

Similar yet Different?

During the Seven Years War, Frederick the Great of Prussia produced many coins that contained much less precious metal than they were supposed to have. The somewhat shady practice was called *debasement*, and such abuse had occurred as long as there had been desperate sovereigns minting coins.¹ The Seven Years War was an especially desperate time for Frederick, who spent much of the conflict expecting to be overwhelmed by the armies of three larger adversaries (Austria, France, and Russia) and their allies. Thanks in part to financial aid provided by debasement, however, Frederick was able to fend off repeated invasions and survive the war. Prussia emerged from the war as an improbable great power and would eventually unify most of Germany into a modern nation-state.²

Frederick's operation was one of the last great debasements as money was moving to paper notes and accounts. War finance would increasingly turn to the printing press, but Frederick's Prussia had no central bank, no paper currency, and underdeveloped private banks. To mint its debased coins, Prussia had only limited access to natural deposits of precious metal (some silver was mined in conquered Saxony) and no sovereign credit with which to borrow more metal. Where, then, did Frederick acquire the great quantities of credit and treasure needed to save Prussia? He found it in places that had what Prussia lacked, and the most abundant location for both metal and credit was Amsterdam.

Amsterdam was at that time a major conduit for gold and silver as it flowed from the New World, through Europe, and on to Asia. Amsterdam

¹ On the general phenomenon of debasement see Rolnick, Velde, and Weber (1996).

² The Seven Years War (1756–1763) was a multi-continent conflict involving many countries. Winston Churchill would later call it “the first world war.” The impacts of the war on the Bank of Amsterdam are analyzed in later chapters.

was also a hub of credit with spokes that extended to northern Europe and much of the world beyond. To connect the flow of metal with the flow of credit, the City of Amsterdam operated a public bank, the Bank of Amsterdam (*Amsterdamsche Wisselbank* or simply “the Bank”), which flourished throughout much of the seventeenth and eighteenth centuries. The penultimate chapter of this book will describe how Frederick, and likely other desperate sovereigns, could utilize debts payable through the Bank to access metal flowing through the Bank. The Bank was well suited for these purposes because that was where the money was. At its high tide during the Seven Years War, around one quarter of New World silver production flowed through the Bank, and the Bank accounts backed by that silver were the most secure and liquid currency in Europe. Gillard (2004) terms the Bank’s ledger money *le florin européen*, the Euro-florin, and private merchant banks made free use of Euro-florins to create an international system of credit. Engineering a successful debasement meant finding the right merchant with the right connections to Amsterdam.

Its evident power notwithstanding, the Bank was an enigma to contemporaries. This aura of mystery was not accidental. Accounting documents like balance sheets, income statements, and collateral inventories were kept rigorously shielded from public view.³ Indeed, we will see in Chapter 5 that the Bank itself had difficulty knowing its true financial condition in real time. In the absence of public disclosures, wild rumors circulated. Writing in 1655, the Dutch poet Joost van den Vondel expressed one popular view when he claimed that the Bank had “received all of Peru” into its vaults (meaning this country’s immense silver production; see Dehing 2012, 85). Not to be outdone, an English visitor to Amsterdam (Rhodes 1701, 67) guessed that the Bank vaults contained “an infinite number of Bags full of Money already Coin’d.” The secretive Bank did little to discourage such flattering hyperbole. Later, more informed estimates of the quantity of precious metal held at the Bank (e.g., Melon 1754, 21; Steuart 1767a, 304; Smith 1981 [1776], 487) overshot the true amount by 50 percent or more.

³ Reflecting the Bank’s habit of secrecy, the cover illustration of this book is from an accounting manual and does not depict Bank employees. We can only guess at how well the Bank could keep its secrets among the close-knit Amsterdam financial community. Our conjecture is that the Bank’s secrecy was motivated in part by a desire to promote its money as an opaque, “no-questions-asked” asset (cf. Chapter 3), despite a rather complex policy framework (Chapter 7). Some other contemporary public banks, for example, the Bank of Hamburg, pursued less complex policies and were more forthcoming about their financial condition.

The Bank of Amsterdam was liquidated at the close of the Napoleonic era (1820), but its storied activities have remained rather mysterious. This book seeks to illuminate these activities through a reconstruction based on original Bank records over the period from 1666 to 1792.⁴ The reconstruction reveals both what the Bank did and what its customers did, with greatest accuracy over much of the eighteenth century (1711–1792), when surviving records are most complete. This analysis (see Chapter 6) shows that customer use of the Bank had large swings in intensity. The reconstructed data also show (see Chapter 7) that the Bank responded to those swings with offsetting actions of its own. Hence, while the Bank held large quantities of desirable gold and silver coins, it was not a simple deposit and withdrawal facility. In the reconstructed balance sheets, the Bank of Amsterdam appears as a central bank, perhaps the first central bank to actively and successfully manage its money stock over a long period.

1.1 Analogies

The thesis of this book is that the Bank of Amsterdam operated much as a modern type of central bank, arguably the first such institution.⁵ In making this claim, we recognize that it is undoubtedly anachronistic and perhaps unfair to compare an eighteenth-century enigmatic municipal institution to today's transparent national or even super-national central banks. In the 1700s, worldly people knew of the Bank of Amsterdam, and select people used the Bank, but few understood it. Today, additional centuries of practical experience and academic inquiry have made central banking seem less alchemical than in eighteenth-century Amsterdam. Every country in the world has a central bank and every commercial bank has an account with the central bank. Central banks aspire for policy transparency and regularly publish statements of their financial condition. With some light, however, many aspects of the Bank look strikingly modern. And some people would argue that modern central banks retain a whiff of the Amsterdam alchemy.

⁴ A limitation of our analysis is that, under currently available technology, transactions recorded in the Bank's archive must be hand transcribed, although machine digitization may become practical in the near future. For this book, about 172,000 ledger transactions were transcribed, or around 1 percent of the total available, from 40,000 photographs taken in the Bank's archives.

⁵ At the time of the Bank of Amsterdam's founding, public banks had been operating in Mediterranean Europe for over two centuries. The novelty of the Bank was to combine certain features of earlier public banks with new touches to create an institution with recognizably modern aspects.

Certain modernish aspects of the Bank bear special emphasis. To cite one example, at the Bank's founding in 1609, Bank accounts were convertible into silver and gold, but Chapter 5 will show how circumstances ended that convertibility around 1685. Similarly, the Federal Reserve at its founding in 1913 created accounts, called reserves, that were convertible into gold, and circumstances in 1933 put an end to that convertibility for domestic purposes. Such inconvertible money is now called fiat, and the Bank, like modern central banks, successfully offered it.

To give a second example, in recent decades, there has been a worldwide shift of large-value payment systems (used to settle interbank funds transfers) to *real-time gross settlement* (RTGS; see Bech and Hobijn 2018). RTGS systems, which allow for instantaneous transfer of central bank balances, are simply a modern version of the type of payment offered by the Bank of Amsterdam: payor-initiated balance transfers (now known as giro transfers) with no netting or automatic overdrafts (Bech and Garratt 2017).

To cite a third example, select central banks today enjoy an international demand for their fiat accounts. Foreigners with no obligation routinely choose to pay in US dollars, for example, and final settlement of those payments often entails a transfer of account balances at the Federal Reserve (Bank for International Settlements 2020). This settlement function supports a worldwide demand for the Fed dollar (often termed “exorbitant privilege”; see, e.g., Eichengreen 2012), much as a similar demand existed for Bank of Amsterdam money in the eighteenth century.

Unlike modern central banks, the Bank (with rare exceptions) did not issue circulating banknotes, but that distinction is losing relevance. Since the Global Financial Crisis of 2007–2008, for example, the size of reserve accounts at the Federal Reserve and other central banks has come to dwarf the stock of currency in circulation.⁶ One reason for the increasing primacy of accounts is the declining use of banknotes as a means of payment in advanced economies.⁷ Partly in response to this decline, central banks are considering and, in some cases, already issuing digital currencies. Central bank digital currencies (CBDCs) are essentially a new type of account offered to a wider cross-section of users, rather than the traditional central bank accounts only available to commercial banks and other select

⁶ For the Federal Reserve, circulating cash now comprises only about 24 percent of total liabilities; pre-GFC this proportion was over 90 percent (*Financial Accounts of the United States*, Table L.109, accessed on August 25, 2022).

⁷ Banknotes remain popular in some countries, however (Bagnall et al. 2016), and the use of banknotes as a store of value (i.e., for hoarding) has increased of late (Bech et al. 2018, 71–74).

counterparties (Bank for International Settlements 2021, 77–85). The Bank of Amsterdam’s open-access policy of offering central bank accounts to any local merchant now seems less far-fetched than just a few years ago.

Large-scale open market purchases, known as “quantitative easing,” are another reason for the relative decline of banknotes. Since the Global Financial Crisis, quantitative easing has dramatically increased the size of central bank balance sheets and account balances. While the scale is new, the technique is not. The early Fed learned to buy and sell “safe assets” (meaning US Treasury debt) in the 1920s (Garbade 2012), and Chapter 5 will explain how the seventeenth-century Bank of Amsterdam similarly learned to buy and sell precious metal. Over the centuries, the type of asset that people consider a *safe asset* (meaning one free from adverse selection; see Gorton 2017) has changed from select coins to select debt, but the buying and selling of safe assets remains the core activity of central banks.

In the early modern era, silver and gold coins were seen as safe in that they held value in most markets around the world, with the most ubiquitous trusted coin being the Spanish dollar (Irigoin 2020). The availability of such coins supported trade as the world economy expanded. Similarly, the rapid growth of the world economy since 1945 has generated an increasing demand for safe assets (Pozsar 2014; Gorton 2017). The international demand for the debt of developed economies, the United States in particular, has been interpreted as a manifestation of this safe-asset demand (Gourinchas, Rey, and Govillot 2017).

Yet another precocious aspect of the Bank of Amsterdam was the means by which it allowed safe assets to be converted to Bank money and vice versa. When customers sold coins to the Bank, they received ledger money (a credit to their Bank account) and a piece of paper called a *receipt*. The receipt was an option to repurchase the coins at a slightly higher price. To effect a repurchase, a customer needed both the receipt and the ledger money. Today, a similar conversion often occurs via *repurchase agreements*, also called repos. A repo is a contract to sell an asset (most often, government debt) and repurchase it at a slightly higher price. Chapter 5 will discuss how a combination of an initial coin sale to the Bank and later exercise of a redemption option often served as a de facto repurchase agreement.

Repurchase is relevant because today’s repo markets are both immense and critical to the functioning of modern finance. As of this writing, there are over \$4 trillion in outstanding US dollar-denominated repo contracts,⁸ of which

⁸ See the Federal Reserve’s *Financial Accounts of the United States*, Table L.207, accessed on September 7, 2021.

more than \$2 trillion is transacted each day (Baklanova et al., 2019), the great majority (roughly two-thirds) of these contracts being for US Treasury securities. A 2016 survey (Bank for International Settlements 2017, 5) estimated global repo positions in government bonds to be \$8.8 trillion. A more recent estimate (International Capital Market Association 2021) puts the global size of repo in all asset categories at €15 trillion (\$17.5 trillion).

Repo has also become both a focus and an important channel for central bank policy. In a crisis, a central bank's support for repo markets can be sudden and large as occurred in 2008 and 2020.⁹ Chapter 7 will detail how the Bank also expanded the reach of its repurchase (receipt) facility in response to a financial crisis. In calmer times, modern central banks (the Fed and the European Central Bank (ECB) included) have come to integrate standing repo and reverse repo facilities into their policy frameworks. "Standing" means that the facility has pre-set terms available at the discretion of users, as was the case for the receipt facility of the Bank of Amsterdam. The policy frameworks of central banks such as the Fed and the ECB in effect offer both a floor (lowest rate) and ceiling (highest rate) for repo markets.¹⁰ Modern central banks can offer both because they use repo to borrow and to lend. The Bank only used repurchase to lend, so it offered only a floor, and the implications of that difference will be explored in Chapter 6.

By virtue of the features described above (fiat money, giro settlement, exorbitant privilege, quantitative operations, repo facilities), the Bank of Amsterdam was able to operate much as a modern type of central bank. By "modern," we mean a system where repurchase supports safe assets (sovereign debt today, coins then), where those safe assets back fiat accounts, and where central banks manage the creation and destruction of fiat accounts to support repo liquidity. Walter Bagehot wrote, "Money will not manage itself" (1979 [1873], 10), and the Bank's approach to money management was to divide itself into two parts: passive and active. The passive part was a standing receipt (repurchase) facility that let customers decide when and how much to convert coins into or out of Bank money. The active part was operations wherein the Bank decided when and how much to trade in coins. The two parts shared the same Bank

⁹ These disruptions are discussed in Chapter 9.

¹⁰ The Fed's use of repos began as early as 1917, when the Fed used repos in US Treasury bonds to facilitate war finance (Garbade 2012, 193). After a long pause in the 1930s and 1940s, the Fed reinstated repos during the 1950s as a way to smooth short-run fluctuations in prices of Treasuries. The Fed's usage of repos was expanded in the 1960s to include repos in longer-term Treasuries, repos in agency securities (those of government-sponsored enterprises), and reverse repos (Garbade 2021, 152–66, 351–70).

money, and the Bank used that connection to direct its discretionary purchases (sales) to offset decreases (increases) in receipts. Through this management strategy, the Bank was able, in its successful years, to control the overall amount of its money.

Although the Bank's behavior was similar enough to be relevant to modern experience, it was different enough to reveal alternative possibilities. For example, the Bank created repo liquidity by issuing options to repurchase rather than entering into explicit repurchase agreements. In this way, claims to coin and Bank money were unbundled into two complementary assets, each providing a customized form of liquidity: ledger account balances for transactions within Amsterdam's credit market, and coin repurchases for transactions with other markets.

Another important difference was the terms under which repo financing was available. The Bank often left repo terms unchanged for long periods. The Fed and other modern central banks change repo rates when they adjust their policy stance, because modern central banks have macroeconomic mandates that translate into interest-rate adjustments to stimulate or cool the economy according to policy objectives. Standing facilities with inflexible terms could bring massive repo flows that might not align with macroeconomic goals. The Bank of Amsterdam did not have macroeconomic goals or even an explicit mandate, so it was free to focus on responding to repurchase activity.

1.2 Origins

The large and persistent demand for the Bank's fiat money is puzzling when one considers that during the early modern era, the concept of money was almost synonymous with coined precious metal.¹¹ The apparent paradox is resolved, however, by the fact that Bank money was intended to augment rather than displace the liquidity of the predominant metallic monies of the time. If we step back into the twenty-first century and view popular varieties of coins as *platforms* for connecting parties over time and space, then what the Bank offered was effectively a platform of platforms – a channel whereby Amsterdam merchants could exchange and

¹¹ The idea that money fundamentally consisted of precious metal coined by a sovereign had roots in Greek and Roman antiquity and persisted through medieval and early modern times (Ugolini 2017, 221–23; Fox, Velde, and Ernst 2016). In practice, there was often ambiguity as to whether the moneyness of a coin derived from its metallic backing or from its sanction by a sovereign, a theme that is explored in Chapter 3.

borrow against desirable safe assets at the lowest possible cost.¹² Such trading was facilitated by a unifying, hyper-liquid asset, which was provided by an abstract Bank money, one that could be predictably converted to safe assets, yet was not explicitly pegged to a single asset. The idea that fiat money could play such a pivotal role might not surprise many people in the modern world, but in 1750 this idea was unique to Amsterdam.

To make the Bank's system work, large quantities of precious metal were required, and much precious metal flowed through Amsterdam. Almost all of this flow originated in the New World, and in light of this fact, the most decisive event in the Bank's pre-history is undoubtedly the 1545 discovery of the Potosí silver lode in Peru (Lane 2019, 20–22).¹³ Production from this one source soon trebled world silver output, and Potosí was followed by the discovery of other major silver and, later, gold deposits (Soetbeer 1876, 8; TePaske and Brown 2010, 56, 113). Elevated levels of New World mine production persisted throughout the early modern period and helped sustain new levels of global trade, as thousands of tons of silver and gold flowed from these mines to western Europe and thence on to Baltic, Mediterranean, and Asian markets (Barrett 1990; De Vries 2003; Irigoín 2018; Palma and Silva 2021).¹⁴ Much of this precious metal would also remain in western Europe, where its circulation stimulated local trade (Palma 2019).

Historians have vigorously debated the impact of this Europe-centered flow of precious metal.¹⁵ It has been pointed out that the direction of flow was not uniformly eastward, but contained many westward cross currents, such as the silver that was mined in Japan and then sent to China, or silver that was smuggled from Spain's American colonies to the Philippines (Flynn and Giráldez 2004). It has also been shown that despite the impressive quantities of metal flowing east, the offsetting westward flow of goods was, by modern standards, quantitatively small.¹⁶ O'Rourke and

¹² A platform as defined by Choudary (2013) is a business entity that creates value by facilitating exchanges between two or more interdependent groups.

¹³ A close second place would be China's fifteenth-century adoption of a *de facto* silver standard (Glahn 2016, 307–9), a policy change that ensured a large and growing global demand for New World silver.

¹⁴ By the close of the eighteenth century, at least 70 percent of the world's silver stock and 40 percent of its gold had originated in New World mines (TePaske and Brown 2010, 67, 140; Irigoín 2018, 4).

¹⁵ For a discussion of recent contributions to this debate, see De Zwart and Van Zanden (2018).

¹⁶ De Vries (2003, 67) has calculated, for example, that the famous trade around the Cape of Good Hope accounted for (at its mid-eighteenth-century peak) about 50,000 tons of Asian goods transported to Europe each year, roughly the capacity of one modern

Williamson (2002) argued that the pace of early modern trade, while advanced over that of previous eras, was insufficient to ensure worldwide convergence in commodity prices and hence did not result in a true “hard” globalization.¹⁷ On the other side, Palma and Silva (2021) estimated that New World precious metal combined with new routes to Asia increased trade between Europe and Asia by a factor of fourteen. According to their estimates, American precious metals were at least as important as the new routes for the observed trade pattern after 1500. Flynn and Giráldez (2002) noted that a hard globalization did occur for the two key monetary commodities, gold and silver, whose price ratio converged worldwide first in the seventeenth century, and after a period of disruption, again by the mid-eighteenth century.

We will offer no comment on this great debate, other than to observe that the eastward flow of precious metal helped keep European prices stable despite prodigious American mine production. The initial influx of New World silver set the stage for a sixteenth-century inflation in Europe – dubbed the “price revolution” by Hamilton (1934) – but as global trade expanded and Asia came to absorb the majority of the world’s precious metal production (Barrett 1990), the trend in European prices (Dutch prices in particular) leveled out.¹⁸ The offsetting forces of American production and Asian demand, in combination with global economic growth, allowed early modern Europe – including Amsterdam – ready access to desirable assets, packaged in the form of silver and gold *trade coins*, which were both abundant and reasonably stable in value. A trade coin had a high denomination, a high precious metal content, and an international network of users that favored it. The most ubiquitous trade coins came from Spanish Peru and Mexico and went by many names:

freighter. For this modest flow of Asian imports, Europe annually sent about 150 tons of silver (or its gold equivalent) in return.

¹⁷ De Vries (2003) and others have pointed out that low volumes of trade between early modern Europe and Asia are in part attributable to the fact that much of this trade was restricted to monopolistic trading companies.

¹⁸ In the Netherlands, these price trends come out as follows (Van Zanden, n.d.). Over the sixty years prior to the founding of the Bank in 1609, annual (nominal) inflation averaged 2 percent, in part due to increased silver imports but in part due to debasement of the coinage. Over the next fifty years, average inflation then fell to 0.9 percent, and over the following century, it fell to 0.1 percent. Because the silver content of Dutch money stabilized in the late seventeenth century, Dutch prices became stable in silver terms as well. This stability contrasts with the situation in Asia, where commodity prices expressed in silver terms increased steadily over the eighteenth century (Esteves and Nogues-Marco 2021).

reales de a ocho or *peso* in Spanish, “pieces of eight” or “Spanish dollars” in English, *piastres* in French, and *pilaren* or *mexicanen* in Dutch. By any name, it was “the most successful world money before the nineteenth century” (Irigoin 2020, 384).¹⁹

High-quality trade coins like the Spanish dollar offered Europe a better approximation to the modern idea of a safe asset than any type of government security then available. Safety, in turn, enhanced international trade. Popular “brand names” of trade coins served as essential platforms that could connect diverse groups of producers, consumers, and middlemen at long lags over great distance. The prevalence and near-global acceptability of early modern trade coins facilitated long-distance commerce that would have been challenging in previous eras (Irigoin 2018). The genius of Amsterdam was to find a way to increase the liquidity of these already highly liquid assets.

What initially drew much of the world’s precious metal flow to Amsterdam was the economic dynamism of the Dutch Republic. This dynamism had its roots in the Republic’s sixteenth- and seventeenth-century trade successes (see, e.g., Israel 1989; De Vries and Van der Woude 1997; Van Bochove 2008). Dutch merchants moved goods (and people) between the New World, the Baltic, the Mediterranean, western Europe, Asia, and Africa, giving rise to a steady stream of revenues from trade.²⁰ Trade activity pulled in precious metal from multiple directions, but especially from the world’s principal supplier, Spain. Conflicts with Spain sometimes disrupted but ultimately could not halt the flow of precious metal into the Republic. Also contributing to the Republic’s pull was the anti-mercantilist outlook of Amsterdam’s governing class, who (atypically for this era) viewed precious metal imports as providing desirable opportunities for re-export.²¹ Regulatory clampdowns on traffic in gold and silver were sporadic, ineffective, and usually short-lived. This *laissez-faire* attitude helped Amsterdam retain its status as a financial center well into the eighteenth century, even as the Republic’s trade dominance faded.

¹⁹ The production of dollars by mints in the Americas was highly private, with little oversight beyond a tax paid to the Spanish crown (Irigoin 2020, 390).

²⁰ The Republic’s people-moving activities included transporting approximately half a million slaves from Africa to the New World (Postma 1990), and sending about 1 million Europeans to Asia (De Vries 2003).

²¹ See van Dillen (1964a) on seventeenth- and eighteenth-century Amsterdam’s attitude toward trade in precious metals. Local anti-mercantilist sentiment was grounded in profit motive rather than philosophical attachment.

Beyond metallic abundance, a second key factor behind the Bank's initial success was information technology, in the form of double-entry accounting. The origins of this technology are obscure, but its use expanded dramatically following the 1494 publication of the Venetian Luca Pacioli's *Summa de arithmetica*, which contained a helpful how-to chapter (Gleeson-White 2011). Pacioli's techniques could, of course, be used to record transfers of money, and by the mid-sixteenth century, certain merchants in the Southern Netherlands, known as cashiers (*kassiers*), were routinely keeping accounts that other merchants could use for payment (Aerts 2011). Cashiers had become commonplace in Amsterdam by 1609, when Amsterdam's governing council (*vroedschap*) tried to outlaw them and replace them with a more reliable City-owned bank – the Bank of Amsterdam (van Dillen 1934, 84). This was another idea borrowed from an Italian precedent, Venice's Banco della Piazza di Rialto, a public bank founded in 1585 to take over from failed private banks (Ugolini 2017, 39–45).²² The basic business model of the cashiers, and the early Bank of Amsterdam, was simple: take in coins as deposits, record *giro* (book-entry, payor-initiated) payments on the ledgers, and pay out coins for withdrawals.

1.3 The Transformation

By the middle of the eighteenth century, the relationship between Bank of Amsterdam accounts and the other monetary platforms had transformed. Bank ledgers were now fiat money, yet a river of silver flowed through the Bank. One goal of this book is to explain that paradox. The main idea of our explanation is that the Bank of Amsterdam came to act as essentially two banks that shared one money. One bank held the trade coins under receipt that customers used as collateral for loans of Bank money. This bank attracted a prodigious flow of silver. The other was a pure fiat bank that adjusted the amount of Bank money through unsecured loans and stabilization operations. When the two banks supported each other, Bank money worked well. When they did not, it did not: an influx of collateral

²² Ledger-money public banks were common in many Mediterranean commercial cities at this time, so this first step was not revolutionary. A 1606 resolution by Amsterdam's governing council mentions a bank in Seville, as well as the one in Venice, as models for an Amsterdam public bank (van Dillen 1925a, 5). Other Italian ledger-money public banks existed in Palermo, Gerona, Genoa, Milan, Rome (Van der Wee 1963, 367), and Naples (Costabile and Nappi 2018; Velde 2018). The function of these banks had commonalities with the earlier practices at certain trade fairs (Lyons, Piacenza, Castile) of settling debts in a stable money of account (Van der Wee 1993, 148–49).

could overwhelm the fiat bank, and a mismanaged fiat bank could provoke collateral flight.

Through this dual structure, the Bank orchestrated its suite of techniques. The Bank supplied a fiat ledger as a money used for the settlement of claims by the financial system. The Bank conducted open market operations as a tool to make substantial adjustments to the quantity of that fiat ledger money. The Bank offered customers repurchase agreements as a mechanism to support smooth flows between coins and fiat ledger money. In these respects, the Bank of Amsterdam flourished as a well-managed central bank.

The fiat side of the Bank, however, could also be used to channel funds to politically favored entities. In practice, the Bank lent large sums to the Dutch East India Company and routinely siphoned off profits to the City of Amsterdam. These activities made the fiat side a fractional reserve bank. Customers could not run on this portion because their accounts had no right of withdrawal, but markets could devalue Bank money. Such a devaluation happened in the 1780s when the Company borrowed heavily from the Bank but could not repay.

Overall, the fiat bank had a double-edged relationship with the receipt bank. Fiat open market operations helped counteract the swings in receipts, but excessive fiat exploitation undermined faith in the Bank's commitments to let customers repurchase coins under receipt. Lacking both private capital and explicit government support, the Bank was stable as long as it was popular, and was popular as long as it was stable. In truly extreme circumstances, it could be neither. Mismanagement of fiscal demands on the fiat portion of the Bank contributed to a general loss of confidence over the 1780s and to the Bank's ultimate collapse in 1795.

To build our case for the Bank's modernity, we first lay out all the key parts of the Bank's operations and how they fit together. Chapter 2 provides a snapshot of the monetary platforms in Amsterdam circa 1750, and Chapter 3 explains how the metallic side of the system was the foundation upon which paper monies could thrive. Chapter 4 describes the founding and early development of the bank as a response to the limitations of coinage in the 1600s. In Chapter 5, the story progresses into the eighteenth century as the maturing Bank reinvents its relationship with trade coins by adding a repo-like (receipt) standing facility for handling such coins. Chapter 6 ties these themes together to reveal the balance of passive policies that made receipts work well. Even then, the receipt bank was volatile, so Chapter 7 reveals how the Bank

used open market operations to stabilize the overall level of Bank money, and shows how the Bank's policy approach was eventually overwhelmed by fiscal stress.

1.4 Relationship to the Historiography of the Bank

Compared to later central banks of similar pre-eminence (the Bank of England and the Federal Reserve), the Bank of Amsterdam remains an under-researched institution despite its wealth of archival material. Challenges to working with this material include its archaic language, its unfamiliar formats, and its sheer mass: the contents of the Bank's archive run to about 550 meters, most of this consisting of dense numerical data. The Bank's institutional setting may also seem alien to researchers more accustomed to the structures of modern central banking.

The Bank is nonetheless associated with a rich literature, beginning with contemporary descriptions such as Adam Smith's well-known "digression" on the subject of the Bank (Smith 1981 [1776], 479–88). Rather than attempt a full literature survey, our analysis will reference specific works at points where they relate to various aspects of the Bank. For more complete guides to the literature, we refer the reader to monographs by Gillard (2004) and Dehing (2012), which offer wide-ranging bibliographies.

A number of works require special mention. The researcher most closely identified with the history of the Bank is Johannes Gerard van Dillen (1883–1969). His monumental two-volume work, *Bronnen tot Geschiedenis der Wisselbanken* ("Sources for History of the Exchange Banks"; van Dillen 1925a, 1925b), offers an accessible compilation of hundreds of archival sources relevant to the Bank, all transcribed in an easy-to-read modern typeface and currently available online. At more than 1,400 pages, the *Bronnen* give some hint of the complexity of the Bank and the vastness of its archive. Van Dillen also wrote introductory guides to the history of the Bank (van Dillen 1964b, 1964c, 1964d), which are based on original versions he published in the 1920s and which contain many data series. Van Dillen further compressed these guides into an English-language summary (van Dillen 1934). Finally, in a posthumously published volume (van Dillen 1970), van Dillen placed much of the Bank's history into the broader context of the economic history of the Dutch Republic. Our assessments of the Bank will at times depart from van Dillen's, but scholarly disagreement does not diminish our immense debt to his work.

The earliest systematic history of the Bank was written by Willem Cornelis Mees (Mees 1838). This was Mees' doctoral thesis, compiled

under difficult conditions, since he was denied any access to the Bank's archives. Mees, who went on to become president of the Bank's successor institution, De Nederlandsche Bank, was a person of extraordinary capabilities. While Mees' work has subsequently been overshadowed by Van Dillen's, many of Mees' insightful characterizations of the Bank have, as noted by his biographer (Van de Laar 1978), retained their validity. We rely on these insights for our analysis.

More recently, a number of authors have sought to extend the scope and, with the help of modern information technology, the numerical reach of Van Dillen's work. Works in this vein include Dehing and 't Hart (1997), Gillard (2004), Dehing (2012), and numerous contributions to the 2009 volume prepared for the Bank's quadricentennial (Van Nieuwkerk 2009). This body of work, to which we are also greatly indebted, has helped to connect the traditional, largely narrative historiography of the Bank to more modern, more analytical approaches to financial history. In particular, we have relied heavily on Dehing's (2012) description of the emergence of the receipt system. Our previous research on the Bank has tried to build on the modern literature, with a primary focus on reconstruction of the Bank's master account. This book attempts to present a more complete, unified, and, it is hoped, accessible treatment of results presented in our earlier work.

In contrast with most of the historical literature, we take a consciously anachronistic approach. There are advantages and disadvantages: On the one hand, terms such as "platform," and "repo facility" were unknown during the time of the Bank, and obviously these terms cannot be taken as historically accurate descriptions of the Bank's structure and policies. On the other hand, both contemporary observers and historians of the Bank have at times struggled to understand aspects of its operations. Because these aspects have strong parallels in the modern world of money and finance, it may be at times useful to apply anachronistic terminology in order to advance our understanding. For example, the Bank's receipts for trade coins were, quite formally, claims that entitled their holder to repurchase a certain quantity of coins from the Bank at a fixed price, within a fixed time period. It would be difficult for anyone with a background in modern finance not to recognize these instruments as American call options on coin, even if the Bank had a different name for them ("receipts"). Once certain concepts are learned, they are hard to unlearn.

This study also takes anachronism the other way. The Bank's regime anticipated many of today's arrangements, by facilitating exchanges of safe but slightly illiquid assets through a system that enabled traders to take

positions in different varieties of such assets, as dictated by their liquidity needs or speculative sentiment. This trading regime was made possible by the collective implicit agreement of Amsterdam merchants, remarkable for the time, that many of these trades would not be of safe assets against safe assets, but of safe assets for the Bank's fiat ledger money. The attraction of this regime is demonstrated by the fact that such arrangements continue to exist today. Frost, Shin, and Wierts (2020) go so far as to propose the Bank's ledger money as a model for certain types of digital currencies, "stablecoins" whose value is enhanced by arrangements that anchor them to traditional monetary assets.

With this focus on monetary architecture, this book is not structured as a traditional narrative history. The early chapters (2 and 3) start in 1750, during the third quarter of the Bank's existence, with a survey of the basics of money at that time: bullion, coins, bills, and banks. The middle chapters (4 and 5) jump back to 1600 and progress forward to the Bank's apogee. A purpose of these chronological chapters is to emphasize how messy the evolution of the Bank was. The ascendant design did not emerge quickly nor painlessly nor through penetrating foresight. Instead, it took the Bank nearly a century of dead ends, desperate fixes, bizarre turns, and unexpected successes to align coins and accounts with the political and economic realities of time and place. Only then do later Chapters (6 and 7) reveal how the mature form of the Bank thrived. With the full system explored, Chapter 8 broadens the perspective with the story of how Frederick's Prussia was able to exploit the liquidity within the Bank. Chapter 9 concludes by placing the Bank's techniques within the history of central banking.

Our book is also not intended as a comprehensive survey. Our focus is on monetary architecture, not on the Bank's relationship with the City of Amsterdam, the Dutch East India Company (VOC), or other important topics, although those relationships certainly form part of our story. Similarly, we do not catalog each crisis nor delve into the full variety of customers who used the Bank. The Bank's archives are vast, and we encourage others to pursue these worthy topics. Instead, this book focuses on the economics of coins and accounts. This approach acquires relevance through establishing similarities between then and now while highlighting differences. It is not meant to diminish the contributions of other researchers but to more firmly anchor the Bank's contribution to the history of money and finance. In doing so, we hope to inspire future generations to investigate the data contained in the remaining 99 percent of the Bank's ledgers.

A.1 TimelinesTable A1.1. *Key events in the history of the Bank*

1609: Bank is chartered by the City of Amsterdam
1638: Emergence of separate unit of account for Bank money
1659: Bank money (bank florin) given formal legal status with its own unit of account
1666: Start of continuous surviving ledgers
1672: France invades the Dutch Republic, run on the Bank
1683: Start of the receipt system and Bank's transition to fiat money
1694: Major reform of Dutch coinage
1763: Financial panic in Amsterdam
1772–1773: Another financial panic
1780–1783: Emergency loans to Dutch East India Company, run on the receipt system
1791: Partial recapitalization of the Bank
1795: Bank collapses in the wake of another French invasion
1820: Liquidation

Source: Authors.

Table A1.2. *Other relevant events in Dutch and European history*

1568: Netherlands revolts against Spanish rule, beginning the Eighty Years War with Spain
1579: Union of Utrecht, formation of the United Provinces, which become a republic in 1588
1609–1621: Twelve Years Truce between the Dutch Republic and Spain
1621–1648: Renewed war between the Republic and Spain (a phase of the Thirty Years War)
1672–1678: Franco-Dutch War, beginning with the Republic's "Year of Disaster" (1672)
1688–1689: Glorious Revolution, Dutch Stadholder Willem (William) III ascends the English throne
1694: Founding of the Bank of England
1701–1714: War of Spanish Succession
1716–1720: Rise and collapse of John Law's System in France
1740–1748: War of Austrian Succession
1756–1763: Seven Years War
1780–1784: Fourth Anglo-Dutch War
1795: France invades the Republic and replaces it with a client state (the Batavian Republic)
1813: Kingdom of the Netherlands established, replacing the Batavian Republic
1814: Founding of De Nederlandsche Bank (central bank of the Netherlands)

Source: Authors.