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MONETARY SYSTEMS: TRANSITIONS AND EXPERIMENTS

The Bank of Amsterdam and the Leap to Central Bank Money

By STEPHEN QUINN AND WILLIAM ROBERDS*

Central bank money is the foundation of modern monetary and payment systems. Central bank money defines a unit of account. The price at which this money trades determines “monetary policy.” And most payment systems require the transfer of central bank funds before a transaction is legally final or “settled.”

Despite its current ubiquity, the origins of central bank money have remained obscure, and the present-day system involves a remarkable conceptual leap from earlier coin-based systems. In this paper, we recount how the critical innovation—the creation of a unit of account that could be maintained solely through open-market operations—took place in the seventeenth-century Dutch Republic (for a more detailed examination see Quinn and Roberds 2005; Quinn and Roberds 2006).

The villain in our story is the incremental debasement that unsettled the quality of new coins and the price of old coins. The protagonists are the Dutch authorities who contended with debasement by regulating the price of coins and by creating “exchange banks,” the Bank of Amsterdam in particular, to assure the quality of coins. The plot is propelled forward because well-intentioned regulatory changes exacerbated the debasement problem. Resolution began when authorities disconnected the Bank of Amsterdam from the price of circulating coins. The solution was conceptually difficult because a coin would have a different price in the Bank of Amsterdam than it had outside. Once this dichotomy was accepted, however, a robust market developed to mediate the relationship between the Bank of Amsterdam and circulating coins, and ledger accounts at the bank become the *de facto* means of final settlement. In the end, the final step into the world of fiat money—the elimination

of the right to withdraw funds from the Bank of Amsterdam—was a quiet formalization of a successful, informal norm of behavior.

I. Debasement

Around 1600, the Dutch Republic was a small open economy with 800 to 1,000 different circulating coins. Each province and many cities had official mints, while private mints, neighboring states, and counterfeiters offered competing coins (Pit Dehing and Marjolein 't Hart 1997, 40). The competition created what Adam Smith (2000, 510) called the “small state” problem of incremental debasement, for mints would attract business by offering light versions of standard coins. For example, in 1607, Republic officials determined that the province of West-Friesland was engaging in debasement of the silver *rixdollar* while the province of Holland was not, and, at the same time, West-Friesland was minting 16 times Holland’s volume of *rixdollars* (M.S. Polak 1998, 103–68).

For debasement to pay, someone had to get stuck with light coins when they were expecting heavy coins. Creditors formed one pool of victims because a type of legal tender law called a mint ordinance established legal values for many coins.¹ Early bankers, called *kassiers* (cashiers), would give out light coins at these ordinance values when settling debts like deposits or bills of exchange. An attempt by Amsterdam in 1604 to ban cashiers noted that cashiers “allow for fraudulent activity, especially the removal of heavy gold and silver coins, and their transport to prohibited and other mints, in order to be converted into new [light] coins, which are then circulated within the community” (our translation of Johannes G. van Dillen 1964, 344).

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¹In a different approach, Isabel Schnabel and Hyun Song Shin (2006) consider information asymmetries created by geographic borders.

This ordinance was never enforced, however, because merchants continued to rely on paper-based payments, even if they found debasement nettlesome. In 1609, Amsterdam tried again, but this time the city council created an alternative called the Bank of Amsterdam. The bank was owned by the city, took deposits, charged a small fee for withdrawals, and did not lend. The bank's purpose was to guarantee the quality of coins upon withdrawal. To attract customers, transfers between accounts were executed quickly and with no fee. To further attract customers, Amsterdam banned cashiers (relaxed in 1621) and required all but the smallest bills of exchange to be settled in the bank. The exchange bank protected creditors because deposits maintained their value in terms of silver.

Much of the Dutch economy, however, transacted outside the Bank of Amsterdam, and there debasement continued. A particularly insidious invader was the *patagon* from the neighboring Spanish Netherlands. The *patagon* thrived in the Dutch Republic as a light-weight mimic of the Republic's *rixdollar*. From the exchange bank's creation in 1609 to the end of the Eighty Years War in 1648, deposits at the exchange bank grew at an average rate of 10 percent per year, for the bank was a monetary haven during the Republic's Golden Age.

II. Two Units of Account

Another result of the ongoing debasement was that the market price of old, heavy coins, like *rixdollars*, rose above their ordinance values to reflect the difference in metal content relative to new, light coins. This was not a problem for the Bank of Amsterdam, for the bank treated incoming *patagons* as bullion, so depositing them was not profitable. Also, the rising market price of *rixdollars* meant that deposits maintained their purchasing power upon withdrawal. For Dutch authorities, however, the situation was frustrating. Mint ordinances were supposed to set the price of coins, yet the market prices of circulating coins rose, and coins like *patagons* circulated with no regulated value. To correct these perceived imperfections, authorities began a series of new mint ordinances.

At first, in 1619, authorities simply raised the legal value of the *rixdollar*, so its production and debasement surged. Figure 1 displays

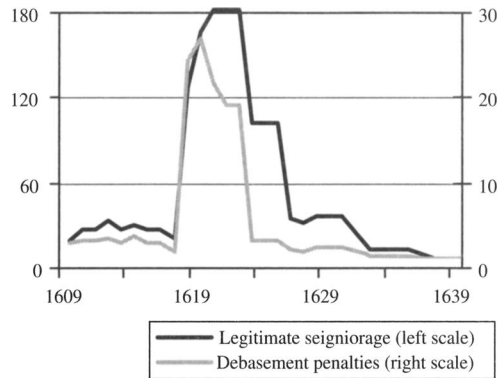


FIGURE 1. *RIXDOLLAR* PRODUCTION AND DEBASEMENT, IN FLORINS PER DAY

the surge in *rixdollar* production (measured as legitimate seigniorage) and debasement penalties for five Dutch provincial mints (Quinn and Roberds 2006, 25). In 1622, authorities added an official price to the invading *patagons*, and the unintended consequence was that *rixdollar* production declined. Why? Because the *patagon*'s ordinance value was set high enough to end the incentive to melt *patagons* in order to mint *rixdollars*.

After 1622, continuing debasement again caused the market price of coins to rise higher than their official price. So, in 1638, authorities raised the price of *patagons* to realign market and ordinance prices. Now the *patagon*'s official value was so high that it paid to melt *rixdollars*, if you could get them at the official price. Returning to Figure 1, *rixdollar* production ceases, and the coin "completely disappeared from circulation to be exclusively used as commercial coins for export" (van Dillen 1934, 88). Unfortunately, the only entities obliged to supply *rixdollars* at ordinance prices were exchange banks, and arbitrage soon compelled the Bank of Amsterdam to switch to giving out *patagons* to cover withdrawals. The change was a default that violated the bank's primary obligation to defend creditors.

In the early 1640s, debasement again had the market prices of coins on the rise, so the *patagon*'s ordinance price at the Bank of Amsterdam became lower than its price in circulation. This time, authorities grudgingly tolerated the mismatched prices. In the gap, a market exchange rate emerged between the unit of account within

the bank (banco florin) and unit of account outside the bank (current florin). This exchange rate was called the *agio*, and it mediated flows between the intra-bank payment system and the outside payment system, despite both systems relying on the same coin (Larry Neal 2000, 121–22).

A reason the dual regime was tolerated was that the conquest of the Dutch Republic by foreign coins was seen as a greater problem, and, in 1659, the Dutch Republic finally introduced new, domestic coins to replace the foreign ones. To ease adoption of the new coins, the dual-unit account system was officially recognized. For example, the new Dutch *dukaat* was worth 2.4 florins inside the bank and 2.5 florins outside, just like the *patagon* that the *dukaat* sought to replace. In 1609, mandating two prices for the same Dutch coin would have been an outrageous proposition, but the peculiar state of the monetary system 50 years later meant that formal retention of two units of account was a conservative, reassuring measure.

III. Demand for Withdrawals

In contrast to the tumult leading to two official units of account, the final steps to a fiat medium of exchange were increasingly placid. As of 1659, the Amsterdam Exchange Bank formally supplied in-bank settlement of large value transactions in its own unit of account, but deposits still had a right of withdrawal. In everyday practice, however, the right was becoming rarely exercised, and the events of the next 25 years further reduced the relevance of withdrawal.

To start, a market formed daily in front of the bank where dealers, like cashiers, sold deposits at the *agio* exchange rate rather than pay a fee to make a withdrawal. This market—the first “open market” in central bank funds—was tested in 1672–73 when a French invasion touched off a run that reduced the total florin value of deposits by 47 percent over two years. The Bank weathered the episode and bolstered its credibility. In 1683, the exchange bank further reduced demand for withdrawals by accommodating dealers in coin with a deposit service. When coin was deposited, the depositor was given the bullion value of the metal on account plus a receipt for the specific coins deposited. A receipt entitled its holder to repurchase the metal

at a fixed price, if he so desired. The receipts (effectively European options on bank funds) were easily saleable, so a metallic withdrawal could be arranged this way. The receipt system also segregated metal with a high expectation of withdrawal and easily transferred that metal to customers desiring a withdrawal.

In this environment, some time in the 1680s, the Amsterdam Exchange Bank ended the right of withdrawal for deposits without a receipt. No act was passed, and no outcry is recorded for what was a write-off of around 9 million florins or 7.5 percent of the Republic’s monetary stock (Jan de Vries and Ad van der Woude 1997, 90). Likely the cashiers played a key role in insulating people from this process through a deep market for exchange and receipts (Lucien Gillard 2004). The silence also meant that depositors no longer expected to make withdrawals, so the disciplinary value of the threat of a run had become negligible. The result was a fiat bank money used as settlement for high-value transactions in Amsterdam and, by extension, international transactions that used Amsterdam as a hub.

IV. Macro Implications

In the 50 years prior to the founding of the Bank of Amsterdam, ongoing debasement caused the metallic value of the Dutch florin to fall by about 1 percent per year. Each debasement created a new incentive to export precious metal, which in turn placed a considerable burden on the Dutch economy. Using the framework explicated in Thomas J. Sargent and François R. Velde (2003), it can be shown algebraically (see Quinn and Roberds 2005) that a debasement-induced increase in the nominal money stock will ultimately be outstripped by subsequent increases in the price level, putting downward pressure on the real money stock. Consistent with our calculations, annual inflation in the northern Netherlands averaged about 2 percent over this period. Competitive debasements meant the real money stock of the Republic existed in a “leaky bucket” that could be sustained only by continual and costly infusions of precious metal.

The creation of the Bank of Amsterdam diminished and (as described above) ultimately severed the link between the commercial credit and debased coin. Mints’ incentives to engage in debasement were curtailed, and the monetary

situation began to stabilize. During the first 50 years of the Bank's existence (1609-1658), the average loss of metallic content slowed to a crawl (0.1 percent annually), and Dutch inflation fell to 1 percent, half its previous level.

Following the official recognition of the *banco florin* in 1659, there ensued a 100-year period of remarkable monetary stability, during which neither the metallic value of the florin nor the domestic price level followed any persistent trend. Over most of this period, the Bank maintained the value of the *banco florin* via open market operations, meaning the exchange of receipts against balances held at the Bank (Smith 2000, 510-20).

V. Conclusion

Unlike modern central banks, the Bank of Amsterdam did not issue notes, buy government securities, or operate a discount window. But, like modern central banks, it settled transactions through the transfer of balances in its accounts, and maintained the value of its balances by using them to purchase assets (receipts) in an open market. In this sense, the origins of fiat money can be traced to an innocuous looking Amsterdam municipal ordinance of January 31, 1609. Little did the city council know that by changing the nature of settlement it would forever change the nature of money.

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