

Unstable Coins: The Early History of Central Bank Analog Currencies

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Summary:

Recently, there has been much discussion as to whether central bank digital currencies (CBDCs) should be introduced, and if so, how they should be designed. This article offers a historical perspective on this discussion, with a survey of early public bank (proto-central bank) “analog currencies”—circulating banknotes. Public banknotes were an experimental product when they were first issued in sixteenth-century Naples, but by the late nineteenth century, such notes could be found in most European countries. In between came all sorts of implementation difficulties: egregious insider fraud, a real estate finance bubble, hyperinflation, rampant counterfeiting, and complete institutional collapse. Despite these many misfires, central bank–issued notes eventually became the default form of payment in virtually every country worldwide.

Key findings:

1. Introduction of a new public payments instrument can entail serious operational and reputational challenges.
2. Promoting the use of publicly issued instruments through exclusive privileges may simply motivate the private sector to innovate around these privileges.
3. A successful public payments instrument will have monetary policy ramifications.
4. Implementation difficulties notwithstanding, a lower-cost method of transacting can be very valuable to society, as was evidenced by the (eventual) widespread adoption of central banks' notes.

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1. Introduction

Seemingly innocuous ingredients can sometimes be combined to yield powerful results. A famous example is the combination of charcoal, sulfur, and saltpeter. In first-millennium China it was discovered that this mixture could be placed in metal cylinder along with a projectile, directed at an enemy, and ignited. The explosive result of that discovery changed military history.

In financial history, an equally transformative mixture was discovered in the last decade of the seventeenth century, when the newly chartered Bank of England combined three ingredients—government debt, leverage, and the issue of circulating banknotes—within a stable, nationally chartered institution (Clapham 1945a). As with early gunpowder experiments, the risk of a backfire was high: the Bank of England’s notes were redeemable in coin and the Bank could be run at any time.¹ The Bank nonetheless found ways to successfully manage this explosive combination, and the Bank survives to this day. Key elements of the Bank’s original, seventeenth-century business model—purchases of government debt funded by circulating notes—still form the core of central banking. Now as then, what powers this business model is the utility of banknotes as money.²

Some observers believe, however, that central banks’ traditional business model is ripe for a major modification. The advent of digital currencies has expanded the set of possibilities for electronic transactions and has led to calls for the implementation of central bank digital currencies (CBDCs) as a way to increase the efficiency of the payments. Whether the Fed, in particular, should issue a CBDC, is the subject of a discussion paper recently issued by the Board of Governors of the Federal Reserve System (Board of Governors 2022).

What is a CBDC? The Bank for International Settlements (2020, 3) defines a CBDC as a digital payments instrument, denominated in the national unit of account, that is a direct liability of the central bank. In principle, digital currencies may be either “wholesale” (large-value, used primarily by financial institutions) or “retail” (small-value, used by the general public). The Board of Governors (2022, 5) adopts a stricter definition, focusing on digital instruments that are “widely available to the general public,” i.e., retail instruments. More generally, the policy discussion surrounding CBDCs has emphasized retail instruments.³

¹ Following the literature, this article will often refer to the Bank of England simply as the Bank. Backfires in the form of runs, suspensions of convertibility, and total liquidations were common occurrences with early public banks; see the examples described below.

² While central bank paper currency (“cash”) is less and less often in transactions in developed economies, the demand for cash continues to increase (Bech et al. 2018). Because cash does not pay interest while its backing assets (often, government bonds) usually do, profits from cash issue are an important source of financial strength for many modern central banks (Archer and Moser-Boehm 2013).

³ Recent examples of these discussions can be found in Bank for International Settlements (2020), Bordo (2021), and Prasad (2021). Not everyone agrees that CBDCs are necessary or desirable; less favorable assessments include Quarles (2021), Waller (2021), and White (2021).

This article will offer a historical perspective on this discussion with a selective survey of early experiences with (proto-) central bank “analog currencies” (i.e., circulating banknotes).^{4,5} While the Bank of England’s successful entry into note issuance is well remembered, it was not the first or only one. Circulating notes issued by publicly chartered European banks (proto-central banks) were a novel payments instrument in the sixteenth century, but had gone mainstream by the late nineteenth. In between were many experimentations that utilized the same unstable ingredients (debt, leverage, notes) as the Bank of England. Results varied by location. There were quiet successes (in Naples) and catastrophic blowups (in France and Austria). There were also intermediate cases of scary, but non-life-threatening mishaps (in Amsterdam and Sweden).

Several patterns can be seen in this history. The first is that introducing a new form of money was always a tricky business. People did not initially appreciate banknotes’ transformative power. Banknotes were at first seen simply as a convenient alternative to coin or cumbersome book-entry transfers. The popularity of banknotes soon widened the policy choices available to public banks, however, and mismanagement of these choices was the norm. Even the famously successful note issuer, the Bank of England, endured several close calls. In particular, when Napoleonic-era fiscal pressures pushed the Bank of England into retail-level (£1) note issue, it suffered reputational costs that forced it out of the retail payments space.

A second pattern is that, despite the many implementation difficulties, the market footprint of banknote issues tended to expand over time. Most early public banknotes were created as customized instruments for use by wealthy people.⁶ If, however, the notes achieved any degree of success, then they tended to move toward a more retail clientele. The usual motivation for this mission creep was not financial inclusion, but a desire to expand the fiscal capacity of the public bank (its capacity to finance government debt), or (in the case of Sweden) the bank’s capacity for real estate lending.

Other features of banknotes evolved in parallel with this down-market trend. The earliest banknotes were highly customized instruments, issued to named counterparties and

⁴ This article will describe some note-issuing European public banks that were founded during the early modern period, which is the historical period from 1492 to 1789. This article will not consider the early history of paper money in China, which is extensive and predates that of early modern Europe (Glahn 2016). Nor will this article review the history of the First Bank of the United States, founded in 1791.

⁵ This comparison is not intended to imply that CBDCs will function exactly as banknotes do for physical transfers of money. CBDC designs may be more or less “banknote-like” (Bank for International Settlements 2020, 12). Instead, this comparison examines the impact of a new form of payment, which, like CBDCs, had the potential to lower transactions costs and broaden the user base of (proto-) central banks.

⁶ This was a natural starting point, because in this era the use of bank accounts and other financial instruments was usually limited to merchants and other wealthy individuals.

only transferable by endorsement. These might bear interest or require payment of interest in order to remain valid. Over time, however, such bespoke instruments were discontinued in favor of preprinted bearer notes in fixed amounts – an advantageous design in an era when many people were illiterate. People liked the simplicity of these notes and also appreciated the privacy they afforded.

To illustrate a third pattern, this essay briefly strays into some later (nineteenth-century) history of English banknotes. The Bank of England’s successful notes inspired numerous private-sector banknote issues, and English “money” increasingly came to mean paper money in place of coin. Many contemporary observers did not see the prevalence of banknotes as compatible with monetary stability. A famous law (the Bank Charter Act of 1844, or Peel’s Act) then constrained the Bank’s note issue and blocked new note issue by private parties. An unforeseen effect of this heavy-handed legislation, however, was to migrate commercial banks’ payment activity to another paper instrument—the check, which came to dominate the English payment system.

A unifying message of these experiences is that whatever the conceptual advantages of a new public payment instrument, some caution is called for in its initial application. Operational and reputational challenges are to be expected. A second message is that promoting the use of publicly issued instruments through exclusive privileges may simply motivate the private sector to innovate around these privileges. A third message is that a truly successful public payments instrument will bring with it serious monetary policy ramifications.

A counterbalancing, more upbeat message is that an advantageous technology can eventually triumph over defective implementation. Despite the many early misfires, central bank-issued circulating notes, like gunpowder weapons, were adopted in nearly every country worldwide (Bordo 2021). And, this seventeenth-century payment instrument remains popular today. Most people would gladly accept a \$100 bill, if offered one.

The remainder of this essay is organized as follows. Section 2 discusses the role of public banknotes within monetary environment of early modern Europe. Section 3 presents a well-documented case of early public banknote issue, in Naples. Section 4 considers a subsequent, unsuccessful implementation of banknotes in Amsterdam. Section 5 discusses Sweden’s expansion of banknote issue into retail payments and the ensuing policy complications. Section 6 reviews the Bank of England’s largely favorable early experience with banknotes. France’s and Austria’s attempts to build on the English model are described in Section 7. The Bank of England’s nineteenth-century banknote experience is briefly described in Section 8. A concluding section considers possible implications of these historical episodes for CBDCs.

2. Money in Early Modern Europe

Certain developments in the global economy set the stage for the emergence of circulating banknotes in early modern Europe.

Somewhat paradoxically, banknotes emerged during a period characterized by an unprecedented abundance of gold and silver coins, thanks to Europeans' exploitation of precious metal deposits in the New World (TePaske and Brown 2010, 56, 113).⁷ Increased levels of trade, however, meant that these coins remained globally scarce (Barrett 1990, Flynn and Giráldez 2002, De Vries 2003, Palma and Silva 2016, Esteves and Nogues-Marco. 2019, Irigoín 2019, Palma 2019). A key driving factor behind this scarcity was China's fifteenth-century decision to abandon its previous system of government-issued paper currency and to adopt a de facto silver standard (Glahn 2016, 307–09). Because China was by far the world's largest and fastest expanding economy, yet lacked natural sources of silver, this policy change guaranteed an almost insatiable worldwide demand for precious metals.⁸

This coincidence of Asian demand and New-World supply created, for the first time in human history, a highly dynamic, globalized monetary environment. Europe was constantly receiving new supplies of gold and silver from Spanish and Portuguese colonies in the New World. At the same time, there was a strong incentive for Europeans to ship coins and bullion eastward (to the Baltic, the Middle East, and especially Asia) to obtain goods that were either expensive in Europe (grain, timber) or not produced there (spices, cotton, tea). European merchants responded to the global scarcity of hard money by devising various forms of paper money for within-Europe transactions, which freed up precious metal for use in long-distance trade.

The most important kind of paper money was the bill of exchange. Bills of exchange were used to move funds between European cities without the physical transfer of precious metal. A bill of exchange was basically a check written ("drawn") by merchant in one city on a business contact (a "friend") in another city.⁹

Once a bill of exchange landed in its destination city, however, there then arose the question of how the bill would be settled. In principle, bills could always be settled by

⁷ The first major American ore strike, in Potosí (Peru) in 1545, immediately trebled world silver production. By 1800, 70 percent of the world's silver stock and 40 percent of its gold had been mined in the New World.

⁸ China's population in 1500 was about 110 million, but by 1800 had grown to 330 million, the latter figure representing one-third of world population (De Zwart and Van Zanden 2018, 11). By contrast, the largest European polity in 1800 was France, with a population of 29 million.

⁹ For an introductory discussion of bills of exchange, see Quinn and Roberds (2008). An informative map of the eighteenth-century European bill-of-exchange network is given in Flandreau et al. (2009). At the core of this network were three cities: Amsterdam, London, and Paris. Public banks operating in these locations are described later in this article.

payments in coin. In practice, however, merchants often preferred to use various forms of local paper money (Jobst and Nogues-Marco 2013).

2.1. The Role of Public Banks

Creating credible local paper money was a challenge. Most early modern European states were ruled by autocratic monarchs and people would not have trusted the monarchs' paper for use in transactions. Some private deposit banks existed, but these were often seen as prone to failure or dishonest in their valuation of coins. Public banks, the predecessors of today's central banks, tended to arise in commercial cities with some degree of political autonomy, the earliest example being Barcelona's *Taula di Canvi*, founded in 1401. Other significant public banks were established in trading centers such as Genoa, Venice, Amsterdam, and Hamburg.¹⁰

These banks were not known as "central banks," a term which entered the English language only in the nineteenth century. Many public banks were privately owned. They were, however, institutions whose charters granted them unique privileges and assigned them some degree of public responsibility. Each of the early public banks has a different life history, but most can be described as cooperative arrangements between local merchants, enabling them to reliably transact with each other without the transfer of coin.¹¹

Early public banks were typically open to anyone in their sponsoring community, in principle. One feature that the first generation (pre-1700) of public banks shared, however, was that their payments almost always occurred as payor-initiated transfers of ledger balances (known as giro transfers). Meticulous double-entry accounting helped ensure the reliability of these transfers, but in an era of hand calculation, the entry and verification of giro payments was a labor-intensive process. Also, payor and payee (or their agents) both needed to be present at the bank to ensure that money had been transferred. Hence, giro transfers were usually only practical for large-value payments between wealthier individuals.

Taken together, these conditions set the stage for the emergence of an alternative form of public-bank paper money, circulating notes. Banknotes, like giro payments, could economize on the use of coin, but had lower transaction costs and could reach a broader user base. Originally, most public banknotes were used only by the merchant class, but over time their use expanded to a larger clientele.

¹⁰ A classic collection of research on early-modern public banks is Van Dillen (1934a). More recent surveys of these institutions include Roberds and Velde (2016a, b, c), Ugolini (2017), and Bindseil (2020).

¹¹ One factor that favored public bank money over the use of coins was the variable quality of the latter. Transfer of large sums in coin could require costly, time-consuming verification of the weight and fine content of the transferred coins.

2.2. Private versus Public Banks

Early modern public banks coexisted, but did not always directly compete, with purely private banks. This was partly because of privileges conferred on public banks by their charters, but also because the concept of a bank was somewhat different in early modern times than now. Especially on the Continent, the term “bank” was often applied to private partnerships that could be heavily involved in trade as well as finance. Traditional sources of funds for these banks emphasized commercial paper (often, bills of exchange) and mortgages, rather than deposits or bearer note issue.

One exception to this generalization was in England, where commercial deposit banking developed rapidly from about 1750 (Clapham 1945a, chapter 4). English commercial banks were also prolific note issuers. The English case is discussed in more detail below.

3. Naples: Breaking Free from the Centralized Ledger

It is unknown when and where public banking first broke free from ledger transactions. Almost certainly this occurred somewhere in Italy, where public banks were in operation from the early fifteenth century (Roberds and Velde 2016a, 321).

One of the first documented uses of public banknotes in Europe did not occur in one of its independent commercial cities, however, but in Naples, the capital city of a kingdom ruled by an appointed agent (viceroys) of the Spanish Crown. From the late sixteenth century, the banking situation in early modern Naples was rather unique. Deposit banking services were provided by eight publicly chartered institutions, seven of which were operated by Catholic charities (an eighth, by a consortium of private tax collectors). The banks’ credibility was enhanced by their association with reputable religious institutions, rather than private firms or state-operated entities. Only one of these banks failed over more than two centuries of operation.¹²

The Neapolitan banks were also more inclusive than other early public banks. By 1611, about 52 percent of Naples households had an account at a bank (Costabile and Nappi 2018, 19). Eight percent of accounts were held by women, a high percentage for the seventeenth century. Some of the loans granted by these banks were semi-charitable “pawnshop” credits granted for small amounts, on the security of personal possessions (Balletta, Balletta, and Nappi 2018, 111). The banks were not, however, operated as nonprofit institutions. They accepted deposits of coin and made profitable loans of various types, including loans to private citizens and various governmental bodies.

Already in the late sixteenth century, some bank customers apparently found it convenient to pay using a banknote (*fede di credito*). The earliest surviving Neapolitan

¹² For a compilation of research on the early Neapolitan banks, see Costabile and Neal (2018). For an overview of these banks, see Velde (2018).

banknote was issued by the *Banco della Santissima Annunziata*, a bank associated with a charity that aided impoverished citizens and orphans. The note was issued on April 20, 1587, to a bank customer, Mr. Guadagniuoli, and its handwritten text reads:

We the Governors of the Annunziata di Napoli certify (*facciamo fede*) we have as our creditor in the said bank Mr. Gio. [Giovanni] Vincenzo Guadagniuoli for D. hundred fifty-six and he can dispose of them at his pleasure on return of the present [*fede*] signed and sealed with our usual seal. Addì [on the day] 20 April 1587

Signatures of the Governors

In more modern language, this early note possessed a key property of modern currency, *that it was an obligation of the bank and not the customer*. It was likely issued against a deposit of coins by Mr. Guadagniuoli. Nonetheless it was the *Banco della Santissima Annunziata* that vouched for the validity of the note.

The note was not used in anonymous transactions, in part because it was for a quite large sum. An ordinary laborer in Naples would have to work five days to earn just one ducat, making this note worth 780 days of labor, something like \$75,000 in today's terms. Actual uses of the note are recorded on the note itself. Mr. Guadagniuoli first used the note to make relatively small withdrawals from the bank (six ducats, three ducats, and two ducats).¹³ He later transferred the remaining balance of the note (145 ducats) to third parties (Messrs. Citarella and Rinaldi) on December 22, 1587.

The 1587 note did not circulate beyond Naples, but later Neapolitan notes sometimes did. This is known because transfers of the notes are recorded as endorsements (*girata*) on the notes. Figure 1 shows a note from 1753, issued by another charitable bank, the *Banco di San Giacomo e Vittoria*.

¹³ An interesting feature of the early Neapolitan notes, reflecting their customized nature, was that they could be split into fractions of the original amount.

Figure 1: Note Issued by a Neapolitan Public Bank, 1753



Source: Image courtesy of François Velde

Like the earlier example, the note in figure 1 was issued for a large sum, 200 ducats. It was issued on August 25, 1753, to Messrs. Noble and Tierney, two British merchants residing in Naples. Endorsements on the note show that Noble and Tierney used this note to pay Onofrio and Salvator d'Aprile, Italian merchants who resided in Gallipoli, Turkey. The endorsements also show that the d'Apriles subsequently used the same note to transfer 200 ducats back to Noble and Tierney.

The note was at all times a claim against the *Banco di San Giacomo e Vittoria*. By requiring that each transfer be recorded on the note itself, however, the bank minimized the chance that this high-value note could be used in a fraudulent fashion. Of course, this way of transacting accorded note users little in the way of privacy.

To summarize: the early Neapolitan banknotes enhanced payments efficiency by allowing bank customers to transact without a trip to their bank. Judging from the surviving notes, the notes were successful for this purpose but did not yet resemble today's pre-printed, small-denomination, bearer notes. These were still very formal, bespoke instruments.

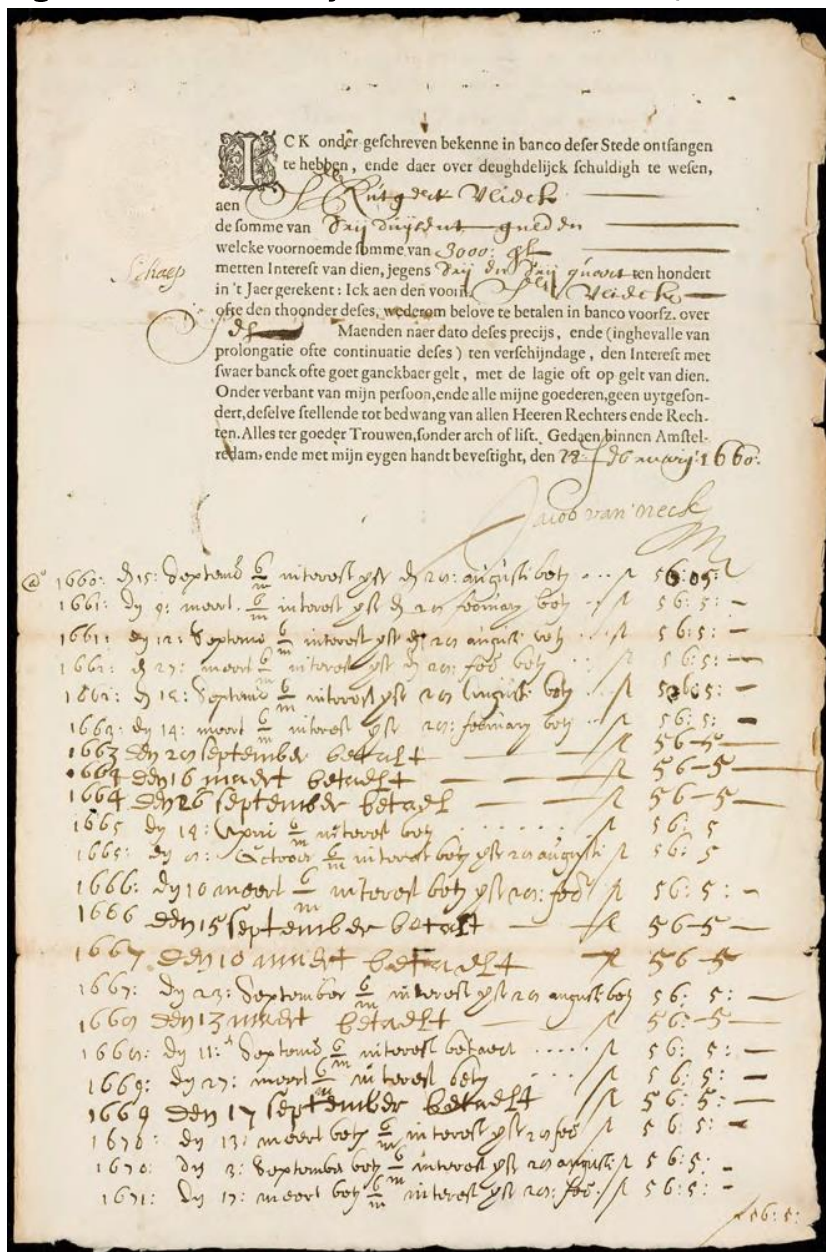
4. Amsterdam: Payments Privacy and Operational Failure

Over the course of seventeenth and eighteenth centuries, however, a number of public banks trialed other types of note issue, in experiments that would ultimately bring paper currency closer to its modern form. One of these issuing experiments, notoriously unsuccessful, took place in Amsterdam.

The banking environment in seventeenth-century Amsterdam was quite different from that of Naples. The city of Amsterdam was heavily Protestant, free from monarchical influence (being located in a republic), and enjoyed a good deal of civic autonomy. Amsterdam did not delegate banking services to religious entities, but instead concentrated them in a single, municipally owned institution. This bank (the *Amsterdamsche Wisselbank* or Bank of Amsterdam), founded in 1609, was governed by local merchants and enjoyed a high reputation within the city and throughout Europe more generally (Van Dillen 1934b). By the mid-seventeenth century, the Bank of Amsterdam had grown to about the same size as the Neapolitan institutions combined (Velde 2018, 218).

The Bank of Amsterdam had little interest in financial inclusion. Bank money (in the form of account balances) was a privileged medium, used almost exclusively by merchants for specific business purposes (trading and settlement of bills of exchange). There were about 2,000 account holders at the Bank in the mid-seventeenth century, as compared with the city's population of about 200,000 (Van Dillen 1925, 985; Israel 1995, 1007). Bank money was valued at a premium of around four percent over other types of money (Van Dillen 1934b, Quinn and Roberds 2014). Bank payments were traditionally giro payments, but the bank issued a number of circulating notes in the mid-seventeenth century (Dehing 2012, 89-94). Probably these were issued as a way of enabling the use of bank funds for people without a bank account. One of the Amsterdam notes is shown in figure 2. The note was issued on February 28, 1660.

Figure 2: Note Issued by the Bank of Amsterdam, 1660



Source: Amsterdam City Archive 5077/19, reproduced in Dehing (2012, 92). This image is in the public domain.

The Amsterdam note, like the Neapolitan examples, is for a hefty sum (3000 guilders when a typical laborer’s daily wage would have been 1 guilder or less) against a deposit of coin.¹⁴ It differs from its Neapolitan counterpart in several ways, however. The note is on a preprinted form, with blank spaces left for the customer’s name (Jacob van Neck), the issuing clerk’s name (Rutger Vlieck), and the amount. It can also be redeemed either by the original

¹⁴ See Allen et al. (2011) for data on early modern wages in the Netherlands and other countries.

recipient of the note (Mr. Van Neck) or by any bearer (*thoonder*), with no endorsement necessary. Thus, unlike the note in figure 1, this note could be used privately, with one caveat.

Reflecting the privileged status of bank money, the note was only redeemable for coin within a period of six months, unless the bearer of the note brought it back to the bank and paid an interest of 1.875 percent (3.75 percent per year) for a renewal (*prolongatie*) of the note.¹⁵ The later annotations on the note are not endorsements, but interest payments, which continue through 1672 (the last notation on the front of the note is for 1671). Because a note holder did have to bring the note to the bank in order to pay the renewal fee, the bank would have known the identity of the note holder at that point. However, the bank did not know whose hands the note had passed through in between renewals.

While the Amsterdam notes enjoyed some popularity, their more anonymous character posed accounting challenges. At this time, Bank of Amsterdam had no reliable methodology for matching coins deposited in its vault to notes issued against those deposits. The clerk who issued the note in figure 2, Rutgert Vlieck, was discovered in 1673 to have issued hundreds of thousands of guilders in bogus notes (likely including this one), a multiple of the bank's annual profit. Other cases of fraud were less spectacular but no less humiliating for bank management. To maintain its reputation with Amsterdam merchants, the bank publicly executed Vlieck (figure 3) and ceased issuing notes in 1674.

¹⁵ Redemption of the note for coin would have incurred a similar fee, hence it made sense to keep the note in circulation.

Figure 3: The Bank of Amsterdam's Execution of a Fraudulent Note-Issuer, 1673



Note: the pamphlet shows the execution taking place in front of the Amsterdam Town Hall, home to the Bank of Amsterdam. The text beneath the image is a lamentation recited by the offender prior to his execution. Source: Anonymous pamphlet, digital collection of the Rijksmuseum. This image is in the public domain.

From 1674 forward, any Amsterdam merchant wishing to transact in bank money, but lacking a bank account, was told to designate a third party with an account to send and receive giro payments for them (Van Dillen 1925, 176–77). The controversial business of note issue

was relegated to private intermediaries, firms known as cashiers, who gradually took on some banking functions (De Jong-Keesing 1939; Jonker 1996).

To summarize: the Bank of Amsterdam enjoyed some success with issuing preprinted, bearer notes, albeit for very large, customized amounts. The Bank soon discovered, however, that it could not implement the bookkeeping necessary to keep track of such notes. Since the bank's business was focused on large-value payments among wealthy merchants, it decided that the advantages of banknotes did not compensate for their reputational risk. This experience underscores the importance of operational integrity for a new type of payment instrument.

5. Sweden: Abrupt Failure, Then Too Much Success

The location that is usually associated with the first European public banknotes is Sweden. Sweden's famous early banknotes were issued by a short-lived public bank, the Stockholm Bank (*Stockholms Banco*). Inspired by the success of the Bank of Amsterdam, the Stockholm Bank was chartered in 1657 but failed after only ten years of operation (Wetterberg 2009, 33–42). Despite its inept management, the Stockholm Bank achieved lasting renown through the issue of innovative banknotes. Figure 3 shows one of these notes.

Figure 3: Note Issued by the Stockholms Banco, 1666



Source: Alvin-portal.org. This image is in the public domain.

The note is for a large sum, ten dollars in silver money (Daler Sölfwermynt), although for a less imposing amount than the Amsterdam and Naples examples (about 33 days of ordinary labor).¹⁶ Differently from those examples, this figure is for a round amount that is preprinted on the note. More generally, everything on the note is preprinted except for the signatures of bank officials. Much like modern banknotes, the note displays a serial number as well as a standardized, decorative design.

Another salient feature of the note in figure 3 is that it was not issued against a deposit of coin, but only as a general obligation of the bank: a “credit note” (*Credityvsedel*). Given the shaky liquidity of the bank, this feature was often more of a necessity than a virtue. Overissue of such notes soon put the bank in a situation where it could no longer redeem them in coin. The last circumstance was followed by closure of the bank, liquidation of its assets, and the jailing of its manager (Wetterberg 2009, 44–45).

In 1668, the Stockholm Bank was superseded by a second public bank, the Bank of the Estates of the Realm (*Riksens Ständer Bank*).¹⁷ This second bank, later to be renamed the *Sveriges Riksbank* or Swedish National Bank, was more successful than its predecessor.¹⁸ In fact, the Riksbank exists today as the world’s oldest central bank.

The ultimate success of the Riksbank did not mean that it enjoyed a carefree early existence. Skepticism of public banks ran high after the failure of the Stockholm Bank, and the new bank was placed firmly under the control of Swedish parliament rather than the crown. To bolster its credibility, the new bank did not issue any notes for the first 33 years of its existence.

Circulating banknotes began to reappear in 1701, in the form of “transport notes” (*Transportsedlar*). By this time, there was already an informal curb market in bank deposit receipts, which people began to circulate as bearer notes, even though this practice had no legal sanction. The transport notes were intended to replace the unsanctioned deposit receipts. Their name emphasized that these were not the same as credit notes of the ill-fated Stockholm Bank (Wetterberg 2009, 57–58). Their advertised advantage was as a convenient

¹⁶ A confusing feature of Swedish monetary systems during this period is the existence of multiple units of account: dollars silver money and dollars copper money (these terms often referred only to units of account rather than the metallic content of the coin). An ordinary laborer in Stockholm would have been paid around 24 öre (sub-units of copper-denominated coin) per day in 1661 (Söderberg 2010, 473). 32 öre was equal to a (copper) dollar and 2.5 copper dollars was equal to a silver dollar, at official parity (Edvinsson 2010, 151).

¹⁷ The term “Estates” here refers to segments of society (nobility, clergy, burgers, and peasants) who were represented in the Swedish Parliament. Each of these segments, the peasants excepted, had representation on the bank’s board (Wetterberg 2009, 50). The nomenclature emphasized that the bank was under the Parliament’s and not under the king’s control.

¹⁸ For convenience, the discussion below refers to the Riksens Ständers Bank by its modern name, which may be more familiar to most readers.

means of transporting large sums, especially of weighty copper money, across long distances within Sweden. To avoid Amsterdam-style problems with anonymity, transport notes initially could only be transferred by assignment, to a payee named on the note (Wetterberg 2009, 58). This feature was not popular among the large portion of the population that was illiterate or among people wanting to keep their transactions private.

The transport notes became more accepted, however, as their privileges and features were expanded. The minimum note denomination was gradually reduced from 100 dollars silver money to six dollars copper money, equivalent to one dollar silver money (Wetterberg 2009, 90). Notes were preprinted in round denominations and featured bilingual texts to aid acceptance among the Finnish-speaking population.¹⁹ Notes became bearer instruments from 1745, re-establishing the possibility of private use. From 1726, taxes could also be paid in notes (Fregert 2014, 362).

Once the notes became established as credible payment instruments, the challenge was how to sustain this credibility. In 1739, a new political party came to power in the Swedish Parliament (the “Hats”), which was determined to exploit the notes’ growing popularity (Heckscher 1934, 178). The Hats remained in power until 1762, and their impact on the Riksbank’s balance sheet can be seen in table 1. The balance sheet expanded nearly fivefold during this time interval, fueled by an 850 percent increase in note issue. Notes funded the Swedish state’s wars against rival powers (Russia and Prussia) but also funded loans to private individuals. Interest-only mortgages were issued against all kinds of personal property, but especially real estate, at fixed, low rates. The “hard currency” value of the Riksbank’s money, as measured against the Hamburg bank mark, depreciated by about 60 percent as a result of these policies (shown in table 1). Notes became irredeemable in coin after 1745, effectively placing Sweden on a fiat monetary standard (Fregert 2014, 342).

¹⁹ Modern Finland was contained within Sweden at this time.

Table 1: Riksbank (Riksens Ständer Bank) Balance Sheets, 1739 and 1762, in Swedish Kronor (SEK)

	1739	1762
Assets:		
Metal	1,045,938	344,534
Loans: private	575,686	6,301,873
Loans: government	1,087,310	7,033,448
Other assets	237,586	525,787
Total Assets	4,360,360	20,549,380
Liabilities:		
Notes	1,331,180	11,263,882
Deposits: non-interest-bearing	1,078,527	1,131,585
Deposits: interest-bearing	1,013,422	1,777,840
Equity	800,578	5,804,707
Other liabilities	136,653	571,366
Total liabilities + equity	4,360,360	20,549,380
Memo: exchange rate, dollars		
Swedish silver money (dsm) per Hamburg mark banco	1	2.4

Note: original values are in daler silvermunt (dsm=silver dollars) and are converted at 6 dsm = 1 sek.

Source: Edvinsson (2010), Fregert (2014)

This situation eventually resulted in a policy backlash. In 1765, a new political party (the “Caps”) came to power in Parliament (Heckscher 1934, 181). The Caps wanted to return Sweden’s money and the Riksbank in particular to their “normal” (pre-Hat) state. Various contractionary policies were implemented in combination: new Riksbank lending was curtailed, amortization was required for existing bank loans, and the bank’s coin reserve was used to buy up outstanding notes. Instituted over a two-year period (1766–68), these policies did succeed in bringing the Swedish exchange rate close to its 1739 level: 1.2 dsm per Hamburg mark banco in 1766 versus 1 dsm per Hamburg mark banco in 1739. As might be expected, this policy combination also collapsed the domestic price level, which fell by 37 percent over a four-year period (1765 to 1769) and pushed the Swedish economy into recession (Edvinsson and Söderstrom 2010). Eventually, the exchange rate was stabilized at about 1.94 dsm/mark banco, and notes again became redeemable in 1776.

Monetary instability returned to Sweden during the Napoleonic period. With the outbreak of war with Russia in 1788, pressure was again exerted on the Riksbank to finance war expenses through note issue. When the bank refused, other types of notes were issued directly by the Swedish National Debt Office (Heckscher 1934, 184). A second war with Russia in 1808 brought new demands on the Riksbank, leading to additional issue of Riksbank notes and a suspension of redemptions in 1809. Sweden ended the Napoleonic period with three

competing units of account: a silver dollar (applied to silver coins, now rarely encountered), a bank dollar (applied to inconvertible bank money), and a treasury dollar (applied to Debt Office notes still in circulation). A definitive, unifying monetary reform did not occur until 1834 (Heckscher 1934, 185).

To summarize: Sweden's public banks brought banknotes closer to their modern form. Small-denomination, preprinted bearer notes offered an efficient alternative to coin, especially the copper coin that was common in Sweden. These notes were simple to use and preserved user privacy. These notes also imparted a degree of stimulus to the Swedish economy. However, the lack of a consistent policy framework for managing the note issues resulted in destabilizing waves of monetary expansion and contraction.

6. England: Storied Success and Public Relations Disaster

The Bank of England was founded in 1694 as a privately owned, leveraged vehicle for state finance. The Bank's private ownership and its charter from Parliament were intended to keep it at a safe distance from the English crown. Many people still viewed public banks as incompatible with monarchy, however, and the Bank's initial charter only guaranteed its existence for 11 years.²⁰

Differently from its predecessors, the Bank's business model was fully centered around note issue. Although it did offer bank accounts to London merchants, the early Bank of England's main source of funds (apart from its private equity capital) was notes. These funds were largely invested in state debt. Somewhat miraculously, the Bank was able to issue great quantities of notes without undermining convertibility of the notes or endangering British monetary standards. Mastery of note issue brought with it stature and prestige. By the eve of the French Revolution in 1788, the Bank of England was firmly established as Europe's leading public bank, with a balance sheet three times the total of the Neapolitan banks, five times that of the Riksbank, and seven times the balance sheet of the Bank of Amsterdam (Roberds and Velde 2016b, 485).

Fiscal pressures experienced during the Napoleonic era, however, caused the Bank to suspend note redemptions in 1797. A lengthy period of irredeemability followed (a period known as the Restriction), but note redemptions resumed in 1821 at prewar parity (an event known as the Resumption).

Some lesser-known details of this success story may be relevant for current policy questions. Although the Bank was to achieve fame as an issuer of round-denomination bearer notes, at its outset it was not clear that this would be its business model. Much like its predecessors in Amsterdam, Genoa, and Venice, the Bank was envisioned as a sort of financial utility for big-city merchants, hence its eighteenth-century nickname: "the Bank of London"

²⁰ A classic reference on the early history of the Bank is Clapham (1945a).

(Clapham 1945a, 107). Notes targeted people who traditionally would have dealt in state debt and would be familiar with existing privately issued banknotes (known as “goldsmith notes”) in the London market.²¹

The Bank’s first notes were issued for large amounts. £100 was a common sum, which could be adjusted to note holders’ individual needs. Until 1759 the minimum denomination was £20, the latter being equal to more than 40 weeks’ wages for an average worker in 1700. Notes were also issued in bewildering variety (Richards 1936, 219–30).²² Some notes were simple deposit receipts; some were payable to a third party (resembling a modern check and technically bills rather than notes); some bore interest; some were transferable only by endorsement; others were payable to bearer.²³ In other words, the early Bank was trying out products for market acceptance. All of the early notes were wholesale instruments, made out by hand and intended for use by knowledgeable merchants.

As the public gained confidence in the Bank’s notes, their design evolved toward a more modern form and functionality. Notes became uniformly non-interest bearing and payable to bearer. Notes became acceptable for tax payments (Desan 2014, 318). Preprinted notes were introduced from 1725.²⁴ Parliament, increasingly aware of the notes’ market acceptance, required that the Bank take on more state debt with every renewal of its charter.²⁵ In return, the Bank received certain privileges, including a near-monopoly on note issue within metropolitan London, helping to assure its continued profitability and survival. The shrewdly managed Bank was also the lucky loser in a potentially catastrophic competition with another chartered company, the South Sea Company, to fund an even larger chunk of outstanding English government debt. The South Sea Company’s “bubble” collapsed over 1720–21 but the Bank survived intact (Roberds and Velde 2016b, 470).

Fiscal pressure on the Bank was unrelenting, however, and this pressure eventually pushed the Bank to issue smaller-denomination notes. In 1759, toward the end of the Seven Years War (1756–63; known in North America as the French and Indian War), the Bank started issuing £10 notes.²⁶ Napoleonic-era wars with France (beginning in 1793) and the Restriction

²¹ The goldsmiths were a type of proto-banker that issued circulating banknotes, in addition to other activities. On the goldsmiths see Quinn (1997) and Temin and Voth (2013).

²² Historical data on English wages are available in the dataset “A Millennium of Macroeconomic Data,” which can be downloaded from the Bank of England’s website at bankofengland.co.uk/statistics/research-datasets.

²³ Some of the Bank of England’s early notes can be seen at the website of the Bank museum at bankofengland.co.uk/museum/online-collections/banknotes/early-banknotes.

²⁴ See the Bank of England website bankofengland.co.uk/about/history.

²⁵ Such renewals occurred in 1697, 1708, 1713, 1742, 1764, and 1782 (Broz and Grossman 2004, 51).

²⁶ The history of note denominations given here is taken from an essay “A brief history of banknotes,” which was formerly available at the Bank of England’s website. Older versions of the website can be accessed at archive.org.

(beginning in 1797) then caused the Bank to issue £5, £2, and finally even £1 notes. One pound sterling was at this time still a respectable sum, equal to about two weeks' average wages, but such notes placed the Bank well within the retail payments space.²⁷ From 1812, the functionality of these notes was enhanced by Parliament's decision to grant them quasi-legal tender status (Desan 2014, 407). More specifically, the tender of Bank of England notes could now keep a person out of debtor's prison.

The Bank's entry into retail payments expanded its market reach but created a major operational headache, in the form of counterfeiting (McGowan 2007). The Bank's traditional, large-denomination, merchant-oriented notes had seen only sporadic counterfeiting. Only six people had been prosecuted for note forgery over the 14 years prior to 1797. The £1 and £2 notes, however, soon became easy targets for organized criminal gangs who had previously specialized in counterfeit coins. Waves of forged notes appeared soon after the start of the Restriction.

The Bank saw widespread forgery as an existential threat and it struck back hard at the counterfeiters. It hired a nationwide network of private lawyers (who were responsible for criminal prosecutions under the conventions of the time) and paid out generous rewards to police who turned over note forgers and "utterers" (people deliberately passing forged notes) for prosecution. At the time, the only possible punishment for such crimes was death, and the Bank did not shrink from application of this punishment. In 1800, for example, 54 counterfeiters were prosecuted by the Bank, and 33 of these were hanged (McGowan 2007, 282).²⁸

Even these tough tactics soon met their limits. The increasing frequency of counterfeits, combined with the numerous prosecutions thereof, caused some juries to decide that the evidence presented by the Bank's prosecutors did not justify the death penalty. More and more acquittals resulted. The Bank again struck back, by requesting and receiving new legislation in 1801, which made it a crime simply to possess a forged banknote, for any reason (McGowan 2007, 252–57). The burden of proof was less for this new crime and the punishment was less severe: deportation to Australia for a period of 14 years ("transportation"). The Bank's prosecutors now routinely threatened death but could offer transportation in return for cooperation from the accused. Plea bargains were unusual for the time and were an effective prosecutorial tactic, but they placed the Bank in the unpopular role of annually making hundreds of life-or-death decisions.

²⁷ Retail-level notes had already been issued in Sweden, as described in Section 5. The Bank of England's issuance was more challenging due to England's larger and more urbanized population.

²⁸ England's population in 1800 was 8.6 million, so extrapolating these figures to the modern-day United States (population 332.4 million) would yield 2,087 prosecutions and 1,275 executions. In addition, these figures underrepresent the extent of the counterfeiting problem, because the Bank only prosecuted cases it was reasonably sure of winning (Palk 2006, 96).

The Bank's numerous prosecutions, deportations, and executions still could fully not control the counterfeiting menace. Court cases peaked in 1820 with 404 prosecutions, 352 convictions, and 77 executions.²⁹ Monetary costs of these prosecutions were substantial (£50,292 in 1820 alone), but the reputational costs to the Bank were even higher. Especially injurious to the Bank's public image were its execution of convicted women counterfeiters and its imprisonment of female plea-bargainers pending their transportation.³⁰ In an uncharacteristic display of compassion, the Bank frequently offered modest amounts of financial support to the latter group, in the hope that this would keep public disapproval from boiling over (Palk 2006, 149).

These PR gestures proved insufficient. As long as war raged, the counterfeiting was seen as an unpatriotic crime deserving of harsh punishment, but with the advent of peace in 1815, the Bank's anticounterfeiting efforts were seen as unnecessarily cruel. Summarizing the public's fallen opinion of the Bank, one postwar satirist quipped that "this villainous Bank has slaughtered more people than a *State*."³¹ Another, George Cruikshank, lampooned the Bank's anti-counterfeiting efforts in a parody banknote (figure 4). The note, in the style of a contemporaneous Bank of England note, features a row of executed counterfeiters and is signed by "Jack Ketch," a slang term for a hangman.

²⁹ Again extrapolating these numbers to the modern United States, this would correspond to 11,916 prosecutions, 10,382 convictions, and 2,271 executions.

³⁰ During the peak years of counterfeiting, 25–30 percent of the Bank's prosecutions involved women (Palk 2006, 92–93). Women counterfeiters were prosecuted with the same zeal as men.

³¹ William Cobbett, cited in Kynaston (2017, 111).

Figure 4. Parody of a Bank of England Note, 1819



Source: Etching by George Cruikshank, British Library. This image is in the public domain.

The Bank could not long withstand such ridicule. Following the restart of note redemptions in 1821, it withdrew its £1 and £2 notes from circulation. Prosecutions for counterfeiting soon trailed off to a manageable level (only five in 1824). The payments function of the £1 and £2 notes was partially taken over by a new £1 gold coin, the sovereign.³² The return to redeemability was seen as a policy triumph for the Bank and the country—England had managed to finance a costly series of wars without permanently devaluing its currency. Withdrawal of the small-denomination notes, however, was a climbdown for the Bank and a tacit admission that it could not manage note issue at the retail level.³³

To summarize: The Bank of England’s adept management of large-denomination note issue made it into a financial powerhouse (in the words of Adam Smith, “a great engine of State”) and a widely admired prototype for public banks in other countries. The Bank’s attempt to extend its business model to the realm of everyday transactions failed, however, due to

³² Small-denomination banknotes continued to be issued by “country banks” (banks operating outside London) for a time after Resumption (until 1833; see Wood 1939, 29). Also, the Bank briefly reissued £1 and £2 notes in 1825 in response to a banking panic. £1 notes were not issued on a permanent basis until the twentieth century.

³³ This situation was to some extent anticipated by Adam Smith (1776, 391), who distrusted small-denomination notes. Smith’s advice was “it is better perhaps, that no bank notes were issued in any part of the kingdom for less than five pounds.”

extensive problems with fraud. The last experience provides another example of the importance of operational integrity.

7. France and Austria: Fiscal Dysfunction

The Bank of England's success did not go unnoticed in other European countries. Inspired by England's example, both France and Austria founded public banks in the early eighteenth century. Both of these banks issued large quantities of notes (Austria's bank somewhat belatedly), and both banks failed spectacularly. It bears emphasis that neither failure resulted from operational issues, and that these banks' notes were initially successful at the microeconomic level. Instead, problems arose from monarchical governments' exploitation of note issue for fiscal purposes.

France's first attempt at a public bank was remarkable for its broad scope, conceptual novelty, and short life. The bank was founded in 1716 by an itinerant Scotsman, John Law, and enjoyed some initial success. Law's bank expanded rapidly during 1717–19 but had fully collapsed by late 1720.³⁴

To grasp the audacity of John Law's "system," as his bank-conglomerate was often called, it may be helpful to step back into the twenty-first century to visualize how this system worked. Let us suppose that a few years now, an innovative hedge fund manager makes a proposal to the US Congress, as a way of managing a worrisome fiscal situation. Under the proposal, the Federal Reserve, the US Treasury, and all government-sponsored enterprises (GSEs, such as Fannie Mae and Freddie Mac) would be combined into a single entity, which would be privately owned. New issues of (perhaps digital) currency and equity would finance this conglomerate. Equity shares in the entity could be purchased with existing US Treasury debt, at a favorable price. The hedge fund manager would oversee the new Fed-Treasury-GSE conglomerate.³⁵

This was the general outline of John Law's system, as it developed over 1716–20. The system started somewhat modestly, as a private bank (the *Banque générale*). The design of the *Banque générale* centered on a state debt-for-equity swap; that is, the bank's shares could be purchased with existing state debt. To fund itself, the bank issued bearer banknotes endowed with several statutory privileges. One was that the notes could be used to pay taxes, at par value. Another was that tax collectors (who were licensed private agents) were compelled to use the notes. Finally, to guard against loss of value, the bank's notes were redeemable in a

³⁴ My description of Law's system is taken from Velde (2003). Other relevant works include Murphy (1997) and Neal (2012).

³⁵ Law's view of France's fiscal situation to some extent anticipated the perspective of modern macroeconomics, which analyzes the balance sheets of a country's fiscal and monetary authorities in consolidated terms (see, for example, Bassetto and Sargent 2020). Eighteenth-century France's weak fiscal structure meant, however, that a practical consolidation could not be implemented along the lines that Law envisioned.

specific coin and not in the general French unit of account, the livre. Armed with these advantages, the bank's notes enjoyed some popularity.

The bank's successful debut was then followed by a series of ambitious expansions, all initiated by Law but approved by the king as ways to reduce France's fiscal burden. The *Banque général* was nationalized in late 1718, with the crown buying out all private shareholders and giving the bank a more prestigious name, the *Banque royale* (Royal Bank). In 1717, John Law founded a parallel company, the *Compagnie des Indes* (Indies Company) to take over various state enterprises (management of the colony of Louisiana, trade with the East and West Indies, supervision of private tax collectors, operation of the tobacco monopoly, etc.). In 1719, the Indies Company acquired the Royal Bank, and in February 1720, the two companies were merged. Meanwhile, the (mostly high-denomination) banknotes that funded this conglomerate had become payable only in abstract units of account, and in January 1720 the Royal Bank's notes became the sole form of legal tender within France.

The last phase of Law's system began in 1719 with the initiation of a Company buyout of *all* French government debt that was not already Company-owned. From that point on, the system took on the flavor of a Ponzi scheme. Bondholders were offered new shares of Company stock and, in order to make that offer more attractive, the notes of the Royal Bank were used to pump up the market price of Company shares. The results were predictably disastrous. The outstanding stock of banknotes increased 15-fold between July 1719 and June 1720, and the value of the paper livre plummeted on the foreign exchange markets. Realizing that his plan had become unsustainable, in May 1720 Law wrote down the face value of the Royal Bank's notes in an attempt to reduce the bank's nominal liabilities. A complete loss of confidence in the Royal Bank followed, and its notes were progressively demonetized over the remainder of the year.

John Law departed France in December 1720 but left behind lasting post-traumatic effects. Liquidation of the Royal Bank dragged on through 1722, and the French public wanted no more of banknotes or even banks. No French bank was chartered for a half-century after the Royal Bank's collapse, impeding the country's financial development. Although private merchants still fulfilled many banking functions, many avoided calling themselves "banks." A durable public bank, the Banque de France, could not be established until 1800.

Austria's initial foray into public banking came in 1703, shortly after the outbreak of a costly conflict (the War of Spanish Succession, 1701–14).³⁶ This public bank, called the *Banco del Giro* (a name borrowed from a public bank in Venice), was chartered by the crown and was intended to fund state debt. People simply did not trust the monarchy to operate such a bank,

³⁶ My discussion of early public banks in Austria is derived from Jobst and Kernbauer (2016) and Jobst (2018).

however, and the bank never got off the ground. It was dissolved within two years of its formation.

Austria's second public bank incorporated a more conservative design, with several features meant to ease fears of excessive fiscal exploitation. The bank was not chartered as a national institution but as an agency of the city of Vienna, seen as more creditworthy than the crown. This bank, the Vienna Municipal Bank (*Wiener Stadtbanco*) was designed to manage Austrian state obligations, but was allocated a dedicated stream of revenues that would allow such debt to be amortized within 15 years. The Municipal Bank did not attempt to issue banknotes but instead funded itself through interest-bearing time deposits. Thus, in this original form, the bank was essentially a debt-management agency.

Thanks to this conservative structure, the Municipal Bank enjoyed some initial success. Because Austria was involved in nearly constant warfare during the eighteenth century, however, fiscal pressure on the bank did not abate. In 1714, dissatisfaction with the Municipal Bank's management led the Austrian treasury to found a rival public bank, the Universal Bank (*Universal-Bancalität*). The loss-making Universal Bank soon (1720) lapsed into insolvency and was merged into the Vienna Municipal Bank. Subsequently, the Municipal Bank fell more and more under the influence of the Austrian treasury, which in 1782 assumed control over the bank.

The fiscal demands of the Seven Years War led the Municipal Bank to experiment with banknote issue. The first emission of notes took place in 1762, near the end of the war. Extraordinary measures were adopted to assuage public fears about banknotes. The amount of the issue (12 million florins) was modest and announced well in advance. The notes carried special privileges, including use for tax payments and exchangeability for interest-bearing bank debt at a favorable price. These advantages meant that the notes did not circulate for very long. Most had been returned to the bank by 1766, and, in a public demonstration of financial virtue, the returned notes were incinerated in a ceremony held just outside Vienna's city walls.

The success of this initial experiment led the Municipal Bank to issue additional notes in 1770 and 1785. These issues, again relatively modest in size, were popular with the public but set the stage for a classic paper-money hyperinflation. With the onset of the Napoleonic wars, already-strained Austrian state finances became wholly dependent on the printing press.³⁷ Redeemability of notes was suspended and the notes became legal tender. By 1796, the Municipal Bank's prewar note stock of 20 million florins had more than doubled to 44 million. By 1811, its note circulation hit 1 billion florins. The latter figure necessarily included many small-denomination notes, because people were melting down every type of coin—gold,

³⁷ The Municipal Bank's printing presses were considered strategic assets and were twice relocated (first to Hungary and then to Romania) to keep them safe from Napoleon's armies.

silver, and copper—which had now become undervalued relative to notes. Food prices increased roughly in step with the stock of banknotes, rising at a more than 20 percent annual rate. The situation became politically untenable, even in an absolute monarchy.

Eventually Austria was forced to undertake two dramatic monetary reforms. The first, occurring in 1811, devalued the bulk of the Municipal Bank notes by 80 percent and replaced them with redenominated banknotes. The recall of the old notes was accompanied by additional banknote-burning ceremonies. This reform temporarily paused but did not stop the wartime inflation. The second reform, undertaken in 1816 after war’s end, was essentially to declare the Municipal Bank a “bad central bank” in preparation for its liquidation. Its note-issuing function was taken over by a new, privately capitalized, nationally chartered institution, the Austrian National Bank (the *Oesterreichische Nationalbank*, which exists today as a member of the Eurosystem). The former Municipal Bank’s redenominated notes were (gradually) exchanged for notes of the new bank, at a ratio of 2.5 to 1. The net effect of the two reforms was to impose a 92 percent haircut on holders of the Municipal Bank’s original notes. As with the John Law example, there was a negative effect on the Austrian economy, which remained depressed until about 1825.

To summarize: the inflationary experiences of early public banks in Austria and France showed that banknote issue, however successful at a microeconomic level, required responsible management at the policy level. In each case, initial microeconomic success led to excessive reliance on note issue as a component of fiscal policy.

8. 19th-Century England: Banknotes as Stablecoins

With the end of the Napoleonic wars in 1814, the restart of redeemability (the 1821 Resumption), and the withdrawal of its troublesome small-denomination notes, the Bank of England appeared to have successfully mastered the art of currency issue. The Bank’s main policy question then became how to manage this success. If banknotes now constituted “money,” on par with coin, how much of this money should be provided?

Attempts to address this question resulted in a highly contentious policy debate between two intellectual camps, the “currency school” and the “banking school.” The view of the currency school, as embodied in David Ricardo’s “currency principle,” was that if notes were to be equivalent to coin, they should be 100 percent backed by coin or other precious metal assets (Horsefield 1953, 116). This view finds some modern resonance in the structure of digital currencies known as “stablecoins,” for which each unit of digital money is backed by “safe assets” that can be used for redemption (Gorton and Zhang 2021; Board of Governors 2022, 11). Safe assets in a modern context are low-risk, liquid financial assets such as

Treasury bills, but in the early nineteenth century this term would have only been applied to precious metal.³⁸

Currency-school advocates argued that adherence to Ricardo’s principle would ensure stability of prices, exchange rates, and the banking system. Adherents of the banking school, and more importantly the Bank of England itself, found this too restrictive. Complete adherence to the currency principle would have limited the (still privately owned) Bank’s ability to extend credit to the state, support private parties through its discount window, and (last but not least) pay dividends to Bank shareholders. Currency-school advocates thought that this last factor would provide an incentive for the Bank to issue notes beyond a manageable level. The policy debate was complicated by the fact that the Bank was not the only banknote issuer in England. Although the Bank dominated banknote issue within London, “country banks” (English banks operating outside London) were also prolific issuers of notes.³⁹

Eventually a modified version of the currency principle was forced on the Bank by the passage of the 1844 Bank Charter Act, also known as Peel’s Act (Clapham 1945b, 183).⁴⁰ Peel’s Act, in effect, created a stablecoin-like bank within the Bank, known as the Issue Department. Banknotes could only be issued by this part of the Bank. The Issue Department was limited to hold no more than a fixed amount (£14 million) in securities, with any note amount above this required to be backed by precious metal (mostly gold). Notes were redeemable in gold coin, and the Bank was constrained to buy any gold bullion offered to it, above a minimum price. The other part of the Bank, known as the Banking Department, could only offer accounts but was allowed to hold Issue Department notes as part of its reserve. These cross-holdings were designated as “own notes.” Table 2 presents a sample balance sheet of the Bank, post-Peel’s Act.

³⁸ Even before application of the currency principle, safety of the Bank of England’s notes was to some extent already conferred by the Bank’s unique charter privileges.

³⁹ In 1833, for example, the note circulation of the country banks was about £10 million as compared to the Bank’s circulation of £19 million (Wood 1939, 214).

⁴⁰ After Robert Peel, who was Prime Minister when the Act was passed. Similar legislation imposed a stablecoin-like structure on the Austrian National Bank from 1863 (Jobst and Kernbauer 2016, 78).

Table 2: Two Versions of the Bank of England’s Balance Sheet of February 22, 1851

As a consolidated bank				As two banks			
Assets		Liabilities and equity		Assets		Liabilities and equity	
Gold	15	Notes	28	Gold	14	Notes	28
Credit	40	Balances	17	Credit	14		
Own notes	9	Bills	1	<i>Issue Department</i>	28		28
		Equity	18				
Total	64	Total	64	Gold	1	Accounts	17
				Credit	26	Bills	1
				Own notes	9	Equity	18
				<i>Banking Department</i>	36		36

Note: Figures are pounds sterling, rounded to the nearest million.

Source: Bank of England Annual and Weekly Balance Sheets (Huang and Thomas 2016)

Peel’s Act also suppressed the issue of banknotes by other banks, forbidding new entrants into banknote issue and freezing the size of existing private banknote issues. The intent was to concentrate banknote issuance into a single entity with minimal discretion as to backing assets (the Issue Department). This move was also thought to relegate the Banking Department to a secondary role, essentially a commercial-bank subsidiary of the Bank. Under the Act, England’s monetary system would be anchored by its stablecoin-like Bank of England notes.

The actual consequences of Peel’s Act were nearly the opposite of its intent. Constrained from issuing additional banknotes, English (particularly, London) banks developed check payments and checkable deposits as alternative means of payment and stores of value. Checks were cleared through a private organization, the London Bankers Clearing House, of which the Bank was but one member (Matthews 1921).⁴¹ London’s major commercial banks (known as clearing banks) expanded during the latter half of the nineteenth century, until several matched or exceeded the size of the Bank itself (Ugolini 2016, 29). Banknotes, and with them, the Issue Department, came to play a subordinate role in within the English banking and payment systems. The status and responsibilities of the Banking Department expanded.

Meanwhile, central banks (as they were now increasingly called) on the Continent increased their banknote issues to accommodate the demand for this increasingly popular

⁴¹ A similar progression occurred in the late-nineteenth-century United States, which lacked a central bank (Quinn and Roberds). CivilWar-era legislation taxed state banknotes out of existence and constrained national banks to back their notes with Treasury debt, which in turn was payable in gold. Checkable deposits expanded rapidly as a result.

instrument. Table 3 shows the relative sizes of several major central banks as of 1909, their stocks of banknotes, and breakdowns of their assets.

Table 3: A Comparison of Selected Central Banks, 1909

Country	Central bank	Note issue/ GDP (percent)	CB balance sheet/ GDP (percent)	Percent of CB assets held as*		
				Metal	Private credit	Public credit
Great Britain	Bank of England	1.41	5.33	36	16	16
Austria- Hungary	Oesterreichische Nationalbank	8.66	11.96	54	36	2
France	Banque de France	12.88	15.59	70	23	6
Germany	Reichsbank	4.71	6.89	30	47	2

*Note: “CB” means central bank. Asset breakdowns do not include miscellaneous other types of assets and so do not total 100 percent.

Source: Jobst and Ugolini (2016, 155–56) and Ugolini (2016, 24).

Somewhat ironically, the Bank of England’s success inspired the note-issuing activity of the Continental central banks shown in table 3. But, by the early twentieth century, the relative size of the Bank’s note issue was small in comparison with its imitators, and these notes composed an increasingly insignificant portion of the British economy. The table also shows that the central banks of Austria-Hungary and France chose to hold a large proportion of their assets as precious metal, in part motivated by the lessons of historical experience. It is also significant that by 1909, government debt was relatively unimportant component of central banks’ balance sheets, a consequence of Europe’s near-century of “armed peace” (Hoffman 2015). That situation that would change in 1914.

To summarize: the 1844 Bank Charter Act attempted to enhance the monetary role of Bank of England by enforcing a 100 percent marginal backing requirement on its notes, and suppressing the issue of competing notes. The ultimate result of this legislation was to foster private-sector innovation that largely negated the intent of the Act.

9. Summary and Implications for CBDCs

Public (proto-central) bank notes were a technical convenience when they were first issued in sixteenth-century Naples. By the late nineteenth century, such notes had revolutionized central banking and were common in most European countries. This article has described some learning experiences that took place in between: egregious insider fraud (Amsterdam), a

real estate finance bubble (Sweden), institutional collapse (France) and hyperinflation (Austria). Even the acknowledged maestro of banknote issuance, the Bank of England, was for a time forced to engage in a repressive campaign of criminal prosecutions in order to maintain the credibility of its notes.

What are the messages of this narrative for current issues surrounding central bank digital currency? The history of the early public banknote issues is rich, and many inferences are possible. The following list offers some suggestions:

1. *Wholesale versus retail CBDCs*: even if a CBDC (like many early banknotes) is initially issued only at the wholesale level, pressures may arise to expand issuance to the retail level. For early public banknotes, this tendency was observed in multiple jurisdictions.
2. *Operational resilience and financial inclusion*: Mastery of operational issues is important for the success of any payment system, CBDCs included (Board of Governors 2022, 20). For public banknotes, operational problems led to the complete failure of note issue in Amsterdam and contributed to a withdrawal of small-denomination notes by the Bank of England. The latter example illustrates the challenges of managing a public payments instrument in the retail arena.⁴²
3. *Simplicity and privacy*: People value these features. Early public banknotes were relatively complex and offered little privacy to their users. Notes evolved in a way that made them easier to use and to use privately. A CBDC that fails to offer these features may create openings for other forms of payment that do.⁴³
4. *Public versus private digital currencies*: The history shows that most countries eventually preferred to concentrate paper currency issue in a privileged institution with public responsibilities—a central bank. Digital currencies might follow the same path, although this same history shows that merely endowing a CBDC with some special privileges will not necessarily force people to use it.⁴⁴ An unintended result may be to encourage the development of private-sector alternatives.
5. *Policy consequences*: If CBDCs are successful, they will (tautologically) expand central banks' balance sheets. The less trivial converse is that central banks may then be tempted to issue (more) CBDCs as a way of implementing additional balance-sheet expansions.⁴⁵ The policy consequences of such actions may be more far-reaching than

⁴² On the potential for retail CBDCs to promote financial inclusion, see Bostic et al. (2020) and Shy (2021).

⁴³ The extent to which CBDC transactions should remain private is a contentious policy issue. For discussions, see Bech and Garratt (2017) and Board of Governors (2022, 19–20).

⁴⁴ For a discussion of the role of CBDCs in maintaining the relevance of central banks' influence over the monetary system, see Brunnermeier, James, and Landau (2019).

⁴⁵ Possible policy consequences of CBDCs have been explored in an extensive academic literature. For a review of this literature, see Carapella and Flemming (2020).

is initially anticipated. The early French and Austrian experiences with banknote issue provide classic examples of policy overreach.

6. *First-mover disadvantages*: Technology evolves in response to experience. Early adopters of CBDCs, like early adopters of central bank analog currencies (Amsterdam and Sweden), may endure hard lessons. For public banknotes, later adopters (England in particular) were able to obtain better results by starting further up the learning curve.
7. *First-mover advantages*: England was the first large European country to implement central bank note issue. Successful implementation supported that country's financial development and contributed to the international stature of the Bank of England. A large country with a well-timed, successful implementation of a CBDC might enjoy similar advantages.⁴⁶

Counterbalancing these largely cautionary messages, however, is the meta-message that provision of a lower-cost method of transacting can be very valuable to society, as evidenced by the (eventual) widespread adoption of central banks' notes. The nineteenth-century public still did not quite trust central banks, hence the relegation of the Bank of England's note issue to a stablecoin-like sub-bank (see table 2), and the high proportion of metallic backing employed by other central banks (see table 3). People nonetheless accepted and used central banks' notes, however reluctantly.

This attitude of wary acceptance was perhaps best captured by the German poet and playwright Johann Wolfgang von Goethe, in his epic play *Faust*. The play (Part 2, published in 1832) features a conversation between the fiscally strapped Holy Roman Emperor and the Devil, disguised as a court jester. Unsurprisingly, the Devil recommends an emission of banknotes to the skeptical monarch (Bernays 1839, 40):

Such a paper, in place of pearls and gold, is convenient as long as one knows what one has.

By 1832, most Europeans would have gotten the joke. Not everyone would have found it funny.

⁴⁶ That is, a successful launch of a Fed CBDC might “support the dollar’s international role” (Board of Governors 2022, 15). In press reports (for example, Adams 2022), China’s recent launch of a digital currency is often described as a means to enhance the international status of the yuan.

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