reserve System has remained voluntary, and its payment network (now known as “Fedwire”) has continued to coexist with other private payment solutions. In particular, the New York clearinghouse has made a spectacular comeback since the 1970s, becoming a serious competitor to Fedwire for the settlement of big interbank payments. Developed in the late 1960s as an electronic replacement for old paper procedures, the Clearing House Interbank Payment System (CHIPS) has thrived in recent decades, thanks to the accrued role of New York banks both at the national level (especially after the legalization of interstate branching in 1994) and at the international level. Despite featuring only 50 members (against roughly 7000 for Fedwire), in 2012 CHIPS operated a total number of payments that was only 26% lower than Fedwire’s. However, such a success has only been made possible by the Federal Reserve’s willingness to ensure interchange with its own payment facilities, as finality of payments in CHIPS depends on members’ balances being settled through a clearing account opened by the New York Fed.²¹⁵ Thus, although reminiscent of the high times of the New York clearinghouse, the success of CHIPS today is based on a totally different economic rationale, as it indirectly rests on the payment infrastructure provided by the Fed.

To conclude, the United States’ management of the national payment infrastructure has been dramatically shaped by the conflict between supporters and opponents of political centralization. This harsh conflict first led to the successive creation and destruction of two European-style public banks, then to the elaboration of two original multi-bank schemes characterized by the exclusion of a large number of banks from access to the infrastructure’s facilities. Even in those moments in which the weak-

²¹⁴ Eichengreen et al. (2015).

²¹⁵ Clair (1989); Copeland and Garratt (2015).

nesses of these “hybrid” schemes have been universally recognized, political resistance has prevented the formal establishment of a government-controlled monopoly of payments as in most other Western countries. The resulting compromises have yielded rather suboptimal outcomes, whose shortcomings have been made clear by the recurrent crises experienced by the system. Debates on monetary issues have never ceased to be directly linked to the struggle between supporters and opponents of a strong centralized government: the result is that, to date, the United States remains the only Western country in which the desirability of central banks is still a matter of public controversy.²¹⁶

In the meantime, other polities than the United States have become confronted with the question of the centralization of payment infrastructures at an interstate level: the establishment of the European Monetary Union in 1999 has implied the creation of a single payment system covering all member countries. The Eurosystem has designed this as a super-clearinghouse, exclusively joined by the central banks of the member states.²¹⁷ Known as the Trans-European Automated Real-Time Gross-Settlement Express Transfer system (TARGET), this mechanism bears a major dissimilarity with respect to the original Federal Reserve System: the net claims and liabilities of national central banks are not settled. During the Eurozone crisis of 2010–2012, the members’ ability to “overdraw” from the Eurosystem has been seen by some as potentially dangerous to financial stability.²¹⁸ As of this writing, however, criticism has appeared to be misplaced, and has not led to changes in the mechanism. In stark contrast to the United States, the desirability of governments’ intervention in the management of a Euro-wide payment system has never been questioned *per se*.

2.2.6 From National to International Payment Systems

So far, this Chapter has dealt with payment systems as mostly domestic infrastructures. Domestic payment systems—we have argued—emerged

²¹⁶ See, for example, Paul (2009).

²¹⁷ Kokkola (2010, pp. 243–259).

²¹⁸ See, in particular, Sinn and Wollmershäuser (2012). On the limits to such criticism, see e.g. Whelan (2014).

out of the necessity of economizing on inconvenient cash transactions. At the international level, however, things are no different: “cash” transactions (i.e. shipments of internationally recognized media of exchange, typically precious metals) being costly and risky, strategies to economize on them have been developed since at least the Middle Ages. Because trade flows can hardly be balanced on a bilateral basis, the obvious way to avoid bilateral “cash” flows consists of paying for one’s deficits (debts) with one’s surplus (credits) on a third place. As in the case of domestic interbank clearing, this international clearing mechanism is more efficiently performed in a centralized than in a decentralized way. Because of the presence of network externalities and scale economies, the international payment system can be seen—as much as the national payment system—as a natural monopoly.

The parallel between the national and international payment system has perhaps been most vividly embodied by John Maynard Keynes’ 1942 plan for the establishment of an International Clearing Union at the centre of the post-war economic order. The proposal consisted of creating an international clearinghouse, whose members were supposed to be the central banks of the countries adhering to the project. In the planned clearinghouse, surpluses would have settled in an inconvertible currency (the famous “bancor”), and members would have been allowed to overdraw. Keynes had probably drawn inspiration from the working of bankers’ clearinghouses, but the problem he intended to solve was just the opposite than the one faced by the latter—he wanted to penalize those members with systematic surpluses, not those with systematic deficits. Whether such a mechanism might have eschewed the shortcomings of bankers’ clearinghouses, we are not entitled to know: as a matter of fact, the plan was rejected at Bretton Woods by US negotiators, who rather insisted on the establishment of an international payment system based on the dollar.²¹⁹

Centuries before diplomatic efforts had first been devoted to create a centralized framework for the clearing of international payments, network externalities had been at work to make international “standards” emerge spontaneously. Because settlement through claims on a third country did *not* guarantee finality in international payments, centralization forces were less strong than in domestic systems; this notwithstanding,

²¹⁹ Gardner (1969).

“payment hubs” for the international transfer of funds did gradually develop. First Venice,²²⁰ then Amsterdam,²²¹ and eventually London²²² subsequently played this role from the later medieval era until the early twentieth century. This means that the domestic payment systems of these centres also played a clearing role for international transfers, thus increasing their systemic importance. This explains why the political authorities of these places were so much concerned with guaranteeing a smooth functioning of their domestic payment infrastructures. This also explains why, conversely, the shortcomings of the United States’ payment infrastructure contributed to seriously delay the emergence of New York as an international “payment hub”.²²³

The Bretton Woods Agreements of 1944 definitively consecrated the role of the dollar as the key international currency and, hence, the role of New York as world “payment hub”. In the subsequent decades, globalization and technological advances considerably increased the scale and frequency of international payments. As a result, a number of issues started to emerge in the global payment infrastructure. These became evident in June 1974 with the failure of the private bank Herstatt. The Bank was closed by the German authorities at the end of the working day in Frankfurt; as the working day had still not ended in New York, however, a number of the foreign exchange operations initiated by the Bank on that place were left unfinished, thus generating substantial losses to the counterparties. This crisis spurred the creation of the Basel Committee on Banking Supervision at the Bank for International Settlements, which fostered a gradual international coordination of regulatory policies.²²⁴ In order to overcome the deficiencies of payment infrastructures in the face of the new challenges, two major innovations were adopted in the subsequent decades.

The first reform fostered by the Basel Committee consisted of taking on the very reason why payment systems were originally created, that is,

²²⁰ De Roover (1974b).

²²¹ Flandreau et al. (2009).

²²² Flandreau and Jobst (2005).

²²³ Jacobs (1910); Broz (1997); Flandreau and Jobst (2009).

²²⁴ Murlon-Druol (2015).

economizing cash. Traditional settlement procedures were invariably *deferred net settlement* (DNS) systems, meaning that only the net balance of payments over a given period (typically, one day) would be transferred at the end of the period. These were very convenient features in a world in which settlement in cash was costly and transactions took place at a slow pace. Such advantages have grown less significant, however, in a world in which “cash” has become synonym to “claims on a central bank” and high-speed trading has become the norm. At the same time, the risks inherent to this mechanism (the occurrence of payment accidents before the final settlement time, as in the Herstatt crisis) have considerably increased over time. As the cost-benefit balance of DNS systems evolved unfavourably, since the late 1980s central banks started to adopt *real-time gross settlement* (RTGS) systems, implying no netting and no delay in payments. While many payment infrastructures operated by central banks (and hence, guaranteeing finality) are now RTGS systems (e.g. Fedwire), privately operated platforms (e.g. CHIPS) remain “cheaper” DNS systems—thus putting public infrastructures at a competitive disadvantage with respect to the private ones.²²⁵

The second change explicitly encouraged by the Basel Committee was the creation of a centralized infrastructure for the clearing of foreign exchange transactions. By the mid-1990s, the central banks of the biggest world economies had come to the conclusion that payments originating in foreign exchange trading should be removed from the wholesale systems they themselves operated, as the latter were inadequate to cope with the specific risks stemming from these transactions. As a consequence, they collectively invited and helped developing a private solution to this particular issue.²²⁶ The result was the creation of the Continuous Link Settlement (CLS), which started operations in New York in 2002. CLS is a user-owned clearinghouse (its shareholders are the world’s biggest international banks) settling trans-currency payments between 18 different currencies, and directly connected to the 18 national payment systems involved (thus guaranteeing finality). In order to avoid the occurrence of accidents like those

²²⁵ Committee on Payment and Settlement Systems (1997); Manning et al. (2009, pp. 51–67); Copeland and Garratt (2015).

²²⁶ Committee on Payment and Settlement Systems (1996).

experienced by Herstatt's counterparties in 1974, CLS makes sure that incoming and outgoing payments in different currencies take place simultaneously, by debiting and crediting at the same time the members' accounts with the respective central banks. Members of the clearinghouse (more than 70 international banks) are allowed to overdraw their accounts in a single currency, but their overall position across currencies must be positive (thus eliminating credit risk to the clearinghouse). Although single transactions are settled on a RTGS basis, the overdrawing facility transforms the mechanism into a de facto DNS system to its users, as they do not need to hold the exact amount of "cash" due in all of the currencies prior to proceeding to multiple trans-currency payments. Moreover, members are allowed to adjust their position in each currency through intraday swaps with other members. The use of CLS is voluntary (older settlement methods are still available to banks), but ten years after its foundation roughly half of the world's payments tied to foreign exchange transactions were cleared through this facility. This is proof that CLS has been a great success, being today the payment infrastructure with the highest turnover in the world. As of this writing, however, its resilience to shocks has remained largely untested, as no failure of a member has still occurred to date (note that Lehman Brothers was *not* a CLS member, and its failure did not have any direct consequence as its provider of settlement services decided to continue settling Lehman's transactions).²²⁷

CLS is a radically different platform from the International Clearing Union proposed by Keynes during the Second World War: while the former is a privately owned "club" of banks aimed at facilitating the foreign exchange business, the latter was to be an international multilateral organization intended to eliminate it altogether. For all of their differences, however, these two projects of an international clearinghouse have one thing in common: they are both based on the interconnection between the international platform and the different national payment systems embodied by national central banks. After a long journey, by the mid-twentieth century the idea that the national payment infrastructure had to be ensured by a public organization had become the international standard. Already in the 1920s, the creation of a central bank in each country had been seen as the

²²⁷ Manning et al. (2009, pp. 104–108); Kahn et al. (2016, pp. 590–602).

necessary precondition for the reestablishment of international monetary order: accordingly, it had been strongly encouraged worldwide. By the end of the century, the absence of a national central bank had come to be seen as an anomaly.²²⁸ When the European Monetary Union took shape in the late 1990s, the only member country that still did not have a central bank (the Grand-Duchy of Luxembourg) was formally obliged to create one in order to allow for its integration into the new TARGET system.²²⁹

2.2.7 The Evolution of Payment Systems: Conclusions

The payment system is not merely a “physical” infrastructure: it is a set of interactions, practices, and rules that allows for the implementation of any economic activity. It is, therefore, an essential service, whose disruption entails huge costs for the economy at large. Like all network infrastructures, the payment system is subject to (direct) network externalities as well as to scale economies, which make it a natural monopoly: competition with alternative networks can be viable only as long as interchange with the “core” network (the wholesale interbank market, guaranteeing finality of payments) is granted. While a state monopoly is not necessarily an optimal solution to the issues raised by the payment infrastructure, a number of factors contribute to making the public solution the most popular one.

The principle that the payment infrastructure should be organized as a state monopoly was far from consensual in the past. To the contrary, in most cases there was considerable resistance to such a solution. In Venice (a place in which the state played a substantial role in many sectors of the economy), the creation of a state monopoly was resisted for almost two and half centuries and was eventually accepted as a default solution for the lack of private initiative. In Amsterdam, it was reluctantly adopted in order to fix the patent shortcomings of available “market-based” solutions. Even in London, the Bank of England’s assumption of a role in the payment system was only a by-product of its primary mission as a monopolistic fiscal agency. As for the United States, the principle was

²²⁸ Singleton (2011, pp. 57–61).

²²⁹ Link (2008).

harshly fought for more than two centuries (leading to a series of suboptimal outcomes) and still remains controversial to date. Despite such a strong ideological resistance, the principle gradually made its way and became the international standard by the mid-twentieth century. The new trend towards privatization of public utilities that started in the 1980s also partially involved the payment infrastructure, as private providers of payment services have been allowed to compete with the public ones by granting interchange with the latter. Yet, despite the campaign launched by supporters of free banking at about the same epoch, the norm that the publicly provided payment infrastructure must be the only one entitled to guarantee finality has been left unscathed everywhere.

The irresistible rise of central banks as monopolistic keepers of the national payment infrastructure might be interpreted as a manifestation of Wagner's law: as the economy became more complex and interactions multiplied, the consequences of market failures got more serious, and public intervention was wanted in order to attain less suboptimal outcomes. As Chapt. 3 will show, this had to be coupled with the assumption of a number of supervisory tasks by the publicly sponsored organization.

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3

Lending of Last Resort and Supervision

We have a number of recent examples in our memory (or better, still before our eyes) of the turmoil and great harm that bank failures have inflicted to this city. Noble and affluent houses have been decayed and extinguished; many citizens have been reduced to extreme poverty or greatly battered; unmarried women have been left with no dowry, widows with no subsidy, orphans with no sustenance; merchants have been left weakened, business disordered, and public revenues diminished. [...] Which does not happen without somewhat discrediting the state: as in view of the fact that banks had been authorised by decree and continuously supervised by a specifically-appointed and fully-dedicated body, one is led to believe that accidents and failures could not develop without the administration being aware of that.

Tommaso Contarini, *Speech to the Venetian Senate in Support of the Creation of a Public Bank*, 28 December 1584 (quoted in Lattes (1869, p. 123), my translation and emphasis).

Lending of last resort and supervision are two kinds of public intervention aimed at tackling the problem of banking instability. Traditionally, the literature on central banks has focused on the provision of these two types of intervention as components of the financial stability mandate. However,

lending of last resort and supervision are only parts of a broader set of policies, which can be described under the common heading of *banking regulation*. We can distinguish between two families of policies. On the one hand, there are *ex-post* interventions, aimed at circumscribing instability. Typically provided at the national level, these include lending of last resort, bailouts, and deposit insurance. On the other hand, there are *ex-ante* interventions, aimed at preventing instability. Although formally provided at the national level, these interventions have been increasingly coordinated at the international level, as shown by the “Basel Concordat” of 1975 and the three “Basel Accords” of 1988, 2004, and 2010. They can be enunciated along the three “pillars” of the Accords: (1) legislation restricting banks’ operations, (2) supervision, and (3) transparency standards.

Central banks have not always been associated with the provision of all these policies. Arguably, however, they have been often indirectly involved in the management and design of all of them—as suggested, for instance, by the fact that banking legislations have recently been dictated by international standards negotiated in Basel by central bankers. In view of this, the present chapter will deal with *all* types of regulatory interventions aimed at minimizing banking instability. First, it will review the theoretical literature on the motivation and optimal design of public intervention in the banking sector. Then, it will track the evolution of banking regulation in the West from the Middle Ages to today. It will show that although the involvement of central banks in the provision of such interventions may not be indispensable, there exist good theoretical and historical reasons for considering the *whole* spectrum of banking regulation as a component of central bankers’ financial stability mandate.

3.1 Lending of Last Resort and Supervision: Theory

3.1.1 The Problem: The Inherent Instability of Banking

In the theory of industrial organization, an *intermediary* is someone who buys certain goods from one kind of agents only to resell them to other kind of agents. A straightforward example of intermediary is a shopkeeper,

who buys goods from producers (if not from other intermediaries, like wholesalers) only to resell them to final consumers (if not to other intermediaries, like consumers' cooperatives). In a world of perfect competition (like the one described by the Arrow-Debreu model),¹ intermediaries are redundant: why should the final consumer buy goods from an intermediary (at a higher cost, as the latter must be remunerated for her intermediation services) when she can buy them directly (at their production cost) from producers? In the real world, however, there exist *frictions* that make consumers' direct access to producers not so easy. Frictions may entail the existence of *economies of scale*: if transaction costs are less than proportional to the amounts of goods exchanged, the transaction technology will display increasing returns to scale (i.e. buying a big stock will be relatively less expensive than buying a small one), thus providing a rationale for the emergence of intermediaries. For instance, one source of economies of scale may be the presence of *search frictions*—that is, difficulties in finding a counterparty for implementing a desired transaction, which a big wholesale buyer may be better placed at overcoming than a small retail consumer. Alternatively, frictions may entail the existence of *economies of scope*: if one operation is more efficiently implemented jointly rather than separately from other operations (i.e. simultaneously buying many different goods is less costly or less risky than buying only one good at the time), then diversified intermediaries may appear. For instance, one source of economies of scope may be the presence of *information frictions*—that is, information asymmetries, that a wholesale buyer active on many markets may be better placed at overcoming than a single retail consumer. As it happens, financial markets are particularly prone to frictions. But there is yet another problem, known as the *incompleteness of financial contracts*. Incompleteness means that it is impossible to write a contract that specifies the reciprocal rights and duties of the parties involved into a financial transaction for every possible future state of the world. For instance, a borrower cannot credibly pre-commit to accomplish certain actions in case of her bankruptcy, as in such extreme conditions she will no longer have the power to implement them. As a result, the lender will always bear a certain amount of risk, which cannot be removed through the market mechanism. In view of this, different kinds

¹ Debreu (1959). On the Arrow-Debreu model and its limits as a heuristic device, see Bowles and Gintis (1993).

of *financial intermediaries* have emerged to provide lenders with a solution to minimize the consequences of the incompleteness of financial contracts. Historically, the first type of financial intermediary to have appeared consists of *banks*.²

The way financial intermediaries allow lenders to get rid of risk (or better, of a certain amount of it) consists of providing a *quality transformation* of assets. If, instead of (say) buying a bond directly, a lender puts her money into a closed-end investment fund investing it in the same bond, the risk-return profile of her investment will be modified (*a priori*, for the better) even though the final borrower is unchanged. But financial intermediaries can also provide a *maturity transformation* of assets, meaning that the time horizon of the lender's investment will not necessarily coincide with that of the final borrower's loan: the capital invested (say) into a fund will be redeemable according to a time schedule that is not necessarily the same as the maturity of the bonds in which the fund is invested. As it happens, the fundamental characteristic of banks is the fact of conducting the asset transformation business on a much more extreme scale than other intermediaries.³ Strictly speaking, a bank is an "entity whose business is to receive deposits, or close substitutes for deposits, from the public, and to grant credits for its own account".⁴ On the one hand, a bank collects funds from lenders in the form of *demandable debt* (i.e. non-standardized deposits that can be withdrawn at any time). On the other hand, it relends these funds to borrowers in the form of *non-securitized loans* (i.e. non-standardized loans that cannot be exchanged on a secondary market). This means that the transformation job implemented by a bank is colossal, both in terms of quality (very idiosyncratic credits are transformed into monetary instruments) and in terms of maturity (long-term, illiquid loans are transformed into perfectly liquid assets payable on demand). Of course, this implies that banks are particularly exposed both to *credit risk* (i.e. the risk of not being repaid by borrowers at maturity) and to *liquidity risk* (i.e. the risk of being unable to repay lenders on their demand).

² Freixas and Rochet (2008, pp. 15–20 and 146–153).

³ Freixas and Rochet (2008, pp. 4–5).

⁴ Bank for International Settlements (2016).

From a theoretical point of view, the existence of intermediaries performing the transformation business on such a spectacular scale is far from obvious, as less risky alternatives appear to exist.⁵ Economists have proposed a number of answers to this riddle: banks have been said to be optimal solutions because they are uniquely well-placed to perform an efficient monitoring (and support) of borrowers,⁶ because their lenders are uniquely well-placed to monitor them (through the threat of withdrawing demandable debt, a very strong monitoring device according to some),⁷ or both.⁸ But *a priori*, other solutions could arguably be designed in order to achieve the same goals in a less risky way. All of the proposed explanations do not sound strong enough to justify the survival of banking in a world of decreasing frictions and increasingly complex financial engineering. Some even argue that banking is just a mature financial technology in the declining phase of its life cycle.⁹ This view, however, appears to overlook a fundamental aspect which makes banks special with respect to all other financial intermediaries. The theoretical literature has generally characterized banks' relationship with their lenders (depositors) as the provision of *liquidity insurance*: depositors are investors that prefer keeping their capital with a bank (rather than, say, with an investment fund) because deposits can be liquidated at any moment in case of an unexpected need.¹⁰ But this interpretation downplays the fact that banks are, first and foremost, providers of *payment facilities*: most often, depositors are not principally sellers of capital, but buyers of payment services (safekeeping and transaction facilities). In fact, banks are hybrid organizations: they are, at the same time, providers of financial *and* payment services. Banks exist primarily because economies of scope clearly exist between non-securitized lending and payment provision, as both activities imply a continuous monitoring of counter-

⁵ See, for example, Jacklin (1987).

⁶ Diamond (1984); Holmström and Tirole (1997).

⁷ Calomiris and Kahn (1991); Flannery (1994). A completely opposite view is held by Dewatripont and Tirole (1994, pp. 29–45), according to whom the prime motivation for banking regulation is precisely the fact that lenders are very *ill*-placed to monitor banks.

⁸ Diamond and Rajan (2001).

⁹ See, for example, Grossman (2010, pp. 16–27).

¹⁰ Bryant (1980); Diamond and Dybvig (1983).

parties.¹¹ But banks are irreplaceable because they are the only providers of payment services that are able to guarantee full *finality* of payments, thanks to their exclusive access to the wholesale interbank clearing: as a matter of fact, other payment service providers formally need to be connected to banks to be able to guarantee settlement services.¹² As a result, banks do remain an essential actor in all financial systems nowadays: rampant competition from other financial intermediaries in the recent decades has led to a reorientation, but not to a decline of banking activities.¹³

Therefore, banks are special because they are the only financial intermediary whose liabilities are used as *legal means of payment*: a disruption in banking activity amounts to a disruption in the payment system, generating negative externalities on the whole economic activity. This means that banks are, at the same time, very risky and very important. This poses serious issues to regulators. In view of the many types of market failures that occur in financial markets, free competition in banking might not be conducive to optimal outcomes.¹⁴ Banking regulation is not a mere application of the general theory of regulation: although banks do emerge as a private solution to market failures, their emergence triggers the appearance of new market failures, hence calling for public intervention.¹⁵ This explains why banking is (and has always been) one of the economic sectors in which public intervention has been heaviest.¹⁶ A number of solutions have been put forward in order to manage the liquidity and credit risks inherent to the banking business: *ex-post* solutions aim at minimizing the *consequences* of liquidity and solvency crises, whereas *ex-ante* solutions aim at minimizing the *likelihood* of liquidity and solvency crises.

¹¹ Goodfriend (1991, pp. 11–12).

¹² Kahn and Roberds (2002). For a definition of finality, see Sect. 2.1.1.

¹³ De Young and Rice (2004).

¹⁴ Allen and Gale (2000, pp. 9–10).

¹⁵ Freixas and Santomero (2003).

¹⁶ A more cynical view (inspired by public choice theory) holds that banking regulation is ubiquitous not because regulators aim at solving market failures, but because they aim at extracting rents: according to this view, because banking would not even be possible without regulatory intervention, extraction is particularly easy in this sector (Calomiris and Haber 2014, pp. 28–34). This view, however, is narrowly focused on limited liability banks. In fact, banking instability and regulation largely predated the introduction of joint-stock banking (see Sect. 3.2.1).

3.1.2 Ex-post Solutions: Lending of Last Resort, Bailouts, and Deposit Insurance

Banking crises typically occur because of the existence of *information asymmetries*, which are probably the most important of the frictions leading to the emergence of financial intermediaries. The reason why lenders put their money with an intermediary (at a lower profit) instead of lending it directly to final borrowers (at a higher profit) is that the intermediary is better placed to assess the creditworthiness of borrowers and to monitor their behaviour. Because acquiring information entails pecuniary and nonpecuniary costs, lenders will prefer delegating its acquisition to those who can do it more efficiently. This, however, implies that lenders can never be fully sure that the intermediary to whom they have entrusted their money has invested it in an appropriate way. Therefore, lenders doubting the quality of their intermediary's investments can be led to withdraw their money for fear of losses—which, in the case of banking, can be done particularly quickly, as banks' liabilities consist of demandable deposits. If a certain number of depositors start to expect that the bank will be unable to repay them at par on demand, they will all rush to withdraw their money, and this, in turn, will encourage other depositors to run on the bank, for fear of arriving too late and thus being unable to get their money back. This is called a *coordination failure*: all depositors would be better off keeping their deposits with the bank, but their failure to coordinate makes everybody worse off. This means that a banking crisis can be a *self-fulfilling prophecy*: even in cases in which the run is irrational *ex-ante* (there was no reason to expect a failure, as the bank was healthy), it can become rational *ex-post* (the mere fact that depositors doubt its ability to repay is sufficient to make it unable to do so).¹⁷ This would not be an issue in case the bank was able to liquidate its assets at their full value: by selling them on the market (e.g. to other intermediaries), the bank would be able to repay its depositors until the very last. The problem is that banks' assets are impossible to sell at no cost: they consist of idiosyncratic loans, whose quality is difficult to assess even for other intermediaries, and whose negotiability entails substantial pecuniary and

¹⁷Diamond and Dybvig (1983); Postlewaite and Vives (1987).

nonpecuniary costs. Although good bank loans are hard to liquidate, it should arguably be possible to use them as collateral for non-securitized borrowing from other intermediaries, thus providing the bank with the means to repay depositors. Unfortunately, coordination failures can also occur among intermediaries, preventing them from extending non-securitized loans to a troubled but healthy bank.¹⁸ This means that, in the event of a run, a bank with no *solvency problem* can be pushed into failure because of a pure *liquidity problem*. If the liquidation of a failed bank is costly (which is always the case in the real world, also in view of the disruption in payments it entails), a liquidity crisis will always lead to a suboptimal outcome.¹⁹ The market failure engendered by information asymmetries calls for public intervention aimed at restoring an optimal situation. This intervention has come to be labelled under the name of *lending of last resort*.

To be precise, this is only one of the possible uses that have been made of the term “lending of last resort”. As it is often the case in economics, scholars have attached (and still attach) quite different meanings to the same wording. Although the term “lending of last resort” can track its root back to a 1797 tract by Francis Baring,²⁰ its use only became widespread since the 1930s thanks to the works of Ralph Hawtrey.²¹ Over time, there have been at least two main conceptualizations of the idea: albeit complementary, the two are based on quite different theoretical foundations. The first one is of macroeconomic nature: it refers to a countercyclical monetary policy aimed at compensating for a collapse in the amount of privately issued money. This interpretation originated with Henry Thornton,²² was popularized by Ralph Hawtrey,²³ and was subsequently developed by twentieth-century macroeconomists, especially those belonging to the Monetarist School.²⁴ The second

¹⁸ Rochet and Vives (2004).

¹⁹ Flannery (1996); Allen and Gale (2000, pp. 282–294).

²⁰ Fetter (1965, pp. 21–23).

²¹ Grossman and Rockoff (2016, pp. 255–256).

²² Thornton (1802).

²³ Hawtrey (1932).

²⁴ Humphrey and Keleher (1984).

conceptualization is essentially microeconomic: it refers to a welfare-maximizing policy aimed at solving market failures in the provision of liquidity. This interpretation was originally elaborated by Walter Bagehot at the time of the violent crises of the mid-nineteenth century,²⁵ and long left behind afterwards; it started to be revalued when the question of financial instability raised fresh interest in the late twentieth century²⁶ and became predominant since the 2008 crisis. While the former conceptualization will be considered in Chap. 5, this chapter will only focus on the latter.

In his seminal book *Lombard Street*, Walter Bagehot based his call for a lender of last resort on a vision of the banking system that bears many similarities to the one formalized by economists in the late twentieth century²⁷: in Bagehot's view, the system was inherently unstable,²⁸ as self-fulfilling runs on cash could develop when expectations turned pessimistic.²⁹ This type of market failure called for intervention from the organization (the Bank of England) which bore responsibility for conducting public policy within the system in view of its privileged position (finality was granted to payments settled in Bank-issued assets).³⁰ Welfare-maximizing intervention had to be guided by three basic principles, distilled by later commentators (albeit somewhat inaccurately)³¹ as the three "Bagehot rules": (1) "lend freely", (2) "on good collateral", and (3) "at penalty rates". The first principle ("lend freely") held that intervention should be unlimited: because panics were generated by the public's fear of being unable to get cash, the only way to stop this self-fulfilling mechanism

²⁵ Bagehot (1873).

²⁶ See esp. Kindleberger (1978).

²⁷ Reference here is to the vast theoretical literature inspired by the modelling of banking panics first proposed by Diamond and Dybvig (1983).

²⁸ "Money will not manage itself" (Bagehot 1873, p. 20).

²⁹ "The peculiar essence of our banking system is an unprecedented trust between man and man: and when that trust is much weakened by hidden causes, a small accident may greatly hurt it, and a great accident for a moment may almost destroy it" (Bagehot 1873, pp. 158–159).

³⁰ "These considerations enable us to estimate the responsibility which is thrown on the Bank of England by our system, and by every system on the bank or banks who by it keep the reserve of bullion or of legal tender exchangeable for bullion" (Bagehot 1873, p. 121).

³¹ Bignon et al. (2012).

was to prove such expectations systematically wrong.³² Strictly complementary to the first principle, the second one (“on good collateral”) held that the ordinary channels through which cash could be obtained in normal times should not be discontinued in crisis times.³³ The third principle (“at penalty rates”) held that agents with pessimistic expectations (including first movers, i.e. those who were liable to generate a self-fulfilling crisis) should be given big monetary disincentives to panic, by making the withdrawal of cash very expensive.³⁴ This was possible because the run on cash the Bank of England experienced did not consist of an increased demand for conversion of banknotes or deposits (whose price could not be adjusted), but of an increased demand for discount window loans (whose price could be adjusted by charging higher interest rates). In Bagehot’s view, self-fulfilling panics could be avoided as long as the Bank and the public kept a cooperative attitude: the former had to accommodate the entire demand for loans, while the latter had to stick to Bank-issued money instead of converting it into “true” cash (i.e. gold).³⁵

Bagehot’s aim in writing *Lombard Street* was not normative: he was not attempting to dictate universal principles for optimal lending of last resort.

³² “The public is never sure what policy will be adopted at the most important moment: it is not sure what amount of advance will be made, or on what security it will be made. The best palliative to a panic is a confidence in the adequate amount of the Bank reserve, and in the efficient use of that reserve. And until we have on this point a clear understanding with the Bank of England, both our liability to crises and our terror at crises will always be greater than they would otherwise be” (Bagehot 1873, pp. 206–207).

³³ “If it is known that the Bank of England is freely advancing on what in ordinary times is reckoned a good security—on what is then commonly pledged and easily convertible—the alarm of the solvent merchants and bankers will be stayed. But if securities, really good and usually convertible, are refused by the Bank, the alarm will not abate, the other loans made will fail in obtaining their end, and the panic will become worse and worse” (Bagehot 1873, p. 198).

³⁴ “The end is to stay the panic; and the advances should, if possible, stay the panic. And for this purpose there are two rules:—First. That these loans should only be made at a very high rate of interest. This will operate as a heavy fine on unreasonable timidity, and will prevent the greatest number of applications by persons who do not require it. The rate should be raised early in the panic, so that the fine may be paid early; that no one may borrow out of idle precaution without paying well for it” (Bagehot 1873, p. 197).

³⁵ “But if the Bank had not made these advances, could it have kept its reserve? Certainly it could not. It could not have retained its own deposits. A large part of these are the deposits of bankers, and they would not consent to help the Bank of England in a policy of isolation. They would not agree to suspend payments themselves, and permit the Bank of England to survive, and get all their business. They would withdraw their deposits from the Bank; they would not assist it to stand erect amid their ruin” (Bagehot 1873, p. 191).

On the contrary, his approach was strictly positive: given the peculiar structure of the coeval English banking system, he wanted to set up the guidelines the Bank of England was advised to follow in order to minimize the likelihood and the impact of shocks.³⁶ This means that the “Bagehot rules” might no longer be relevant if transposed to different contexts, in which the assumptions on which they are founded might not hold. And in fact, all of the three principles put forward by Bagehot have been subsequently questioned, to the point of making them sound obsolete (at least, until the 2008 shock).³⁷ The first principle (“lend freely”) has been considered as ill-suited to a world in which financial markets are sufficiently developed, something they allegedly were not in Bagehot’s times. In such a world, the central bank has no informational advantage with respect to market participants; to the contrary, it may even be at a disadvantage. As a result, central bank operations in developed financial markets should be strictly securitized (i.e. collateralized by exchange-traded securities), while idiosyncratic bank loans should not be eligible as collateral. However, securitized central bank lending will be no better than interbank lending at sustaining solvent but illiquid banks: therefore, in contrast to Bagehot’s view, the central bank should not lend at all to individual banks, but only provide aggregate liquidity to the banking system through open market operations (i.e. buying exchange-traded securities on the market without interacting with single banks).³⁸ An alternative rationale for having exclusively securitized central bank operations stems from a common criticism of Bagehot’s second principle (“on good collateral”): central bankers should protect themselves from potential losses because, in the run-up to a crisis, it is practically impossible to distinguish illiquid banks (“good collateral”) from insolvent banks (“bad collateral”).

³⁶Note that Bagehot thought that such a structure was suboptimal (it was the outcome of government intervention in the sector, which had produced the Bank of England’s monopolistic position) and inferior to free banking: “I believe that our system, though curious and peculiar, may be worked safely; but if we wish so to work it, we must study it. We must not think we have an easy task when we have a difficult task, or that we are living in a natural state when we are really living in an artificial one” (Bagehot 1873, p. 20).

³⁷See, for example, Laidler (2004).

³⁸Goodfriend and King (1988). Freixas et al. (2004) clarify the argument within a rigorous theoretical framework and find some scope for central bank lending to individual banks, but only under very restrictive conditions.

Central bankers have good reasons to be very cautious, because there is a lot of self-selection at the discount window: banks will ask for individual central bank support only as long as they will have become unable to borrow from the interbank market—that is, when there is already “at least a whiff of suspicion of insolvency”—but at that point, it will be impossible for central banks to establish how solvent banks actually are.³⁹ Moreover, the existence of pure liquidity crises has been questioned: some scholars have argued that panics are not triggered by casual events (“sunspots”), but rather by correct (albeit noisy) signals of incoming economic difficulties, which might be actually associated to insolvency problems.⁴⁰ On the basis of this all, Bagehot’s insistence on supporting solvent banks has been dubbed as devoid of practical fallouts. Finally, the third Bagehotian principle (“at penalty rates”) has been reconsidered from two very different viewpoints. On the one hand, in a vein that is reminiscent of the early criticism of Bagehot’s theses famously formulated by Bank of England director Thomson Hankey,⁴¹ the “penalty rates” have been interpreted as a palliative to the moral hazard necessarily produced by lending of last resort.⁴² Because the discount window is a sort of “put option” supplied by the central bank,⁴³ the price of this option should actually be maintained high enough in order to discourage excessive *ex-ante* risk-taking by banks.⁴⁴ This, however, only applies if central bank lending is non-securitized: with exclusively securitized lending, the “put option” does not exist, and interest rates must only be determined according to macroeconomic considerations.⁴⁵ On the other hand, the “penalty rates” have been interpreted as a device inherently tied to the convertibility regime to which the Bank

³⁹ Goodhart (1999, pp. 345–346). The flipside of the coin is that potentially troubled banks face disincentives to approach the central bank for fear of providing bad signals—a phenomenon known as *discount window stigma*. See Sect. 3.2.3.

⁴⁰ See, for example, Gorton (1988).

⁴¹ Hankey (1867).

⁴² For a survey, see Moore (1999).

⁴³ Solow (1982) was the first to describe the discount window as an insurance facility on banks’ assets, that is, as something economically akin to deposit insurance. In parallel, deposit insurance was described as a put option by Merton (1977).

⁴⁴ See, for example, Sleet and Smith (2000) or Freixas et al. (2004). This conclusion is disputed by others, for example, Castiglionesi and Wagner (2012).

⁴⁵ Goodfriend and King (1988).

of England was subjected (under which cash was a scarce resource).⁴⁶ This makes this rule irrelevant under a fiat money regime (under which cash can be created at will): once the convertibility constraint is removed, optimal liquidity provision should rather take place at very low rates.⁴⁷

More recent theoretical developments, many of whom stimulated by the huge liquidity crisis of 2008, have nonetheless led to a renewed interest into the “Bagehot rules” and to a reassessment of their validity.⁴⁸ First, the idea that non-securitized central bank lending to individual banks would be redundant in developed financial market has been challenged. On the one hand, non-securitized central bank loans as the ones advocated by Bagehot⁴⁹ have been argued to be desirable, as they may prevent the occurrence of confidence crises in which assets that are normally “*information-insensitive*” (i.e. trading as high-quality instruments despite being backed by opaque collateral) start to be questioned by lenders. In fact, a non-securitized discount window allows for the conversion of opaque bank assets into unquestionably good central bank assets: as long as information about central bank lending is undisclosed, this kind of intervention makes all banks look the same from the public’s viewpoint, thus allowing for the restoration of general confidence in the banking system.⁵⁰ On the other hand, loans to individual banks have been proved to be necessary by the manifest malfunctioning of interbank markets during the 2008 crisis, during which the hoarding of liquidity (a phenomenon dismissed by pre-crisis theory, but clearly identified by Bagehot) did occur on a spectacular scale.⁵¹ Second, the pre-crisis conclusion that pure liquidity crises (devoid of solvency issues) cannot occur has definitely fallen out of favour, and alterna-

⁴⁶ Martin (2009).

⁴⁷ See, for example, Flannery (1996) or Antinolfi et al. (2001).

⁴⁸ Allen and Gale (2017).

⁴⁹ To be precise, Bagehot recommended the Bank of England to extend *both* securitized and non-securitized loans: the former consisted of advances on exchange-traded securities, while the latter consisted of discounts of bills of exchange. Bills of exchange were idiosyncratic, uncollateralized certificates of corporate indebtedness with multiple guarantees (see Sect. 2.2.3). They were bought outright by the Bank’s discount window and never reinjected onto the market: Flandreau and Ugolini (2013). Bagehot’s recommendations under this respect have sometimes been slightly misrepresented by later commentators, who have often translated them as lending on collateral “which is *marketable* in the ordinary course of business”: see, for example, Hogan et al. (2015).

⁵⁰ Gorton and Ordoñez (2014).

⁵¹ For a survey of this literature, see Allen and Gale (2017).

tive theoretical foundations to Bagehot's intuitions have gained new ground.⁵² In addition, also the idea that central bankers always need to protect themselves from losses (because illiquidity and insolvency cannot be properly disentangled) has been questioned: illiquidity has started to be seen as a cause rather than as a consequence of insolvency,⁵³ which implies that overly prudent central bankers might precipitate fundamentally healthy banks into failure. Third, Bagehot's recommendations on "penalty rates" have also been reconsidered under a new light. On the one hand, moral hazard concerns (a rationale Bagehot did *not* provide) have been argued to be separable from the lending-of-last-resort function, thus pointing to the triviality of Hankey's classical criticism of Bagehot.⁵⁴ On the other hand, the idea that "penalty rates" find no justification under a fiat money regime has also been reconsidered in the light of the fact that even under such regimes central banks *do* find serious limitations to their monetary policy making: if existing political or fiscal constraints imply that room for central bank intervention may actually be limited,⁵⁵ Bagehot's concern with discouraging a run on cash retains much of its significance.

On the whole, the 2008 panic has vindicated the relevance of the "Bagehot rules" as universal guidelines to welfare-maximizing public intervention in the money market, and central bankers have widely acknowledged to have drawn inspiration from them during the crisis.⁵⁶ Some have argued that the correct application of Bagehot's "pure" theory to nowadays' context consists in saying that the central bank should act as a *market-maker of last resort*—that is, as an intermediary fixing a floor to eligible securities' price.⁵⁷ In their view, the three "Bagehot rules" should be translated as (1) "insure freely" (i.e. stand ready to accept unlimited

⁵² See, for example, Rochet and Vives (2004); Goldstein and Pauzner (2005).

⁵³ See, for example, Morris and Shin (2016). Note that the commonplace translation of the second Bagehot rule as "lend to illiquid but solvent banks" is not truly faithful to the author's view, as Bagehot was aware of the reverse causation link between illiquidity and insolvency: "The evil is, that owing to terror, *what is commonly good security has ceased to be so*; and the true policy is so to use the Banking reserve, that if possible the temporary evil may be stayed, and the common course of business be restored": Bagehot (1873, p. 205), my emphasis.

⁵⁴ Repullo (2005); Martin (2006).

⁵⁵ Goodhart (1999, pp. 348–352); Archer and Moser-Boehm (2013).

⁵⁶ Gorton and Ordoñez (2014); Hogan et al. (2015).

⁵⁷ The concept of "market-maker of last resort" has been first popularized by Buiter and Sibert (2007).

amounts of securities as collateral for loans, thus creating a floor to their price), (2) “all high-quality securities” (i.e. extend eligibility to all securities that did not suffer from pre-crisis solvency concerns), and (3) “at a high premium” (i.e. impose high haircuts on the value of collateral).⁵⁸ Such translation seems, however, to go much further than Bagehot. Sure, the lender of last resort and the market-maker of last resort can be seen, in the absolute, as isomorphic concepts: Bagehot’s Bank of England might well be depicted as a market-maker fixing a floor price to bills of exchange. Yet, the reformulated “Bagehot rules” for market-making of last resort sound more faithful to the Fed’s reaction to the 2008 crisis than to the spirit of *Lombard Street*. As a matter of fact, Bagehot did not recommend *extending* the list of eligible securities during a crisis (as the Fed did after the fall of Lehman Brothers): he only recommended *not restricting it*, with the aim of reducing the public’s uncertainty. While the policy suggested by Bagehot is not necessarily conducive to moral hazard, an extension of eligibility entails *distributional effects* (insurance is unduly provided to holders of securities previously considered as risky, thus increasing their welfare at the expense of the rest of the population) and may provide perverse incentives (it may generate expectations that “put options” will be provided in the future to currently imprudent banks).⁵⁹ Therefore, the idea that the Fed’s market-making of last resort after the panic was an application of the “Bagehot rules” is disputable. As we shall see,⁶⁰ extending eligibility during a crisis is indeed a type of lending-of-last-resort intervention that had existed well before Bagehot’s time, but it does not quite correspond to the practice of his times.

Even more disputable is the idea that Bagehot’s teachings are compatible with *bailouts* (i.e. the rescue of failing intermediaries through the injection of new external capital) as the many ones that were organized during the

⁵⁸ Mehrling (2011, pp. 23–29 and 132–135).

⁵⁹ Hogan et al. (2015, pp. 343–345). Note that in his early criticism of Bagehot’s proposals, Hankey argued that they could have been conducive to moral hazard because they entailed distributional effects not within the financial sector, but between the financial sector and other economic sectors (Hankey 1867, pp. 29–30). To this, Bagehot replied that Hankey’s argument was irrelevant, as the intervention he advocated largely consisted of direct lending to the real sector (not to the financial sector) through the discount of bills of exchange issued by all kinds of firms (Bagehot 1873, p. 172).

⁶⁰ See Sects. 3.2.1 and 3.2.2.

2008 crisis.⁶¹ In *Lombard Street*, bailouts are clearly indicated as suboptimal interventions entailing socially undesirable distributional effects (shifting welfare from the “good” to the “bad”).⁶² This opinion is consistent with the conclusions of recent theoretical developments, all pointing to the fact that bailouts are inescapably conducive to moral hazard as they provide a “put option” to risky banks.⁶³ If the social costs of bailouts (in terms of banks’ increased risk-taking) are evident, the reason why policymakers have often indulged into them (and spectacularly so in recent years) is that, as the fallouts of the bankruptcy of Lehman Brothers have clearly shown, banking failures may generate substantial negative externalities on the economy. But not all banks enjoy a “bailout clause”, as not all banks are the same: in fact, the impact of a banking failure on the rest of the system will depend on at least two factors. Traditionally, it was thought that negative externalities were direct proportional to the size of the troubled bank, meaning that some banks might be *too-big-to-fail*.⁶⁴ The devastating effects of the fall of Lehman Brothers (a bank that was relatively small, but played a crucial intermediation role in wholesale financial markets) have nonetheless shown that other factors than size could act as generators of externalities. In particular, the particular position occupied by the bank within the interbank network has been understood to be a crucial element.⁶⁵ A new stream of research has pointed to the fact that the impact of shocks depends on the *topology* of the interbank network (i.e. on the structure of the credit links connecting banks, which act as transmission channels for shocks).⁶⁶ The position occupied by a bank within a given network topology is therefore essential in determining how much damage its failure is liable to produce, meaning that some banks might be *too-interconnected-to-fail*. In the aftermath of the crisis, academics and regulators alike have struggled to create a new comprehensive framework taking into account both size and interconnectedness. The result has been the creation of the category of *Systemically*

⁶¹ See, for example, Humphrey (2010) or Bordo (2014).

⁶² “Any aid to a present bad bank is the surest mode of preventing the establishment of a future good bank”: Bagehot (1873, p. 104).

⁶³ See, for example, Rochet and Vives (2004); Farhi and Tirole (2012); or Keister (2016).

⁶⁴ The term “too-big-to-fail” was apparently coined in 1984 by Congressman Stewart McKinney in connection to the bailout of Continental Illinois (Gorton 2012, p. 146).

⁶⁵ Allen and Babus (2009).

⁶⁶ For surveys, see Chinazzi and Fagiolo (2015) and Hüser (2015).

Important Financial Institution (SIFI) and the construction of a number of indicators to assess the degree of “systemicity” of banks.⁶⁷ Because the overall costs generated by failure are so huge that they can easily surpass the costs of rescue, the bailout of a systemically important bank may indeed be desirable. Nonetheless, the certainty of being rescued provides perverse incentives to systemically important banks, which will thus feel free to behave recklessly. And indeed, the desire to acquire the status of “SIFI” has been shown to be a major determinant of the great merger movement endured by banks since the early 1990s.⁶⁸

The provision of a “bailout clause” to systemic banks has generally been interpreted by the theoretical literature as akin to another popular policy aimed at facing the fragility of banking—namely, *deposit insurance*.⁶⁹ Deposit insurance consists of the obligation for banks to contribute to a fund (typically granted with a fiscal backstop) meant to repay depositors in failed banks (at least, up to a certain threshold) whenever a failure occurs.⁷⁰ By preventing the occurrence of depositors’ “coordination failures”, deposit insurance is supposed to protect the banking system from self-fulfilling panics.⁷¹ And in fact, the widespread adoption of such schemes since the 1970s has been effective in making runs on insured deposits disappear completely, even in times of severe distress.⁷² Deposit insurance schemes have been the first policy (well before bailouts) to be accused of providing misbehaving banks with a “put option” producing moral hazard.⁷³ The “bailout clause” for systemic banks presents, however, clearly different distributional implications than deposit insurance. First, while the former does not contemplate *ex-ante* payments of insurance premiums, the latter generally does. Second, while the

⁶⁷ For a survey, see Bongini and Neri (2014).

⁶⁸ Brewer and Jagtiani (2013).

⁶⁹ Some authors even consider that in the absence of “explicit” (i.e. formal) deposit insurance schemes, “implicit” deposit insurance always exists because of the government commitment to organize the bailout of failing banks: see, for example, Demirgüç-Kunt et al. (2015).

⁷⁰ This is the design adopted in most countries: deposit insurance schemes are mostly funded *ex-ante* by banks and provided by a fiscal backstop (e.g. a Treasury credit line) in case of insufficient funding. Exceptions exist, though. For a complete overview, see Demirgüç-Kunt et al. (2015).

⁷¹ Diamond and Dybvig (1983).

⁷² Demirgüç-Kunt et al. (2015).

⁷³ Merton (1977).

former only applies to systemic banks, the latter applies to all participants into the insurance scheme. Third, while the former provides a guarantee to all banks' liabilities, the latter only does so for a limited portion of them (i.e. demandable deposits, and generally only up to a certain threshold). Because of this, contrary to bailouts,⁷⁴ deposit insurance has not been found to be necessarily associated with moral hazard.⁷⁵

To sum up, the three categories of *ex-post* intervention to solve the market failures inherent to banking activities (lending of last resort, bailouts, and deposit insurance) can be characterized as concerning three different dimensions of the problem. Deposit insurance, which prevents the occurrence of runs on deposits by protecting small deposits, can be described as an intervention focused on the retail payment functions provided by banks. Bagehotian lending of last resort, which prevents the occurrence of runs on liquidity by protecting banks' counterparties from payment accidents, can be described as an intervention focused on the wholesale payment functions provided by banks. Bailouts, which prevent the occurrence of runs on short-term credit by protecting banks' creditors from solvency accidents, can be described as an intervention focused on the financial functions provided by banks. Because all three kinds of intervention consist of a public solution to market failures, the three of them imply some degree of implication by public (or quasi-public) authorities.

In theory, deposit insurance and lending of last resort are not necessarily conducive to moral hazard, while bailouts are. In practice, however, the limits between these three types of intervention are often blurred, which explains why economists have often tended to see the three of them as different versions of the same policy of provision of "put options" to banks.⁷⁶ The combination of the three policies, often referred to as the *safety net*, has produced a system of perverse incentives in the recent decades.⁷⁷ The solution to the undesirable consequences of these often desirable *ex-post* interventions has been generally sought in the strengthening of *ex-ante* constraints on bankers' activities.

⁷⁴ Dam and Koetter (2012).

⁷⁵ Laeven (2002).

⁷⁶ For a survey, see Santos (2006).

⁷⁷ Calomiris et al. (2016).

3.1.3 Ex-ante Solutions: Legislation and Supervision

Ex-ante interventions to stabilize banking systems can be regrouped into three families, which roughly correspond to the three “pillars” of the current international standard of banking regulation (i.e. the Basel Accords): (1) legal restrictions on banks’ operations, (2) supervision, and (3) disclosure. The first one consists of rules aiming at discouraging the build-up of fragility in banks’ balance sheets. They include restrictions on the size of operations banks can implement relative to their capital (*capital requirements*), on the size of operations banks can implement relative to their cash reserves (*reserve requirements*), on the timing of operations banks can implement relative to their expected payment flows (*liquidity requirements*), and on the type of operations banks can implement relative to their corporate form (*activity restrictions*). The second “pillar” consists of monitoring procedures aimed at ensuring the efficiency of risk management at the micro-economic level. They basically include the auditing and inspection of individual banks. The third “pillar” consists of transparency standards, aiming at reducing information asymmetries between banks and their lenders. They impose unified communication policies to all banks and oblige them to disclose a certain amount of information to the public.

Although *ex-ante* and *ex-post* interventions are clearly complementary (the former can reduce but not eliminate resort to the latter, while the latter have negative effects that can only be mitigated through the former), the case for their joint provision is less than obvious. A priori, these are activities of a rather diverse nature, implying different competences, and thus arguably provided in the most efficient way by agencies with different specializations. This applies to all single *ex-ante* and *ex-post* intervention, and in fact, economists have long discussed who should be the lender of last resort, the deposit insurer, the rescuer, the regulator, and the supervisor of banks. Different answers have been provided to the question, also in view of the often blurred limits between these types of intervention. One approach has consisted of focusing on agencies’ incentives: for instance, considering lending of last resort and deposit insurance as two varieties of bailout policy, some have come to the conclusion that the provision of the two should be separated and that supervisory functions should be allo-

cated to the agency that is better equipped to sustain losses (i.e. a government-backed deposit insurer, and not a central bank).⁷⁸ A more popular approach has consisted of focusing on agents' incentives: obsessed by the problem of *capture* (i.e. the fact that agencies could be made subservient to some particular rather than to the general interest), many have concluded that responsibilities should be kept as much separate as possible.⁷⁹ As others have pointed out, however, a clear-cut separation between agencies would be possible only *de jure*, as the functions that they are called to provide are closely interrelated *de facto*.⁸⁰ In fact, economies of scope appear to exist in the joint provision of both *ex-post* and *ex-ante* interventions to stabilize the banking systems: these economies of scope arguably stem from the collection and management of highly sensitive information.⁸¹ Although no consensus has yet emerged in the literature, the 2008 financial crisis (perceived as the outcome of spectacular coordination failures) has provided support to those pleading for a centralization of responsibilities with a single agency (viz. the central bank).⁸²

3.2 Lending of Last Resort and Supervision: History

3.2.1 Early Regulation: The Venetian Model

Banking is well known to be one of the most heavily regulated economic sectors worldwide. It is also one of the most heavily regulated economic sectors historically. Contrary to what is sometimes explicitly or implicitly suggested,⁸³ regulatory concerns with banking well predate the emergence of joint-stock banks as we know them today. Early regulators have typically interpreted market failures tied to banking as *agency problems*—that is, as

⁷⁸ See, for example, Repullo (2000); Kahn and Santos (2005).

⁷⁹ See, for example, Boyer and Ponce (2012); Barth et al. (2012, pp. 219–220).

⁸⁰ Goodhart and Schoenmaker (1995).

⁸¹ Blinder (2010).

⁸² For a survey, see Masciandaro and Quintyn (2016).

⁸³ See, for example, Grossman (2010), Turner (2014), or Calomiris and Haber (2014).

the result of the moral hazard incurred by principals delegating the accomplishment of some operations to some agent. As a matter of fact, a banker acts as an agent to her principals (her depositors), who have delegated him with the management of their money. As this is a delicate business particularly exposed to fraud, the solution traditionally adopted to minimize agency problems has consisted of making individual bankers fully liable for all their operations. This explains why not only limited-liability banking has been regarded with high suspicion until well into the nineteenth century, but also early regulation was particularly concerned with impeding bankers' delegation of their tasks to third parties. Among the general regulation of economic activities in medieval Constantinople, for instance, banking stands out for the harshness of the punishments reserved to delegation. A famous edict by Emperor Leo VI the Wise (dating towards the end of the ninth century) ruled that bankers could be sentenced to mutilation just for delegating their signature or leaving their books to their employees.⁸⁴ To increase the weight of the liability impending on individual bankers, new entrants were often asked to provide guarantors; in many places, moreover, bankers were organized as guilds with restrictive barriers to entry.⁸⁵ On the whole, early regulation appears to have been particularly focused on the prevention of *wildcat banking*—that is, on impeding bankers from maximizing their profits in the short term and then disappearing with their creditors' money.

Unfortunately, historical evidence on the evolution of banking regulation in medieval and early modern times is still quite scattered to date. The case on which we know the most is that of Venice. As we have already pointed out,⁸⁶ Venice is a particularly interesting case because of the great level of sophistication reached by its deposit banking sector since the late Middle Ages. This explains why Venetian regulators were probably the first ones to develop a broad range of intervention tools that went beyond early regulators' basic approach to banking in terms of agency problems. As a matter of fact, Venice developed both *ex-ante* and *ex-post* intervention devices that were not unlike those adopted by nowadays' regulators.

⁸⁴ Freshfield (1938).

⁸⁵ Note that unlimited liability can in itself be interpreted as a barrier to entry: Carr and Mathewson (1988).

⁸⁶ See Sect. 2.2.1.

Ex-ante intervention included tools akin to the three “pillars” of the Basel Accords (restrictions on banks’ operations, supervision, and disclosure), while *ex-post* intervention included an early form of lending of last resort.

Contrary to most other important banking centres of the Middle Ages (like Constantinople or Florence), Venice did not have a bankers’ guild. But this does not mean that barriers to entry were lower in the Most Serene Republic than elsewhere. As deposit bankers were considered as providers of a public service, those willing to enter the business were compelled to apply for a licence (i.e. to rent one of the benches owned by the City on the Rialto): this procedure allowed authorities to screen entrants and to seize some of their capital as a first guarantee.⁸⁷ Besides paying this rent, the new banker was additionally required to post a bond. The guarantee consisted of movable assets deposited with the mercantile magistrates of the City (Consoli dei Mercanti) by the banker himself or a number of guarantors close to him. As time passed, the sum to be pledged increased. We know that the guarantee required from Rialto bankers was fixed by the Senate at 3000 ducats in 1270, raised to 5000 in 1318, then to 20,000 in 1455, and eventually to 25,000 in 1523: while between 1455 and 1523 government bonds were accepted as a guarantee, in all other periods more tangible assets were required.⁸⁸ Despite its important increase over time, the size of the guarantee was not prohibitive: towards the end of the fifteenth century, a typical Rialto bank had outstanding liabilities for more than 300,000 ducats, meaning that the compulsory deposit would only cover 6.66% of them. In theory, the guarantee was meant to repay depositors in case of bankruptcy; in practice, however, this was seldom the case.⁸⁹ In fact, this regulatory device was less akin to an embryonic deposit insurance than to an ancestral reserve requirement (which today takes the shape of a compulsory deposits with the central bank), although the amount of the guarantee was completely unrelated to the size of the operations actually implemented by the bank.

⁸⁷ Mueller (1997, pp. 36–37).

⁸⁸ Lattes (1869, pp. 13–15 and 20); Ferrara (1871, pp. 444–446).

⁸⁹ By contrast, bankers’ cash reserves kept (for safekeeping purposes) in the Treasury’s safes at Palazzo dei Camerlenghi could be frozen in case of failure and thus used to repay depositors: Mueller (1997, pp. 52–61 and 71–72).

Besides this rudimentary reserve requirement, Venetian authorities designed other regulatory instruments in the spirit of the “first pillar” of the Basel framework: activity restrictions and (some sort of) capital requirements. In contrast to the guarantee deposit, however, the means the government had at its disposal in order to enforce these other instruments were limited, so that their effectiveness was indeed dubious. The fact that the regulation of these issues was sometimes redundant or inconsistent with respect to already existing legislation appears to suggest that it was widely disregarded. In early times, the most popular regulatory device consisted of activity restrictions, and especially of restrictions to trading in commodities (by far, the most active speculative market of those times in view of high price volatility). As we have seen, at the time when the Morosini plan to create a public bank was discussed (1374),⁹⁰ the Senate’s only regulatory response to the latest crisis consisted of forbidding bankers to purchase, lend on, or intermediate operations involving the most speculative commodities of the time (silver, copper, tin, lead, fustians, saffron, and honey).⁹¹ To what extent bankers actually complied is impossible to know, but we do know that in 1386 they loudly complained that these restrictions were weighting too heavily on the profitability of the banking business. As a reaction, the Senate partially transformed the activity restriction into a sort of capital requirement: the 1374 ban was suspended for two years, but bankers were allowed to implement operations in commodities only within the limit of 100% of their personal capital (which, in a regime of unlimited liability, coincided with the capital of their bank). The suspension was subsequently extended at the same conditions, until in 1403 the conversion of the activity restriction into a capital requirement was perfected: bankers were asked to keep the total size of “investments by land and sea” (grain imports excluded) within the limit of 150% of the personal capital the banker had invested in government debt.⁹² It is difficult to assess, however, to what extent this requirement was actually binding to bankers. The enforceability of regulation appears to have been limited, in these early years, by lack of serious tools to supervise banks’ activities once their entry into the sector had been approved.

⁹⁰ See Sect. 2.2.1.

⁹¹ Mueller (1997, pp. 151–153).

⁹² Ferrara (1871, pp. 184–188).

The situation changed as Venetian authorities gradually developed new procedures in the spirit of the “second pillar” of the Basel Accords. As said, until the sixteenth century banking was included (as all other commercial businesses) among the competences of the Consoli dei Mercanti. For a long time, though, the only supervisory task accomplished by the mercantile magistracy consisted of receiving and checking the quality of the assets deposited as a guarantee to bankers’ liabilities. Starting from the 1455 banking reform, the magistrates’ tasks were extended: they were gradually asked to secure public disclosure of bankers’ books, to make sure that capital requirements were respected, and to enforce the legal price of different coins.⁹³ But it was only in 1524 that a specific supervisory body consecrated to banks was created—as far as we know, the first in the world ever. The bank superintendents (Provveditori sopra Banchi) were government-appointed magistrates (there were as many as the number of banks) who had their office on the Rialto and were responsible for the smooth functioning of all operations. Besides collecting the complaints of customers and fining the bankers that did not comply with regulatory and transparency standards, they regularly inspected bankers’ books with the help of an official auditor (Quaderniere). Tellingly, bank superintendents did not disappear when the last private deposit bank closed down in 1584: as a matter of fact, the magistracy continued to supervise the operations of the two public banks (Banco della Piazza and Banco del Giro) until the fall of the Republic in 1797.⁹⁴ This confirms that the *de facto* establishment of a state monopoly of deposit banking since 1587 was not meant to crowd privates out, but rather to compensate for the lack of private initiative in the sector.⁹⁵ At the same time, the strong regulatory push towards a centralization of non-cash payments at the Rialto clearing⁹⁶ allowed the supervisory body to acquire a large amount of information on domestic financial flows. The Republic had started to obtain access to this type of information in 1446, when the principle of bank secrecy had been first challenged with the aim of

⁹³ Ferrara (1871, pp. 446–449).

⁹⁴ Ferrara (1871, pp. 449–451).

⁹⁵ See Sect. 2.2.1.

⁹⁶ See Sect. 2.2.3.

tackling tax avoidance.⁹⁷ But occasional access to individual accounts by tax auditors did, however, only provide the state with scattered information on domestic financial trends. By contrast, continuous inspection of books by bank superintendents allowed authorities to have an overview of the potential fragilities that might be building up in the economy. This means that, half a century before the creation of a state monopoly of payments, the combination of centralization and supervision had already started to produce a generalized monitoring system that might have reduced moral hazard and hence enhanced the quality of bank assets. Such a system certainly did not foster a new age of financial stability; still, the bankruptcies of the sixteenth century appear to have been less spectacular than those of the fifteenth century.⁹⁸

Venetian authorities also took formal steps in order to enhance transparency standards, in the spirit of the “third pillar” of the Basel Accords. Also under this respect, the 1455 banking reform was an important step forward as it definitively established the principle that bankers’ books were public records whose access should be granted to anyone upon request. At about the same period, moreover, a strict regulation of the opening hours of banks was also adopted: the aim was to stop the then common practice of strategic closures (sorts of self-declared “bank holidays”), which bankers put in place in order to minimize cash withdrawals. As one commentator famously argued, these reforms turned bankers into some sort of civil servants.⁹⁹ In a sense, this was consistent with Venice’s general approach to banking, according to which bankers were (as much, if not more, than notaries) providers of services that were vital to the functioning of the Republic and had therefore to be regulated accordingly. However, one might ask to what extent the gradual but steady increase in regulation from the fourteenth to the sixteenth century might have been responsible for the total extinction of private deposit banking by 1584. High barriers to entry and binding requirements apparently made deposit banking a less and less attractive business, eventually obliging the state to step in to compensate for the lack of private initiative. In

⁹⁷ Mueller (1997, pp. 67–69).

⁹⁸ Mueller (1997, pp. 125–168).

⁹⁹ Lattes (1869, pp. 14–15).

view of this, the Venetian experience has been interpreted by advocates of free banking as supporting the thesis that excessive regulation would lead to nefarious “financial repression”.¹⁰⁰

The copious *ex-ante* interventions put in place in order to reduce financial instability were completed by *ex-post* ones, as Venetian authorities repeatedly stepped in to support troubled banks in the event of panics. The history of banking panics in Venice during the late medieval and early modern period is so rich that a detailed taxonomy of such episodes can easily be established. Consistent with the idea that liquidity crises generally occur because of well-grounded solvency concerns, many runs on Venetian banks were triggered by real factors like macroeconomic shocks (wars, famines), seasonal fluctuations in the demand for cash (which was much stronger in the autumn), or falling prices (burst of commodity bubbles). However, consistent with the idea that liquidity crises can also occur because of “sunspots”, many other runs were *not* provoked by real solvency concerns. On several occasions, runs occurred as bad news was spread about the physical health of bankers (not of the financial health of banks). For instance, the Benedetto bank fell victim to two consecutive runs (in 1400 and in 1404), both sparked by the inaccurate news that the owner had died of plague. Also the very last of Venice’s private deposit banks, the Pisani-Tiepolo bank, failed after a run by depositors, motivated by the announcement of its owner’s decease (in 1576). Depositors were apparently concerned because the death of the banker (who was fully liable to depositors on his personal capital) could entail a freeze of operations until a successor bank was launched, an undertaking which could take some time to organize.¹⁰¹

On some of these occasions, government intervention to keep banks afloat was considered and sometimes implemented. Probably the most interesting episode in which intervention was taken into consideration was the 1499 crisis, in the event of which two out of the four deposit banks operating on the Rialto failed, also leading the remaining two on the brink of collapse. A vivid account of this panic is provided by chronicler Domenico Malipiero, who was a member of the Senate and thus had first-hand

¹⁰⁰ Ferrara (1871, pp. 458–466). On the concept of “financial repression”, see McKinnon (1973, pp. 68–77).

¹⁰¹ Mueller (1997, pp. 126–128 and 163–168).

knowledge of the events.¹⁰² Malipiero relates that on 1 February 1499, Andrea Garzoni (the owner of the Garzoni bank) secretly went to the Senate, to announce in tears that his bank was about to suspend payments. Tellingly, even before the banker had had the time to detail the situation, the Doge proposed to lend 30,000 ducats in order to keep the bank afloat, while putting it under the supervision of two magistrates.¹⁰³ The Garzoni bank was one of the biggest funders of the government's floating debt, and this non-securitized loan could be considered as collateralized by the government's own non-securitized credit lines from the bank.¹⁰⁴ But Garzoni explained that the proposed sum was far from enough. Because this was apparently the whole liquid sum available at the Treasury, the president of the assembly proposed to assign to the bank the incoming revenues of one tax; as the timing of this cash flow was uncertain, however, the run could not have been stopped in this way, and the idea was discarded. At this point, the balance sheet of the bank was examined. It was found that troubles were mainly occasioned by a run by foreign depositors (especially Florentine bankers, who were retaliating to Venice's military support to the Pisan revolt against Florence) and that in a few days' time the bank had lost deposits for 40,000 ducats. Having ascertained its powerlessness, the government stepped back, and two bankruptcy administrators were named to manage the repayment of the remaining 200,000 ducats liabilities.¹⁰⁵ News of the Garzoni failure prompted runs on the other banks (especially on the Lippomanno bank), which could however be sustained for some time. But after having lost 300,000 ducats of deposits in the space of few weeks, on 16 March this bank experienced additional withdrawals for 30,000 ducats in one single day. On that day, the Doge lent Lippomanno the whole of the Treasury's liquid funds (10,000 ducats just raised from private investors), but these were immediately withdrawn by insiders (senators who held deposits with the bank and who themselves ran on it); as a result, the bank failed on that same day. According to Malipiero, the fall of Garzoni and

¹⁰² Lattes (1869, pp. 15–17).

¹⁰³ Lattes (1869, p. 15).

¹⁰⁴ Ferrara (1871, pp. 204–211).

¹⁰⁵ Lattes (1869, pp. 15–16).

Lippomanno was such a blow to the Republic, that it was worse than the military loss of a rich and strategic mainland city like Brescia. Immediately, the two surviving banks (Pisani and Agostini) also fell victims to heavy withdrawals. Still totally cash-stripped, the government did whatever it could to help them: this means that it refrained from borrowing from them as it normally would and incited tax farmers to become inflexible with taxpayers in arrears. On 27 March, a big run on the Pisani bank, accompanied by riots, developed on the Rialto. Members of the Pisani family ran to the Doge's Palace to signal the uprising. As a reaction, four magistrates were sent to the Rialto to declare that the bank was liquid and that 60 noblemen had accepted to act as guarantors of the bank's deposits. To what extent this last-minute, privately provided (but government-sponsored) deposit insurance was credible is actually unclear, but the move succeeded to halt the run, and the Pisani bank did not fail. On the same day, also the other surviving bank (Agostini) had suffered a run: after yet another 16,000 ducats had been withdrawn, it had been left with an amount of outstanding deposits that was smaller than its capital. In order to calm depositors, Agostini publicly displayed his remaining cash reserves (40,000 ducats), which managed to reassure creditors. In seeing the scene from his adjacent bank, Pisani reportedly commented that the confidence crisis would have been avoided had regulation been stricter: reserve requirements had been fixed by law at too low a level and should have been raised from 20,000 to 50,000 ducats in order to maintain depositors' trust in the banking system.¹⁰⁶

Malipiero clearly describes the 1499 crisis as a liquidity shock: although some solvency concerns did exist (especially with the Lippomanno bank, whose bankruptcy was perhaps the biggest financial scandal in the history of Venice),¹⁰⁷ the panic is said to be triggered by exogenous events (warfare with Florence) and to develop as a series of depositors' runs on fundamentally solvent banks. Interestingly, Malipiero bemoans in passing the inherent fragility of Venetian deposit banks (funded through demandable deposits), which were proving to be very much prone to liquidity shocks, in comparison to the solidity of Florentine investment banks (funded through

¹⁰⁶ Lattes (1869, pp. 16–17).

¹⁰⁷ Lattes (1869, pp. 18–20).

long-term placements), which were going through the military escalation without suffering.¹⁰⁸ From the beginning to the end of the storm, the chronicler describes Venetian public authorities as proactively doing whatever they can to relieve the banks. In view of Malipiero's remarks, government intervention during the crisis can be more properly interpreted as rudimentary lending of last resort rather than as a sort of bailout. That this was the actual predisposition of Venetian authorities is confirmed by another important episode. When in 1576 depositors ran on the Pisani-Tiepolo bank, the supreme security council of the Republic (Consiglio dei Dieci) ordered the Mint to lend the bank 65,000 ducats for three months at 4% interest. Contrary to the loans proposed or extended in 1499, this time the loan was securitized: as a matter of fact, the Mint acted as custodian of the government debt owned by the bank, which was used as collateral for the loan.¹⁰⁹ Hence, the 1576 intervention to support the Pisani-Tiepolo bank can be doubtlessly characterized as lending of last resort. The intervention succeeded in halting the liquidity crisis, and the bank managed to survive—at least, until a subsequent, fatal run in 1584.

Until the seventeenth century, the big limit to the government's lending-of-last-resort operations had been, as we have seen, the amount of cash at its disposal. This constraint was removed once the state became the monopolist of deposit banking in 1638. Through the Banco del Giro, the government had the power to create inconvertible money that could be lent to private intermediaries (e.g. to merchant banks) and directly used by the latter in order to repay creditors. Although the Banco del Giro was not intended to lend to others than the government, its foundation arguably enhanced the government's means to act as a lender of last resort to the domestic financial sector. As we are very ill-informed on the operations of this public bank, however, we do not know whether this opportunity was actually seized in the subsequent decades in order to support troubled merchant banks. What we know, nonetheless, is that in another financial centre that had drawn substantial inspiration from Venetian institutions (viz. Amsterdam),¹¹⁰ the state-owned centralized

¹⁰⁸ Lattes (1869, p. 17).

¹⁰⁹ Mueller (1997, pp. 126–127). On the role of Mints as lenders of last resort, also see the case of early modern Ragusa (Dubrovnik): Pierucci (1991).

¹¹⁰ See Sect. 2.2.2.

payment organization (viz. the *Wisselbank*) did implement lending of last resort in the event of at least one major crisis. In August 1763, a violent liquidity shock hit Amsterdam's merchant banks. Although they did not collect demandable deposits, merchant banks performed a maturity transformation business that was not unlike the one conducted by deposit banks: they funded themselves domestically at short maturity by issuing bills of exchange and then relent at long maturity on foreign markets. When the bill market froze, failures started to occur among Amsterdam-based merchant banks.¹¹¹ As bills of exchange had to be repaid at maturity through the public bank, deposits with the *Wisselbank* suddenly came in high demand. Like the *Banco del Giro*, however, the *Wisselbank* normally did not lend to privates and only opened accounts to customers upon deposit of selected, high-quality coins. In order to meet the increased demand, the Bank extended the number of assets that were eligible as collateral for advances in bank money. By accepting to lend to merchant banks on the security of (previously ineligible) depreciated silver bullion and coins, the *Wisselbank* contributed substantially to appease the run on liquidity and to prevent the failure of the biggest Amsterdam-based merchant banks.¹¹² This successful type of liquidity-injecting intervention was implemented again during the following crisis (1773), but this time it was coupled with the creation by the most important merchant banks of a fund of mutual assistance (extending loans on deposit of collateral), which was provided with a liquidity backstop by the *Wisselbank*. The solution proved so much satisfactory that it was made durable during the subsequent crisis (1781) with the creation of the City Chamber of Loans, again provided with a liquidity backstop by the public bank. Starting from the 1763 crisis, therefore, the *Wisselbank* increasingly took up the role of lender of last resort in the Amsterdam banking system.¹¹³ Although no archival evidence of the kind has been found so far, we can speculate that the *Banco del Giro* provided Venetian authorities with a lending technology that would have allowed them to behave accordingly in case of a domestic liquidity crisis.

¹¹¹ Schnabel and Shin (2004).

¹¹² Quinn and Roberds (2015).

¹¹³ Uittenbogaard (2009, pp. 127–131).

To sum up, well before the emergence of limited-liability banking in the nineteenth century (which would exacerbate agency problems), Venetian authorities had been obliged to develop intervention tools with the aim of addressing complex issues with the banking system that went well beyond basic agency problems. Market failures repeatedly generated liquidity crises, and by the mid-sixteenth century a complete range of *ex-ante* and *ex-post* interventions had been designed in order to cope with them. These included legal restrictions on bank operations (reserve requirements, capital requirements, activity restrictions), supervisory policies, disclosure policies, and lending of last resort. Many of the tools developed in the Most Serene Republic were replicated in Amsterdam, a financial centre that had followed the Venetian approach to the payment infrastructure under many respects. By contrast, other centres had chosen to adopt different approaches, and banking regulation had consequently had to be developed along rather different lines. This was, most notably, the case of London.

3.2.2 Gentlemanly Regulation: The English Model

When the Bank of England was founded in 1694, private deposit bankers (“goldsmiths”) had already started to flourish in London. “Goldsmiths” issued banknotes that were becoming increasingly popular means of payment among the public. By 1697, the Bank was well aware that its success as a private fiscal agent to the state (whose core business model consisted of transforming private demandable debt into long-term government credit) crucially depended on its ability to keep its own banknotes in circulation.¹¹⁴ As a result, the Bank asked the government for legal protection of its role as main issuer of banknotes in the country. This was granted through a series of acts (passed in 1697, 1707, 1708, and 1742) which provided the Bank with the actual monopoly of joint-stock banking. The acts ruled that no other bank in England and Wales could have more than six partners—implicitly confirming, as usual, unlimited liability for all partners. *De facto*, this created a binding constraint on the size of banks and hence on their issuance of banknotes, thus leaving the Bank of

¹¹⁴ See Sect. 2.2.4.

England with an overwhelmingly predominant position.¹¹⁵ As deposit banking started to take off throughout the country in the second half of the eighteenth century and ballooned during the Napoleonic Wars, hundreds of small banks mushroomed in the provinces.¹¹⁶ Throughout this time, the principle of unlimited liability and the cap on the number of partners remained the sole regulatory standards adopted in the country.

The situation started to change in the aftermath of the 1825 crisis, a major shock that entailed a serious disruption in the national payment system as well as the failure of dozens of banks countrywide.¹¹⁷ Concerned with making “country” banks much more resilient, in 1826 the government summoned the passing of the Banking Co-Partnership Act, which allowed for the creation of chartered joint-stock banks except in the London region (this exception would be dropped by the Bank Charter Act of 1833). Although the 1826 reform did eliminate the cap on the number of partners and allowed banks to branch out, it did not touch upon the principle of unlimited liability; to the contrary, its rationale was the idea that increasing the number of shareholders would make the guarantee more credible.¹¹⁸ In addition, new joint-stock banks had to be chartered: this amounted to raise barriers to entry in the sector, again with the aim of enhancing stability.¹¹⁹ Chartering and unlimited liability in banking were only dropped in 1858, but until the late 1870s only a handful of banks embraced the limited-liability regime. This was due to the fact that the new regime raised suspicions among depositors—and especially so after the collapse of Overend, Gurney & Co. in May 1866, just months after the company had adopted the limited-liability regime.¹²⁰ But the failure of the City of Glasgow Bank in October 1878 was a watershed. The forced *bail-in* of the Bank required by the unlimited-liability regime entailed the bankruptcy of 1565 out of its 1819 shareholders, most of them small middle-class investors. The episode immediately fostered the passing of

¹¹⁵ Richards (1929, pp. 146–147 and 191–192).

¹¹⁶ Pressnell (1956).

¹¹⁷ See Sect. 2.2.4.

¹¹⁸ Turner (2014, pp. 108–109).

¹¹⁹ Cottrell (2010).

¹²⁰ Turner (2014, pp. 123–126).

the 1879 Companies Act, which allowed banks to convert unlimited liability into reserve liability: in case of crisis, banks would call for more capital from shareholders, but within a pre-specified limit. In a few years' time, all banks shifted to the new regime. While in the 1880s callable capital covered for a substantial share of the banks' liabilities, the coverage rapidly decreased in the following decades (mostly because of the big merger movement that took place during those years) and became almost irrelevant in the Interwar period.¹²¹

As it had been the case everywhere since the ancient times, the way in which nineteenth-century British authorities had tried to limit banking instability had consisted of sticking to the principle of unlimited liability and barriers to entry. While chartering was dropped in 1858 (earlier than across the Channel), limited-liability banking became the norm in Britain only after 1879 (much later than in most Continental countries). What is more surprising is that, contrary to Venice in the times of its heyday, the country that hosted by far the most advanced banking system of the nineteenth century did not develop other *ex-ante* regulatory instruments than these two very primitive devices to discourage agency problems. In stark contrast to Renaissance Venice, Imperial Britain did not develop a complex set of tools akin to the three “pillars” of the Basel Accords. As for the first “pillar”, legal restrictions on bank operations were almost inexistent. Activity restrictions were limited to the cap on the issuance of banknotes imposed by the Bank Act of 1844; capital requirements proper (i.e. limits to the banks' operations relative to capital) were absent; and reserve requirements, albeit theoretically introduced by a “gentlemen's agreement” in 1891,¹²² were actually disregarded by deposit banks.¹²³ Concerning the second “pillar”, banking supervision was not contemplated by any piece of British legislation.¹²⁴ And for what concerns the third “pillar”, also formal disclosure standards were unknown: although in 1891 banks had agreed to regularly publish their balance sheet,¹²⁵ no

¹²¹ Turner (2014), pp. 120–133).

¹²² Pressnell (1968).

¹²³ Ugolini (2016).

¹²⁴ Cottrell (2010).

¹²⁵ Pressnell (1968).

precise accounting criterion had been fixed, and banks indulged massively into window-dressing.¹²⁶ Perhaps the system of unlimited liability and then reserve liability may have been sufficient to provide for an efficient regulatory regime devoid of the distortional effects potentially produced by other instruments.¹²⁷ But also when barriers to entry were lifted and reserve liability became residual towards the end of the century, no other serious regulatory measure was taken to compensate for the potential amount of moral hazard this may have introduced into the system.

One reason why the downscaling of *ex-ante* intervention in nineteenth-century Britain was not associated to increasing financial instability may have to do with the synchronous upscaling of *ex-post* intervention. In fact, it was precisely in the central decades of the century that the Bank of England developed lending-of-last-resort operations along the lines advocated by Walter Bagehot. As we have seen, lending of last resort had already been practised in early modern Venice and Amsterdam in the event of major liquidity shocks. However, such intervention had always consisted of the extraordinary extension of eligibility criteria in crisis periods. This followed logically from the fact that early modern public banks were actually *not* used to extend loans to the private sector in non-crisis times. The Banco del Giro, the Wisselbank, but also the Hamburger Bank or Genoa's Banco di San Giorgio were all banking organizations meant to extend loans exclusively to the government (or to other government-sponsored companies, like the Dutch East India Company in the case of the Wisselbank).¹²⁸ Essentially inspired by the model of San Giorgio, also the Bank of England had been originally intended as an exclusive lender to the government. And indeed, for almost 70 years since its foundation, the Bank's loans to the private sector had been residual.¹²⁹ Things changed substantially with the 1763 crisis. This huge international shock, which pushed the Wisselbank into lending of last resort, also encouraged the Bank of England to do the same.¹³⁰ Unlike the Wisselbank, however, the Bank of

¹²⁶ Ugolini (2016).

¹²⁷ Turner (2014, pp. 6–12).

¹²⁸ Uittenbogaard (2009).

¹²⁹ Clapham (1944, I, pp. 300–302).

¹³⁰ Lovell (1957).

England faced the crisis by implementing non-securitized loans to the private sector under the form of discounts of bills of exchange. As we have seen,¹³¹ bills of exchange had become very popular monetary instruments in England since the seventeenth century: discounting bills during the shock actually meant providing the economy with liquidity in the most direct way possible. After 1763, an important change took place: the Bank became accustomed to discounting bills to privates not only during crises but also on a regular basis. By the beginning of the Napoleonic Wars, discounting had become one of the core businesses of the Bank.¹³² To say it in modern parlance, in the 1760s the Bank of England established the first *lending facility* ever offered by a public bank—that is, a pre-commitment by the Bank to implement operations with private counterparties on their own initiative. This change in the Bank's habits obviously entailed an important modification in the public's habits as well, as the latter started factoring in the possibility of having continued access to the discount window. This was a considerable departure from the early modern procedures, and it paved the way to the development of a new concept of lending of last resort.

The suspension of gold convertibility during the Napoleonic Wars allowed the Bank of England to expand its discount operations well beyond the pre-war levels. At the same time, the national banking system grew more and more reliant on the Bank's standing facility. Therefore, when the big post-war financial boom turned into a bust in 1825, the whole system turned to the Bank in order to obtain liquidity. However, in 1821 convertibility had been restored, and the Bank now faced tighter constraints on its operations. As a result, for fear of depleting its gold reserve, the Bank started to ration credit by rejecting demands for discounts that it would have normally accepted. The perspective of seeing usual refinancing options become unavailable alarmed market participants and precipitated a run on cash. The whole system found itself on the brink of collapse, and the worst was avoided only thanks to a last-minute U-turn in the Bank's lending policy: the Bank eventually restarted discounting by reissuing some small-denomination banknotes it had previously withdrawn from circulation, and thanks to the fact that demand for conversion into gold remained limited, the

¹³¹ See Sects. 2.2.3 and 2.2.4.

¹³² Clapham (1944, I, pp. 300–302).

Bank managed not to deplete its bullion reserve.¹³³ This episode demonstrated to what extent the Bank's lending operations had become indispensable to the system.¹³⁴ In the following years, London banks reduced their direct dependence on the Bank by starting to keep demandable deposits with an emerging type of intermediaries, known as the bill brokers: in case of crisis, banks would obtain liquidity by withdrawing funds from brokers instead of borrowing from the Bank of England.¹³⁵ This, however, did not mean that the banking system as a whole was any less dependent from the Bank: in case of crisis, bill brokers could only provide liquidity to depositing banks by borrowing themselves from the discount window. In the years between 1826 and 1844, the Bank vowed to assume its "public responsibilities" in the management of the system. During this period, its attitude consisted of discouraging the public's regular resort to the standing facility, while granting large access in the event of monetary shocks (like the 1836 and 1839 crises).¹³⁶ This policy, however, was totally discontinued by the Bank Charter Act of 1844, which put strong constraints on the issuance of banknotes but freed the Bank from its public responsibilities on the banking system. According to the first proponent of the bill, Robert Peel, the principle sanctioned by Parliament was that the Bank should have been "governed on precisely the same principles as would regulate any other body" except for what concerned its banknote circulation.¹³⁷ Therefore, the Bank was encouraged to compete with private lenders: between 1844 and 1847 it lowered discount rates aggressively and returned to be a big actor in the London discount market in non-crisis times.¹³⁸ When in 1847 sentiment turned negative, however, the Bank (which was now subjected to much stricter constraints than before on its issuance of banknotes) started to ration credit as it had done in 1825. The result was a major liquidity shock that could only be appeased when the government temporarily lifted the limits to banknote circulation, thus allowing the Bank to accommodate the whole demand for discounts. This

¹³³ Clapham (1944, II, pp. 93–102).

¹³⁴ Wood (1939, pp. 90–95).

¹³⁵ King (1936, pp. 62–70).

¹³⁶ Wood (1939, pp. 101–103).

¹³⁷ Clapham (1944, II, pp. 187–189).

¹³⁸ Wood (1939, pp. 135–143).

was the situation in which *The Economist* magazine started to campaign for the unquestioned adoption of lending-of-last-resort policies by the Bank.¹³⁹ Walter Bagehot and his colleagues structured their plea around the principle of the continuity of standing facility procedures. As the standing facility was available on the public's demand in normal times, it should have also been equally available in crisis times ("lend freely"), for all normally eligible collateral ("on good collateral"), although at a different price ("at penalty rates") in order to prevent abuses. In a sense, Bagehot was asking the Bank to provide the public with the most advantageous aspects of the two different regimes that had been adopted in the preceding decades: acceptance of "public responsibilities" (as in 1826–1844) combined with draconian limitations to operations (as in 1844–1847). This was a considerable departure from the debates of the preceding decades, and not completely devoid from inconsistencies.¹⁴⁰ It is hardly surprising that a Bank insider like Thomson Hankey reacted violently to *The Economist's* campaign, writing that the adoption of what he believed to be "the most mischievous doctrine ever broached in the monetary of banking world" would amount to the private sector's "free riding" on the (costly) reserve maintenance business provided by the Bank. It was precisely this "free riding"—Hankey insisted—that was the source of moral hazard.¹⁴¹ Hankey's precise wording suggests that he was not so much concerned with the idea of lending of last resort *per se*, but rather with the decrease in private banks' cash reserves this would have encouraged.¹⁴²

¹³⁹ Bignon et al. (2012).

¹⁴⁰ Fetter (1965, pp. 257–258 and 282–283).

¹⁴¹ Hankey (1867, pp. 25–30).

¹⁴² "Ready money is a most valuable thing; it cannot from its very essence bear interest – every one is therefore constantly endeavouring to make it profitable, and at the same time to make it retain its use as ready money, which is simply impossible. Turn it into whatever shape you please, it can never be made into more real capital than is due to its own intrinsic value, and it is the constant attempt to perform this miracle which leads to all sorts of confusion with respect to credit. The Bank of England has been long expected to assist in performing this miracle; and it is the attempt to force the Bank to do so which has led to the greater number of the difficulties which have occurred on every occasion of monetary panics during the last twenty years": Hankey (1867, p. 25). Note that Bagehot based the whole of his argument precisely on the positive observation that, for historical reasons, the Bank of England had come to centralize the country's reserves of cash—which was, to him, an inferior situation to free banking from a normative viewpoint: Bagehot (1873, p. 20).

This means that the most logic way to address Hankey's concerns would have consisted not of suppressing lending-of-last-resort intervention, but rather of introducing reserve requirements. The introduction of reserve requirements, however, was fiercely resisted by bankers' lobbies¹⁴³ and never adopted until as late as the 1960s,¹⁴⁴ while the "Bagehot rules" were tacitly accepted by the Bank since as early as the 1870s.¹⁴⁵

In developing its discount window operations, therefore, the Bank had to find a way to protect itself from the moral hazard that the absence of regulation (except for unlimited liability) may have potentially produced. At first sight, this goal was fully achieved, as the losses inflicted on the Bank by its lending operations experienced a secular decline throughout the nineteenth century.¹⁴⁶ A major contribution to this success came from the development, since at least 1844, of an informal but very rigorous system of monitoring of money market participants, which bore many similarities to the supervisory devices adopted by the Rialto public banks or the *Wisselbank* more than two centuries earlier. As we have already pointed out,¹⁴⁷ in London (unlike in Venice or Amsterdam) bills of exchange did not have to be made payable through the public bank, as the latter had been originally thought as a fiscal agency rather than as an organization in charge of the payment infrastructure. For many decades, therefore, the Bank of England had only had access to scarce information on the state of affairs in the financial system, because a centralized payment infrastructure intermediating all sizable transactions did not exist in London. Things started to change in the second half of the eighteenth century, when the Bank became the biggest player in the London discount market. Through its vast discount operations, the Bank was enabled to acquire large amounts of information on transactions that were taking place on that crucial market. Bills of exchange were particularly well-suited to this aim. Because a bill could be made assignable to third parties only through nominative

¹⁴³ Ugolini (2016).

¹⁴⁴ Tamagna (1963, pp. 98–99).

¹⁴⁵ Fetter (1965, pp. 272–275).

¹⁴⁶ Bignon et al. (2012).

¹⁴⁷ See Sect. 2.2.3.

endorsement, the names of all the parties that had been involved in its origination and distribution (the drawer, the acceptor, and all subsequent endorsers until the final discounteur) were actually recorded on the instrument.¹⁴⁸ By collecting systematically all the information reported on the bills that it discounted, the Bank was able to constantly monitor the overall state of the money market.¹⁴⁹ This allowed the Bank, for instance, to foresee Baring Brothers' incoming problems weeks ahead of their explosion (mid-November 1890) and thus not to be caught unprepared by the shock.¹⁵⁰ Completed by inputs coming from its direct operations with the London clearinghouse (started in 1854),¹⁵¹ this tremendous information-gathering effort gave the Bank a detailed overview of the state of affairs in the system. Therefore, although legislation had not provided for the existence of an official supervisory body in Britain, an unofficial one had spontaneously emerged as a by-product of the crucial role played by the Bank of England in the discount market. Such a development had been the result of a natural "incentive alignment" between the Bank and the government: the former pursued its own interests in protecting itself from moral hazard, but (given the extent of its operations) this arguably generated positive externalities for the system as a whole, as it probably contributed to discourage excessive risk-taking by borrowers.

Informal supervision was not all-powerful, though. Its only leverage on market participants consisted of the threat to reject dubious collateral at the discount window, but this threat was insufficient to prevent excessive risk-taking in non-crisis times (when funding was available from less informed lenders on the market) and turned not totally credible in crisis times (when exclusion from the discount window could potentially precipitate failures and, thus, generate negative externalities). And in fact, the late nineteenth century was not a period of unquestioned financial stability. The Baring crisis of 1890, that the Bank foresaw but could not impede, is an illustration of the suboptimality of this informal supervisory system. Following badly managed operations in the sovereign

¹⁴⁸ See Sect. 2.2.3.

¹⁴⁹ Flandreau and Ugolini (2013).

¹⁵⁰ Flandreau and Ugolini (2014, pp. 87–89).

¹⁵¹ See Sect. 2.2.4.

loan market, Baring Brothers (one of the oldest and most reputed merchant banks in the City of London, and an unlimited-liability partnership) found itself deeply insolvent in November 1890.¹⁵² Because the bank was one of the leading actors in the accepting business, a large number of bills circulating in the London money market were normally payable by it at maturity. In the run-up to the crisis, Baring tried to refinance itself on the market by extending as much as possible its accepting business,¹⁵³ meaning that its failure would have been highly contagious throughout the financial system. In modern parlance, Baring was a SIFI: it was a relatively small, yet too-interconnected-to-fail bank.¹⁵⁴ Lacking effective *ex-ante* tools to prevent the crash, the Bank of England carefully prepared its *ex-post* intervention. Ordinary Bagehot-style lending of last resort was not a sufficient solution to Baring's ailments, as the bank had run out of collateral eligible for standing facility lending. As a consequence, the insolvent bank had to be rescued through the organization of the first government-sponsored bailout in British history. But although deeply involved in the rescue operation, the government explicitly refused to be put any money on the table at that moment (except for providing the guarantee to cover part of the eventual losses in the future), thus leaving initiative to the Bank. A "bad bank" (to be liquidated) and a "good bank" (a new joint-stock company, to which the personal assets of the old partners were transferred) were created out of Baring Brothers. In order to avoid a meltdown of the London discount market, the Bank agreed to continue discounting bills accepted by Baring, which were supposed to be no longer eligible as the old bank had failed. Instead of asking for immediate repayment of the discounted bills, the Bank of England extended extraordinary long-term loans to the "good bank" to allow for the orderly liquidation of the "bad bank". However, the Bank asked to be covered from the potential losses it may have suffered from the liquidation. To this aim, a guarantee fund was formed, to which both the government and the most important banking institutions of the country agreed to contribute. Although the liquidation took longer than

¹⁵² Flores (2011).

¹⁵³ Chapman (1984, pp. 32–33 and 121–122).

¹⁵⁴ Ugolini (2014).

initially forecast (and the Bank faced some moments of real hardship in the early 1890s), the bailout of Baring Brothers was unanimously hailed as a success.¹⁵⁵ Its model was partly replicated in the event of the 1914 and 1931 crises, when the Bank supported London merchant banks by continuing discounting bills of exchange accepted by them notwithstanding their dubious solvency, which had been seriously jeopardized by the debt moratoria declared by foreign countries.¹⁵⁶

To sum up, the period in which British banking reached its international heyday was characterized by two regulatory trends in the domain of stability-enhancing policies. On the one hand, there was a downscaling in *ex-ante* interventions: legal barriers to entry and unlimited liability in banking were gradually lifted, but this was compensated not by the introduction of reserve and capital requirements nor by an enhancement of supervisory and transparency standards. On the other hand, there was an upscaling in *ex-post* interventions: lending of last resort was tacitly included in the Bank of England's mandate, and even bailouts of systemically important banks became a fact of life before the end of the nineteenth century. Taken together, the two trends point to a general shift in the balance of power between regulators and bankers, that was decidedly favourable to the latter. The traditional view has held that despite the lack of formal *ex-ante* regulatory tools, "informal control" was effective, thanks to the cohesiveness of the banking system: the few big banks that had emerged from the big merger movement of the late nineteenth century would cooperate with the Bank of England and readily fall into line in case of danger. While this view may be consistent with the situation prevailing in the Interwar period (especially under the long governorship of Montagu Norman),¹⁵⁷ it is however at odds with historical evidence from the pre-war period (when the relationship between the big banks and the Bank's governors was often conflictual, as illustrated by the spectacular coordination failure that led to the 1914 crisis).¹⁵⁸ It seems that "informal control" could be an effective means of leverage only as long as the Bank

¹⁵⁵ Clapham (1944, II, pp. 328–339).

¹⁵⁶ Roberts (2013); Accominotti (2012).

¹⁵⁷ Turner (2014, pp. 174–180).

¹⁵⁸ De Cecco (1974); Roberts (2013).

of England held significant market power within the money market. While this had been the case in the early nineteenth century and again in the Interwar period, the situation had turned different in the decades preceding the First World War.¹⁵⁹ The difficulties experienced by the Bank in these decades (and especially, the events of 1914) expound the limits of the “gentlemanly” model of regulation that had been adopted in Britain in the course of the nineteenth century.

Britain had, however, not been the only country to pursue the model of gentlemanly regulation in the course of the nineteenth century. Both of the trends observed in Britain (a decrease in *ex-ante* intervention and an increase in *ex-post* regulatory intervention) can also be observed in Continental Europe in the very same decades. France is a case in point. On the one hand, the suppression of unlimited liability and barriers to entry in banking in the mid-nineteenth century were not compensated by the introduction of legal restrictions on banks’ operations, formal supervision, or disclosure policies.¹⁶⁰ On the other hand, though, the provision of lending of last resort and bailouts became a fact of life at about the same time as across the Channel.¹⁶¹ Like the Bank of England, the Banque de France developed informal supervisory devices that allowed it to monitor discounters and hence, indirectly, to check risk-taking in the system.¹⁶² A crucial difference with Britain, however, consisted of the degree of market power enjoyed by the bank of issue within the system. The Banque de France was a huge player in the domestic discount market: since the development of its provincial branch network until the First World War, it constantly accounted for as much as 40% of the total discount operations in France.¹⁶³ In a context of general dependence on the standing facility in non-crisis times, threat of exclusion from the discount window must have been more compelling in France than in coeval Britain, where abundant market funding was always available in non-crisis times.

In sum, gentlemanly regulation was the prevailing model adopted throughout Europe during the nineteenth century. Its basic ingredients

¹⁵⁹ Ugolini (2016).

¹⁶⁰ Toniolo and White (2016, pp. 431–433 and 441–442).

¹⁶¹ Bignon et al. (2012); Hautcoeur et al. (2014).

¹⁶² Bignon and Avaro (2017).

¹⁶³ Roulleau (1914, p. 41).

were a *laissez-faire* approach to banks, on one hand, and the government-sponsored provision of a “safety net” on the other. Both ingredients presupposed the existence of a sufficiently strong centralized government, fostering both a unified level of legislation on banking issues and the assumption of “public responsibilities” by a monopolist monetary authority. The model endured in Europe until the banking shocks of the 1930s, when its limits were exposed by the prohibitive costs entailed by bailouts. Among the many costly bailouts that had to be organized in most European countries (leading in some cases, as, e.g. in Italy, to the *de facto* nationalization of the banking system),¹⁶⁴ the most spectacular episode was probably that of Austria, whose bailout of the country’s biggest bank (the infamous Creditanstalt) in May 1931 triggered a huge foreign exchange crisis that contributed substantially to the end of the international gold-exchange standard.¹⁶⁵ Following the catastrophes of the early 1930s, the previous model of gentlemanly regulation was rapidly replaced by the strong interventionist system that fostered the age of “financial repression”.¹⁶⁶ In the meantime, the English model had never been adopted in the former English colonies of North America, as its basic prerequisite (a strong centralized government) had been missing there from the outset.

3.2.3 Land of Regulation: The US Model

As we have seen,¹⁶⁷ the evolution of the payment system in the United States was shaped by the constant conflict between supporters and opponents of centralized government, which led to the subsequent creation and demise of two European-style banks of issue. Obviously, this conflict did not spare the domain of financial regulation. Lawmakers at the state level cherished their authority on banking, while those at the federal level intermittently laid claim to intervene on the matter. The result was a patchy and relatively heavy regulatory system, which was gradually

¹⁶⁴ Toniolo and White (2016, pp. 460–461).

¹⁶⁵ Jobst and Kernbauer (2016, pp. 176–186).

¹⁶⁶ Toniolo and White (2016, pp. 455–467).

¹⁶⁷ See Sect. 2.2.5.

built over the decades through the superposition of different (and not always mutually consistent) layers of legislation at both the state and federal level.

As early as in 1783, notwithstanding the Continental Congress' explicit demand to refrain from doing so, states started to intervene in the sector by chartering joint-stock banks.¹⁶⁸ Since the very beginning, requirements for opening a bank varied widely from one state to the other. In many states, banks could be opened without being chartered; in some, capital and reserve requirements were introduced; and restrictions on branching were also enforced in some states. Despite these differences, one more or less common pattern that had emerged across states by the early 1800s was the obligation for banks to be incorporated as joint-stock companies, which established the principle of limited liability in banking.¹⁶⁹ This stood in stark contrast to England, where (until 1826) all banks except the Bank of England had to be small partnerships, and (until 1879) unlimited liability in banking was the norm. In the decades following 1800, however, a number of important states (esp. Pennsylvania in 1808 and New York in 1846) started to renege on the principle of limited-liability banking. This comeback would have national implications afterwards, as restrictions on limited liability inspired by these states' provisions would be included in the National Banking Acts of 1863–1865.¹⁷⁰

Following Andrew Jackson's election and demise of the (Second) Bank of the United States in 1836, banking became increasingly dissimilar from state to state. This was a period of great regulatory experimentations, which produced crucial innovations in the field. One such innovation was the introduction of capital requirements. Homogeneous capital requirements for all banks were first introduced as former barriers to entry (charters) were abolished. Following Michigan (1837) and New York (1838), many states adopted the so-called free banking laws. The incorporation of banks no longer required political approval, but the issuance of banknotes had to be backed by a proportional amount of capital invested into bonds issued by the local state and deposited with a public official empowered

¹⁶⁸ Grubb (2003).

¹⁶⁹ Van Fenstermaker (1965).

¹⁷⁰ Leonard (1940); Macey and Miller (1992).

with some supervisory power.¹⁷¹ Another major innovation developed in these decades was deposit insurance, first invented in New York in 1829 (and readily copied in a handful of other states) with the aim of protecting depositors and banknote holders from losses. Early insurance schemes were fully private in nature: membership was voluntary, funding came exclusively from member banks, and no fiscal backstop was provided. Most of them did not actually work; for instance, the pioneering New York scheme failed by 1842. In other states, legislation provided user-owned deposit insurance funds with strong regulatory powers: in the case of Ohio, for instance, the Board of Control of the fund was allowed to force banks to implement interbank loans during a panic. This form of lending of last resort may resonate with Walter Bagehot's later concerns with fining "unreasonable timidity" in a crisis, but took it to such an extreme form (more akin to expropriation than to a tax) that *The Economist* would have certainly disapproved of. This notwithstanding, the Ohio scheme worked smoothly and fared particularly well during the big panic of 1857, thus providing for a model to the lending-of-last-resort facilities subsequently developed by the New York and other clearinghouses.¹⁷² But lending of last resort was also provided, to a certain extent, through the only means of leverage left to the federal level after 1836: Treasury deposits. Andrew Jackson's commitment to produce federal government surpluses had left the secretary of the Treasury with a substantial mass of liquid funds. These funds had been withdrawn from the (Second) Bank of the United States in 1833 and deposited with a number of state banks located across the Federation. In case of crisis, this mass could be used to provide liquidity to troubled banks through deposits (*de facto*, a type of lending operation). Already at the times of the (First and Second) Banks of the United States, the Treasury had acted independently from the Banks in order to provide relief to cash-stripped banks in times of monetary stringency (e.g. by exceptionally accepting their banknotes for tax payments or by anticipating repayments on bonds held by them). After 1833, however, intervention became much more systematic. By moving funds from one bank to the other, the

¹⁷¹ Rockoff (1991).

¹⁷² Calomiris (1990).

Treasury was able to impact their cash reserves and provide individual assistance in case of difficulties. Intervention was not always skilful (it unwillingly precipitated, for instance, the occurrence of the 1837 panic), but it became better crafted as secretaries became increasingly aware of the consequences of their action.¹⁷³ Treasury funds potentially provided the federal government not only with the means for *ex-post* intervention but also with leverage for *ex-ante* one. Possessing full discretionary power on the choice of the depositories of its liquid funds, the Treasury was in the position to dictate to banks the conditions for eligibility to public deposits. In 1835, Congress tried to take advantage of this market power in order to impose federal regulation onto depository banks. The initiative was carried on by proposing the introduction of yet another regulatory invention: reserve requirements. To be eligible for Treasury deposits—the proposal went—banks should have maintained a minimum cash reserve equal to 20% of their liabilities. Approved in 1836, the Act provided the direct blueprint for the subsequent adoption of reserve requirements under the National Banking System.¹⁷⁴

While the shift in political equilibria occasioned by the Civil War allowed for the empowerment of banking regulation at the federal level, it did not however lead to a complete overhaul of the preexisting system.¹⁷⁵ The philosophy behind the National Banking Acts of 1863–1865 was not very dissimilar from that of the bill of 1836, as it consisted of creating a dual banking system with two layers: on top, a group of “national” banks uniformly regulated at the federal level, allowed to issue banknotes and receive Treasury deposits, and at the bottom, a group of “state” banks regulated at the local level, strongly discouraged to issue banknotes and prevented from receiving Treasury deposits. In regulating national banks, legislators drew extensively from the panoply of instruments that had been developed by different states at different moments—leaning sometimes with the foregoing regulatory trend, sometimes against it. First and foremost, the Acts restricted limited liability by charging national banks’ shareholders with “double liability”—that is, the same

¹⁷³Taus (1943, pp. 16–57).

¹⁷⁴Timberlake (1993, pp. 47–51).

¹⁷⁵See Sect. 2.2.5.

thing that would be called “reserve liability” in Britain by the Act of 1879. Second, they reintroduced the principle of chartering for national banks: barriers to entry were thus re-established at the federal level. Third, they developed the idea of capital requirements along two dimensions: on the one hand, as in antebellum “free banking” legislations, issuance of banknotes was required to be backed by a proportional amount of Treasury bonds, deposited with a public official (the Comptroller of the Currency) empowered with some supervisory tasks; on the other hand, also deposits were required to be backed by a minimum amount of paid-up equity, fixed by legislation according to the population of the town where the bank was located. Fourth, reserve requirements were extensively adopted, with conditions modulated according to the status of the town where the bank was located: increasingly binding requirements applied to banks located in “reserve cities” and “central reserve cities”, but these were compensated by the privilege of having their deposit liabilities recognized as legal reserves for other banks, thus increasing the demand for deposits located in “reserve cities” and “central reserve cities”. Fifth, legislators *de facto* submitted national banks to a ban on branching.¹⁷⁶ The one major regulatory innovation of the antebellum era that the Acts of 1863–1865 did not take up was deposit insurance: federal banks’ deposits (and banknotes) remained uninsured, and all initiative in this domain was entirely left to state legislators (a number of states tried to reintroduce it at the very beginning of the twentieth century, but again with very bad results).¹⁷⁷ As in the antebellum period, under the National Banking System the federal Treasury continued to perform its lending-of-last-resort interventions in the event of monetary stringencies. These operations, however, could only be directed to banks which were eligible as depository institutions (national banks), while all other banks were excluded. Moreover, liquidity injections were contingent to the availability of Treasury surpluses—a precondition that was not always met, as it was the case during the 1893 panic, which was aggravated rather than alleviated by the Treasury’s action.¹⁷⁸ In the meantime, clearinghouses started to extend lending-of-last-resort assistance to members in case of crisis: during the

¹⁷⁶ White (1983, pp. 10–35).

¹⁷⁷ Calomiris (1990).

¹⁷⁸ Taus (1943, pp. 68–71, 75–76, 85–93, and 121–128).

last decades of the century, many of these user-owned platforms developed procedures for encouraging mutual interbank lending as in the antebellum example of Ohio's deposit insurance fund. But again, intervention only covered banks that were members of a clearinghouse, and membership remained far from universal throughout the period.¹⁷⁹

For political reasons, the US banking system had been constructed all along the nineteenth century as a system of heavy regulation, barriers to entry, and privileged statuses. Not much changed with the creation of the Federal Reserve System, which was basically conceived as an "upgrade" of the National Banking System. Although many of the reformers had hoped that membership to the newly created System would be universal, in fact the old duality was maintained: only a group of banks adhered and were thus subjected to federal regulation, while a substantial group did not join and remained only subjected to state regulation. Many of the provisions of the National Banking Acts were basically maintained by the Federal Reserve Act of 1913. Double-liability clauses and the principle of chartering were not touched upon; capital requirements were modified only as far as an additional constraint was added (buying shares of the local Federal Reserve Bank); and reserve requirements were modified only in their level and repartition (liquid funds had to be gradually transferred from "reserve city" banks to Federal Reserve Banks, a process that was only completed in 1917). The *de facto* ban on branching was not modified until 1927, when the question was delegated to state legislation, and deposit insurance remained, as before, a matter of state jurisdiction. The supervisory tasks of the Comptroller of the Currency were maintained, although Federal Reserve Banks were also allowed to supervise member banks.¹⁸⁰ The one substantial change to the preexisting framework had to do with the provision of lending of last resort: it consisted of the creation (for the first time since 1836) of a European-style standing facility. Some of the leading reformers had thoroughly studied the British model and had come to the conclusion that the lack of a discount market (and of a discount window on top of it) was the biggest impediment to the

¹⁷⁹ See Sect. 2.2.5.

¹⁸⁰ White (1983, pp. 95–104 and 156–167).

development of the US financial system.¹⁸¹ Hence, they pleaded for the replacement of the current “proxies” of a lender of last resort (clearing-house loans and Treasury deposits) with the “true” one advocated by Bagehot. This, however, amounted to a big change to the philosophy underlying lending-of-last-resort intervention. Like in early modern Venice or Amsterdam, in the United States this had always consisted of extraordinary crisis-time intervention. The Federal Reserve Act, by contrast, prefigured the engrafting upon the American system of a discount window as the one first developed in London in the late eighteenth century—that is, accessible to a wide public in crisis as well as non-crisis times. The reformers’ analysis of the English model, however, passed by a crucial element of its structure: the existence of the centralized system of informal supervision gradually developed by the Bank of England through its discount window lending. It was precisely this deep knowledge of the money market that had allowed the Bank to expand its lending-of-last-resort operations while protecting itself from moral hazard.¹⁸² In stark contrast with the Bank of England, the newly created (and decentralized) Federal Reserve Banks found themselves obliged to open a standing facility in a totally different framework. When the United States entered the First World War just months after the foundation of the Federal Reserve Banks, the latter were flooded with demands for discount of paper whose quality they were largely unable to assess. In order to protect themselves from losses, they rapidly turned what was supposed to be a facility for non-securitized lending into a *de facto* securitized lending facility,¹⁸³ thus contravening fundamentally to their founders’ spirit. In order to minimize risk,

¹⁸¹ See esp. Warburg (1910). For an historical account, see Broz (1997).

¹⁸² Flandreau and Ugolini (2013).

¹⁸³ Generally short of information on borrowers’ creditworthiness, the Feds as a rule discounted paper only up to the amount of capital of the borrowing bank, and required the pledging of additional collateral whenever the amounts discounted exceeded that sum: “As a general principle, the Federal Reserve bank takes the position that a member bank may benefit from its name up to its capital and surplus and may borrow from the Reserve or other banks to that amount without collateral, but beyond that its name is exhausted and further protection is warrantably asked. It may make exceptions of banks in which it has great confidence and lend them beyond capital and surplus without additional collateral, while to others it loans less than this amount on account of its knowledge of the condition of the bank, and the ability of their management; some of the larger banks may have credit much greater than their capital and surplus but they are secured by government bonds”: Westerfield (1932, p. 49).

already in the early 1920s the Feds had abandoned the reformers' idea that regular liquidity-injecting operations should consist of standing facility loans, and had started to favour open market operations in government bonds and prime bills of exchange accepted by first-class banks. In order to discourage generalized resort to the discount window, moreover, the Feds rapidly introduced quantitative restrictions to individual borrowing and indulged into "moral suasion" to prevent discounters from showing up too often.¹⁸⁴ This was a huge departure from the Bank of England's model, as it inevitably created stigma around the discount window—something that was totally absent in English practice. Last but not least, access to the Feds' discount window was restricted to member banks. The possibility to access the standing facility had been thought by reformers as a major incentive for bankers to join the System, but membership had remained limited anyway.¹⁸⁵ As a result, while the proponents of the Federal Reserve Act of 1913 had aimed to transplant to the United States a European-style lender of last resort (a non-stigmatized standing facility, universally accessible, and extending non-securitized lending in crisis and non-crisis times), by the beginning the 1920s the Feds had produced just the opposite (a stigmatized standing facility, accessible to a minority of banks, and extending securitized lending chiefly in crisis times). Given this, it is hardly surprising that the Feds' instrument to provide lending of last resort remained (albeit with some local exceptions) largely inactive in the midst of the three waves of bank failures that took place in 1929, 1931, and 1933.¹⁸⁶ The sort of "Bagehot illusion" that had inspired the reformers had vanished completely by the early 1930s.¹⁸⁷ From then on, the United States fully returned to their traditional view of lending of last resort as the extension of extraordinary intervention in crisis times.

The catastrophic crises of 1929–1933 led to the most famous regulatory reform in US history, the Banking Acts of 1933–1935 (which included the very famous Glass-Steagall Act). While making regulation

¹⁸⁴ Bindseil (2004, pp. 121–126).

¹⁸⁵ Calomiris et al. (2016).

¹⁸⁶ Bordo and Wheelock (2013).

¹⁸⁷ Eichengreen and Flandreau (2012).

considerably stricter under a number of respects, the Acts did not question the banking system's dual structure—which has, in fact, endured until today. Besides modifying existing provisions (e.g. enhancing the Comptroller of the Currency's supervisory powers or creating the Federal Open Market Committee in order to improve the efficiency of the Fed's lending-of-last-resort operations), the reform introduced two major innovations. The first was the creation of federal deposit insurance schemes, that all banks were invited (but not obliged) to join. Deposit insurance was meant to replace double-liability rules. As it had been the case in Britain at the time of the fall of the City of Glasgow Bank (1878), during the panics of the early 1930s these rules had created much embarrassment to banks' shareholders, who had been asked to provide fresh capital at a most difficult time. The result of the reform was the rapid disappearance of double-liability banking.¹⁸⁸ Insurance schemes worked reasonably well until the 1980s, when the crisis of the "savings and loan associations" made two insurance schemes insolvent and required the activation of the fiscal backstop (taxpayers' money had to be used to bail-out the failing insurance funds).¹⁸⁹ The second major innovation of the reforms of the Great Depression was the introduction of activity restrictions and more specifically (and most famously) the prohibition for deposit banks to perform a series of operations, which entailed the separation between commercial banks and investment banks.¹⁹⁰ The Glass-Steagall Act ushered in the age of "financial repression" in the United States; its repeal in 1999 was seen as the culminating point of the deregulatory wave that had started in the 1980s.

To sum up, the perennial conflict between supporters and opponents of centralization that has characterized the whole history of the United States has had obvious implications on the domain of public intervention in the banking system. It has created the dual structure that persists to date and transformed the country into the "land of regulation" as far as the banking sector is concerned. The United States early developed many

¹⁸⁸ Macey and Miller (1992).

¹⁸⁹ Kane (1989).

¹⁹⁰ Toniolo and White (2016, pp. 461–463).

of the *ex-ante* intervention tools that feature today's international standards (capital requirements, reserve requirements, activity restrictions, and formal supervisory bodies). They also developed *ex-post* intervention, although not on a universal basis as in Europe: adherence to deposit insurance remained voluntary, and lending-of-last-resort operations (and, more recently, bailouts) were conceived of as discretionary interventions. These differences of approach dramatically resurfaced in the uneven treatment of troubled banks in 2008: while no European bank was allowed to fail, many US banks were eventually allowed to do so, including (most unexpectedly) a systemically important one.

3.2.4 The Evolution of Regulation: Conclusions

Because market failures are inherent to the banking business, government intervention aimed at remedying to their consequences appeared at the same time as banks themselves. For a long time, regulation mostly consisted of the adoption of barriers to entry and unlimited liability. As the banking activity intensified (and crises became more costly) in the late medieval and early modern period, additional solutions were introduced with the aim of reducing instability. By the mid-sixteenth century, Venice had already developed rudimentary versions of most of the intervention tools existing today. In the course of the nineteenth century, however, European countries substantially downscaled *ex-ante* intervention, as traditional regulatory devices (barriers to entry and unlimited liability) disappeared in the age of *laissez-faire*.

In view of their peculiar political equilibria, the United States had their public intervention to stabilize the banking system diverge substantially from Europe throughout the nineteenth century and the first quarter of the twentieth century. On the one hand, while in Europe *ex-ante* intervention was surprisingly light (and softening) throughout the period, it proved extensive (and burgeoning) in the United States, where the competition between state and federal legislators produced a considerable amount of innovations in the field: it would not be unfair to say that most of our current regulatory tools track their roots, in their modern form, to the age of great experimentation that followed the demise of the

(Second) Bank of the United States. On the other hand, *ex-post* intervention developed on the two sides of the Atlantic along very different lines: while Europe's development of lending-of-last-resort operations and bailouts revolved around the central bank's standing facility and its continued accessibility at all times, the US approach was based on the rebuttal of standing facility lending and on the extension of crisis intervention according to fully discretionary criteria. It is interesting to note that, for all their dissimilarities, both the European and the American approach failed substantially the test of the banking crises of the 1930s. The result of this generalized failure was a considerable strengthening in government intervention everywhere, leading to a certain convergence in regulatory standards. Convergence accelerated as the age of "financial repression" gave way to the age of liberalization, and is currently at its highest tide under the aegis of the Basel Accords.¹⁹¹

Deep-rooted structural differences, however, were not overturned: the United States remained attached to their dual (and fragmented) banking structure, while European countries stuck to their unified (and concentrated) one. In particular, the philosophy inspiring *ex-post* intervention continued to diverge: in the United States, crises continued to be faced with discretionary *ad hoc* intervention, while in Europe widespread access to lending facilities continued to be granted as in the nineteenth century. These differences resurfaced very clearly in the event of the 2008 crisis, whose immediate effects were handled quite dissimilarly in the two areas: the Federal Reserve System opened extraordinary lending facilities for previously ineligible collateral and was thus dubbed as the "market-maker of last resort", while the Eurosystem remained faithful to Bagehot-style lending of last resort and just continued to implement its ordinary liquidity-injecting operations (which bear many features of standing facility lending) with a large number of banks.¹⁹²

As our historical survey has shown, none of the different types of intervention which try to address market failures in the banking sector necessarily has to be implemented by the organization that stands at the centre

¹⁹¹ Toniolo and White (2016).

¹⁹² Jobst and Ugolini (2016). On the standing facility features of the European Central Bank's liquidity-injecting operations, see Bindseil (2004, pp. 152–162).

of the payment system. Over the centuries, both *ex-ante* and *ex-post* interventions have generally been performed directly by government or by other government agencies. This is also the case for the intervention whose provision is (according to some)¹⁹³ the fundamental central banking function: lending of last resort has, indeed, often been provided by organizations not directly related to the payment infrastructure (like Treasuries, mints, or credit and deposit insurance schemes). We have seen that the Bagehot philosophy of lending of last resort (defined as the continuation of ordinary operations throughout crisis times) has emerged later than the alternative interpretation (defined as the introduction of extraordinary operations contingent to crisis times), which had already been adopted in Venice and Amsterdam well before the nineteenth century. The Bagehot view took shape in the particular English context, the first instance in which an organization that found itself at the centre of the payment system started to provide a lending facility to the private sector. This framework proved extraordinarily successful and was largely imitated throughout Europe (and beyond), but was rejected in the United States, which continued to reject it even after the Federal Reserve System had been created.

In view of this all, one might be tempted to conclude that the case for providing regulatory tasks to the central bank might not be supported by long-term evidence. This would be, however, too hasty a conclusion. History shows that provision of *ex-post* intervention by organizations unrelated to the payment system may prove difficult because of the lack of adequate means (as it was the case for the lending-of-last-resort operations of the US Treasury, whose scale was conditional to the availability of liquid funds). It also shows that the efficiency of *ex-ante* intervention may be impaired by the lack of “soft” information that can be derived from the day-to-day management of the payment system (as it was the case for the multilayer regulation put in place in the United States, which often precipitated rather than prevented the occurrence of crises). The Bank of England’s ability to minimize, thanks to its informal supervisory action, the impact of a potentially very disruptive shock (the failure of Baring Brothers in 1890), suggests that economies of scope *do* exist between the

¹⁹³ See esp. Goodhart (1988).

management of the payment system and the management of banking instability. This implies that the advantages of centralizing all regulatory tasks with the same agency are conditional to the agency's ability to treat efficiently (and unbiasedly) the massive amount of information coming from its different branches of activity. In the case of big organizations with complex governance rules (as the Federal Reserve System or the Eurosystem), this may be less trivial than it appears at first sight.

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4

Issuing Money

No single private or public body would fail to be convinced that this Republic is very rich of gold, if they were to observe that here all creditors are promptly and orderly repaid upon demand. *Let this belief become deeply-rooted in all minds and spread across the world, and the following results will be produced: everybody will be willing to service this State, because of the certainty of being duly paid; bordering Principalities will be more respectful of this Republic, because of their persuasion that her gold might mobilize substantial forces; and farther Principalities will hold her in higher esteem than they presently do, because of her alleged wealth and power.*

Tommaso Contarini, *Speech to the Venetian Senate in Support of the Creation of a Public Bank*, 28 December 1584 (quoted in Lattes (1869, pp. 137–138), my translation and emphasis).

Issuing money is perhaps the first and foremost function that most people spontaneously associate to central banks. In the modern world, the main channel through which the general public becomes aware of the existence of central banks is through the handling of the banknotes they issue. This is why most people are shocked by the idea that nowadays'

central bankers look at banknotes as a largely residual part of their business, and that the models they use to guide their decisions often do not even account for the existence of money. This apparent paradox illustrates well the difficulties we still encounter in defining money. To date, money does not cease to be one of the most elusive and controversial phenomena in economics. John Maynard Keynes is famously attributed with having half-jokingly said that he knew of “only three people that really understand money: a professor at another university; one of my students; and a rather junior clerk at the Bank of England”. Another great twentieth-century economist, Joseph Schumpeter, is reported to have never been able to get “his ideas on money straightened out to his own satisfaction”.¹ Since the age of Plato and Aristotle, controversies on the nature of money have quickly taken an ideological turn: proponents of the one concept of money have often been ridiculed by proponents of the rival one, and vice versa. This has led to a complete intellectual deadlock between “orthodox” and “heterodox” thinkers, hence to the still unsatisfactory understanding of money within the discipline and beyond.

Fortunately, the theoretical advances of the recent decades have produced a number of intellectual tools that have allowed improving our comprehension of monetary phenomena and hopefully leaving behind our shoulders the old (and largely unfruitful) divide between orthodoxy and heterodoxy. In this chapter, we will start by reviewing these advances and showing how they concur to sketching a clearer definition of the nature and origins of money. It will emerge that a number of factors concur in assigning to the public sector a crucial role in the determination of monetary standards. Then, we will examine how government intervention has shaped the creation and circulation of monetary instruments in the West from the Middle Ages to today. This will allow understanding why the currently adopted mechanisms for the issuance of money actually emerged and why they evolved over time into their present form.

¹ Ingham (2004, pp. 3–5).

4.1 Issuing Money: Theory

4.1.1 Money in a Decentralized Economy

Contemporary monetary theory revolves around an apparent paradox: money (one of the most ubiquitous features of real-world economies) does not find a place in the workhorse model of modern economics. The Arrow-Debreu model of a frictionless and perfectly competitive economy (the modern reframing of Léon Walras' general-equilibrium model)² is, indeed, a representation of a pure *barter economy*: agents exchange real goods for real goods through a centralized market mechanism, and the resulting equilibrium is optimal from a social viewpoint.³ Starting from this puzzling result, contemporary monetary theorists have tried to justify the existence of money with departures from the model's basic hypotheses. Two main strategies have been followed.⁴

The first one, faithful to Léon Walras' original reflections, has focused on *market microstructure* (i.e. on the institutional arrangements presiding over the exchange mechanism): it has consisted of questioning the hypothesis that all transactions in the economy take place simultaneously through a centralized device (the so-called *Walrasian auctions*). As Stanley Jevons had famously put forward, the working of barter economies is impaired by the lack of *double coincidence of wants*: an agent willing to exchange a given quantity of good A for good B has little chance to find a counterparty willing to exchange precisely the required quantity of good B for good A at the very same moment.⁵ In Walras' view, this problem was basically a *timing* issue (lack of synchronization) that could be solved if one of the many goods that are traded in the economy took up the status of *medium of exchange*.⁶ Following this line of reasoning, economists attached to the general-equilibrium approach have built models of market economies where exchanges take place on a decentralized

²Walras (1954).

³Debreu (1959).

⁴Álvarez and Bignon (2013).

⁵Jevons (1876).

⁶Álvarez and Bignon (2013).

(bilateral) basis instead of a centralized (multilateral) one. In this setting, the good that is easiest to resell (or in technical parlance, the one featuring the lowest *bid-ask spread*) will not suffer from the lack of double coincidence of wants (it will be easy to find counterparties ready to accept it): as a result, the social planner⁷ will exogenously impose it as money, thus restoring optimality in the economy.⁸

Other monetary theorists have, however, been unsatisfied with these conclusions, which (despite dropping the hypothesis of a centralized exchange mechanism) still imply a centralized intervention by a social planner.⁹ Inspired by the work of Carl Menger,¹⁰ these economists have questioned the hypothesis of lack of uncertainty and focused on modelling the *strategic interaction* (i.e. economic agents' individual behaviour within a given set of rules) that leads to the endogenous emergence of money in a market economy. In Menger's view, the problem of the lack of double coincidence of wants was not fundamentally a question of timing, but rather of a permanent *matching* problem: in a barter economy, agents willing to exchange good A for good B may be faced with a systematic lack of counterparties willing to exchange good B for good A.¹¹ Following this line of reasoning, economists attached to a search-theoretic approach have built models in which search frictions¹² prevent agents from promptly finding counterparties for implementing their desired transactions. In this decentralized setting, strategic interaction between agents makes one (or more than one) good spontaneously emerge as medium of exchange.¹³

Despite their differences, both lines of research have focused on why some *goods* acquire the property of “moneyness”. This means that, *de facto*, their actual goal has been to justify the existence of *commodity money*—although, *de jure*, their results have been claimed to justify also the existence of *fiat money* by showing that the intrinsic value of the money-good

⁷ For a definition of social planner, see Sect. 2.1.2.

⁸ For a thorough presentation of this kind of modelling, see Starr (2012).

⁹ Jones (1976).

¹⁰ Menger (1892).

¹¹ Álvarez and Bignon (2013).

¹² On search frictions, see Sect. 3.1.1.

¹³ For a thorough presentation of this kind of modelling, see Nosal and Rocheteau (2011).

is irrelevant to its assumption of the “moneyness” property.¹⁴ Despite the important insights they have produced, all these researches are confronted with an intrinsic limit: by construction, the extent to which scope for the emergence of money is provided remains strictly contingent to the restrictiveness of the hypotheses adopted in terms of microstructure and frictions. Their inevitable conclusion is, therefore, that money (read, commodity money) can emerge only when conditions are so extreme that credit does not exist and becomes redundant as soon as credit gets feasible.¹⁵ This may explain why all these theoretical efforts have, to date, failed to produce a major impact on the macroeconomic models that conceive of money as a good: in these models, agents are still artificially obliged to use money through the imposition of an exogenous (and dubiously microfounded) constraint.¹⁶

As a result, a fully satisfactory theory justifying the existence of money *as a good* in sufficiently developed economies remains unavailable to date. Tellingly, textbook treatments of money as a good still start from the (23-century-old!) functional definition of money given by Aristotle, who famously described money as the good providing at the time three basic functions (medium of exchange, unit of account, and store of value). For all the authoritativeness of its original proponent, however, this definition fails to solve the puzzles related to money. Besides suffering from the drawbacks common to all functional approaches,¹⁷ Aristotle’s definition has been

¹⁴ See esp. the founding paper of the search-theoretic approach to money, that is, Kiyotaki and Wright (1991). This was also the original view adopted by Carl Menger, who had famously wondered why “every economic unit in a nation should be ready to exchange his goods for little metal disks *apparently useless as such*”: Menger (1892, p. 239, my emphasis). Kahn and Roberds (2009, pp. 6–11) present these approaches to money under the label of “*store-of-value* payment theories”.

¹⁵ This is the implication of one of the most important results in contemporary monetary theory, according to which scope for money disappears as soon as information on the past behaviour of counterparties is available: Kocherlakota (1998). The fact that this is a major obstacle to modelling money as a good is explicitly acknowledged by Nosal and Rocheteau (2011, p. 10), who write that “one of the key challenges in monetary theory is to provide an explanation for the coexistence of money and credit. [...] One reason why coexistence is a challenge is that the frictions that are needed to make money essential typically make credit infeasible, and environments where credit is feasible are ones where money is typically not essential.”

¹⁶ This is typically made through the so-called *cash-in-advance constraint* first suggested by Clower (1967), but alternatives have also been proposed.

¹⁷ I refer esp. to the problem of the definition of relevant functions: see Sect. 1.2.1.

criticized for being based on a number of contingent historical hypotheses that prevent it from having a universal character: contrary to Aristotle's vision, in fact, history abounds with examples of situations in which (unlike in classical Greece) the three monetary functions were separately provided by different objects or arrangements.¹⁸

4.1.2 Money in a Centralized Economy

If we do not drop the assumption that the exchange mechanism is centralized but introduce timing and matching frictions into such an economy, then scope for the emergence of a medium of exchange will still be provided. In this situation, however, the role of money will be played not by a present good, but by a claim on future goods (i.e., by credit). This is actually a very old line of reasoning.¹⁹ Its intellectual roots can be tracked back to no less than Plato, who famously defined money as a “symbol”.²⁰ Its basic intuitions are that money is but a claim on future goods and that the only determinant of the value of such claim is the solvability of the issuer (i.e. of the agent liable to convert the claim into real goods in the future). Its conclusions are that as long as information frictions are reasonably limited and contracts are enforceable, there will be no reason for any good to become a medium of exchange, as credit will be used for the settlement of all transactions through the centralized clearinghouse system.²¹ These microeconomic conclusions are in line with the basic assumptions of some of today's most influential macroeconomic models, which posit that money is but a special type of credit.²²

Therefore, the “moneyness” of credit and the “moneyness” of goods are not mutually exclusive concepts. They simply refer to two alternative equilibria, in which settlement occurs via two different things (a claim or

¹⁸ See, for example, Schumpeter (1954, pp. 62–64) or Ingham (2004, pp. 15–37 and 89–106).

¹⁹ Kahn and Roberds (2009, pp. 6–11) classify these approaches to money under the label of “*account-based* payment theories”. On the intellectual roots of this tradition of monetary thought, see Wray (2016).

²⁰ Schumpeter (1954, p. 56).

²¹ Mitchell-Innes (1913, 1914); Keynes (1971, I).

²² See esp. Woodford (2003). There is, however, no apparent intellectual filiation between the two: twenty-first-century New Keynesian modelling finds its main source of inspiration in the work of Knut Wicksell rather than in Keynes's early writings: Woodford (2003, pp. 1–4). Wicksell actually described the macroeconomic implications of a pure credit economy, but (in contrast to Mitchell-Innes or Keynes) he saw this model as an abstraction: Wicksell (1936, pp. 68–71).

a good). The former equilibrium will occur in centralized settings in which credit is feasible (i.e. in proximity transactions between fellows), while the latter will occur in decentralized settings in which credit is infeasible (i.e. in long-distance transactions between strangers).²³ Historical evidence appears to strongly support this finding. Early centralized societies in ancient Mesopotamia or Egypt actually developed pure credit systems (through central clearinghouses kept at local temples and warehouses), whereas coins were first invented several centuries later, in the fragmented political environment of Asia Minor and Greece, as a practical device to remunerate mercenary armies.²⁴ Even in long-distance trade, the use of commodity money was early minimized by the transformation of kinship networks into international trading networks, which made credit feasible also on an international scale.²⁵

The distinction between credit instruments and commodity money is very clear not only from a historical but also from a juridical viewpoint. In the Western legal tradition, in fact, laws governing credit instruments (i.e. dematerialized payment orders) and laws governing commodity money (i.e. coin payments) have developed as two clearly distinct juridical strands since the Middle Ages.²⁶ This notwithstanding, since the late eighteenth century, economic theory has been plagued by pervasive confusion between the two concepts. A substantial contribution to the spread of this confusion has come from Adam Smith. Attached to the notion of money as a commodity that had by then (especially thanks to David Hume) become mainstream, Smith however tried to modernize it by taking into account one of the great novelties of his times: banknotes.²⁷ In *Wealth of Nations* (book II, chapter II), he famously argued that “paper” (for which he explicitly meant banknotes) was a “less costly and sometimes equally convenient” *substitute* for that “very expensive instrument of commerce” that is “gold and silver money”.²⁸ In so doing, Smith

²³This intuition is formally modelled by Jin and Temzelides (2004), who conclude that “money might “emerge” when, as a result of increased mobility, trades among people from faraway locations become sufficiently frequent.”

²⁴Mitchell-Innes (1913, 1914); Ingham (2004, pp. 90–101).

²⁵Greif (1993); Flandreau et al. (2009).

²⁶Fox et al. (2016, p. 14).

²⁷Mitchell-Innes (1914, p. 151); Schumpeter (1954, p. 290); Arnon (2011, pp. 45–49). On the invention of banknotes in early modern England, see Sect. 2.2.3.

²⁸Smith (1776, p. 350).

actually treated a claim on future goods (a banknote, which is just a credit from the holder to the issuer) as a present physical good (a cheap commodity substituting for a more expensive commodity), thus opening scope for more than two centuries of misunderstandings among economists. Such misunderstandings would most dramatically explode at the time of the so-called Banking Controversy of the late 1830s and early 1840s. In the event of this debate, a pressure group purporting a radical version of Smith's concept (known as the "Currency School") managed to have a major central bank reform voted on the basis of the (at best, dubious) argument that banknotes are money, while other credit instruments (including deposits) are not.²⁹ Of course, deposits have been definitively considered as money in the later macroeconomic consensus. Yet, the idea that banknotes and deposits (i.e. claims on bankers) are "paper" or "scriptural" money (i.e. intrinsically worthless monetary goods) has continued to generate serious (and unsolved) puzzles about how to properly measure the actual quantity of such goods.³⁰

4.1.3 Money in a "Hybrid" Economy

Thus, the theoretical literature has pointed to the conclusion that a fully decentralized economy has no room for credit, while a fully centralized economy has no room for money as an entity distinguished from credit. In the first scenario, only commodity money (be it intrinsically worthy or worthless) exists; in the second one, only pure direct credit exists. Obviously, these are two idealized situations that are never completely verified in the real world, where centralized and decentralized exchange mechanisms do coexist within the same economic system. If we take the historical examples mentioned in the Section 4.1.2, for instance, we find that in ancient Mesopotamia the settlement of decentralized transactions apparently took place through transferable clay tablets redeemable by their issuers at the centralized exchange,³¹ while credit was obviously very well developed alongside coinage in the ancient Greek

²⁹ Schumpeter (1954, pp. 725–729); Fetter (1965, pp. 165–197); Arnon (2011, pp. 187–208).

³⁰ See, for example, Barnett (2012). This very problem in Smith's theory has been early recognized by Thornton (1802, pp. 44–56).

³¹ Mitchell-Innes (1913).

cities.³² To account for this, some scholars have constructed models of “hybrid” economies mixing some basic features of decentralized and centralized systems, which allow understanding under what circumstances *credit money* emerges.³³ The conclusions of this research stream have been that, under certain conditions, commodity money need *not* emerge even in decentralized exchanges, as its role can be played by some particular forms of debt. The necessary conditions for this to occur are two: transferability (meaning that enforceability of the debt is not diminished when the debt is assigned to a new creditor) and finality (meaning that the third person’s debt discharges all obligations between the two transacting parties). For these properties to hold, contracts must be enforceable in the whole economy—meaning that a crucial ingredient of centralized exchanges must also apply to decentralized ones. If debt is enforceable in every part of the economy, then settlement in debt becomes a perfect substitute for settlement in commodity money even in decentralized exchanges.³⁴ As a result, a third agent’s debt will start to be used as medium of exchange in bilateral transactions—or differently said, credit money will be able to replace commodity money. This process is known as *debt monetization*.

The condition of universal enforceability of contracts in decentralized interactions is not, however, a very realistic one. In the real world, people can never be sure that the third person’s debt they may accept from their direct counterparty will actually be honoured in the future. As a result, in the real world only a certain amount of “privileged” agents will be able to have their debt used as a medium of exchange in decentralized transactions. These agents are “special” because they possess one (or more) characteristics inciting “common” agents to believe that all of their circulating debt will be repaid at maturity. These characteristics may include the fact of being easy to locate, possessing high social capital, or having market power. “Privileged” agents will therefore become *de facto* (although not necessarily *de jure*) bankers, as their liabilities will be used as means of payment by other agents.³⁵ The more a bankers’ debt will be transferred

³² Bogaert (1968).

³³ For a survey, see Kahn and Roberds (2009, pp. 10–11).

³⁴ Kahn and Roberds (2007).

³⁵ Cavalcanti and Wallace (1999); Williamson (1999). On the payment functions of banks, see Sect. 3.1.1.

by its creditors, the more it will establish itself as a standard for payment in decentralized transactions, thanks to the working of network externalities.³⁶ Once the belief that the debt is a “safe asset” will have been established across the economy, it will always be optimal for all decentralized agents to accept it in payment as they will no longer have to acquire information about its quality—meaning that the debt will have become fully *information insensitive*³⁷ and will be treated as a substitute for commodity money precisely because of this.

To sum up, credit money is a sort of “hybrid” between pure (commodity) money and pure credit. As such, it is not supposed to exist under extremely decentralized and centralized situations, in which either only money or only credit are feasible: in fact, it will rather emerge in “hybrid” situations that actually correspond to reality. In such situations, commodity money is not a necessity, as it can be substituted in decentralized transactions by credit money. Decentralized agents will accept credit money in payment as long as they believe that it will be convertible into real goods in the future.

4.1.4 Money and the State

One economic actor that appears to be naturally well-situated to contribute to the emergence of credit money is, of course, the state. As a matter of fact, the state is a big player in its domestic economy in view of its capacity to tax. Importantly, the public sector’s cash flows are largely complementary to those of the private sector: the state will typically be in deficit when privates have surpluses (e.g. when the state has paid privates for the purchase of goods and services, but privates have not paid their taxes yet), and vice versa. This means that smoothing the cash flow of the public sector means also smoothing the cash flow of the private sector and will thus be beneficial to both. Hence, the government’s ability to make some asset emerge as money does not really descend from its formal power to provide it with a legal-tender status for all private transactions (an obligation whose actual

³⁶ On network externalities, see Sect. 2.1.1.

³⁷ Gorton (2017).

enforceability may often be limited), but rather from its use of such an asset for both making and receiving payments. In view of its large market share, the government is actually able to set standards: because of network externalities, the standard adopted for state payments will also be adopted as a medium of exchange in transactions between third private agents.³⁸

In view of its market power, then, the state is able to provide a monetary status not only to commodities but also to debt that would not necessarily be able to circulate otherwise. If the government declares a certain type of private debt (e.g. banknotes or deposits issued by private banks) eligible for tax payments, then state-supported credit money will actually consist of these private issuers' debt. Therefore, through its eligibility policy, the government has the power to create privileges (*rents*) for some private agents, who will thus be enabled to borrow much more easily and at better conditions from all decentralized holders of monetary instruments. Such a policy might generate distributional effects from "common" agents to "privileged" ones (sometimes referred to as *bank seigniorage*).

Because payments between the public sector and the private sector are typically aimed at covering the former's deficits with the latter's surpluses, one would naturally expect them to involve the transfer of direct government debt rather than the transfer of third people's debt. However, while the state is well-situated to provide a monetary status to private agents' debt, it may face some difficulties in doing the same for its own debt. As a matter of fact, the state is the only actor which (unlike private agents) possesses the full capacity to renege on its obligations (meaning that the enforceability of its debt contracts is dubious). This is far from a mere detail, as it may strongly discourage decentralized agents from accepting its debt as money. The political economy literature has identified at least two main strategies through which the government can solve this problem by dissipating doubts about the actual enforceability of public debt contracts. The first one consists of delegating a part of its fiscal competences to a public agency entrusted with the mission to defend the creditors' interests

³⁸This idea was famously popularized by the German jurist Georg-Friedrich Knapp, who was a major source of inspiration to Keynes: Knapp (1924). For its later development, see in particular Lerner (1947). Not only the state in the strictest sense, but also other forms of collective action should be able to provide a monetary status to some types of debt as long as participants display a sufficiently cohesive behaviour: Mitchell-Innes (1913, 1914).

(typically, a census-based parliament).³⁹ A variant of this first strategy (crafted for situations in which parliaments' foremost goal might not be defending creditors' interests) consists of delegating the management of the value of government debt to a public but fully independent agency entrusted with the mission to preserve the stability of debt contracts (typically, a fully independent central bank).⁴⁰ The second and alternative strategy consists of delegating the government's borrowing business (debt issuance and repayment) to a private agency, which will have with no incentive to renege on its obligations (typically, a chartered bank of issue).⁴¹ The first strategy implies that the solution is found internally within the public sector, while the second one implies that it is externalized to the private sector. While both strategies may be effective in enhancing the acceptability of public debt by decentralized private agents, the relative superiority of each one will depend on a number of factors. Organization theory posits that *internalization* will be the preferred option when the (pecuniary and nonpecuniary) costs of implementing a given activity within the organization are lower than the (pecuniary and nonpecuniary) costs of accessing the market mechanism, whereas *externalization* will be preferred otherwise.⁴² In every particular historical setting, political and social factors will contribute to determine the size of transaction costs and henceforth the degree of optimality of the one or the other solution.

4.2 Issuing Money: History

4.2.1 The Ups and Downs of Internalization: Venice, Amsterdam, and Beyond

As we have seen,⁴³ the very peculiar geographical situation of the City of Venice had implied early and pervasive public intervention in a

³⁹ North and Weingast (1989).

⁴⁰ See the large literature on central bank independence initiated by Rogoff (1985).

⁴¹ Broz (1998).

⁴² Coase (1937).

⁴³ See Sect. 2.2.1.

number of strategic sectors of the domestic economy, the most politically sensitive of which being the cereal market. Following an ancient Roman and then Byzantine tradition, the Venetian government had been obliged to step in to stabilize the supply of grain to the metropolitan population, whose potential volatility was exacerbated by the lack of a rural hinterland (the Republic would not undertake the conquest of the mainland until the early fifteenth century). To this aim, a state monopsony had been created: all importers of cereals had been required to sell their stocks to a dedicated government agency (the Grain Office), which then took care of the production, storage, and distribution of flour. The business was generally loss-making (for political reasons, flour was often sold at subsidized prices)⁴⁴ and implied highly irregular cash flows (grain stocks had to be bought from purveyors at the time of the crops arrivals, while flour was sold to the population throughout the year). In view of the big size of this sector within the domestic economy and of the systematic need of short-term credit it generated, it is not surprising that the first government attempt to monetize its debt occurred in association with these operations.

In 1262, after losing control of Constantinople (a big fiscal shock to the Republic), Venice consolidated the considerable amount of floating debt it had been accumulating in the preceding years into a long-term funded debt.⁴⁵ In 1282, Doge Giovanni Dandolo also rationalized the issuance of the floating debt by centralizing its management at the City's main victualling agency. The Grain Office, whose financial tasks had been previously limited to the purchase of cereals from private purveyors (albeit often at a credit), thus saw an important extension of its operations, as it was allowed both to borrow on the collateral of future tax revenues allocated to other government offices and to receive deposits from the general public. This means that the victualling agency (which was already, probably, the most important issuer of floating debt) was

⁴⁴ Mueller (1997, pp. 134–135).

⁴⁵ Mueller (1997, p. 426).

transformed into a *de facto* state bank.⁴⁶ On the assets side of its balance sheet, the Office now started to lend to all other branches of government, as well as to private enterprises considered of public interest (e.g. flour mills, brick furnaces, or construction firms). On the liabilities side of its balance sheet, besides the streams of fiscal revenues earmarked to it, the Office now no longer had only borrowings from purveyors (to whom current accounts were opened), but also from small domestic investors (to whom savings accounts were opened) and even big foreign investors like the landlords of the politically instable mainland. In order to encourage savers to deposit with the Grain Office, the government resorted to repressive devices (after 1329, dowry funds had to be compulsorily deposited with the agency), but also to commitment mechanisms (in 1317, it was ruled that deposits were inalienable, which made the deposit facility attractive also to foreigners). The strategy was, at first, successful: current accounts with the Office were used by merchants as a means of payment, while deposits established themselves as the benchmark asset held by the Venetian middle class.⁴⁷ From the late thirteenth century to the third quarter of the fourteenth century, then, the Grain Office apparently succeeded in performing a rudimentary form of monetization of the public debt.

After the mid-fourteenth century, however, the Grain Office started to run into some serious difficulties. The Office's loans to privates (often extended according to political criteria) performed rather badly. Forced to postpone the payment of interests on savings accounts, the agency had its reputation tarnished, and its depositors started to withdraw their funds. In 1365, the agency lost its victualling responsibilities to the Fodder

⁴⁶ Mueller (1997, pp. 364–367). The monetization of the public debt through the opening of transferable credits on current accounts was performed not only by the Grain Office. The city's other important victualling agency (the Salt Office, which also was a monopsonist agency buying salt from private purveyors) worked along the same principle as the Grain Office: it opened to merchants' credits on current account that were transferable to third parties. The Salt Office continued these practices well beyond the liquidation of the Grain Office. Contrary to the latter, however, the former was never allowed to collateralize its loans by future fiscal revenues, nor was it asked to accept deposits or lend to the private sector. Venice's third important monopsonist agency (the Mint) also opened credits to purveyors of bullion, but these were non-transferable and normally convertible into coins at a (more or less) short maturity. Hocquet (1979, II, pp. 407–416 and 422–428); also see Sect. 2.2.1.

⁴⁷ Mueller (1997, pp. 365–402).

Office: this move was a prelude to its *de facto* liquidation. The fact that in none of the late-fourteenth-century debates on the creation of a public bank the option of returning the monetization business to a victualling agency was ever mentioned is, in fact, evidence that the Grain Office's standing had been irremediably compromised.⁴⁸ The demise of the Grain Office was accelerated by the circumstance that a more competitive alternative for performing the monetization of the public debt had actually emerged in the meantime. In the 1320s, Venetian legislators had recognized transfers as legal means of payment: in so doing, they had definitively provided a monetary status to the Rialto banks' deposit liabilities. As Luca Pacioli would explicitly put it in his famous treatise on double-entry accounting (book IX of his *Summa de arithmetica*, first published in 1494), in Venice a claim on a transfer bank had become money because it was seen "as authoritative as a notarial instrument *since it is backed by the government*".⁴⁹ This means that the state was using its authority to encourage the general public to accept the debt of the Rialto bankers, who could thus expand their liabilities thanks to this privileged status. In exchange for this, it was expected that the ensuing expansion of banks' assets partly consisted of an increase in loans to the government. Strictly speaking, the transformation business conducted by the banks was not unlike the one previously conducted by the Grain Office: the government borrowed short term on the collateral of its long-term fiscal revenues. The difference was that now a private intermediary took responsibility for performing this function. From the authorities' point of view, there were at least three non-negligible advantages to this kind of arrangement. First, after the recent accidents experienced by the Grain Office, private bankers (who were unlimitedly liable for their debts on their personal wealth) were better situated than a government agency for eliciting depositors' trust. Second (and related), thanks to this externalization, the government would no longer bear responsibility for the inevitable accidents to which the banking business was exposed in a world of high macroeconomic instability (precisely the kind of accidents the Grain Office had just experienced and which had generated wide discontent among the population).

⁴⁸ Mueller (1997, pp. 111, 361, and 404–421). Also see Sect. 2.2.1.

⁴⁹ Mueller (1997, pp. 5 and 16).

Third, private bankers were able to provide creditors (both merchants and petty depositors) with a number of sophisticated products (e.g. forward contracts on commodities) that public agencies were not in a position to offer in view of the rigidity of their cash flows.⁵⁰ Therefore, by externalizing the monetization of the floating debt (which was previously internalized by the public sector) to the private banks of Rialto, the government clearly hoped to make the business more efficient.

As deposit collection by private banks thrived in the fourteenth and fifteenth centuries, the bet might be seen to have been correct. However, the banking sector's endemic instability⁵¹ suggests a more nuanced view is of order. As much as monetization by the Grain Office had been jeopardized by the public issuer's loans to the private sector, monetization by the Rialto banks was jeopardized by the private issuers' loans to the public sector. According to an old historiographical tradition, banking instability in Venice was even mainly caused by the government's disordered short-term borrowing.⁵² Such a claim is certainly exaggerated: the total amounts lent by the banks to the public sector appear to have been, on average, very small with respect to those lent to the private sector. Still, there is no doubt that the government came to rely systematically on banks in order to finance its operations and especially its interventions on the cereal market (as purveyors' credits with the Fodder Office were now made payable at Rialto banks).⁵³ Here laid the biggest downside to this arrangement: once made totally dependent from private banks for the day-by-day management of its cash flows, the government was now obliged to support them in case of troubles. This explains why, to avoid potential systemic crises (as e.g. in 1499 or 1576), public authorities did not hesitate a second to come to the rescue of ailing private banks.⁵⁴ In a

⁵⁰ Mueller (1997, pp. 406 and 419).

⁵¹ See Sects. 2.2.1 and 3.2.1.

⁵² Ferrara (1871, pp. 204–213 and 458–466).

⁵³ Mueller (1997, pp. 428–435). This was also the case for purveyors to the Salt Office. The only exception was, apparently, the Mint, which continued to open credit accounts (but non-transferable) to purveyors. This exception was due to the different nature of these credits, which were actually legally considered as claims on the coins struck with the very bullion sold to the Mint—and thus, they enjoyed a higher standing than private bank money: Hocquet (1979, II, pp. 423–425). Such credits should not be confused with the so-called Mint deposits (*depositi di zecca*) introduced in 1542, which were actually long-term government loans: Vietti (1884, p. 125).

⁵⁴ See Sect. 3.2.1.

sense, externalization was partly a fiction: in case of a major shock, the government would always be there to provide public support to private “contractors”, hence (to a certain extent) to temporarily re-internalize a monetization business that was so vital to it.

When private deposit banks became extinct in 1584, the Venetian authorities’ first reaction consisted of soliciting new potential “contractors”. For three years, no receivable proposition was submitted to them. To solve the deadlock, in 1587 they reluctantly agreed to the (to them, temporary) solution of founding the Banco della Piazza di Rialto. As we have seen,⁵⁵ this was only a formal step towards internalization, as in reality the management of the public bank (which was not provided with any stock capital) was actually still out-contracted to a private banker with unlimited liability on his personal wealth. A more substantial step towards internalization had come, already before the creation of the Banco della Piazza, from the forced resumption of the Grain Office’s old practices: as private banks had run into difficulties and their monetization business had ground to a halt, the Fodder Office had been obliged to pay purveyors via the direct opening of transferable credits (called “*banco del giro delle biave*”, i.e. the Fodder Office’s transfer bank).⁵⁶ When in 1619 the Mint faced similar difficulties in readily converting the deposited bullion into coins, also this agency started to open transferable credits to purveyors on its books. This (initially temporary) device was extended some months afterwards, as the credit accounts of purveyors to all state agencies were merged with those of the Mint into a single mechanism (*the Banco del Giro*).⁵⁷ At that point, the government had *de facto* re-internalized the whole monetization business and rendered the Banco della Piazza di Rialto redundant under this viewpoint. The distribution of tasks was now clear: while the Banco della Piazza would privately monetize private debts, the new Banco del Giro would publicly monetize public debts. The two banks equally enjoyed the support of the state to the circulation of their debt: the money of either bank had to be used for the payment of bills of exchange, and harsh restrictions had been imposed

⁵⁵ See Sect. 2.2.1.

⁵⁶ Luzzatto (1934, p. 52).

⁵⁷ Luzzatto (1934, pp. 52–54). Also see Sect. 2.2.1.

on the circulation of other privately issued monetary instruments.⁵⁸ In theory, the money issued by the Banco della Piazza (pure private credit money) should have been strongly preferred by decentralized creditors to that issued by the Banco del Giro (pure state credit money). Interestingly, this was not the case. By 1638, the business of the Banco della Piazza had completely faltered, to the point that the bank had to be closed down.⁵⁹ Until after the fall of the Republic in 1797, the Venetian government would continue to monetize its floating debt through the Banco del Giro; only in 1807 Napoleon would suppress it and convert its debt into long-term funded debt.⁶⁰

To sum up, since the thirteenth century the Venetian government strongly supported the use of credit money in decentralized transactions, with the aim of improving the management of its floating debt. This does not mean that debt monetization was necessarily conducted by the state itself, nor that it necessarily consisted of the direct monetization of public debt: to the contrary, Venetian authorities always displayed a strong preference for an externalized solution featuring the issuance of private credit money, as long as it provided the state with the possibility to smooth its irregular cash flows. The private sector, however, had not always been able to supply the expected services: before the mid-fourteenth century as well as after the mid-sixteenth century, the government had henceforth been obliged to perform the monetization directly through a public agency (the Grain Office first, the Banco del Giro afterwards). In the interlude, the state had supported the circulation of private credit money, but only provided that it was issued through a centralized (and increasingly controlled) mechanism. Instead, the circulation of private credit money issued on a decentralized basis (e.g. transferable bills of exchange) had been fiercely resisted by the authorities, on the grounds that it was conducive to degradations in the quality of the medium of exchange.

This was also the approach adopted in 1609 in Amsterdam, where a public bank modelled on the example of the Banco della Piazza di Rialto was founded with the aim of preventing such degradations.⁶¹ The City's

⁵⁸ Luzzatto (1934, pp. 49–50). Also see Sect. 2.2.2.

⁵⁹ See Sect. 2.2.1.

⁶⁰ Vietti (1884, pp. 114–119).

⁶¹ See Sect. 2.2.2.

government made use of claims on the Wisselbank compulsory for the payment of large bills of exchange (as in Venice), and the Bank was formally required to keep a 100% cash reserve (and thus, *not* to issue credit money at all). Since the beginning, however, this requirement was violated on a sizeable scale, as the Bank secretly started to engage into lending to the government and to a government-sponsored private organization (viz. the Dutch East India Company). Hence, the Wisselbank's monetization business profited to both public and private debts and contributed to stabilize the irregular cash flows of both the government and the most strategic domestic private company. Especially after 1782, the Wisselbank's lending activities were largely expanded through increasing loans to both the Dutch East India Company and the City Chamber of Loans, a fund for the mutual assistance of merchant banks that redirected the borrowed sums to the private sector. As in the case of the Venetian Grain Office in the fourteenth century, however, private debt proved non-performant, and the ensuing difficulties irremediably compromised the reputation of the public credit money issued by the Wisselbank.⁶² Basically collapsed at the time of the French invasion in 1795, the Bank was eventually liquidated in 1820.

Early modern Venice and Amsterdam (but also Hamburg, which adopted a strictly similar device)⁶³ were city states that were stably run for centuries by a very cohesive elite of merchants. In these places, the interests of the government were strongly aligned with those of its creditors, as the latter firmly controlled the former. Therefore, the commitment to defend creditors' interests was implicit in their institutional setting.⁶⁴ This goes a long way in explaining why the creation of a purely public monetization mechanism in these places (their municipal public banks) did *not* prevent decentralized agents from using public credit money as a

⁶²Uittenbogaard (2009). Also see Sect. 3.2.1.

⁶³See Sect. 2.2.2. The case of Barcelona fits into the same category, but its outcomes were quite different. Sure, the Taula de Canvi was a municipal bank that was an integral part of the City government. However, the bank played a limited role in the domestic payment system (at least after the fifteenth century), so that its monetization business remained limited—except during the revolts of 1462, 1640, and 1713. Moreover, because of the strong interference of the Crown of Aragon in municipal life, political equilibria in Barcelona were not as stable as in the three above-mentioned merchant republics: see Sect. 2.2.2.

⁶⁴Stasavage (2012).

medium of exchange. By contrast, polities not run by commercial elites did not possess this implicit commitment and thus had a much harder time convincing decentralized agents of the quality of their debt. In such cases, internalization of the monetization process to a branch of government as in Venice and Amsterdam (or Hamburg) was not a viable option. One variant of internalization that may however have been viable consisted of entrusting monetization to an independent public agency, specially designed to defend the creditors' interests.⁶⁵ During the early modern era, this solution was adopted by three territorial monarchies that had credibility problems in their creditors' eyes: Naples, Sweden, and Austria. In Naples, as we have seen,⁶⁶ eight charities were granted money-issuing rights in the second half of the sixteenth century, and their management was formally left to religious orders or guilds rather than the Crown. In Sweden, a purely public bank was created in Stockholm in 1668 (the Riksbens Ständers Bank), and its management was formally put into the hands of the Parliament rather than the Crown.⁶⁷ In Austria, a purely public bank was also created in Vienna in 1705 (the Wiener Stadtbanco), and its management was put into the hands of the City rather than the Crown.⁶⁸ In the three cases, things worked more or less smoothly in quiet times, but the banks' independence from the sovereign proved hard to defend in times of emergency, when the Crown managed to impose its will and violate the formal separation of powers. As a result, unchecked monetization produced great embarrassments in the three countries during the Napoleonic Wars. The outcome was different in the three cases. The money-issuing charities of Naples were merged and reorganized in the state-owned Banco delle Due Sicilie (then renamed Banco di Napoli), which would have been the oldest surviving bank of issue in the world had it not lost all of its monetary prerogatives to Banca d'Italia in 1926.⁶⁹ The Bank of the Swedish Parliament managed to survive and evolved into today's Riksbank, which is, as a result, the doyen of present-day central

⁶⁵ Rogoff (1985).

⁶⁶ See Sect. 2.2.2.

⁶⁷ Heckscher (1934).

⁶⁸ Jobst and Kernbauer (2016, pp. 18–33).

⁶⁹ De Simone (1993, pp. 23–25).

banks.⁷⁰ By contrast, the Wiener Stadtbanco could not survive and was replaced in 1816 by a new bank of issue modelled along the Bank of England (the Oesterreichische Nationalbank).⁷¹

4.2.2 Full Externalization: Genoa, England, and Beyond

Not all early modern city states were run by cohesive elites as those of Venice, Amsterdam, or Hamburg. In the Italian context, to the contrary, Venice was very exceptional: during the late medieval era, basically all other city states of the peninsula experienced highly factional and unstable politics. Despite being a maritime republic like Venice, Genoa was no exception among the cities located on the Italian mainland.⁷² This explains why, following harsh intestine infighting and the loss of its naval power in the late fourteenth century, the Republic saw no other way to restore trust in its public debt than completely externalizing its management to a private company owned by the state's creditors (the Casa di San Giorgio, founded in 1407). As we have seen,⁷³ this coordination device was effective in aligning the interests of the magnate families, which had proven unable to align otherwise. Besides being a private manager of the funded debt, San Giorgio was also a private facility for the monetization of the floating debt: thanks to the same mechanism that had been practised by Venice's victualling agencies (opening transferable credits on current account to creditors), the company transformed the Republic's floating debt (mostly, interest payments in arrears) into a means of payment widely used for small transactions. However, this money was considered as largely inferior to the one issued by domestic private bankers, which was the one actually used for larger transactions.⁷⁴ Moreover, for centuries the total size of the monetary issuance performed by the Casa remained limited and was used to finance not only loans to the public

⁷⁰ Heckscher (1934).

⁷¹ Jobst and Kernbauer (2016, pp. 35–45).

⁷² Greif (1995).

⁷³ See Sect. 2.2.2.

⁷⁴ Heers (1961, pp. 191–192).

sector but also loans to the private sector. Last but not least, circulation was jeopardized by the lack of uniformity between the different types of bank money issued by the company.⁷⁵ Only in 1675 did the company merge the five kinds of accounts it opened to customers and start to issue a uniform bank money unit.⁷⁶ At the same time, bills of exchange were made compulsorily payable at the Casa, and the issuance of transferable certificates of deposits (like those issued by the Neapolitan banks) was authorized.⁷⁷ Taken together, these three reforms finally turned the company into a bank proper and allowed for an expansion in the circulation of bank money in Genoa. Still, until the very end, the Casa was accused of unduly restricting the borrowing capacity of the state. When the Republic fell to the French armies in 1797, the company was deprived of the streams of fiscal revenues that had constituted its main asset since its foundation, which struck a major blow to its financial solidity. In the following years, it struggled to survive. After the retreat of the Napoleonic troops, the provisory republican government considered to revive it in 1814; in 1815, however, Genoa was annexed by the Kingdom of Sardinia, and the Casa was immediately abolished.⁷⁸

Privatizing the monetization of a state's floating debt was a business at which the Genoese excelled. At the international level, they did it on a spectacular scale for the world's biggest borrower of the sixteenth century (the King of Spain), whose floating debt they transformed into short-term monetary instruments through their quarterly "Bisenzone" fairs.⁷⁹ In Genoa as in Spain, such externalization was effective in smoothing the state's highly irregular cash flows, but also in restricting its ability to raise funds. As Venice had experienced in the sixteenth century, complete externalization had negative consequences as it made the government dependent on private intermediaries: the state's inability to raise funds on its own provided contractors with considerable market power. In the case

⁷⁵ Felloni (2006). Also see Sect. 2.2.2.

⁷⁶ Gianelli (2006).

⁷⁷ See Sect. 2.2.2.

⁷⁸ Assereto (2006). A bank of issue modelled along the Bank of England (the Banca di Genova) would be founded in the city in 1844. It would be the ancestor of the Banca Nazionale nel Regno d'Italia, transformed into the Banca d'Italia in 1893; De Mattia (1967).

⁷⁹ Pezzolo and Tattara (2008); Drelichman and Voth (2011).

of the Republic of Genoa, the contractor's monopoly was perfect, as the Casa di San Giorgio had been designed as a permanent institution, *de facto* enshrined in the Genoese constitutional order. Such a monopolistic position obviously made the contractor profit from rents.

This may explain why, when the Genoese model was transposed to England in the aftermath of the Glorious Revolution, it was also significantly amended. The English choice of drawing inspiration from the solution Genoa had found in the aftermath of the War of Chioggia may not appear straightforward at first sight. Institutional differences between the two polities were patent: early-fifteenth-century Genoa was a politically decentralized republic with a decaying military influence,⁸⁰ while late-seventeenth-century England was a centralized territorial monarchy on its way to become a major military power.⁸¹ There was, however, one important institutional similarity between the two: factional politics. Post-1688 England was characterized by a strong political divide between two factions: one backed by the landowning elite (the Tories), and another one backed by the commercial elite (the Whigs). Equilibrium between these two parties could have potentially proved unstable in the long term, thus questioning the long-term alignment of incentives between the state (mostly controlled by the landed aristocracy) and its creditors (mostly merchants).⁸² In such a situation, the internalized solutions adopted in cohesive polities like seventeenth-century Venice or Amsterdam were certainly not viable. An obvious alternative was the fully externalized solution found in Genoa. The model of the Casa di San Giorgio was indeed explicitly acknowledged as a source of inspiration by the founders of the Bank of England.⁸³ There were, however, two major differences with respect to the Genoese example. First, the original charter of the Bank was set to expire after only 11 years, and renewal was far from certain (it would have been conditional to future political equilibria). Although the Bank of England was rechartered nine times until 1844 (when the charter was eventually made perpetual), for a long time its inclusion into the domestic

⁸⁰ Epstein (1996).

⁸¹ O'Brien and Hunt (1993).

⁸² Carruthers (1996).

⁸³ Clapham (1944, I, p. 3).

constitutional order could not have been taken for granted.⁸⁴ Second, externalization only involved a portion, and not the whole of the public debt. In the early decades of the eighteenth century, management of other portions of the public debt was actually externalized to two other major private companies (the South Sea Company and the East India Company).⁸⁵ This means that, unlike San Giorgio, the original Bank of England created in 1694 was *not* a monopolist contractor. It was only since 1751 that the different strands of the public debt started to be reorganized into a single pool, and the Bank gradually acquired control of basically all of the payment flows related to it.⁸⁶ This proved that, as the government's borrowing mechanisms were rationalized, the specific business in which the Bank was specialized (transforming the long-term public debt into demandable monetary instruments) remained very valuable to the state.

As a matter of fact, the monetization business performed by the Bank of England had proved successful to an extent that surpassed its founders' rosiest expectations.⁸⁷ Sure, this accomplishment rested on two important preexisting peculiarities of the domestic financial system. First, English creditors had long been accustomed to the use of government-issued credit money as a means of payment. Since at least the twelfth century, the King's Exchequer had issued certificates of deposit (under the form of wooden sticks called *tallies*) that were eligible for tax payments: as they were assignable to third parties, tallies were used as a medium of exchange in decentralized transactions. Economically equivalent to the credit practices of the Venetian victualling agencies, this specific form of public debt monetization was still in use at the time of the Bank's creation.⁸⁸ Second, as we have seen,⁸⁹ the English public had also become accustomed to the use of privately issued credit money as a means of payment: both bills of exchange and "goldsmiths'" banknotes circulated

⁸⁴ Broz and Grossman (2004).

⁸⁵ Quinn (2008).

⁸⁶ von Philippovich (1911).

⁸⁷ Clapham (1944, I, p. 3).

⁸⁸ Desan (2014, pp. 171–190 and 259–260).

⁸⁹ See Sect. 2.2.3.

widely by the end of the seventeenth century. In this already favourable context, the private monetization of public debt proposed by the Bank of England under the form of the issuance of banknotes found no major difficulty in being accepted by the general public.⁹⁰ In the very first decades of its existence, the transformation business enacted by the Bank was particularly extreme: its balance sheet was basically composed of perpetual public debt on the assets side and of demandable banknotes on the liabilities side.⁹¹ After the reorganization of the public debt in the mid-eighteenth century, the nature of the “contract” between the government and the Bank was fundamentally modified: the Bank became the monopolist manager of the public debt (except for some residual portions of it), and from monetizing one specific portion of the long-term debt, it was now asked to monetize essentially the short-term debt, as well as private commercial debt under the form of bills of exchange.⁹² This means the Bank could now perform more efficiently than before the same function performed by the public banks of Venice or Amsterdam—namely, smoothing the irregular cash flows faced by the government. In 1776, Adam Smith could famously write that the Bank of England had become “a great engine of state” (*Wealth of Nations*, book II, chapter II),⁹³ implicitly suggesting that this private company was now an organic part of the domestic constitutional order.

Yet, the private contractor’s increasing market power raised in England (as in Genoa) a number of questions concerning its privileged status and the rents the Bank might have extracted from it. Critics argued that incentives failed to be aligned between the principal (the government, interested in the maintenance of orderly financial conditions) and the

⁹⁰ See Sect. 2.2.4.

⁹¹ On the transformation business, see Sect. 3.1.1.

⁹² Roberds and Velde (2016b, pp. 469–471).

⁹³ “The stability of the Bank of England is equal to that of the British government. [...] It acts, not only as an ordinary bank, but as a great engine of state. *It receives and pays the greater part of the annuities which are due to the creditors of the public, it circulates exchequer bills, and it advances to government the annual amount of the land and malt taxes, which are frequently not paid up till some years thereafter.* In those different operations, its duty to the public may sometimes have obliged it, without any fault of its directors, to overstock the circulation with paper money. It likewise discounts merchants’ bills, and has, upon several different occasions, supported the credit of the principal houses, not only of England, but of Hamburg and Holland”: Smith (1776, p. 387, my emphasis).

agent (the Bank, interested in maximizing its profits by overexploiting its privileges). The polemic first burst when the need to finance the Napoleonic Wars imposed the suspension of convertibility (1797). During the so-called Bullion Controversy of the 1800s, the Bank was accused of jeopardizing monetary stability by “over-issuing” banknotes in order to increase loans to the private sector (and hence, profits).⁹⁴ The question of the social acceptability of the Bank’s “exorbitant privilege” was so delicate that the government tried to abstain as long as possible from providing the Bank’s notes with the legal-tender status and only resorted to this measure (as late as in 1812) when the situation became untenable from a juridical viewpoint.⁹⁵ After the restoration of convertibility (1821) and the ensuing repeal of the legal-tender status, the Bank overtly acknowledged its “public responsibilities” and considerably decreased its monetization of private commercial debt. At the time of the eighth renewal of its charter (1833), governor John Horsley Palmer’s explicit engagement to refrain the Bank from discretionary policymaking contributed to regain the legal-tender status for its banknotes.⁹⁶ Criticism of the Bank’s privileged position was however revamped during the so-called Banking Controversy, which revolved around the ninth (and last) renewal of the Bank’s charter. The Currency School’s eventual victory (encapsulated in the Bank Act of 1844)⁹⁷ resulted in a complete redrafting of the (now permanent) contract between the government and its contractor. The Bank of England was *de jure* (although not *de facto*) split into two distinct entities. On the one hand, there was a public bank (called the Issue Department) structured in a not very dissimilar way than the (by that time, defunct) banks of Venice and Amsterdam: it was a public agency (with no paid-up capital) which would have only issued legal money (in the form of legal-tender banknotes) against a pre-specified amount of government debt. On the other hand, there was a private joint-stock bank

⁹⁴ Fetter (1965, pp. 26–63); Arnon (2011, pp. 63–151).

⁹⁵ Fetter (1950).

⁹⁶ Wood (1939, pp. 61–104); Wood (2005, pp. 62–75). The aim of the deal of 1833 was to avoid the occurrence of a major panic like that of 1825: Bank of England’s notes were declared legal tender in order to prevent a run of banknote holders’ on the gold reserve; in return, the Bank was expected to maintain a countercyclical lending behaviour: Fetter (1950).

⁹⁷ On the Currency School, see Sect. 4.1.2.

(called the Banking Department) structured as any other commercial bank: this bank would have used the banknotes created by the Issue Department for extending loans at its will to the public or private sector.⁹⁸ By separating the issuance of banknotes (in their view, the “monetary” business) from lending activities (in their view, the “financial” business), the Currency School argued to have found the definitive solution to the problem of incentive misalignment: the monetary business would be internalized by the state, while the financial business would be externalized to privates. As the crisis of 1847 would soon show, however, this was wishful thinking. Again, the Bank was called to its “public responsibilities” in the financial business and asked to provide the lending-of-last-resort function.⁹⁹ But the strict restrictions on the issuance of banknotes imposed by the Act of 1844 posed a severe constraint to the monetization process the Bank was now able to perform. Accused of being unwilling to perform its duties, yet largely deprived of the means to perform them, the Bank experienced increasing difficulties until 1914.¹⁰⁰ Then came the World Wars and the ensuing explosion of Britain’s public debt, which made the Bank’s monetization mechanism again strictly indispensable. Now unquestionably a vital component of the public sector for both its monetary and financial business, the Bank was eventually nationalized in 1946.

To sum up, the histories of the Casa di San Giorgio and of the Bank of England are evidence of the benefits and costs of externalizing the monetization business to a private contractor. As we have seen, externalization occurs when the government tries the profit from the contractor’s credibility in exchange for a rent.¹⁰¹ The deal may be advantageous when the government’s credibility as a borrower is low among decentralized agents. It may turn disadvantageous, however, if the monopoly power provided to contractors becomes non-contestable¹⁰² in the long term: in such a case, the rent may become difficult to justify. Hence, externalization

⁹⁸ Fetter (1965, pp. 182–197); Whale (1944).

⁹⁹ See Sect. 3.2.2.

¹⁰⁰ Ugolini (2016).

¹⁰¹ Broz (1998). Also see Sect. 4.1.4.

¹⁰² On contestability, see Sect. 2.1.1.

to private issuers appears to be a temporarily optimal device only as long as a government remains unable to have a higher credibility than that of private intermediaries.

But this was precisely the situation in which most governments found themselves as a consequence of the Napoleonic Wars, which explains why the Bank of England model eventually imposed itself as the definitive model throughout Europe. As a matter of fact, the conflict was a major watershed in the history of money-issuing banks. The wars wiped out the glorious merchant republics of Venice, Amsterdam, and Genoa together with the public banks that they had created (only Hamburg being temporarily spared); they entailed the fall of the Wiener Stadtbanco and the reorganization of the Neapolitan banks of issue; and they almost killed the Riksbank. To an early-nineteenth-century observer, only one of these banks may have appeared as performant: the Bank of England, which (albeit not without difficulties) had basically managed to stay the shock. It is thus unsurprising that, after 1800, all European countries constantly turned to this model when they wanted to establish a facility for the monetization of public and private debts.

The Dutch case is particularly illustrative of the reasons for the spread of the English model across the continent. When in 1814 William I of Orange became sovereign of the newly created (yet already heavily indebted) United Kingdom of the Netherlands, the hypothesis of relaunching the glorious Wisselbank was not seriously considered. By contrast, the new monarchic regime actually sponsored the foundation of a joint-stock bank of issue (the Nederlandsche Bank) inspired by the model of the Bank of England, and fostered the circulation of its credit money (banknotes) in the Northern part of his domain. The King's hope to create an active externalized mechanism for monetizing the public debt was, however, frustrated, as the board of the Bank refused to indulge into this business on the scale he had anticipated.¹⁰³ To upscale the monetization process, in 1822 William created a new bank of issue in the Belgian part of his domain (the Brussels-based Société Générale). This was formally a fully private joint-stock company, but the King actually held an overwhelming share of its capital. This *de jure* externalized

¹⁰³ Uittenbogaard (2015, pp. 78–80).

(yet *de facto* internalized) solution did not succeed in inspiring the creditors' confidence, and the Société Générale's monetary issuance remained limited.¹⁰⁴ After the loss of Belgium in 1830, the Kingdom of the Netherlands completely reorganized its public finances and went back to a fully externalized system based on the Nederlandsche Bank. In the meantime, the Dutch King's stock in the Société Générale was frozen, and the Bank became the main bank of issue of the new Kingdom of Belgium.¹⁰⁵ In sum, the evolution of the money-creation mechanism in the Netherlands in the decades around 1800 provides additional evidence of the crucial role played by political equilibria in the definition of the optimal mechanism for the monetization of the public debt. As long as Amsterdam was ruled by a cohesive elite of merchants heavily invested in the domestic public debt, the purely public mechanism supplied by the Wisselbank did not raise any confidence problem with the public (at least, as long as abuses were not reported). Once the Netherlands turned into an absolutist monarchy in the Restoration era, externalization to the private sector became necessary. However, the "contractor" (the Nederlandsche Bank) failed to monetize the debt to the extent desired by the King: the country which had accepted credit money creation to an impressive extent in the early modern era¹⁰⁶ was now unwilling to use banknotes beyond a very low limit.¹⁰⁷ As a reaction, William I tried to use another formally externalized device (the Société Générale) in order to boost monetization; the attempt was, however, hardly successful, as the public understood the issuing bank to be an actual part of the public sector.¹⁰⁸

Therefore, externalization did not always provide sovereigns with satisfactory results. This was also the case in Restoration France, where the Banque de France (founded by Napoleon in 1800) failed to meet the Bourbons' expectations in terms of support to the new regime's floating debt. In order to bypass the bank of issue, Louis XVIII founded in 1816 a new state bank (the Caisse des Dépôts et Consignations) to work as a

¹⁰⁴ Demoulin (1938, pp. 33–48 and 71–104). Also see Sect. 2.2.4.

¹⁰⁵ Ugolini (2011).

¹⁰⁶ Roberds and Velde (2016a, p. 45).

¹⁰⁷ Uittenbogaard (2015, p. 113).

¹⁰⁸ Chlepnier (1926, I, pp. 47–50).

compulsory depository institution for notaries, who traditionally ran a big intermediation business in France.¹⁰⁹ Holding notaries' deposits on the liabilities side and government debt on the assets side of its balance sheet, the new bank was *de facto* able to perform the monetization business despite being prevented from issuing banknotes. Unlike the Banque de France, the Caisse followed the model of the Riksbank: it was set up as a public agency under the patronage of Parliament and was thus provided with a considerably independent status that remained almost unscathed through the frequent changes of political regime experienced by France in the following decades.¹¹⁰ The Caisse des Dépôts et Consignations, which became a model imitated in other European countries,¹¹¹ still exists and performs the same functions today. Curiously, Banque de France never became a big holder of government debt by international standards even after its nationalization in 1936.¹¹²

4.2.3 Concurrent Internalization and Externalization: The United States

As we have seen,¹¹³ the economies of the European colonies of North America were plagued by the scarcity of coins. As a result, in spite of paying with commodity money, since as early as 1690 British colonial authorities had started to issue certificates (“bills of credit”) that were eligible for tax payments. Bills of credit were negotiable zero-coupon bonds rather than banknotes, but they immediately started to be used as medium of exchange in decentralized transactions. In view of the growing circulation (and, in the case of some colonies, of the strong depreciation) of these instruments during the first half of the eighteenth century, in 1751 the British Parliament endeavoured to regulate their issuance: colonial bills of credit—it was ruled—should have never been declared legal tender and always been collateralized by precise streams of fiscal

¹⁰⁹Hoffman et al. (2000).

¹¹⁰Boudet (2006, pp. 21–24).

¹¹¹See, for example, the case of Italy's Cassa Depositi e Prestiti: De Cecco and Toniolo (2001).

¹¹²Jobst and Ugolini (2016, pp. 155–158).

¹¹³See Sect. 2.2.5.

revenues.¹¹⁴ This was exactly the time when the British public debt was being reorganized, and the Bank of England's monetization was made backed by the government's most important tax incomes¹¹⁵: as a matter of fact, Westminster was trying to impose the same principles to colonial authorities, although the latter were implementing monetization directly rather than through a private intermediary. Starting in 1776, the Continental Congress tried to finance the Revolutionary War by issuing bills of credit (called "Continental dollars") that mimicked those issued by the former colonial authorities. There was, however, one major difference: Congress did not dispose of *any* fiscal revenue to collateralize the issuance of Continental dollars, so that (unsurprisingly) the value of these certificates collapsed completely. Following this failed internalization of the money-issuing mechanism, the Continental Congress tried to resort to externalization, and in 1782 it backed the foundation in Philadelphia of a private joint-stock company (the Bank of North America): modelled along the original Bank of England of 1694, the company was mainly supposed to monetize one big Congressional loan. In order to make the new Bank's notes acceptable to the general public, Congress asked the former colonies (now states) to make them eligible for tax payments. State authorities, however, did not comply and, in turn, started to encourage the local incorporation of private joint-stock banks to issue notes backed by state debt. Soon it became evident that, even before becoming fully operational, the first project for creating an externalized facility for the monetization of the federal debt had been killed by the states' opposition.¹¹⁶ It was only the first in a series of three similar experiments, all three of which involved a Philadelphia-based private contractor in the management of the federal portion of the public debt, and all three of which were eventually terminated by opponents of centralization. In 1791, a (First) Bank of the United States was established for 20 years, but its charter failed to be renewed at expiration. In 1816, a (Second) Bank of the United States was (again) established for 20 years, but (again) its charter failed to be renewed at expiration.¹¹⁷ The debates that surrounded

¹¹⁴ Grubb (2003, pp. 1178–1179).

¹¹⁵ See Sect. 4.2.2.

¹¹⁶ Grubb (2003, pp. 1787–1790).

¹¹⁷ See Sect. 2.2.5.

the termination of this third effort to secure monetization of the federal debt are particularly instructive about the political limits to externalized solutions. The Governor of the (Second) Bank of the United States, Nicholas Biddle, had been trying to redesign the company's business model from one that was still similar to the early-eighteenth-century Bank of England's (monetizing one single stock of *long-term* public debt) to one that was more similar to the early-nineteenth-century Bank of England's (monetizing both public and private *short-term* debt). Biddle was persuaded that, had the Bank managed to secure an efficient private provision of public goods (like a national payment system and a lender of last resort), politicians would have been unable to do without it.¹¹⁸ But Biddle's arguments about the welfare-improving effects of the Bank were overshadowed by his opponents' charges against its rent-seeking motives. The company's monopolistic position was violently accused of feeding an ever greater lobbying power.¹¹⁹ Strengthened by a policy of systematic fiscal surpluses (boosted by extensive land sales in the Western territories), by 1832 President Andrew Jackson was in the position to safely get rid of a monopolistic private device for monetizing the federal debt, and he did.

The period that ensued the fall of the (Second) Bank of the United States was characterized by two parallel developments. At the state level, "free banking" laws adopted in many places consecrated the principle of competitive private monetization of the public debt. These laws authorized any private bank to issue banknotes, provided that issuance was collateralized by bonds issued by the local state. This sort of capital requirement was officially supposed to boost decentralized agents' confidence in banks' notes.¹²⁰ It was, however, also intended to force all "free" banks to monetize the states' debt: instead of externalized by idiosyncratic legislation to a single monopolist contractor, the task would thereafter be externalized by generalized regulation to a multiplicity of competitive contractors.¹²¹ At the federal level, monetization of the public debt did not cease completely, but was internalized by the Treasury, which in 1837

¹¹⁸ Catterall (1903, pp. 96–113).

¹¹⁹ Catterall (1903, pp. 243–284).

¹²⁰ Rockoff (1991). Also see Sect. 3.2.3.

¹²¹ For a general reflection on this type of evolution, see Lamoreaux and Wallis (2016).

was authorized to issue “Treasury notes”. Although these notes were at first designed as interest-bearing bonds redeemable after one year, in the 1840s they were made convertible into specie on demand: this evolution made them more similar to banknotes and paved the way for the issuance of “greenbacks” in the 1860s.¹²²

The pressing need to finance the costly Civil War with scanty fiscal revenues prompted the federal government to adopt a unique double system of monetization that would last for more than a century. On the one hand, the internalized system of monetization of the federal debt through the Treasury was widely exploited through extensive issuance of “greenbacks” (formally called “United States notes”). Provided (unlike all previous federal monetary issues) with the status of legal tender for both public and private payments, “greenbacks” were initially intended as a temporary device, set to be redeemed in coins and disappear shortly after the end of the war. Yet, as convertibility into specie had to be postponed to 1879, and as their (to many, dubious) constitutionality was definitively confirmed by courts in the early 1880s, the legal-tender notes remained a permanent feature of the US monetary system.¹²³ Although capped at the levels of the 1860s, their circulation remained a fact of life until as late as the 1990s. On the other hand, the externalized system of competitive private monetization developed by state legislators during the “free banking” era was also adopted at the federal level. In fact, the National Banking Acts of 1863–1865 required the federally regulated national banks to hold a 111% (later 100%) backing in federal bonds for their issuance of banknotes.¹²⁴ The Acts also made the issuance of banknotes prohibitively costly for state banks, thus *de facto* preventing the monetization of state debt. Taken together, the provisions of the Civil War implied that the whole issuance of banknotes in the Federation (be it internally performed by the Treasury or externally performed by the national banks) now entirely consisted of a monetization of federal debt.

By establishing a rigid connection between national banks’ circulation and the outstanding amount of federal debt, the Acts of 1863–1865 seriously limited the expansion of money supply in times of stringency.

¹²² Timberlake (1993, pp. 71–74).

¹²³ Timberlake (1993, pp. 129–145).

¹²⁴ White (1983, pp. 25–26). Also see Sect. 3.2.3.

The issuance of “greenbacks” by the Treasury, which was strictly limited by law, was no source of much additional flexibility.¹²⁵ This inherent lack of “elasticity” was one of the strongest arguments in support of the creation of a central bank after the big panic of 1907.¹²⁶ Designed as an “upgrade” of the National Banking Acts of 1863–1865, the Federal Reserve Act of 1913 did not completely overhaul the double monetization system created during the Civil War: the internalized money-issuing facility of the Treasury was not touched upon, and the competitive externalized facility provided by national banks continued to exist. But a third facility, provided by the Federal Reserve Banks, was introduced. This new facility was different from the others under two important respects. First, it consisted of a user-owned organization that was supposed to work as a quasi-public (but independent) agency. Second, it was expected to collateralize its monetary issuance by private rather than public debt: as some of the reformers put it (and the Act of 1913 then formally required), “commercial paper” would have to be the “fundamental redeeming medium” of its banknotes.¹²⁷ As we have pointed out,¹²⁸ however, for a number of reasons (an important one being the outburst of the First World War) the Federal Reserve Banks soon frustrated the reformers’ original idea of transplanting a European-style standing facility to the United States, and by the 1930s the System had become but the third device for the monetization of the federal debt. The triple monetization system created in 1913 lasted until 1935, when the New Deal reforms outlawed the issuance of national banks’ notes and consecrated the role of the Fed as *the* public agency for the monetization of the federal debt. Despite its formally private nature, the Fed lost much of its independence from the government: therefore, the reforms of the 1930s marked the eventual internalization by the US government of the monetization of federal debt.¹²⁹ This notwithstanding, suspicions about the formally private nature of the Fed (and its alleged leniency towards its shareholders’ interests) periodically resurfaced over the decades. The fact that the double monetization system (a relic of the Civil War) was never formally dropped until as late as 1994 provided

¹²⁵Taus (1943, pp. 121–128 and 179).

¹²⁶See, for example, Noyes (1910).

¹²⁷Timberlake (1993, p. 228).

¹²⁸See Sect. 3.2.3.

¹²⁹Timberlake (1993, pp. 274–287); Meltzer (2003–2010, I, p. 70, fn. 7).

ground for controversy: the legitimacy of the Fed's allegedly externalized money-issuing facility has continued to be questioned and often contrasted to that of the Treasury's internalized one.¹³⁰

To sum up, the historic rift between supporters and opponents of a centralized government has made the US approach to the issuance of money considerably diverge from that of modern European countries. Since the early nineteenth century, most European countries created monopolistic facilities for the monetization of public and private debt, which were first externalized to a private contractor and then internalized to a public agency. After failing to do the same three times between 1782 and 1836, the United States took a different path. Three concurrent mechanisms for monetizing the federal debt were juxtaposed: an internalized facility with a branch of government (the Treasury, since 1837), a competitive externalized facility with competitive contractors (the national banks, since 1863), and yet another formally externalized facility with a user-owned contractor (the Fed, since 1913). The system was substantially redesigned in the 1930s, as issuance by national banks was abolished and the Fed was transformed into a *de facto* public agency; yet, only with the disappearance of Treasury issues in the 1990s the system eventually converged towards the European model. However, the United States continued to differ from most European countries under one important respect: issuance of legal-tender money continued to be overwhelmingly backed by public rather than private debt.¹³¹ This divergence is, in fact, the paradoxical legacy of more than two centuries of struggles to prevent the US government from resembling its European fellows.

4.2.4 The Evolution of Money-Issuing Mechanisms: Conclusions

In any sufficiently developed economy, money consists of the debt of some “privileged” agents used as medium of exchange by “common” ones.

¹³⁰ Ironically, the double monetization system (seen by someone as a conflictual race between the two issuers) has given rise to a specific genre of conspiracy theories. According to one of these, President John Fitzgerald Kennedy would have been murdered because of his alleged willingness to relaunch the Treasury's issuance of notes in opposition to the Federal Reserve's: Woodward (1996).

¹³¹ Jobst and Ugolini (2016, pp. 155–158).

Because the state plays a big role in the economy both as a sender and as a receiver of payments, the government has a strong influence on determining who the “privileged” agents will be. Moreover, because the state faces rigid cash flows that are largely complementary to those faced by the private sector, the government has a strong interest in being itself that “privileged” agent. However, in view of its formal power to renege on contracts at no cost, the state may have serious problems in convincing creditors to hold its debt. Over the centuries, two families of solutions have been put in place in order to cope with this problem. The first one has consisted of enhancing the credibility of the state as an issuer (“internalization”). In earlier polities, this has consisted of organizing the domestic political regime as consubstantial to the interests of creditors: in merchant republics like Venice, Amsterdam, or Hamburg, this has been sufficient for building public trust in money issued by a branch of government (a municipal public bank). In other contexts, this has rather consisted of entrusting monetization to an independent public agency: early experiments like the Swedish or Austrian ones have however displayed the difficulties of giving substance to formal independence, and the questions of the optimal design of central bank independence (and of the potential gap between *de jure* and *de facto* independence) remains open to date. The second solution to cope with the government’s own credibility problem has consisted of borrowing a private intermediary’s credibility in exchange for a rent (“externalization”). In places like Genoa or England, the benefits of this strategy have been substantial as long as the government’s credibility remained low, but the social acceptability of privilege has become increasingly difficult to defend over time. Most European countries started with the latter solution and then gradually converted it into the former. The United States long adopted both solutions at the time and only converged towards the European model after a long diversion. In all the examined cases, political equilibria were primordial in determining what money was and how it was produced.

Nowadays, in all Western countries legal-tender money is issued by an independent public agency and backed by both public and private debt. But legal-tender money is just one tiny fraction of the total mass of credit instruments that bear monetary properties. Such instruments are issued by private intermediaries and overwhelmingly backed by private debt. The fact that the government and its debt still play a crucial role in the

money-issuing mechanism does not at all mean that the public sector is the only one to profit from it: to the contrary, a number of “privileged” private agents still exist today. However, the line separating “monetary instruments” from “credit instruments” still appears quite difficult to draw. Many millennia after having invented it, a fully consensual definition of what money is and where it stops is still missing to date.

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5

Monetary Policy

As long as private banks manage to not get into trouble and run their ordinary business, they do not refrain from doing remarkable harm to this city by vilifying the money they issue and hence increasing the price of specie. [...] *In thirteen-hundred-something (I cannot remember the exact year), the gold sequin was valued at three pounds; it then started to appreciate up to the level we see today, and will continue to rise in the future as it did in the past. [...] Which could be tolerated in itself, did it not generate a loss to the public sector, as well as a decrease in private people's purchasing power.*

Tommaso Contarini, *Speech to the Venetian Senate in Support of the Creation of a Public Bank*, 28 December 1584 (quoted in Lattes (1869, pp. 126–127), my translation and emphasis).

The controversies on the nature of money¹ have had an obvious direct impact on the debates concerning monetary policy. Supporters of the idea that money is a good have naturally treated fiat money as a special type of commodity money and hence interpreted money creation as a government's method for farming the seigniorage tax. Their conclusion has

¹ See Sects. 4.1.1 and 4.1.2.

thus been that monetary policy is tax policy, which should be designed in order to minimize its distortionary effects. By contrast, supporters of the idea that money is credit have rather interpreted money creation as a way for the government to impact credit creation by the private sector. Their conclusion has thus been that monetary policy is regulatory policy, which should be designed in order to minimize financial instability. While at first sight this debate might appear as a purely academic one, its practical implications on daily economic life are far from negligible. Although its effects are still imperfectly understood, monetary policy is arguably one of the most crucial tools for intervention on the real economy, whose effects can be very far-reaching (at least in the short term). It is therefore not surprising that the conduct of monetary policy has been generally considered as one of sovereigns' most important attributes.

This chapter will start by surveying the theoretical debate on the optimal design and implementation of monetary policy. As it will be shown, this is a very old debate that has been extraordinarily extensive, albeit hardly conclusive. Then, the chapter will review how monetary policy has been conceived and applied in the West from the Middle Ages to today. This will allow underlining that, in spite of the violent ideological rifts that have always characterized monetary controversies, monetary policy-making has displayed over time a strong continuity for what concerns its goals and a rather gradual evolution for what concerns its means.

5.1 Monetary Policy: Theory

5.1.1 Monetary Policy as Tax Policy

In nowadays' mainstream macroeconomic theory,² a broad consensus exists on the desirability of *price stability*. As money is modelled as an intrinsically worthless good and money creation is modelled as a state monopoly, *inflation* (i.e. the increase in the price level) is mechanically interpreted as a form of *distortionary taxation*. Through the issuance of

²In what follows, the term "mainstream macroeconomic theory" is used to refer to what first Goodfriend and King (1997) and then Woodford (2009) defined as the "New Neoclassical Synthesis".

fiat money, the government is able to extract wealth from those who accept it in exchange for real goods: in fact, this is nothing but a form of taxation (called *seigniorage*) affecting a specific tax base (money holders). Seigniorage revenues can be boosted by “running the printing press”, which is supposed to generate inflation.³ Like any other real-world taxation technology, then, inflation pushes a frictionless economy away from its optimal (taxless) equilibrium. The straightforward implication is that, for optimality to be preserved, distortionary taxes must be minimized, which means that the inflation rate must not depart from zero.⁴

Once the (unrealistic) assumption of absence of frictions is dropped, however, the optimality of a zero inflation rate can be questioned. On the one hand, some types of frictions militate for the adoption of a negative inflation rate. As we have seen,⁵ because a frictionless economy does not have room for money, the demand for (fiat) money must be artificially induced by introducing some particular constraint: as agents are impeded from paying for all transactions by raising credit, they are forced to hold a certain amount of money in the place of other assets. In this setting, money has an *opportunity cost* to those who are obliged to demand it. In fact, money does not earn interest to its holders, while other assets that could have been held in its place do earn it: this means that the opportunity cost of holding money is equal to the interest rate of the representative asset that the investor was prevented from buying. At the same time, (fiat) money has a negligible production cost to its supplier, as it can be issued “out of thin air” by the state. In view of this, the optimal monetary policy consists of minimizing the opportunity cost of holding money by maintaining an inflation rate that perfectly compensates the real rate of return of other assets: if the latter is positive (as it should be), the former

³Note that this interpretative framework was originally developed for analysing the working of seigniorage taxes in a commodity money system (the word “seigniorage” originally meaning the fee collected by the sovereign for transforming bullion into specie). In this framework, the only difference between a fiat money system and a commodity money system stays in the size of the gap between the intrinsic and the legal value of the monetary good.

⁴Note that the opposite holds for negative inflation rates: as a matter of fact, deflation can be interpreted as a negative tax redistributing wealth from the state (i.e. from payers of other taxes) to money holders. On the distributional effects of the inflation tax, see, for example, Erosa and Ventura (2002).

⁵See Sect. 4.1.1.

must be negative. The conclusion (known as the *Friedman rule*) is that the optimal rate of inflation is supposed to be normally lower than zero.⁶

On the other hand, though, the presence of other types of frictions suggests that the optimal inflation rate should be higher than the negative one famously suggested by Milton Friedman. First, from a stricter fiscal perspective, imperfections in the tax system (e.g. the existence of untaxed income due to evasion) provide a justification to the indirect taxation of money holders through inflation.⁷ Moreover, the possibility of taxing foreign holders of domestic money (a non-negligible source of income for governments that have the privilege of issuing an international currency) also motivates a departure from the Friedman rule.⁸ Then, from a broader public policy perspective, imperfections in markets that play a crucial role for the real economy (e.g. the labour market, where large nominal rigidities⁹ or search frictions¹⁰ may exist) may justify the need for a positive inflation rate in view of achieving an optimal equilibrium (e.g. the optimal unemployment rate).¹¹ Eventually, from a more technical perspective, because measured inflation rates present a systematic upward bias as they underestimate quality improvements in the goods whose prices are recorded, the “real” optimal inflation rate (taking this upward bias into account) may be higher than the one predicted by theory (without taking the bias into account).¹²

Once all these opposed effects are combined, price stability can still be confirmed to be (with a relatively small margin of error) the optimal policy monetary authorities should pursue. The next question is, then, how price stability can be achieved. Once money is modelled as a good

⁶ Friedman (1969a).

⁷ Nicolini (1998).

⁸ Schmitt-Grohé and Uribe (2012a).

⁹ The term *nominal rigidities* (or alternatively, *price stickiness*) is used to describe a situation in which prices do not adjust to changes in other factors as rapidly as they would in a frictionless economy.

¹⁰ On search frictions, see Sects. 3.1.1 and 4.1.1.

¹¹ Kim and Ruge-Murcia (2009); Galí (2010). The baseline scenario stemming from the New Keynesian *Phillips curve* (i.e. the newly microfounded version of the classical Keynesian relationship between inflation and unemployment) points, however, to the optimality of a zero inflation rate: Goodfriend and King (1997).

¹² Schmitt-Grohé and Uribe (2012b).

(be it worthy or worthless),¹³ the intuitive answer is that the price level will be direct proportional to the supply of money. Known as the *quantity theory of money*, this proposition is now universally appraised according to the formulation famously provided by Irving Fisher¹⁴ (although the precise intuition had been circulating in economic writings since at least the Renaissance)¹⁵ and applies interchangeably to commodity or fiat money as long as they are defined as goods. The quantity theory was centre stage in the two most important nineteenth-century monetary debates (the Bullion and Banking Controversies), during which a large number of writers (led by no less than David Ricardo) argued that the Bank of England's issuance of banknotes should have been regulated as if fiat money was commodity money.¹⁶ In the second half of the twentieth century, it was strongly popularized by the Monetarist School as a rule for the control of inflation,¹⁷ and for decades legions of scholars spent a considerable amount of energy in attempting to empirically prove its validity.¹⁸

Once macroeconomists had established price stability as the goal of monetary policy and control of money supply as the way to pursue it, the last important question they needed to address was the design of an optimal monetary authority efficiently controlling the money supply. Traditionally, scholars had tended to see monetary policy in isolation: money market equilibria could be determined by the monetary authority independently of the action of the fiscal authority. This view was encapsulated in Milton Friedman's arch-famous say that "inflation is always and everywhere a monetary phenomenon."¹⁹ The direct implication was that the design of an optimal monetary authority was relatively simple: a fully independent government agency strictly concerned

¹³ For a discussion on the definition of money as a good, see Sect. 4.1.1.

¹⁴ Fisher (1911).

¹⁵ Schumpeter (1954, pp. 311–317) argues that the first intuition of the quantity theory can be found in the work of sixteenth-century Florentine writer Bernardo Davanzati and was developed to its final version by Richard Cantillon well before David Hume.

¹⁶ See Sect. 4.2.2.

¹⁷ See esp. Friedman (1969b).

¹⁸ For a survey, see, for example, McCallum and Nelson (2010).

¹⁹ Friedman (1968, p. 18).

with the achievement of price stability would have done.²⁰ In the recent decades, however, the interpretation of monetary issuance as a fiscal device has been developed much further, so that monetary policy has been increasingly seen as an integral component of public policy that cannot be analysed separately from fiscal policy. First, it has been pointed out that inflation is just one in many distortionary taxes and that it has to be determined jointly with the others in order for an optimal equilibrium to be attained.²¹ Second, it has been shown that the lack of coordination between the monetary authority and the fiscal authority may dispossess the former from any control over the inflation rate.²² Third, it has been argued that coordination between monetary and fiscal authorities, which has wider fiscal implications than the mere seigniorage tax considered by the earlier literature (as inflation impacts the value of the whole stock of public debt), is not easy to produce and can only work under certain circumstances.²³ In view of these developments, the conclusion that monetary policy can no longer be considered in isolation from fiscal policy has gradually become widely accepted in the literature. Regardless of their affiliation, mainstream economists now share the idea that monetary policy is first of all a matter of public finance and that the achievement of price stability necessitates its integration within a consistent set of fiscal policies:²⁴ only such integration will allow public policy to be truly *time consistent* and hence credible to private agents. This is crucial: because the present inflation rate depends on private agents' *expectations* about future price levels,²⁵ the control of inflation will only be possible if the public sector's policymaking is made credible to the private sector; in turn, credibility can only be created via subjugation to transparent *policy rules* and renunciation to all margins of discretion.²⁶

To sum up, today's mainstream macroeconomic theory is based on the conceptualization of money as an intrinsically worthless good produced

²⁰ Rogoff (1985). Also see Sect. 4.1.4.

²¹ Phelps (1973).

²² Sargent and Wallace (1981).

²³ Woodford (2001).

²⁴ Canzoneri et al. (2010)

²⁵ Lucas (1976).

²⁶ Kydland and Prescott (1977).

by the government with the aim of extracting wealth from its captive buyers. This means that inflation is but a distortionary tax as many others. The conclusion is that public policy, which boils down to the mere management of the private sector's expectations, is the only driver of monetary equilibria. The implication is that the public sector's monetary policymaking always dominates the private sector's credit creation and that it does so even in extreme frameworks in which publicly issued money does not even exist.²⁷

5.1.2 Monetary Policy as Financial Regulation Policy

The restrictive interpretation of monetary policy adopted by mainstream macroeconomics (sometimes called the “money view”) has been questioned from two different perspectives: the “real business cycle view” and the “credit view”.²⁸ While the two perspectives start from very different assumptions and arrive at very different conclusions, both insist on the fact that money creation by the public sector can well be dominated by credit creation by the private sector.

The monetary application of real business cycle theory²⁹ has been originally inspired by the intuitions of the so-called New Monetary Economics School.³⁰ The starting point of this School was the idea that because money is credit, the concept of money supply is basically meaningless.³¹ Formal control of the money supply is not only unnecessary to the achievement of price stability,³² but even a suboptimal strategy to achieve it.³³ On this basis, real business cycle theorists have argued that fluctuations in the price level can be entirely determined by changes in the demand for monetary instruments (be them issued by the public or by

²⁷This is, for example, the case in Woodford (2003), whose approach is dubbed as “Monetarism without money” by Laidler (2015).

²⁸See, for example, Bernanke (1986).

²⁹As its name suggest, real business cycle theory originally focused on moneyless models, as, for example, that of Kydland and Prescott (1982).

³⁰For a presentation of this line of thought, see Cowen and Kroszner (1987).

³¹Black (1970).

³²Fama (1980).

³³Sargent and Wallace (1982).

the private sector): because monetary instruments are considered as inputs for the production of real goods, their demand will depend on expectations about future real economic activity.³⁴ At a later stage, this kind of modelling has been integrated within the mainstream one—in which, however, a stable demand for state-issued money for transactional motives is artificially induced, which limits the volatility of the overall demand for monetary instruments.³⁵ Yet, the earlier (more radical) results of real business cycle theory rather pointed to the conclusion (inconsistent with the “money view”) that money creation by the private sector may well dominate money creation by the public sector in the determination of the price level.

A parallel challenge to the “money view” has come from the “credit view”, which has drawn considerable inspiration from advances in the microeconomics of finance.³⁶ According to this approach, the effects of changes in money supply by the public sector may be substantially distorted by changes in credit supply by the private sector.³⁷ Such a distortion is due to the existence of frictions in financial markets, which generate an amplification mechanism (called the “financial accelerator”) making the impact of monetary and real shocks much more dramatic than mainstream models would predict.³⁸ Importantly, financial frictions may generate effects that run counter to the ones which would be expected following a modification in money supply by the monetary authority.³⁹ Despite its very different microfoundations, the “credit view” shares with the original “real business cycle view” the conclusion that the private sector’s issuance of monetary instruments can well dominate the public sector’s in the determination of the inflation rate.

As much as the “money view” has its roots in an old theoretical lineage that goes back to at least the Renaissance, the “credit” and “real business cycle views” find their antecedents in an antagonist intellectual tradition that Lloyd Mints (Milton Friedman’s predecessor at Chicago) famously—

³⁴ King and Plosser (1984).

³⁵ Goodfriend and King (1997).

³⁶ Some of these advances are those briefly presented in Sect. 3.1.1.

³⁷ Blinder and Stiglitz (1983).

³⁸ Bernanke et al. (1996).

³⁹ Bernanke and Gertler (1995).

albeit controversially—dubbed as the *real bills doctrine*.⁴⁰ The implication of this tradition (whose paternity is generally ascribed to Adam Smith)⁴¹ is that, in the determination of the price level, there can well be a domination of the private sector's credit creation over the public sector's money supply.⁴² The real bills doctrine shares an important element with real business cycle theory: the idea that monetary instruments are an input for the production of real goods.⁴³ Credit demand is henceforth determined by expectations about future real economic activity: as long as only this production-motivated type of demand is satisfied by suppliers—the doctrine maintains—the price level will move proportionally to real output. But the real bills doctrine also shares an important element with the “credit view”: the idea that uncontrolled credit creation can generate destabilizing effects.⁴⁴ “Good” credit finances real business activities

⁴⁰ Mints (1945). It should be pointed out that a lot of confusion exists on the meaning of this label. As a distinguished macroeconomist put it some years ago, “it is not an entirely straightforward task to determine what the real bills doctrine, or commercial loan theory of credit, is”: McCallum (1986, p. 149, ft. 19). In what follows, an original synthetic interpretation of the doctrine is proposed, informed by recent historical research on the traditional practice of discounting—see esp. Flandreau and Ugolini (2013) and Jobst and Ugolini (2016). I do not mean this interpretation to be representative of the thought of any precise proponent of the doctrine, although I believe it to be more or less close to the views of the directors of the Bank of England in the nineteenth century. As suggested by Friedman and Schwartz (1971, p. 297), the views of the directors of the Federal Reserve Banks in the early twentieth century might have been different.

⁴¹ Adam Smith's actual adherence to such a theory has been disputed (but eventually confirmed) by historians of economic thought: Arnon (2011, pp. 43–45). Some have desperately tried to absolve Smith from having fallen into the “real bills fallacy”, by arguing that his was only a maxim of good conduct for individual banks with no macroeconomic implication: see, for example, Glasner (1992). However, it is hard to see how Smith's “macroeconomics” might have been not “microfounded”.

⁴² Note that the real bills doctrine (an argument about financial regulation) is distinct from Fullarton's *law of reflux* (an argument about monetary regulation): Glasner (1992); Arnon (2011, pp. 227–229). According to this law, the supply of monetary instruments by the private sector is *always* optimal as it is purely determined by their demand: Fullarton (1845, pp. 82–98). As Schumpeter (1954, p. 728) pointed out, this law is logically inconsistent with its own proponent's insistence on the convertibility of monetary instruments into commodity money. Also see Sect. 2.1.3.

⁴³ This aspect has been often overlooked by critics of the real bills doctrine, who have accused it of mistaking the functioning of the exchange mechanism: see, for example, Selgin (1989). For a representation of the exchange mechanism more in line with the one the early proponents of the real bills doctrine had in mind, see Arnon (2011, pp. 152–169).

⁴⁴ Goodhart (2011) describes the real bills doctrine as a unified theory of macroprudential and microprudential regulation.

(“flows”), while “bad” credit finances the purchase of potentially bubbly assets (“stocks”): as long as monetary instruments are supplied only against “good” collateral—the doctrine maintains—the price level will move proportionally to real output.⁴⁵ In the eyes of the proponents of this doctrine, the monetary authority is no different than any other bank: its money creation generates the very same effects as (short-term) credit creation by the private sector. What is relevant to the determination of price fluctuations is not *who* issues monetary instruments, but *how* it issues them. As long as monetary instruments are issued against “good” collateral (i.e. as an advance on a future stream of revenue produced by real economic activity), changes in prices will only follow changes in output. Therefore, the public and private sector should be submitted to the same rules as far as the issuance of monetary instruments is concerned: an optimal equilibrium can be achieved as long as both follow the same prudential rules. As a matter of fact, supporters of this doctrine viewed monetary policy as an important type of financial regulation policy.

The real bills doctrine has always been extremely controversial since its first appearance. It has been fiercely fought by proponents of the quantity theory of money during the two British monetary controversies of the early

⁴⁵ This distinction between “flows” and “stocks” is explicit in Adam Smith’s famous metaphor of the “water pond” (*Wealth of Nations*, book II, chapter 2): “When a bank discounts to a merchant a real bill of exchange drawn by a real creditor upon a real debtor, and which, as soon as it becomes due, is really paid by that debtor; it only advances to him a part of the value which he would otherwise be obliged to keep by him unemployed, and in ready money for answering occasional demands. The payment of the bill, when it becomes due, replaces to the bank the value of what it had advanced, together with the interest. The coffers of the bank, so far as its dealings are confined to such customers, resemble a water pond, from which, though a stream is continually running out, yet another is continually running in, fully equal to that which runs out; so that, without any further care or attention, the pond keeps always equally, or very near equally full. Little or no expense can ever be necessary for replenishing the coffers of such a bank”: Smith (1776, p. 367). This idea would be later developed as the notion of liquidity as “self-liquidation”, as opposed to the notion of liquidity as “marketability”. This opposition was encapsulated in the famous nineteenth-century English banking maxim that “banking is the easiest possible business to conduct, when once the banker has grasped the difference between a bill of exchange and a mortgage”: Withers (1914, p. 46). As remarked by Plumptre (1940, p. 7), “emphasis upon marketability rather than self-liquidation is evidence of the growth of finance independently of productive processes. Marketability is, obviously, a financial concept: whereas self-liquidation is a concept associated with the flow of goods through the processes of production.” On this distinction and its relation to contemporary financial theory, also see Mehrling (2011, pp. 11–29) and Jobst and Ugolini (2016, pp. 162–163).

nineteenth century and constantly presented as a “fallacy” afterwards.⁴⁶ Despite its overwhelming rejection by economists, however, the doctrine has remained, until the 1930s, extremely popular among practitioners as a “rule of thumb” for the conduct of monetary policy. Since, the doctrine was squarely accused of having caused the Great Depression⁴⁷ and was abandoned altogether.⁴⁸ Henceforth, the doctrine has remained totally despised by theoreticians (with the rare exception of some provocative attempts).⁴⁹ In the meantime, economists raising doubts on the quantitativist dogma have at times been accused of erring on the side of this infamous doctrine. This happened, for instance, to 1960s Keynesians, who believed that an increase in money supply would not be inflationary as long as output grew at a lower than optimal rate.⁵⁰ The same also happened to supporters of price-oriented monetary policies, who were pleading for the satisfaction of the whole money demand at a fixed interest rate without caring about the size of

⁴⁶Humphrey (1982) presents the standard theoretical refutation of the real bills doctrine: issuing money to finance real activities will increase the price level, and this in turn will generate a higher demand for money to finance new real activities, thus generating a vicious circle of ever growing inflation. Note that this refutation is critically based on the hypothesis that the input of production is a good created out of nothing (not credit), and that this creation necessarily entails an instantaneous inflationary effect. Humphrey (1982, pp. 5 and 9) states that this refutation was originally formulated by Henry Thornton. However, in the one passage from the *Two Speeches on the Bullion Report* (1811) that Humphrey quotes twice in support of his claim, Thornton does *not* refer to the directors of the Bank of England (who lent on real bills), but to John Law (who lent on speculative assets). Humphrey’s (1982, pp. 5–6) contention that John Law is the true father of the real bills doctrine amounts to a misrepresentation of the latter, whose core argument was that lending had to be collateralized by flows of real revenue (not by stocks of value like land, as Law maintained). In *Paper Credit of Great Britain*, Thornton certainly strongly criticized the real bills doctrine, but mostly on the ground of its practical applicability (he argued that it was impossible to distinguish “real” from “fictitious” bills) rather than of its inherent logic: Thornton (1802, pp. 30–36). For a reconciliation between Thornton and the inherent logic of the real bills doctrine, see Arnon (2011, pp. 58–60 and 167–169); for a critical view, see Meltzer (2003–2010, I, pp. 26–31 and 54–64). On how the Bank of England tried to distinguish “real” from “fictitious” bills, see Flandreau and Ugolini (2013).

⁴⁷See esp. Friedman and Schwartz (1971) and Meltzer (2003–2010, I).

⁴⁸It is curious to notice, in passing, that the universal abandonment of the real bills doctrine as a practical rule for the conduct of monetary policy in the 1930s has coincided with the decoupling of credit creation by the private sector from money creation by the public sector in all industrial countries: Schularick and Taylor (2012).

⁴⁹See esp. Sargent and Wallace (1982).

⁵⁰Hetzel (2008, pp. 60–66); Meltzer (2003–2010, II, p. 890).

money supply.⁵¹ None of these economists, however, shared the fundamental “qualitative” focalization of the original real bills doctrine, which was mostly concerned with formulating a rule of conduct for impeding an overheating of economic activity.

To sum up, nowadays’ consensus on the interpretation of monetary policy as tax policy is a relatively recent one. Until the 1930s, the consensual view (at least, among practitioners) was rather that monetary policy was a type of financial regulation policy, allowing for the maintenance of the adequate inflation rate. This view was based on the fundamental idea that no clear distinction can be drawn between money and credit creation. Accordingly, the monetary authority was expected to behave no differently from a well-behaved private bank: as long as the good rules of conduct (i.e. providing advances to real economic activity) were respected, the price level was expected to move in tandem with real output regardless of the quantity of monetary instruments issued by either the public or private sector. By contrast, in case private banks did not follow a “sound” collateral policy in the issuance of their monetary instruments, the monetary authority alone could not be expected to control the inflation rate, as its action would have been dominated by that of the private sector. As a result, the way in which the monetary authority could have tried to impact the behaviour of the private sector did not consist of modifying the quantity of the money it issued, but rather its price (i.e., the interest rate). This amounted to modifying lending conditions for private banks: it was henceforth supposed to provide them with incentives to modify their issuance behaviour.⁵² The management of expectations was thus a crucial ingredient in this old view as much as it is in the current view, but it was then focused on the financial sector rather than on the general private sector. Policymaking by the monetary authority fundamentally consisted, therefore, of regulatory action aimed at counterbalancing the total domination of the private sector in the determination of monetary equilibria. Treated as marginal for many decades, these crucial dimensions of monetary policymaking have only started to be revalued since the outburst of the 2008 crisis.⁵³

⁵¹ Humphrey (1982).

⁵² For the development of this view at the Bank of England during the first half of the nineteenth century, see Wood (1939, pp. 92–104 and 135–143).

⁵³ See, for example, Borio and Zhu (2012).

5.1.3 Monetary Policy Strategy and Implementation

While monetary policy has always been one of the most popular topics in macroeconomics, its concrete implementation by the monetary authority has long been treated as irrelevant by the scholarly literature. This neglect reflects a clear division of labour within nowadays' central banks between "white-collar" policymaking (elaborated at economics departments, in contact with universities) and "blue-collar" policymaking (performed by operations departments, in contact with financial intermediaries).⁵⁴ Following the intellectual dominance of the quantity theory of money in the second half of the twentieth century, it is not surprising that the implementation of monetary policy has long been conceived by economists in an extremely basic way: in order to achieve price stability, the monetary authority was merely supposed to increase or decrease the supply of money (thus impacting the interest rate) by buying or selling assets on the market. This kind of reasoning, however, implicitly assumes that targeting the *quantity* of money in order to have an impact on its *price* is an optimal method for maintaining orderly conditions in the real economy. But such an assumption is questionable: even from a purely theoretical viewpoint, it is legitimate to wonder whether an opposite method (i.e. targeting the price of money directly rather than its quantity) might not actually be superior to the former.⁵⁵ Starting from this question, a new literature (informed by advances in the microeconomics of banking)⁵⁶ has gradually emerged in parallel to traditional monetary macroeconomics and has provided new insights on how monetary authorities should interact with the surrounding financial system.⁵⁷ Its largely consensual conclusion is that authorities should only focus on prices, while leaving quantities to adjust automatically.⁵⁸

⁵⁴ Bindseil (2014, p. 11).

⁵⁵ Poole (1970).

⁵⁶ See esp. one of its early contributions, that is, Poole (1968).

⁵⁷ For an account of the evolution of this literature, see Bindseil (2004, pp. 20–44).

⁵⁸ This conclusion has been comforted by more recent macroeconomic modelling, esp. Woodford (2003). For a more reserved (but not irreconcilable) view, see, for example, McCallum and Nelson (2010).

This literature has developed a useful taxonomy that allows distinguishing between the different aspects at stake in the design of monetary policymaking. At a more macroeconomic level, *monetary policy strategy* features the definition of a *final target*, which is the monetary authorities' ultimate goal. Today, such a final target consists of price stability, but other goals may be conceived (e.g. full employment, sustained output growth, or the maximization of fiscal revenues).⁵⁹ The achievement of the final target is pursued through the control of an *intermediate target*, defined as “an economic variable that (a) the central bank can control with a reasonable degree of precision, and (b) which is in a relatively stable or at least predictable relationship with the final target of monetary policy, of which the intermediate target is a leading indicator”.⁶⁰ In today's big industrialized countries this role is generally played by interest rates, but in other contexts alternative variables have been used (esp. money supply and exchange rates). At a more microeconomic level, *monetary policy implementation* features the definition of an *operational target*, which is an economic variable that monetary authorities can control more precisely than the intermediate target, but allows to impact the latter with a certain degree of efficacy. When the intermediate target is the level of interest rates, the role of operational target is generally played by the shortest interbank interest rate (i.e. the overnight rate); in case the intermediate target is the level of money supply or of exchange rates, this role can be played (respectively) by one specific monetary aggregate or by one specific bilateral spot exchange rate (or more generally, by the spot price of a particular asset used as international medium of exchange).⁶¹ The control of the operational target is achieved by the monetary authority through the deployment of a number of tools known as *monetary policy instruments*. There exist three families of such instruments: (1) operations

⁵⁹ Mishkin (2007, pp. 37–57).

⁶⁰ Bindseil (2004, pp. 8–9).

⁶¹ Bindseil (2004, pp. 7–8). In this chapter, I will use the word “exchange rate” in its widest acceptance—that is, as a synonym of “conversion rate”. My use will thus encompass both *internal* exchange rates (i.e. rates of conversion between two domestic currencies, often known as *agio* in the technical literature) and *external* exchange rates (i.e. rates of conversion between one domestic and one foreign currency, or foreign exchange rates strictly speaking). This choice is dictated by the will to underline the continuity in the rationale of monetary policymaking throughout different institutional contexts.

conducted with voluntary counterparties on the initiative of the monetary authority (*open market operations*); (2) operations conducted on the initiative of voluntary counterparties, on the basis of a commitment of the monetary authority to allow such operations under pre-specified conditions (*standing facilities*)⁶²; and (3) forced operations imposed on counterparties under pre-specified conditions (*reserve requirements*).⁶³

To sum up, the relatively recent development of theories of monetary policy strategy and implementation has provided for more precise micro-foundations to the macroeconomic action of monetary authorities. This is important because looking at monetary policymaking from the viewpoint of policymakers allows for assessing the rationale of their action in a less dogmatic way than the macroeconomic literature has traditionally done.⁶⁴ In particular, once the concrete constraints on monetary authorities are taken into account, the apparently huge formal differences in the way monetary policy has been conducted over the centuries can actually be shown to break down to much smaller substantial dissimilarities. This is what the remainder of this chapter will attempt to do.

5.2 Monetary Policy: History

5.2.1 Inconvertibility and Monetary Stability: Venice, Amsterdam, Hamburg

Medieval Europe inherited from the Greek and Roman Antiquity a legal system based on the principle that legal money consisted of metallic coins monopolistically produced by the sovereign authority. As we have seen,⁶⁵ this system was very different from the one developed by earlier centralized civilizations in Mesopotamia and Egypt. The Greeks had been the first to develop coinage as a practical device to remunerate mercenaries in a highly fragmented political framework. The Romans had quickly appropriated

⁶² On standing facilities, also see Sect. 3.2.2.

⁶³ On reserve requirements, also see Sect. 3.1.3.

⁶⁴ See esp. Friedman and Schwartz (1971).

⁶⁵ See Sect. 4.1.2.

this useful innovation at the time of their conquest of the Hellenistic world and had contributed to spread it westwards.⁶⁶ Once the age of military expansion had come to its conclusion and the Empire had started to reorganize itself on a more stable basis, Roman rulers had seen coinage as an extraordinarily powerful way to conduct centralized policy in a highly inhomogeneous imperial economy. The Roman state had internalized both the clearing of interbank payments (via its efficient network of tax collectors, through which private payments could be performed)⁶⁷ and money creation (via its official mints) and used the latter as a way to issue *de facto* fiat money on a metallic (instead of a paper) support.⁶⁸ When the Empire collapsed, Europe went back to a highly fragmented political situation, yet it did not lose the extensive juridical tradition Rome had developed around this particular concept of money.⁶⁹ As a result, until well into the nineteenth century all European countries continued to see metallic coin as the sole legal money.

This explains why *convertibility* into metallic coin (i.e. into legal-tender money) has been the hallmark (or, one might legitimately say, the “gold standard”) of monetary *and* financial regulation in the West until as late as the twentieth century. In a world in which the “price level” was a totally abstract concept with no practical relevance, convertibility was no guarantee of price stability in the short term, but was universally (albeit incorrectly) perceived as such a guarantee in the long term. More importantly, because gold and silver were accepted as media of exchange on a world scale, convertibility was (correctly) seen as a guarantee of foreign exchange rate stability in the short as well as long term. Differently said, convertibility provided a synthetic rule for the maintenance of both internal and external monetary stability. As a result, *any* kind of bank (be it private or public) was authorized to issue monetary instru-

⁶⁶According to Scheidel (2008, p. 285), “in the final analysis, there is nothing inherently ‘normal’ or inevitable about the conversion of gold and silver into standardized coin. [...] It is primarily – and perhaps even exclusively – in the military sphere that the portability and fungibility of normed units of silver in particular would greatly outweigh the utility [of alternative media of exchange] [...]. Coins are not inherently irresistible.”

⁶⁷Bogaert (1968, pp. 344–345).

⁶⁸Harris (2008).

⁶⁹Fox et al. (2016).

ments only as long as these would be convertible into coin upon demand; violation of the convertibility rule (a “suspension of payments”) was often the premise to bankruptcy. Under this respect, there existed no formal difference between private banks and early government-sponsored banking organizations like Venice’s Grain Office,⁷⁰ Barcelona’s Taula de Canvi,⁷¹ or Genoa’s Casa di San Giorgio⁷²: all of them were equally subjected to convertibility requirements. In case of difficulties, payment in coins could be postponed or assigned to third parties (as in the case of the Grain Office’s transferable credits on current account),⁷³ but it could not be actually replaced by other forms of payment and thus “inflated away”.

Given the highly volatile quantity and quality of metallic coins available in late medieval and early modern Europe, however, convertibility was no guarantee of stable monetary conditions in the short term.⁷⁴ The problem was most clear in Venice, a financial centre which was at the junction of Western and Eastern Mediterranean trade routes, and was therefore directly exposed to shocks in the supply of specie on both sides. Because the West was in constant trade deficit with the East, substantial amounts of bullion had to be shipped through Venice in order to pay for Western imports of Eastern goods. As the galleys to the Levant typically left the Lagoon in late summer, the domestic stock of specie was lowest in early autumn and was only gradually refurbished (from Central Europe and the Balkans) in the subsequent months: this strong seasonality left Venetian banks exposed to runs during this time of the year—and, unsurprisingly, almost all failures occurred in this very period.⁷⁵ The difficulties experienced by the Grain Office in meeting convertibility requirements after the mid-fourteenth century might have provided a good reason for the government to discharge this delicate task onto the Rialto banks.⁷⁶ Such difficulties were exacerbated by the “silver crisis” of

⁷⁰ See Sect. 4.2.1.

⁷¹ See Sect. 2.2.2.

⁷² See Sect. 2.2.2.

⁷³ Mueller (1997), pp. 364–367).

⁷⁴ Sargent and Velde (2002).

⁷⁵ Mueller (1997), pp. 126–128).

⁷⁶ See Sect. 4.2.1.

the early fifteenth century, when the supply of bullion collapsed in the whole of Europe and beyond.⁷⁷ As we have seen,⁷⁸ in the 1440s the Taula de Canvi experienced troubles that led it to depart from its original design and to give up its responsibilities on the management of the domestic payment infrastructure. As for San Giorgio, in 1444 the Casa stopped the convertibility of bank money into cash altogether—or differently said, it dropped the two standing facilities (a coin-selling facility and a coin-selling one) it had previously offered to the public.⁷⁹ By the mid-fifteenth century, therefore, all three early attempts to circulate government-sponsored money (in Venice, Barcelona, and Genoa) had virtually failed because of the difficulties of maintaining convertibility. Certain amounts of inconvertible money still circulated in Genoa (the *moneta di paghe*, i.e. the Treasury’s “coupon” money)⁸⁰ and occasionally in Venice (the *giro delle biave*, i.e. the victualling agencies’ transfer money),⁸¹ but only to a relatively limited extent. Private banks fared no better, though: although formally bound to maintain convertibility, private bankers were in constant search for creative methods to circumvent this obligation.⁸² Apparently, Venetian bankers offered their customers different types of products: inconvertible (formally illegal) bank money coexisted with (legal) convertible one and could be exchanged with the latter at a variable exchange rate.⁸³ This actual inconvertibility may explain why, from the fourteenth to sixteenth centuries, the *partita di banco* (the money issued by the Rialto bank) often depreciated with respect to circulating coins despite its formal convertibility.⁸⁴ When in the 1520s the first dedicated

⁷⁷ Aerts (2006).

⁷⁸ See Sect. 2.2.2.

⁷⁹ Felloni (1991).

⁸⁰ See Sect. 2.2.2.

⁸¹ See Sect. 4.2.1.

⁸² Already in the 1320s the Venetian government felt obliged to state formally that bankers were required to convert deposits into specie within three days of request: Mueller (1997, pp. 128–129). Statements of this sort were reiterated many times (apparently, in vain) in the following decades: Lattes (1869).

⁸³ For instance, during the “Continental blockade” organized in 1421 by King Sigismund of Hungary (which cut Venice off from its silver supplies), this practice apparently became so widespread that the government had to restate once more its unlawfulness: Lattes (1869, pp. 47–54); Mueller (1997, pp. 117–118).

⁸⁴ Luzzatto (1934, pp. 41–45).

banking supervisory agency (the *Provveditori sopra Banche*) was created, one of the main tasks it was assigned consisted of the enforcement of convertibility rules, with the aim of reducing the depreciation of bank money.⁸⁵

Yet, monetary instability could be caused by the volatility not only in the quantity but also in the quality of the supplies of coins. Starting from the 1560s, a “race to the bottom” in the enactment of competitive debasements provoked a serious degradation in the quality of circulating silver coins throughout the continent, which engendered a depreciation of up to two-thirds in the gold price of silver specie.⁸⁶ This time, the governments of the merchant republics of Venice, Amsterdam, and Hamburg reacted to the problem with a radical departure from the traditional principle of convertibility: as preserving convertibility into cash now meant downgrading the quality of bank money, the defence of monetary stability implied a complete separation between the two. Therefore, the principle of *internal inconvertibility* was adopted by these governments in order to allow not for depreciation, but rather for appreciation of bank money with respect to cash.

Venice was the first to follow this path. As we have seen,⁸⁷ in 1587 the Republic had (reluctantly) created the *Banco della Piazza di Rialto* as a way to revive the domestic payment infrastructure, which had ground to a halt when the last private deposit bank had suspended convertibility in 1584. Following the tradition, the *Banco della Piazza* was required to keep its money convertible into coin. However, shortly after the opening of the new bank, in 1588 the government deprived the circulating medium of around 20% of its silver content, while keeping the value of bank money pegged to old coins: this actually made the price of bank money around 20% higher (and fluctuating) with respect to legal money. In so doing, the money issued by the public bank (which would be declared legal tender for large payments in 1593) was insulated from the effects of fluctuations in the quality of the circulating medium.⁸⁸ The principle of internal inconvertibility

⁸⁵ Lattes (1869), pp. 88–97). Also see Sect. 3.2.1.

⁸⁶ Luzzatto (1934), pp. 45–46); Schnabel and Shin (2006).

⁸⁷ See Sect. 2.2.1.

⁸⁸ Roberds and Velde (2016), pp. 333–335).

vertibility of bank money was applied more radically with the creation of the Banco del Giro, which greatly expanded the (previously limited) circulation of inconvertible (but transferable) credits on current account issued by state agencies. As we have pointed out,⁸⁹ credits with the *giro della zecca* had been originally opened to Giovanni Vendramin against his deposits of bullion to the Mint, which had not been promptly repaid in specie: such credits were legal tender and transferable to third parties, but they were not convertible on demand (they would only be converted into specie at the government's will). As this temporary device became a permanent one after 1619, a much more innovative model of public bank than the one adopted in 1587 was established for some decades. Actually, despite its separation from the circulating medium, the money issued by the Banco della Piazza remained convertible into specie on demand: bank money could be created and destroyed on the counterparties' initiative by depositing and withdrawing coins (albeit at a variable exchange rate), as the Banco della Piazza provided the public with two standing facilities (a coin-buying facility and a coin-selling one). In stark contrast, the money issued by the Banco del Giro remained fully inconvertible unless the government decided otherwise: bank money could be created (by opening credits to counterparties) and destroyed (by repaying it in specie to counterparties) exclusively on the government's initiative, as the Banco del Giro did not provide the public with any standing facility. Counterparties' demands for the creation of bank money (by depositing bullion or coins to the Mint) or for its destruction (by withdrawing specie) were occasionally met, but not on a systematic base. This made the Banco del Giro the likely first experiment with a purely fiduciary state-issued legal-tender money. The Banco adjusted the price of its money through open market operations: it depreciated it by borrowing from its purveyors, while it appreciated it by repaying its debt in specie. While in the 1620s and then in the 1640s the Banco's money depreciated in view of high military spending, in the 1630s and then in the 1650s it re-appreciated as government debt was gradually resorbed. Except in wartime conditions, the government used open market operations to keep the value of bank money about 20%

⁸⁹ See Sect. 4.2.1.

higher than that of cash.⁹⁰ This early radical experiment with managed money came however to an end in 1666. Following a number of petitions from local merchants, on that year the government re-established the convertibility of the Banco's money into specie at a fixed exchange rate (yet maintaining the 20% overvaluation of bank money over cash that had been originally established in 1588), thus reintroducing a coin-buying and a coin-selling facility. From that moment until the end of the Republic (with the exception of the Second Morean War of the 1710s and its aftermath, when convertibility was temporarily suspended), the price of the money issued by the Banco del Giro remained stably pegged to that of circulating coins, whose instability had come to an end in the second half of the seventeenth century.⁹¹

The Venetian experiments with inconvertibility were imitated in Amsterdam with a small lag, but with some important modifications. As we have seen,⁹² the foundation of the Wisselbank in 1609 had been chiefly motivated by the City's desire to stabilize monetary conditions in the face of the serious deterioration in the quality of circulating coins. The original Bank was strictly designed to counteract *Gresham's law*⁹³: it was supposed to "clean" coin circulation by withdrawing "bad" and releasing "good" specie. To do so, the Wisselbank provided the public with two asymmetric standing facilities: bank money (whose demand had been made positive by making it legal tender for large transactions) could be created by depositing low-quality specie as well as destroyed by withdrawing high-quality specie, although the latter operation implied a relatively high fee.⁹⁴

This original plan was not completely successful: the high withdrawal fee discouraged counterparties not only from withdrawing but also from depositing specie, and since the mid-seventeenth century, the demand for bank money gradually declined. The public's reluctance to use the two standing facilities made bank money behave like a *de facto*

⁹⁰ Luzzatto (1934, pp. 56–64).

⁹¹ Luzzatto (1934, pp. 64–69).

⁹² See Sect. 2.2.2.

⁹³ Gresham's law famously states that "bad money drives out good money." On the interpretation and validity of this law, see Velde et al. (1999).

⁹⁴ Quinn and Roberds (2014).

inconvertible money, as its price started to fluctuate independently from that of circulating coins. In order to make deposits more attractive to the public, in theory the Wisselbank could have done what the Banco del Giro had done in 1666—namely, restoring symmetric conditions between the two standing facilities. Yet this option was not viable, as in the United Provinces (unlike in Venice) the quality of coin circulation still had not stabilized by that time.⁹⁵ In order to bypass this difficulty, in 1683 the Wisselbank gave up its original role as “cleaner” of the coin circulation and transformed its buying and selling facilities into a lending facility. On the one hand, the coin-buying facility started to issue receipts that were only convertible in the very same coins that had been originally sold to the bank. On the other hand, the coin-selling facility started to pay in specie only upon presentation of the new type of receipts, while already existing bank money was made ineligible for conversion into specie. *De facto*, this meant that the Bank now made temporary (albeit renewable) advances on the deposit of specific, non-fungible stocks of coins.⁹⁶ In so doing, the Wisselbank actually restored symmetric conditions between its two standing facilities, without however (thanks to the non-fungibility of cash reserves) pegging the price of bank money to that of circulating coins. This made the bank’s deposits more attractive and discharged all difficulties tied to the instability of circulating coins on the public itself.⁹⁷ After 1683, then, the money issued by the Wisselbank continued to be *de facto* inconvertible as before, but at more “user-friendly” conditions. The new system did not entail as much a radical departure from convertibility as the one that had been attempted by the early Banco del Giro; still, it allowed the Bank to perform a relatively comfortable “managed float” of the price of bank money through the implementation of open market operations.

The model of the early Wisselbank was closely copied by Hamburg, another city state that found itself heavily exposed to the collapse in the quality of silver specie in the early seventeenth century.⁹⁸ In 1619, the

⁹⁵ Quinn and Roberds (2009).

⁹⁶ Quinn and Roberds (2017).

⁹⁷ Quinn and Roberds (2014).

⁹⁸ See Sect. 2.2.2.

Hamburger Bank was designed to counterbalance the working of Gresham's law with two asymmetric standing facilities. The Bank experienced considerable difficulties in the first century and a half of its life, and in a number of occasions, the price of its money sunk below that of circulating coins, so that the coin-selling facility had to be temporarily closed. Unlike the *Wisselbank*, hence, the Hamburger Bank struggled hard to maintain monetary stability through the internal inconvertibility policy. As a result, in 1770 the Bank abandoned this policy and envisioned to solve the problems inherent to coin circulation by adopting a new version of convertibility. In that year, the old asymmetrical coin-buying and coin-selling facilities were replaced by two symmetrical ingot-buying and ingot-selling facilities.⁹⁹ By pegging very tightly the price of its money to that of ingots instead of specie, the Hamburger Bank introduced for the first time the model of a pure ingot standard, which would be adopted elsewhere only in the aftermath of the First World War. It was very close to the celebrated "ingot plan" proposed for England in 1816 by David Ricardo¹⁰⁰ (which John Maynard Keynes regarded as the first sketch of "a pure managed money"),¹⁰¹ with just one exception: the Bank only issued money on current account, while Ricardo's project was focused on the issuance of banknotes. The new facilities proved very popular among domestic and foreign merchants and actually transformed Hamburg into the reference market for silver in Europe until the time of German Unification.¹⁰² Paradoxically, the replacement of the Hamburger Bank by the Reichsbank in 1875 made the Hanse Town retrocede from its innovative pure ingot standard to a much more archaic specie standard.

To sum up, like today's central banks, late medieval and early modern public banks were primarily concerned with the achievement of monetary stability. Contrary to our preconceptions, in these early times convertibility of bank money into specie was no guarantee of stability. Confronted with the high volatility in the quantity and quality of circulating coins, the merchant republics of Venice, Amsterdam, and Hamburg

⁹⁹Roberds and Velde (2016, pp. 350–351).

¹⁰⁰Ricardo (1816).

¹⁰¹Keynes (1971, p. 14).

¹⁰²Seyd (1868, pp. 316–317 and 405–406).

tried to stabilize the value of their public banks' money by making it *de facto* inconvertible into specie. Stabilization of the intermediate target (the exchange rate between bank money and cash) was pursued by these banks through both their standing facilities and open market operations. On the one hand, with the remarkable exception of the early Banco del Giro (the first true experiment with a purely managed money), all of these banks provided counterparties with standing facilities that did not concern financial assets, but coins. On the other hand, open market operations concerned coins, but also government debt—albeit in the form of non-securitized, non-marketable direct loans. This means that, in fact, early public banks had no interaction with money markets in a modern sense and could not therefore have a direct impact on interest rates. Not actually intervening in liquid financial markets, early modern monetary authorities had no choice but implementing their monetary policy through changes in the quantity of outstanding money.

5.2.2 Convertibility and Monetary Stability: England and Beyond

As we have pointed out,¹⁰³ while the banks of Venice, Amsterdam, and Hamburg were part of the public sector, the Bank of England was a joint-stock company to which the government had externalized a number of tasks in the framework of a specific charter. Because the monopolistic privileges granted to its shareholders were a highly controversial political issue, the Bank was not treated differently than other any other domestic financial intermediary as far as the convertibility of its money into legal money (i.e. specie) was concerned. The Bank's notes were only declared legal tender (and very reluctantly so) in the last phase of the Napoleonic Wars (1812), and with the restoration of the gold standard, the status was repealed until 1833.¹⁰⁴ As a result, the principle of convertibility (i.e. of the maintenance of a fixed exchange rate between bank money and circulating coins) was the cornerstone around which the Bank organized its

¹⁰³ See Sect. 4.2.2.

¹⁰⁴ Fetter (1950).

whole functioning for more than two centuries. In order to make this strategy successful, however, in its early years the Bank had to contribute to addressing the problem of the instability of the metallic circulation. Once the permanent solution was definitively found in the early eighteenth century, the Bank was finally able to reorient its targets and gradually develop a more refined monetary policy strategy.

Despite substantial organizational differences, the early Bank of England had in common with the public banks of Venice, Amsterdam, and Hamburg an identical final target: maintaining the stability of the value of bank money, which was issued in order to monetize a stock of non-securitized debt (mostly owed by the government or government-sponsored entities like the East India Company).¹⁰⁵ The Bank provided two classical, symmetrical standing facilities (a coin-buying and a coin-selling facility)¹⁰⁶ and implemented open market operations (esp. on smaller portions of securitized public debt, like tallies¹⁰⁷ or Exchequer bills) in order to impact the price of bank money by increasing or decreasing the quantity of outstanding banknotes. In its very first years of life, however, the domestic metallic circulation was still highly unstable. With the development of the role of London as the leading trade centre between Europe and India, in the late seventeenth-century England had found itself in a situation that was similar to the one Venice had experienced in the late Middle Ages. Because the West held systematic trade deficits with the East, large quantities of silver had to be shipped regularly to Asia by the East India Company, and by the 1690s the domestic circulation of silver coins had become considerably compromised.¹⁰⁸ In 1696, the costly “Great Recoinage” of silver specie sponsored by John Locke and the Whig party had failed to stabilize the metallic circulation, although it had definitely increased the demand for banknotes for transactional purposes.¹⁰⁹ The unanticipated solution to these

¹⁰⁵ Clapham (1944, I, pp. 113–122).

¹⁰⁶ To be precise, in the 1690s the Bank offered a number of different coin-buying facilities with the aim of refurbishing its bullion reserves. These early facilities were reorganized after 1700: Clapham (1944, I, pp. 37–38 and 131–133).

¹⁰⁷ On tallies, see Sect. 4.2.2.

¹⁰⁸ Wagner (2017).

¹⁰⁹ Clapham (1944, I, pp. 34–37); Desan (2014, pp. 360–381).

ailments emerged out of historical contingencies in the course of the following decade. By signing with Portugal the Methuen Treaty of 1703, Britain secured a regular access to the output of the gold mines of Guinea and especially Brazil.¹¹⁰ This alimeted England's circulation of gold coins, which had previously been rather marginal. As the output of the newly discovered Brazilian mines started to flow into Europe, the market price of gold decreased, thus making the British mint price seriously overvalued: merchants were therefore incited to bring gold (and no silver) to the London Mint. This called for realignment of mint prices to the new level of market prices, and in 1717 Isaac Newton (then Master of the Mint) advised the Parliament to act accordingly. By refusing to follow Newton's suggestion, however, legislators definitively prevented the reestablishment of a silver circulation and *de facto* put the country on a gold specie standard.¹¹¹ This meant that domestic metallic circulation and the one used for intercontinental shipments were now completely separated: gold coins were used for internal circulation in Britain, while silver coins were shipped to Asia by the East India Company. As the country was moving to this new equilibrium, the Bank of England consciously endeavoured to establish itself as the central intermediary of the bullion market. In 1700, it created a new lending facility inspired by the one the Wisselbank had opened in 1683, but with one major difference: advances were offered to the counterparties at pre-specified conditions upon deposit of ingots rather than coins. In 1711, a gold-ingot-buying facility was added, with the explicit aim to provide the Bank with the means for systematically refurbishing its specie reserves through the Mint.¹¹² Taken together, these reforms proved extraordinarily successful and contributed substantially to establishing the Bank as the world's gold market-maker—a role it retained until well into the twentieth century.¹¹³ By the 1710s, the originally harsh problem of the stabilization of the internal exchange rate had been basically solved for good. The role of

¹¹⁰ Sideri (1970).

¹¹¹ Nogués-Marco (2013).

¹¹² Clapham (1944, I, pp. 133–137).

¹¹³ Ugolini (2013).

intermediate target could now shift from the internal to the external exchange rate, which was actually the determinant of gold flows to and from the country.¹¹⁴

During the first half of the eighteenth century, domestic financial markets for both government bonds¹¹⁵ and bills of exchange¹¹⁶ started to deepen in England. After the reforms of the public debt of the 1750s, the government relied increasingly on the issuance of long-term bonds on the market and left the Bank with the tasks of managing the floating debt and of easing the floatation of the funded debt.¹¹⁷ Although since its foundation the Bank had always extended a certain amount of loans to the private sector, this had remained a rather idiosyncratic business, and a very marginal one with respect to direct loans to the public sector.¹¹⁸ It was only in the second half of the eighteenth century that the business gained momentum: the Bank gradually became accustomed to systematically accommodating counterparties' demands for discounts on bills of exchange and advances on government bonds at pre-specified conditions. Thus, a lending facility on public *and private* debt became a fact of life in the 1760s, and its popularity was well-established by the 1790s. The new facility was undoubtedly a huge success. However, the increasing dependence of the domestic banking system on the lending facility put the Bank of England in a situation that none of the earlier public banks had ever experienced. Sure, both the Banco del Giro and the Wisselbank had been pressed by large demands for loans to government or government-sponsored entities, but the effects of such loans only indirectly impacted the private sector—as increased issuance led to a depreciation of bank money with respect to circulating coins.¹¹⁹ By contrast, a reduction of standing facility lending directly impacted the private sector if the latter depended on the

¹¹⁴Nogués-Marco (2013).

¹¹⁵Dickson (1967, pp. 457–469).

¹¹⁶Scammell (1968, pp. 115–130).

¹¹⁷Clapham (1944, I, pp. 150–153 and 203–204). Also see Sect. 4.2.2.

¹¹⁸Clapham (1944, I, pp. 122–130 and 153–156).

¹¹⁹To be precise, starting from the 1760s also the Wisselbank was subjected to an increasing pressure to continuously support the private sector; loans to privates, however, were not formally granted through an official standing facility, but through the intermediation of a government-sponsored guarantee fund (since 1781, the City Chamber of Loans): see Sect. 3.2.1.

Bank for refinancing—or, in modern parlance, if the latter had a *liquidity deficit* with respect to the monetary authority. Had the Bank been able to adjust the interest rate at which it lent to counterparties, a reduction of outstanding loans could have been achieved in a less painful way. Yet this was not possible, as *usury laws* capped the Bank's discount rate at 5% (i.e. the very rate at which it used to lend in normal times). As price policies were not available for addressing the risk of a depreciation, the only alternative consisted of enacting quantity policies—that is, of *rationing* credit. Introducing quantitative restrictions to the standing facility was however a highly costly policy in terms of financial stability, as it ran opposite to the principle of lending of last resort: curtailing lending to counterparties at the very moment they needed it most (i.e. in times of monetary tensions) amounted to precipitating the occurrence of financial accidents.¹²⁰ This put the Bank of England in front of a serious dilemma between financial stability and monetary stability. The dilemma emerged very clearly during the Napoleonic Wars, in the period that preceded the suspension of convertibility in 1797. The reason why a suspension actually occurred at this very time is less straightforward than it might appear at first sight. As a matter of fact, between 1794 and 1797 Britain's real military spending had been lower than in previous wars, when a demise of the gold standard had *not* been necessary; moreover, public debt monetization had been relatively limited prior to the suspension.¹²¹ And in fact, although fiscal concerns were certainly important, the context in which convertibility was suspended was one of financial panic rather than of fiscal crisis. Since late 1795, the Bank had been suffering a decline of bullion reserves and had reacted by reducing its banknote circulation through the rationing of discounts. The move had raised considerable apprehension (and protest) within the financial community. In late February 1797, accidents started to occur, and an important banking house came to the Bank to beg for support. Just a handful of days later, the King authorized the Bank to suspend the convertibility of its banknotes (i.e. to close its coin-selling facility) with the aim of suspending credit rationing and hence calming the panic.¹²²

¹²⁰ See Sect. 3.1.2.

¹²¹ Barro (1987, p. 235).

¹²² Clapham (1944, I, pp. 269–272). Incidentally, note that it was precisely in 1797 that the term “lending of last resort” was first coined by Francis Baring: see Sect. 3.1.2.

Therefore, the suspension of 1797 temporarily displaced emphasis from the monetary stability mandate to the financial stability mandate. In order to accommodate demand from the private sector, the Bank was now allowed to expand its banknote circulation. This came at the expense of dropping the fixed exchange rate between bank money and circulating coin, which had always been strictly maintained since the 1710s. Yet, surprisingly, the expansion of banknote issuance did *not* result into volatility in this internal exchange rate, which remained fairly stable for more than 12 years. Only in the aftermath of the catastrophic military events of 1809 banknotes depreciated with respect to specie, in a way that bore no proportion to the actual monetary expansion enacted by the Bank.¹²³ The abrupt depreciation triggered the explosion of the Bullion Controversy: critics accused the Bank's directors of having over expanded the issuance of banknotes in order to boost profits, while the latter replied they had just met the private sector's demand for credit that appeared legitimate according to their eligibility criteria.¹²⁴ The Bullion Controversy succeeded in shifting emphasis back from financial stability to monetary stability. Technically, the convertibility rule (as opposed to the "real bills" rule) was presented by David Ricardo and followers as the best viable method to achieve monetary stability, and this ended the search for alternative strategies: the external exchange rate, which was the determinant of international bullion flows, returned to be the Bank's intermediate target.¹²⁵ In 1821 convertibility was restored, although not along the lines proposed by Ricardo,¹²⁶ but via the reopening of the old coin and ingot facilities at pre-war conditions. This, however, amounted to relegate financial stability to the backstage once again. The Bank of England actually accompanied the return to convertibility with a steady reduction in its loans to the private sector. When the 1825 crisis erupted, the Bank reacted as the Bullionist School had instructed it to do—that is, by reducing the quantity of bank money through credit rationing.¹²⁷

¹²³ Antipa (2016).

¹²⁴ See Sect. 5.1.2.

¹²⁵ Flandreau (2008).

¹²⁶ Ricardo (1816). See Sect. 5.2.1.

¹²⁷ See Sect. 3.2.2.

From a theoretical viewpoint, this famous episode in the fight between supporters of the quantity theory of money and supporters of the real bills doctrine almost entirely abstracted (with some notable exceptions, esp. that of Henry Thornton) from the question of the role of interest rates.¹²⁸ This may have been understandable at the time of the Bullion Controversy, as usury laws were still firmly in force then. But this oblivion was less excusable three decades later, when the Banking Controversy erupted. By that time, the cap fixed by usury laws on the discount rate for bills of exchange had been abolished (in 1833) and the discount market had considerably deepened, thus providing scope for the first embryonic development of an interest rate policy.¹²⁹ In the course of the 1830s, a new implementation framework had been designed: the issuance of bank money was now mainly adjusted through open market operations (esp. in government debt), while access to the lending facility was granted yet discouraged by keeping official discount rates at a higher level than market rates.¹³⁰ This notwithstanding, the Banking Controversy remained obsessively focused on the question of the quantity of money and rather oblivious of the question of interest rates.¹³¹ Its final outcome (the Bank Charter Act of 1844, sanctioning the victory of the Currency School) was an explicit attempt at separating monetary stability from financial stability: the mere fact of strictly limiting the issuance of banknotes (now declared legal tender) was expected to take care of monetary stability, while financial stability would take care of itself.¹³² The passing of the Act, which explicitly encouraged the Bank to behave like any other private intermediary,¹³³ entailed an immediate change in the Bank's implementation framework: open market operations were downscaled, while standing facility lending (now extended at close to market rates in order for the

¹²⁸ David Ricardo went as far as denying in Parliament the existence of any relationship between interest rates and the quantity of money, although this was inconsistent with his own theoretical writings: Viner (1937, pp. 148–153). Also see Meltzer (2003–2010, I, pp. 26–27 and 56).

¹²⁹ King (1936, pp. 71–101); Scammell (1968, pp. 130–158).

¹³⁰ Wood (1939, pp. 101–103). Also see Sect. 3.2.2.

¹³¹ The one major exception was Thomas Tooke: Arnon (2011, pp. 234–245).

¹³² See Sect. 4.2.2.

¹³³ Clapham (1944, II, pp. 187–189).

Bank to be competitive) became its leading instrument.¹³⁴ Unfortunately, the violent crisis of 1847 (during which the cap on banknote circulation had to be temporarily lifted in order to stop credit rationing) proved that quantitative limitations to the issuance of banknotes were no sufficient condition for financial or monetary stability whatsoever.¹³⁵

As it had been the case in the 1790s, the Bank of England found itself once more divided between the obligation to preserve monetary stability (tightly regulated by the Act of 1844) and the need to foster financial stability (vocally requested by *The Economist* magazine and the banking community since 1847). Starting from the 1850s, the Bank had no other choice than reconciling the two by playing hard with the instrument it had been lacking at the time of the Napoleonic Wars—namely, flexible interest rates. Gradually, the Bank adjusted its implementation framework in order to make it more consistent with the maintenance of orderly monetary and financial conditions: the new framework was later conceptualized as the British “*Bank rate*” doctrine. In this new setting, the role of intermediate target was now gradually assumed by the market interest rate. This does not mean that foreign exchange rates had become irrelevant; but in the context of the increasing prominence of London as the world’s money market and gold market (a prominence that would only be reinforced by the emergence of the international gold standard in the 1870s),¹³⁶ the London discount rate had become the direct determinant of exchange rates and bullion flows.¹³⁷ Because variations in the official standing facility rate had an impact on the market rate, the Bank started to change the former very aggressively, as its critics (most notably, Walter Bagehot) had advised it to do.¹³⁸ However, the ensuing volatility of British interest rates (unknown to any other European country at the time)¹³⁹ triggered obnoxious effects on the real economy, thus exposing the Bank’s monetary policy to fresh criticism (most notably, by Walter Bagehot’s successor at *The Economist*,

¹³⁴ Wood (1939, pp. 127–149).

¹³⁵ See Sect. 3.2.2.

¹³⁶ Flandreau (2004); Flandreau and Jobst (2005).

¹³⁷ Flandreau and Gallice (2005).

¹³⁸ Bagehot (1873, pp. 180–187).

¹³⁹ Morys (2013).

Inglis Palgrave).¹⁴⁰ In order to minimize such volatility, towards the end of the nineteenth century the Bank increasingly resorted to the implementation of liquidity-absorbing open market operations (the so-called “Bank’s borrowings”).¹⁴¹ Moreover, the Bank also started to modify frequently the conditions attached to its coin-buying and ingot-buying facilities (the so-called “gold device” policy)¹⁴² in order to refurbish its bullion reserves, as it had done in the 1690s.¹⁴³ Although these sophisticated implementation techniques were relatively effective in “fine-tuning” the market rate, they also witnessed an increasing difficulty in attaining the final target of monetary stability. These difficulties were dramatically exposed by the crisis of 1914, in which the Bank totally lost control of the monetary system days before the outburst of the First World War. As it had been the case in February 1797, also in July 1914 it was the impossibility to reconcile monetary and financial stability (rather than the explosion of government borrowing) that ultimately motivated the suspension of convertibility. Submerged by demands for loans at its lending facility and by demands for conversions at its coin-selling facility, the Bank was unable to sustain both.¹⁴⁴ The run on the Bank of England’s coin reserves that immediately preceded the Great War was the “grand final” that closed the curtains on the model of the specie standard—the monetary arrangement that had been overwhelmingly predominant in Europe since the rise of the Roman Empire. The military effort made metallic circulation vanish throughout the continent; when the restoration of convertibility was planned in the Interwar, it was designed everywhere under the form of a pure ingot standard (like the one Hamburg had established in 1770).

As we have seen,¹⁴⁵ the model of the Bank of England as it had emerged in the second half of the eighteenth century (i.e. a joint-stock bank issuing notes convertible into specie, and providing the private sector with a lending facility) was imitated in basically all European countries in the course of the nineteenth century. Although different arrangements to

¹⁴⁰ Palgrave (1903).

¹⁴¹ Sayers (1936); Ugolini (2016).

¹⁴² Sayers (1936); Ugolini (2013).

¹⁴³ Clapham (1944, I, pp. 37–38).

¹⁴⁴ De Cecco (1974); Roberts (2013). Also see Sect. 3.2.2.

¹⁴⁵ See Sect. 4.2.2.

limit the issuance of bank money existed in each country (most of which were, however, less rigid than the one imposed by the Bank Act of 1844),¹⁴⁶ all European banks of issue shared with the Bank of England the same final target (monetary stability), as well as an informal commitment to financial stability (witnessed by the repeal of usury laws and the spread of lending-of-last-resort practices in the 1850s).¹⁴⁷ What Continental banks could not share with the Bank of England was the exact implementation framework. The unique position of London as the world's gold and money market had allowed for the Bank's focalization, since the 1840s, on the market interest rate as an intermediate target. More peripheral countries, however, lacked an equally efficient transmission mechanism between domestic interest rates and foreign exchange rates and had therefore to rely more on the latter in their attempt to maintain the convertibility of bank money into specie. Quite naturally, therefore, the privileged banks of issue of a number of Continental countries started to implement open market operations in the foreign exchange market as a way to impact exchange rates directly, without generating volatility on the domestic money market. This practice originally developed as a gradual evolution of the old practice of implementing open market operations in the specie market, a practice that had already been popular among early modern public banks. At an early stage, banks situated in countries that shared their circulating coins with a bigger neighbour started to intervene in the foreign exchange market in order to aliment their coin-selling facility without modifying the access conditions to the lending facility: this was, for example, the case of the Banco de Portugal (which used sterling claims to import British gold specie, into which its banknotes were convertible)¹⁴⁸ or of the Banque Nationale de Belgique (which used franc claims to import French silver specie, into which its banknotes were convertible).¹⁴⁹ Gradually, this strategy evolved into foreign exchange policy proper, sometimes with high levels of sophis-

¹⁴⁶ For a survey of the arrangements in force in the early twentieth century, see Bloomfield (1959, pp. 17–18).

¹⁴⁷ Bignon et al. (2012).

¹⁴⁸ Reis (2007).

¹⁴⁹ Ugolini (2012a, b).

tication as in the case of the Oesterreichische Nationalbank.¹⁵⁰ By the eve of the First World War, it had been adopted by the banks of issue of a large number of Continental countries, including the most economically important ones (Germany and France). On this basis, it is possible to claim that the pre-war international gold standard already bore some basic features of a *gold-exchange standard* as the one that would be constructed in the Interwar.¹⁵¹ There were, however, some fundamental differences between the two—the most visible being, probably, the disappearance of specie circulation during the conflict, which transformed central bank money into the only legal domestic money.

To sum up, the “long” nineteenth century saw the European triumph of the principle of convertibility as the hallmark of both internal and external monetary stability. This was made possible by a number of technical improvements in the production and regulation of metallic specie¹⁵² that allowed for the long-awaited stabilization of coin circulation. In this new framework (pioneered in England since the 1710s), the arguments that had motivated early public banks to adopt the strategy of internal inconvertibility lost their reason for being, and convertibility became a viable strategy for the achievement of monetary stability. In the meantime, the deepening of financial markets encouraged privileged banks to refine their mode of interaction with the private sector through the first development of lending facilities (pioneered in England since the 1760s). Gradually developed in London in the course of the eighteenth century, the model of a monetary authority issuing convertible banknotes mostly through its standing facilities was imitated throughout the continent in the following century. Despite their wide popularity, lending facilities posed problems to the banks that offered them, as they could not be limited without entailing negative fallouts on the financial sector. As long as usury laws forced monetary authorities to resort to quantity policies (i.e. to limit monetary issuance by rationing credit), a trade-off inevitably existed between monetary stability and financial stability—one that explicitly emerged in the debate between supporters of the quantity theory and supporters of the real bills doctrine during the

¹⁵⁰ Jobst (2009).

¹⁵¹ Lindert (1969); De Cecco (1974).

¹⁵² Redish (2000); Sargent and Velde (2002).

Bullion Controversy of the 1810s. It was only thanks to the abolition of interest rate caps, as well as the further deepening of financial markets, that these two opposed needs were tentatively reconciled through the development of price policies in the mid-nineteenth century. Price policies were developed differently in different European countries according to their position in the international financial system. Countries whose domestic market interest rate exerted a direct impact on bullion flows (most notably, Britain) could focus on this rate as an intermediate target for the achievement of monetary stability. Countries whose domestic market rate only had a noisy impact on bullion flows (both small countries like Belgium and large ones like Austria-Hungary) preferred to focus on the exchange rate as an intermediate target. In both cases, standing facility lending was accompanied by open market operations aimed at limiting the volatility of the intermediate target. On the eve of the First World War, the principle of convertibility of money into metallic specie, which European countries had inherited from their Roman ancestors, had reached its highest degree of perfection. Ironically, in the space of just a few days of July 1914 this principle would dramatically expose all its fragility and would consequently be discarded for good.

5.2.3 Convertibility and Monetary Instability: The United States

As we have seen,¹⁵³ the British colonies of North America had always suffered from an instability of circulating specie that was far worse than the one experienced by Europe: as a result, they had seen an early widespread development of credit money in the form of “bills of credit” issued by colonial authorities. It might, therefore, appear somewhat paradoxical that the early United States actually became the country in which the principle of convertibility came to be seen as sacrosanct. *A priori*, one might have expected a country with high instability in the metallic circulation to rather behave like early modern merchant republics had done—that is, to try to secure bank money stability by making it inconvertible

¹⁵³ See Sect. 2.2.5.

into specie. But the precondition to such a solution was the existence of a centralized government enjoying the confidence of its creditors. To the contrary, the early United States were a decentralized country that experienced serious difficulties in establishing creditors' trust in the federal government debt. Moreover, in stark contrast to all European polities, for more than one century since independence the country was left in a sort of constitutional limbo concerning the central authorities' right to issue money. As a matter of fact, the Constitutional Convention of 1787, which had explicitly prevented states from issuing monetary instruments, had only provided Congress with the right to "coin money and regulate the value thereof". Interpreted literally (and in the likely spirit of its writers), this clause meant that the only form of legal money consisted of metallic specie: while the federal government had the monopoly of the creation of commodity money, it had no legitimacy to issue other monetary instruments. A much looser interpretation of this clause was however put forward by supporters of centralization, according to whom the Constitution did allow the federal government to issue any kind of money. Cyclically resurfacing over the decades, this juridical dispute became particularly hot in the aftermath of the Civil War, as the legality of the legal-tender notes the Treasury had issued in order to finance the military effort was actually questioned. In fact, the federal authorities' right to create money was definitively confirmed by the Supreme Court only as late as in the 1880s.¹⁵⁴

Given the unclear constitutionality of any other kind of money than specie, it is unsurprising that the main argument mobilized by legislators in support of the creation of a federal privileged bank was always the same: the reestablishment of the convertibility of the monetary instruments Congress had issued in times of war. This was the case for the aborted Bank of North America (1782–1785), for the (First) Bank of the United States (1791–1811), as well as for the (Second) Bank of the United States (1816–1836). Equally unsurprisingly, both successful attempts were let to expire once the task of restoring convertibility had been accomplished. The fact that both banks had tried to prove their public utility by accomplishing other tasks was not a strong enough motivation for justifying their continuation. Under the leader-

¹⁵⁴Timberlake (1993, pp. 4, 8, 37, 49–50, 85–86, and 143–145).

ship of Nicholas Biddle, the (Second) Bank of the United States had developed new valuable policies to enhance monetary stability: it had started to work as a market-maker for inland bills in order to stabilize interregional exchange rates and had provided counterparties across the country with lending facilities along the model of the Bank of England.¹⁵⁵ Still, a strict interpretation of monetary stability as synonym to convertibility had prevailed, and (in the name of its dubious constitutionality) the Bank's federal charter had not been renewed—although at the price of increased actual instability.¹⁵⁶

The demise of central banking in the Jacksonian Era did not completely deprive the federal authorities of the tools to intervene in the monetary system. As we have seen,¹⁵⁷ the Treasury started to issue convertible notes and to implement open market operations with depository banks: this *de facto* amounted to monetary policymaking, although the scale of intervention was often too small to be adequate. The Civil War increased considerably the amount of notes issued by the Treasury; as issuance was rigidly capped by Congress, however, margins for flexibility were limited. By contrast, the Treasury played a much more substantial role in the bullion market, as a buyer of ingots and supplier of coins. Under this respect (which was the only monetary task uncontroversially delegated to the federal level by the Constitution), this branch of government actually played the role of market-maker in the domestic bullion market, which in European countries was played by money-issuing banks.¹⁵⁸ This was a particularly crucial function in the United States as elsewhere, yet for quite different reasons than elsewhere. In Europe, the management of bullion flows was a fundamental component of monetary policymaking because of the very high level of market integration across countries,¹⁵⁹ which made coin circulation extremely sensitive to changes in international monetary conditions. By contrast, for geographical and economic reasons, the coin circulation of the United States was relatively more

¹⁵⁵ Catterall (1903); Knodell (2016, pp. 99–131).

¹⁵⁶ Knodell (1998).

¹⁵⁷ See Sects. 3.2.3 and 4.2.3.

¹⁵⁸ Taus (1943).

¹⁵⁹ See, for example, Nogués-Marco (2013).

insulated from external shocks than that of European countries (at least until the 1870s),¹⁶⁰ which made the case for direct intervention less compelling. However, unlike European countries, the United States were an important producer of bullion, being host to both gold and silver mining industries. Hence, the role of the Treasury as a market-maker in the bullion market had clear distributional implications, as it amounted to support to the one or the other domestic industry. This aspect had already emerged clearly with the minting reform of 1834, which had overvalued gold in order to support the newly opened goldmines of the South. It emerged even more clearly in 1873, when the dollar was *de facto* anchored to gold by relegating silver to divisionary coins. A display of public outcry followed the 1873 reform: as the Treasury was accumulating large bullion reserves in view of the resumption of convertibility of the “greenbacks” (which eventually occurred in 1879), it became clear that future purchases would henceforth be directed only to gold in order to allow for the minting of the new specie. As compensation to the national silver mining industry for this “crime of 1873”, an act was passed to force the Treasury to continue silver purchases, although at market rather than fixed prices. In the meantime, following its synchronous demonetization also by Germany and France, the price of silver was collapsing, and the United States were experiencing strong deflationary pressure.¹⁶¹ In this context, important sectors of the economy started to lobby for the remonetization of silver. Remonetization was a way to depreciate the exchange rate and hence alleviate the ailments of the silver mining and agricultural sectors, which were suffering from the 1873 reform and the ensuing deflation¹⁶²: this means that the extension of convertibility amounted to a strategy for increasing (rather than reducing) external monetary instability. The bimetallic question took central stage in domestic political debates for more than two decades, until the defeat of the “silverite” candidate William Jennings Bryan at the presidential elections of 1896 sealed the eventual failure of the campaign. The Treasury continued to fully retain its market-making role for bullion after the creation of the Federal Reserve

¹⁶⁰ Officer (1996).

¹⁶¹ Friedman (1990).

¹⁶² Frieden (1997).

System, which did not touch upon any of the monetary prerogatives of the federal government.¹⁶³ The Treasury played an independent gold and foreign exchange policy during the First World War and the ensuing stabilization, and continued to support the domestic gold and silver mining industries. When in 1933 President Roosevelt outlawed private ownership of monetary gold (thus destroying the last vestiges of the specie standard), the whole national stock of gold was centralized with the Treasury.¹⁶⁴

Thus, the “division of labour” between the Treasury and the early Fed was very clear from a formal viewpoint. Following a long (and contorted) evolution, in 1913 the federal monetary authority was officially split into two: on the one hand, the Treasury continued to be responsible for external monetary stability through its management of the bullion market (and, later on, of foreign exchange reserves); on the other hand, the Federal Reserve System (which was but a development of the National Banking System) was made responsible for internal monetary stability through its management of the payment system and short-term credit markets. Contrary to what had always been the case and still was the case in Europe, then, in the United States the central bank was clearly designed to be focused on domestic issues. Although international factors (most notably, the desire to establish the US dollar as an international currency) did play an important role in its foundation, the way the Fed was expected to foster external stability was by addressing the *domestic* causes of instability.¹⁶⁵ This fundamentally inward-looking design explains why the early Fed faced considerable problems in coordinating its international action¹⁶⁶ and why attempts at creating a consistent external policy ended in failure.¹⁶⁷ It was only with the Banking Act of 1935 that the integration between the two monetary authorities was tentatively enacted, but this was done through the transformation of the Fed into a *de facto* public agency.¹⁶⁸

The main function the founders of the Federal Reserve System expected it to perform was the provision of an “elastic” money supply. As we have

¹⁶³ Also see Sect. 4.2.3.

¹⁶⁴ Taus (1943).

¹⁶⁵ Broz (1997).

¹⁶⁶ Meltzer (2003–2010, I, pp. 205–245).

¹⁶⁷ Eichengreen and Flandreau (2012).

¹⁶⁸ Taus (1943).

seen,¹⁶⁹ by drawing inspiration from the regulatory innovations of the antebellum period, the National Banking Acts had rigidly tied the issuance of banknotes to holdings of government bonds. This provision was not unlike that of the British Bank Act of 1844, which had explicitly asked the Bank of England to care about monetary stability and forget about financial stability. However, the Bank of England had been obliged to be again confronted by financial stability as soon as in 1847: henceforth, it had retransformed its standing facility into the instrument for the provision of lending of last resort, at the expense of violating the constraints to monetary issuance (as it happened in 1847, 1857, 1866, and eventually 1914).¹⁷⁰ By contrast, the National Banking System lacked a way to violate constraints to monetary issuance in the name of financial stability. As a surrogate, private money creation was actually implemented by bankers' clearinghouses in the event of panics, but this only benefitted the "happy few" members of these clubs.¹⁷¹ This explains why the main goal of those who campaigned for the creation of the Fed after the 1907 crisis was the establishment of a European-style lending facility. Reformers dreamt of a discount window for bills of exchange open to any domestic intermediary under any circumstance. This would have allowed continuously financing "legitimate" business activities (the "real bills") which, under current arrangements, were crowded out by "illegitimate" ("speculative") investment opportunities and suffered from credit rationing during crises. "Illegitimate" investments included government bonds: the National Banking System had been designed to create a captive demand for federal debt which was only reinforced during panics (when Treasuries were seen as "safe assets"), but this weighed heavily on the funding of business. Concern for the real economic fallouts of credit crises was, thus, the leading motivation for what Lloyd Mints presented as the real bills doctrine's obsession for "elasticity".¹⁷² The result was that the Federal Reserve Act of 1913 strictly designed the new System to perform standing facility lending

¹⁶⁹ See Sect. 3.2.3.

¹⁷⁰ See Sect. 5.2.2.

¹⁷¹ See Sect. 2.2.5.

¹⁷² Mints (1945, pp. 223–256).

on “real bills”—to the point of explicitly outlawing the issuance of banknotes against government bonds.¹⁷³

The great tragedy in the history of the Fed was that the outbreak of the First World War prevented it from even starting to work in the way it had been intended to. First, political pressure forced the Fed to maintain artificially low interest rates during the conflict, so that standing facility loans actually had to be rationed. Second, no time was given to the Fed to create the sophisticated monitoring system that allowed European central banks to distinguish between “real” and “fictitious” bills.¹⁷⁴ After the dramatic post-war inflation and deflation, the System tried to improve its operational framework by adopting the so-called *Strong rule* (from the new of its main sponsor, Benjamin Strong, governor of the New York Fed). The new framework was understood to be modelled along the practices of the Bank of England: it consisted of keeping the official discount rate high enough to discourage regular resort to the standing facility in ordinary times, while implementing open market operations in order to manage the float of the market interest rate (supposed to be the central bank’s intermediate target).¹⁷⁵ In theory, this actually corresponded to what the Bank of England had been doing in the last decades before the First World War as well as before the Act of 1844.¹⁷⁶ In practice, however, this did not actually correspond to what the Fed ended up doing in the 1920s. First, because the official standing facility rate was still not high enough for discouraging the inflow of low-quality paper to the discount window, the Reserve Banks resorted to a number of “unorthodox” methods unknown to Britain: between 1920 and 1923 (i.e. as long as this practice was legal), they put into place “personalized” discount rates¹⁷⁷; they applied “per-

¹⁷³ Meltzer (2003–2010, I, p. 70, fn. 7). This formal prohibition was removed temporarily by the Glass-Steagall Act of 1932. The removal became permanent in 1945.

¹⁷⁴ See Sect. 3.2.3.

¹⁷⁵ This framework had been recently described by Hawtrey (1919, pp. 48–52), who is credited for having exerted a direct influence on Strong: Laidler (1993).

¹⁷⁶ See Sect. 5.2.2.

¹⁷⁷ Wallace (1956).

sonalized” margin calls¹⁷⁸; and in general, they used “moral suasion” to reject unwanted borrowers.¹⁷⁹ Second, because defining the benchmark market rate was far from self-evident in the United States (unlike in Britain, where the three-month discount rate for bills of exchange was unquestionably *the* benchmark market rate), the role of operational target was assumed not by an interest rate, but by the quantity of member banks’ reserves with the System. This was a considerable departure from the British experience,¹⁸⁰ and one that had its roots in native traditions. As we have seen, since the fall of the (Second) Bank of the United States, a pyramidal payment system centred on New York banks had emerged, and the amount of deposits with correspondents in banking “hubs” had become the crucial indicator of the safety of any intermediary.¹⁸¹ The National Banking Acts of 1863–1865 had only reinforced this role by introducing rigid reserve requirements, and the Federal Reserve Act of 1913 had implied no substantial modification under this respect (except for the obligation to transfer reserves to the Fed).¹⁸² Moreover, since 1921 banks in a surplus position had initiated the practice of selling reserves to banks in a deficit position, thus giving rise to the *federal funds market*.¹⁸³ In view of all this, the Fed started to see the aggregate level of member banks’ reserves as a clearer and more efficient operational target than market interest rates. This gave birth to the so-called *reserve position doctrine*, which was in fact a radical departure from the British “Bank rate” doctrine and which received strong endorsements by famous economists like John Maynard Keynes.¹⁸⁴ In the Interwar Fed’s version of the doctrine (sometimes referred to as the “Riefler-Burgess doctrine”), discounts were interpreted as negative reserves¹⁸⁵: when demand for discounts increased and excess reserves vanished, liquidity was provided

¹⁷⁸Westerfield (1932).

¹⁷⁹Goldenweiser (1925, p. 48).

¹⁸⁰Although it is sometimes said that before the First World War the Bank of England implemented open market operations with the aim of modifying banks’ reserves, this was not actually the case. In fact, the Bank intervened in order to impact market expectations about future interest rates: Ugolini (2016).

¹⁸¹See Sect. 2.2.5.

¹⁸²See Sect. 3.2.3.

¹⁸³Meltzer (2003–2010, I, pp. 164–165).

¹⁸⁴Keynes (1971, II).

¹⁸⁵Meltzer (2003–2010, I, pp. 161–165 and 495–496).

through the standing facility; when demand for discounts faltered and excess reserves accumulated, liquidity was absorbed through open market operations.¹⁸⁶

This was the monetary policy strategy with which the Fed confronted first the manias of the late 1920s and then the crashes of the early 1930s. Its directors remained faithful to the “Riefler-Burgess doctrine”: they mechanically accommodated “legitimate” demand for discounts, and when they saw banks’ reserves contract in 1929, they even performed liquidity-injecting open market operations (despite some difficulties in intervening in the government bond market, whose liquidity was still less than ideal).¹⁸⁷ When, however, “legitimate” demand for discounts decreased and member banks started to accumulate excess reserves, the directors did not see any reason for providing further liquidity. At no point they seem to have doubted about the appropriateness of their policy: their operational target (member banks’ aggregate reserves) was not pointing to the need for liquidity injections,¹⁸⁸ while their final target (monetary stability, in the sense of the convertibility of their banknotes) was never at risk of being jeopardized. From the viewpoint of the Fed as it had been designed, therefore, things were going the way they were supposed to go.¹⁸⁹ Unfortunately, in the meantime, things were going awfully badly outside. A considerable proportion of the huge private debt burden that had accumulated in the previous decade became unsustainable to debtors as prices started to fall. This put the banking system under considerable strain, and a vicious circle was set in motion.¹⁹⁰ Instead of redistributing liquidity within the banking system as they were supposed to do, liquid banks hoarded it and

¹⁸⁶ This policy generated the phenomenon known in the literature as the “*scissor effect*”: Tomia (2013).

¹⁸⁷ Wood (2005, p. 208).

¹⁸⁸ Friedman and Schwartz (1971), who famously accused the Fed to have remained indifferent to a contraction in money supply, actually looked at the monetary aggregate *M1* (which includes central bank notes circulation plus private demand deposits with the banking system). Yet, in view of the conceptual framework put in place since the National Banking Acts of 1863–1865 (and not unaware of the principles of the Currency School), deposits (i.e. banks’ liabilities) were *not* considered as money by the directors of the Fed, who were only concerned with reserves (i.e. banks’ assets). This is explained by Meltzer (2003–2010, I, pp. 495–496).

¹⁸⁹ Meltzer (2003–2010, I, pp. 271–282 and 400–413).

¹⁹⁰ Bernanke (1983).

left troubled ones to starve. Arguably, the Federal Reserve System had been created precisely to assist troubled banks through its standing facility. But the problem was that, for various reasons, many of the troubled banks could *not* be assisted by the Fed's standing facility—either because they did not possess securities eligible for discount or because they simply were not members of the System.¹⁹¹ Stopping the shockwave would have necessitated bold action: huge-scale liquidity-injecting open market operations to stop the debt-deflation spiral on the one hand, and extraordinary support to banks that were ineligible for ordinary support on the other hand. But none of these initiatives were within the scope of the Fed's mandate.

The System's inability to cope with the catastrophic banking crises provided scope for substantial redrawing of its institutional design. The Banking Act of 1935 *de facto* transformed it into a government agency working in tandem with the Treasury, while the Employment Act of 1946 changed its formal mandate, introducing broader macroeconomic concerns (in particular, the unemployment rate) among its final targets.¹⁹² In the meantime, the Fed also saw its implementation framework gradually evolve, albeit in clear continuity with respect to the past: open market operations on government bonds (now facilitated by the improved liquidity of the government bond market)¹⁹³ definitively became the prime tool of monetary policymaking, standing facility lending was relegated to the status of extraordinary crisis-time measure, while reserve requirements (whose level could now be fixed by the Fed since the Act of 1935) were turned from a purely regulatory into a monetary policy instrument, used to adjust the amount of excess reserves (as a substitute to the now defunct discount policy).¹⁹⁴ Thus, aggregate member banks' reserves were confirmed as the operational target, and the interest rate at which banks lent each other their excess reserves (known as the "Fed funds rate") started to be considered as the benchmark market interest rate in the financial system.

¹⁹¹ See Sect. 3.2.3.

¹⁹² Wood (2005, pp. 218–222 and 244–247).

¹⁹³ Garbade (2012).

¹⁹⁴ Meltzer (2003–2010, I, pp. 495–500); Bindseil (2004, pp. 183–188).

To sum up, while in the English tradition convertibility was the cornerstone around which an integrated framework for the management of external and internal monetary stability was constructed, in the United States external and internal stability have long been treated as two constitutionally separated questions. As the Constitutional Convention of 1787 had clearly assigned to the federal government the management of the metallic circulation, external stability (a less pressing problem than in Europe) was uninterruptedly handled by the Treasury. By contrast, as the federal government's right to issue monetary instruments remained very controversial until as late as the 1880s, internal monetary stability long had to be pursued through financial regulation rather than monetary policymaking. The creation of the Federal Reserve was an attempt to produce the long-awaited internal stability through the transplantation of a European-style standing facility, but (for both conjunctural and structural reasons) the new organization never worked the way it had been originally intended to. Bound by a number of institutional constraints, the Fed behaved very mechanically throughout the banking panics of the early 1930s and was thus unable to prevent the unprecedented unravelling of the domestic financial system. Only in 1935 the institutional divide between external and internal stability was formally solved through an integration of both within government. Yet, in practice, the Fed was always encouraged to remain overwhelmingly focused on internal issues (esp. unemployment) and to devote only scanty attention to the external ones. This politically designed "home bias" continues to weight on the Fed's monetary policymaking today.

5.2.4 The Evolution of Monetary Policy: Conclusions

Although all public and privileged banks were actually created with an eye to the possibility of monetizing the public debt, none of them was actually conceived as a mere seigniorage-generating agency. Rather, it might be said that they were actually conceived as devices for minimizing the distortions generated by government borrowing in domestic markets—distortions that were actually very large in relatively underdeveloped financial systems. Thus, it appears legitimate to say that monetary

policy has only been indirectly related to fiscal policy, while it has always been directly related to regulatory policy: in practice, the quest for monetary stability has hardly been separable from the quest for financial stability. Such a regulatory nature of monetary policymaking has emerged most clearly with the introduction of standing facility lending on private debt, first pioneered by the Bank of England in the second half of the eighteenth century: a monetary policy designed around a widely accessed standing facility is indeed an extraordinarily powerful way to regulate the banking system. This regulatory appeal may explain the insistence of dozens of commentators (from Adam Smith to the founders of the Fed) on the superiority of a *quality-based* over a *quantity-based* monetary issuance, on the ground of arguments that have often been misrepresented by their critics. The adoption of a correct implementation framework has proved, however, to be a crucial precondition to the success of an integrated monetary *and* financial stability policy: while standing facility lending worked smoothly in Europe, its attempted transplantation to the United States turned out to be catastrophic in view of its inadequacy to the peculiar structure of the American banking system.

The pursuit of monetary stability has always been the final target of money-issuing organizations. This is not surprising, as the long-term viability of the monetization mechanism crucially rests on its credibility. Given the juridical framework Europe inherited from the Greco-Roman tradition, the maintenance of the convertibility of bank money into specie spontaneously emerged as the basic strategy for the achievement of monetary stability. Coin circulation, however, was not necessarily stable, as it was heavily exposed to external shocks to both its quantity and its quality (as it was particularly the case in the fifteenth and seventeenth centuries). In order to make bank money more stable than commodity money, in the early seventeenth century the public banks of Venice, Amsterdam, and Hamburg developed a strategy of internal inconvertibility that worked as a “convertibility plus” rule. One century later, by contrast, the Bank of England managed to turn the convertibility rule into a recipe for monetary stability, but not before having found a unique solution to the instability of metallic circulation. In the course of the nineteenth century, the English solution was imitated throughout Europe as it

appeared as the optimal strategy for the joint achievement of both internal and external monetary stability. European countries remained constantly attached to this kind of strategy well after the First World War wiped out the Greco-Roman heritage of the specie standard: adherence to the gold-exchange standard of the Interwar period, to the Bretton Woods system of the post-war period, as well as to the successive foreign exchange arrangements that eventually led to the European Monetary Union all testify of a shared belief that internal monetary stability could not be achieved in isolation from external monetary stability.¹⁹⁵ In stark contrast, the peculiar constitutional equilibria that founded the development of the United States provided for an early separation between the management of external monetary stability (clearly entrusted to the federal Treasury) and the management of internal monetary stability (contended for long by the states). Harsh political controversies prevented the stable emergence of a federal money-issuing organization for more than one century (with the partial exception of the monetary issuances of the Treasury), and when the Federal Reserve was created in 1913, its exclusive focus was with internal stability. Even after the Fed was *de facto* internalized by the federal government in 1935, the “division of labour” between the central bank and the Treasury remained a fact of life: the former continued to be told to conduct monetary policy taking only internal factors into account.

Concerning monetary policy strategy and implementation, tools varied over time, with cyclical swings from quantities (different sorts of monetary aggregates) to prices (exchange rates, interest rates) and vice versa. Price and quantity targets were complementary rather than competing alternatives, as policymakers’ choices crucially depended on the characteristics of the financial markets through which they interacted with the economy.¹⁹⁶ In England, a true interest rate policy could not actually be developed before legal caps on discount rates were lifted and a deep discount market emerged. Similarly, in the United States the development of interest rate policies was hampered by the lack of

¹⁹⁵ After the demise of the Bretton Woods system, however, a handful of European countries started to display a decreasing appetite for external stability—including, in chronological order, Switzerland, Britain, Sweden, and Norway. For a discussion of the “fear of floating” and its evolution in twentieth-century Europe, see Straumann (2010).

¹⁹⁶ Jobst and Ugolini (2016).

a clear benchmark market interest rate before the emergence of the federal funds market. This problem is a hardy perennial: when in the 1980s European policymakers became persuaded of the superiority of price policies over quantity policies, they endeavoured to artificially create new interbank markets along the model of the fed funds market in order to generate a “interbank rates” akin to the fed funds rate.¹⁹⁷ This generalized move made European monetary policy implementation more similar to the American one. Still, important differences remain for what concerns the role of the standing facility and its accessibility: these have implied, as we have seen,¹⁹⁸ a spectacular divergence in the way the 2008 crisis has been managed on the two sides of the Atlantic.¹⁹⁹

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¹⁹⁷ Forssbæck and Oxelheim (2003).

¹⁹⁸ See Sect. 3.2.4.

¹⁹⁹ These differences have implications not only during crises but also in normal times. In fact, it is arguable that open market operations organized as reverse repos and following a preannounced calendar (which is currently the case both in the Federal Reserve System and in the Eurosystem) bear many similarities to standing facility lending. However, while the Federal Reserve only accepts government or government-related bonds as collateral for its open market operations, in the Eurosystem the list of eligible collateral (a very long one) is the same for open market operations and standing facility loans: Bindseil (2004, pp. 152–162 and 177–178).

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6

Conclusions

If our forefathers – who invented a lot of excellent institutions and sound provisions – had envisioned doing nothing but what their predecessors had done, today we would certainly lack many comforts which, not contrived by ancestry, have been actually devised by posterity. [...] If we want to follow in our progenitors' footsteps, we must imitate them in their alacrity to invent things that are beneficial to the public, as they were used to do; which cannot be done without establishing new provisions and new methods.

Tommaso Contarini, *Speech to the Venetian Senate in Support of the Creation of a Public Bank*, 28 December 1584 (quoted in Lattes (1869, p. 134), my translation).

The original ambition of this book was to provide a fresh survey of the theory and history of central banking in the West. Its starting point was the assessment that the state-of-the-art literature, albeit still valuable under many respects, is poorly equipped to address one fundamental (and, since the financial crisis started in 2007, quite topical) question: *why and how the organizational structures allowing for the provision of financial and monetary stability may change over time?* In order to tackle this issue, the book has abandoned the traditional institutional approach

and has embraced a functional approach. After identifying four core central banking functions (two microeconomic functions tied to financial stability and two macroeconomic functions tied to monetary stability), the theoretical and historical literature relating to each one has been presented in a different chapter. This last chapter will first summarize the main findings of the four surveys. It will henceforth conclude with some final speculations revolving around the starting question of the book.

6.1 What Have We Learnt?

6.1.1 The Functional Survey: Overview of the Results

Chapter 2 has looked at the management of the *payment system*. It has pointed out that the payment system is a highly strategic infrastructure, whose disruption can result in heavy losses for the real economy. The payment system is a network infrastructure displaying strong *network externalities* and *scale economies*, two factors that are conducive to a situation of natural monopoly. Natural monopolies can be handled in different ways: they can alternatively be internalized by the public sector, externalized to some private contractor, or fully liberalized. Earlier economic thought has long favoured the competitive option, which free banking theory has endeavoured to depict as the optimal solution. Historically, this solution has actually been the preferred option in many contexts (esp. in late medieval Venice and in nineteenth-century United States). However, the logic of network externalities has systematically compromised the working of tentatively competitive payment systems, to the point of forcing reluctant authorities to eventually embrace nationalization (as Venice did in 1587 and the United States in 1913). In other contexts (esp. in nineteenth-century Europe), the natural monopoly was out-contracted to a private monopolist, subject to a number of conditions; one of these conditions has often consisted of the costly extension of the payment infrastructure to the less profitable areas of the national territory. Today, state-owned and privately owned payment systems generally coexist, because of a generalized political will to ensure competitive conditions in the provision of payment services. The viability of private initiative,

however, strictly depends on public policy: payment services are only valuable to customers as long as they ensure finality, and finality (a purely legal concept) can only be granted as long as interchange with the legally recognized clearing mechanism is secured.

Chapter 3 had dealt with lending of last resort and supervision, and more at large with the question of *banking regulation*. Fragility is an inherent characteristic of any banking system. This is due to the fact that this sector is plagued by a number of market failures, the most important of which being *information asymmetries*. However, in view of banks' crucial role as providers of means of payment, bank failures produce large negative externalities on real economic activity. All this justifies heavy regulation of the banking sector. Regulatory tools include both *ex-ante* interventions (legislation and supervision) and *ex-post* interventions (lending of last resort, bailouts, and deposit insurance). Earlier economic thought, especially embodied by the "Bagehot rules", has long favoured the joint provision of *ex-post* (lending of last resort) and *ex-ante* (informal supervision) interventions in the context of a light-touch regulatory framework. Designed around the monetary authority's standing facility ("universally" accessible by all domestic intermediaries), this discretionary model was actually adopted throughout Europe in the course of the nineteenth century; it nonetheless ran into serious troubles when banking systems became increasingly concentrated, as the creation of a "safety net" was not counterbalanced by an increase in regulatory standards. This European model of "gentlemanly regulation" was, however, the exception rather than the rule from a long-term viewpoint. Before that period, the international norm had consisted of very binding *ex-ante* interventions under the form of unlimited-liability requirements; in addition to that, more refined tools had been developed over time (e.g. in early modern Venice). Regulatory experimentation would however know its heyday in nineteenth-century United States, a country characterized by high banking fragmentation and the lack of a monetary authority. In stark contrast to the European model, the American model was rule-based, did not have a "universal" character, and did not rely on standing facility lending. As much as its European counterpart, however, this model failed the test of the banking crises of the Interwar period—although for quite opposite reasons. Today, international regulatory standards look more similar to

the old American rather than to old European model; the key insight of the latter (i.e. the joint provision of lending of last resort and supervision, which justifies the assumption of a supervisory role for the central bank) seems to have been temporarily lost—at least, until the recent crisis.

Chapter 4 has been devoted to *money creation*. Theory shows that in a frictionless economy money cannot exist: the existence of money strictly depends on the presence of frictions—most notably, *search frictions*. In a perfectly decentralized economy, the role of money will be typically taken up by a commodity. In a perfectly centralized economy, the role of money will be typically taken up by pure bilateral credit. Yet, in a “hybrid” economy where both centralized and decentralized transactions coexist (which is actually the case of all real-world economies), the debt issued by some third “privileged” agents can play the role of money in bilateral transactions between “common” agents. Earlier economic thought has been totally split on the question of the nature of money—that is, whether it should be conceptualized as a type of credit or as a type of good (albeit intrinsically worthless). In particular, the role of the state in money creation has been the subject of violent (and often, purely ideological) controversies. Of course, the state can play a very important role in this domain. Decentralized agents’ demand for some particular types of credit money can actually be increased by the state, either through legal restrictions or market power. The state, however, does not necessarily promote only the monetization of public debt; it can well promote also the monetization of private debt. Historically, while the monetization of public debt has certainly been one crucial motivation for government intervention in the field, this has always been accompanied by the monetization of private debt: government-sponsored money creation has been collateralized by private debt in most instances (e.g. in medieval Venice, in nineteenth-century England, as well as in the original design of the Federal Reserve). This is also overwhelmingly the case today.

Finally, Chap. 5 has been concerned with *monetary policy*. The mainstream conceptualization of monetary policy today is as a type of tax policy: the government issues fiat money (i.e. an intrinsically worthless good) with the aim of managing its intertemporal budget constraint. Because the inflation tax (as any real-world tax) entails distortionary effects on the economy, the optimal monetary policy will be the one that allows for the minimization of such distortions—that is, price stability. This theoretical

framework does not, however, take into account the fact that the price level can be impacted by other factors than the public sector's money creation: this is particularly the case of the private sector's credit creation. In view of the existence of *financial frictions*, the price level can behave suboptimally regardless of the monetary stance adopted by authorities: this means that optimal monetary policy should be determined not according to fiscal criteria alone, but also according to regulatory criteria. Earlier economic thought has been as split as the current one between supporters of the "money view" (i.e. the proponents of the quantity theory of money) and supporters of the "credit view" (i.e. the proponents of the so-called real bills doctrine); controversies have often taken a rather ideological turn. Historically, while money creation has certainly been used as a fiscal tool in times of emergency (typically, in order to sustain wartime budget deficits), in general monetary policy does not seem to have been chiefly interpreted as a seigniorage-maximizing strategy. In the absence of a proper technology to assess the price level, the role of yardstick of monetary stability has long been played by convertibility: the historical record shows that commitment to convertibility has been paramount over the centuries, and inconvertibility has at times been introduced as a way to enhance rather than jeopardize monetary stability (as in the case of early modern Venice or Amsterdam). Emphasis on external monetary stability has always been (and still is) very strong in the highly integrated European countries, while the more isolated United States have traditionally been more focused on internal monetary stability. Also implementation frameworks have diverged on the two sides of the Atlantic: while in Europe monetary policymaking has been tailored around the lending facility, in the United States, the adoption of this instrument has been repeatedly rejected (esp. in the 1830s and in the 1930s). In both frameworks, however, monetary stability has been equally jeopardized by the need to defend financial stability—as the events of the Interwar period have clearly shown.

6.1.2 The Functional Survey: General Conclusions

As it will by now be evident, a number of transversal themes emerge throughout this general survey. There are "horizontal" themes: the two

microeconomic central banking functions share the question of the negative externalities generated by payment disruptions and bank failures on the real economy, while the macroeconomic functions share the question of the coordination between publicly issued money and privately issued money. There are also “vertical” themes: Chaps. 2 and 4 share the question of the role of the state in determining the “finality” or “legal-tender” status, while Chaps. 3 and 5 share the question of the role of standing facility lending as a tool for regulatory intervention. As pointed out in Chap. 1, the functional approach was chiefly intended here as a heuristic device: the idea was to provide different viewpoints on the same (complex) phenomena. The above-mentioned symmetries between the four chapters might arguably be taken as evidence of the overall adequacy and consistency of the taxonomy of central banking functions defended in the Introduction.

More generally, analysing separately (both theoretically and historically) the four tasks accomplished by nowadays’ central banks allows for the creation of a comprehensive and consistent conceptual framework to understand that “mysterious” complex object that is central banking. As it will have become evident to any reader by now, central banking can be defined as *an integrated set of public policies* aimed at addressing market failures in the financial sector of the economy—most notably, (a) network externalities in the payment infrastructure, (b) information asymmetries in financial intermediation, (c) search frictions hindering the convergence towards a cashless economy, and (d) financial frictions hindering monetary stability. Thus, the question of the evolution of central banking can arguably be translated as the question of the evolution of the public policies aimed at addressing these market failures, as well as of their integration into a consistent set of policies. Strong economies of scope appear to be generated by a joint provision of these policies, but not all of these economies are consensually agreed upon or well understood. Historical evidence seems to suggest that they do exist, and that a disjointed provision may lead to suboptimal outcomes. Theoretical research on this topic is still in its infancy, and we may hope that our understanding of these complex interactions will substantially improve in the future.

6.2 Where Do We Go from Here?

6.2.1 Speculations: The Future of Central Bankers

Now that we reconstructed why and how the “eternal” problem of the provision of financial and monetary stability crystallized around the organizational form known as the “modern central bank” (a process that was only completed in the Interwar period), we are better placed to indulge into some tentative speculations on our original motivation: will the current organizational form for the provision of central banking functions be resilient in the long term? As I pointed out in the Introduction, history has always been ill-positioned to provide readily applicable lessons to policymakers. As it happens, history is not immune from the *Goodhart critique*¹: as soon as a lesson from the past will start to be used as guidance for policy, its validity will tend to collapse. As a result, we should not expect historical evidence to have any predictive power *per se*. This notwithstanding, historians may still legitimately interpret their own function as consisting of the provision of “food for thought” to society. In this spirit, the evidence quoted in this book can be seen as supplying some “raw material” for sketching tentative answers to both questions raised at the very beginning of Chap. 1.

The first question concerned the relationship between monetary and fiscal authorities: is central bank independence currently under threat, and is it going to disappear in the future? Our survey has shown that emphasis on this question might be misplaced. Central banks are unquestionably part of the public sector, as the functions they are required to provide are *de facto* public policies. Although different arrangements have been designed over time in order to manage their provision (including the full externalization to a private contractor), *all* of them have been squarely defined within a framework of social welfare maximization.

¹The so-called *Goodhart critique* (an early version of the more famous *Lucas critique*) argues that “any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes.” It was formulated by Charles Goodhart in a paper originally published in 1975: Goodhart (1984).

Central bank independence has worked efficiently as a political device to restore policy credibility in the aftermath of the Great Inflation, but its more substantial implications may be less straightforward than they appear at first sight. Central banks (including the privately owned ones) have always derived their legitimation from their “public utility” character. As a result, central bankers’ ability to retain their social legitimation in the future will crucially depend on their ability to make such a case in the face of changing political equilibria.

6.2.2 Speculations: The Future of Central Banks

The second question we asked at the beginning of Chap. 1 concerned the resilience of the “modern central bank” as the definite organizational form for the provision of financial and monetary stability: can central banks be taken for granted, or will other types of organization emerge in the future, as they did in the past?

Two points can be made under this respect. The first one is that current trends do not appear to question the optimality of the joint provision of central banking functions; quite to the contrary, the recent crisis has prompted many countries to reintegrate crucial supervisory tasks to central bankers’ mandate. As financial systems become more complex, the demand for the provision of central banking functions increases accordingly, and economies of scope makes a joint provision of such functions more desirable: this implies that central banks may be expected to play an increasingly important role in the future. In a sense, this is but the financial application of *Wagner’s law*.

As for the second point, historical evidence suggests that revolutions are unlikely to take place in the foreseeable future, as innovation in central banking has extensively proved to be extremely gradual (and perhaps, not even incremental). The cardinal principle of Aristotelean biology (“*natura non facit saltus*”) may well be said to apply also here: central banking “does not make jumps”. Our survey showed that the most apparently revolutionary changes (e.g. the nationalization of deposit banking in Venice in 1587) only led to very marginal concrete implications, and that even the creation of brand new organizations (e.g. the foundation of

the Federal Reserve in 1913) only slightly modified preexisting financial and monetary habits. This does not mean that central banking is “neutral”; rather, it means that central banking is deeply rooted in the economic and political context in which it happens to operate, and that the evolution of the former closely depends on the evolution of the latter. This allows concluding on a slightly pessimistic note: institutional innovation might, after all, have nothing in common with technological innovation. The prime mover of the evolution of central banking does not seem to have been the imitation of particularly brilliant ideas suddenly sprung out of the mind of some particularly smart guy; rather, it seems to have been the extremely gradual (and conservative) adaptation of preexisting practices to a changing economic and political environment. This is something historians have been knowing for quite a long time. It still is, perhaps, the most precious lesson they have to offer to economists.

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