How Amsterdam Got Fiat Money
(and why, as a monetary theorist, you should care)

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The Weber approach to economic history research

1. Principle #1: do good history
The Weber approach to economic history research

1. Principle #1: do good history
2. Principle #2: ensure it has relevance to theory & policy
This paper

- Empirical study of early, book-entry fiat money system
  - Bank of Amsterdam (*Amsterdamsche Wisselbank*, AWB), 1683
- WP #1: why interesting to historians?
  - early example of fiat money
  - key monetary institution
  - 150 years’ archival data
- WP #2: why interesting to theorists?
  - defies conventional explanations of fiat money role
Bank of Amsterdam—basic history

- 1609 – chartered
- 1638 – distinct unit of account
- ~1650 – market in bank funds
  - **1683** – right of withdrawal curtailed
- 1795 – collapse
- 1819 – liquidation
Why did AWB introduce fiat money?

- **Explanations that don’t work**
  - circulate banknotes [only book-entry money]
  - operate a discount window [no such facility]
  - peg price of government debt [no secondary markets]

- **Explanation that does**
  - create a liquid, stable valued “settlement asset” for financial trades
Typical AWB 6-month ledger
Typical AWB ledger page
Rest of talk

1. **Settlement of financial trades in Amsterdam before 1609**
2. Settlement, 1609-1683
3. Settlement after 1683
Active trade in bills of exchange (“commercial paper”)

Bill

- an order to pay a sum in florins/guilders (unit of account) to a beneficiary at a certain date

Problems

- In principle, could settle a bill with any of ~1000 officially recognized coins
  - mint ordinance law assigned different values to same weight of silver
  - market values of coins diverged (up to 9%) from official values
  - confusion created incentives for debasement & inflation

- Or, a bill could be “settled” by endorsing or drawing another bill
  - daisy chains of unsettled bills, lack of finality
Original Bank of Amsterdam “exchange bank” regime

1609 AWB city charter sought to

- Eliminate daisy chains, assure finality
  - Bills must be settled through the Bank (“gross settlement”)
  - Bank balances cannot be attached

- Eliminate “price gouging” for desirable coins
  - Recognized coins can be deposited in Bank at legal value
    - others at metallic value
  - Coins withdrawn at legal value minus a discretionary fee ($<2.5\%$, no gouging)
    - average fees $\approx 1.5\%$
    - some fee necessary to prevent coin-to-coin arbitrage

- Guarantee liquidity and solvency of the Bank
  - no Bank lending allowed
Bank of Amsterdam – stylized balance sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities + NW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loans $^A$</td>
<td>Deposits $^D$</td>
</tr>
<tr>
<td>Coins &amp; bullion $^A$</td>
<td>Capital $^A$ (retained earnings)</td>
</tr>
<tr>
<td>– Coins deposited $^U$</td>
<td></td>
</tr>
<tr>
<td>– Metal purchased $^U$</td>
<td></td>
</tr>
</tbody>
</table>

$D$ = daily data available, 1666-1702 with gaps  
$A$ = yearend data available, 1666-1702  
$U$ = no data available

Using techniques described in paper, we reconstruct monthly balance sheet over 1666-1702
Outline

1. Settlement of financial trades in Amsterdam before 1609
2. *Settlement 1609-1683*
3. Settlement after 1683
Bank of Amsterdam: early successes

- centralization of settlement, daisy chains go away
- high-quality coins more available
- incentives for debasement reduced; prices stabilize
Dutch price level, 1500-1800
Problems and solutions, 1609-1683

With each solution, AWB more like a central bank

- Problem (1620s): heavy liquidity demands from Dutch East India Company (VOC)
  - Solution: credit policy, lend to VOC

- Problem (1630s): Amsterdam flooded with “junk” coins from southern Netherlands
  - Solution: apply discretionary haircuts to deposited coins (1638)
  - dual unit of account (bank guilder and current guilder) formalized in 1659

- Problem (ongoing): high withdrawal fees discourage deposits
  - Solution #1: secondary market in Bank funds (~1650)
    - Bank money trades against current money
    - Bank money quoted at a premium or agio current money
  - Solution #2: monetary policy; trade bank money for bullion (16??)
Sources of funds

Monthly AWB balances, 1666:2-1703:2
Uses of funds

VOC loan balances (principal), 1666:2-1703:2
Uses of funds

(Normalized) coin deposits and net metal purchases, 1666:2-1703:2
Market price of bank funds

Agio on bank vs. current money, 1666:2-1703:2
Impact of OMOs

(Choleski) impulse responses pre-1683
Outline

1. Settlement of financial trades in Amsterdam before 1609
2. Settlement 1609-1683
3. Settlement after 1683
Persistent problems with pre-1683 system

High withdrawal fees led to

- Instability of market value of Bank funds (agio)
- “Inelastic currency”: reluctance to deposit funds
Distribution of the agio

Steady-state bounds

### Agio distribution: no-arbitrage bounds for two trade coins

<table>
<thead>
<tr>
<th></th>
<th>Dukaat</th>
<th>Rijder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Statutory Values</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in current guilders</td>
<td>2.5</td>
<td>3.15</td>
</tr>
<tr>
<td>in bank guilders</td>
<td>2.4</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Implied deposit (statutory) agio ($a$)</strong></td>
<td>4.17%</td>
<td>5.00%</td>
</tr>
<tr>
<td><strong>Implied withdrawal agio</strong> ($\frac{1 + a}{1 + w} - 1$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with $w = 1.5%$</td>
<td>2.63%</td>
<td>3.45%</td>
</tr>
<tr>
<td>with $w = 1.5%$, and a rijder-specific fee of 1%</td>
<td></td>
<td>2.44%</td>
</tr>
<tr>
<td>with $w = 0.25%$</td>
<td>3.91%</td>
<td>4.74%</td>
</tr>
</tbody>
</table>

(steady-state) no-arbitrage upper bound on agio

(steady-state) no-arbitrage lower bound on agio < 1683

(steady-state) no-arbitrage lower bound on agio > 1683
Density of the agio vs. *rijder* no-arbitrage bounds, 1666:2-1683:7
1683 Reform

- Introduction of receipts for new deposits
- Receipt = option to repurchase exact same deposited coin within 6 months for small (≤ 0.5%) fee;
  - Receipts renewable and negotiable
  - New deposits get receipts
  - Existing deposits do not

- 18th century evidence: most receipts eventually redeemed
- “Deposits” now look more like term repos; cf.
  - “fixed rate tenders with full allotment” (OMOs by ECB during crisis)
  - “gold swaps” ($ lending by BIS 2010)
1683 Reform: consequences

- Cheaper to redeem receipt ($\leq 0.5\%$) than withdraw ($1.5\%$)
  - If depositor already has receipt, exercise redemption option
  - If no receipt, purchase someone else’s

- $\implies$ No demand for traditional withdrawal
- Traditional withdrawal (quietly) abolished $\implies$ bank balances become *fiat money*
The bank of Amsterdam pays none in either gold or silver coin, or bullion; consequently it cannot be said, that the florin banco [bank guilder] is attached to the metals. What is it then which determines its value?

I answer, That which it can bring; and what it can bring when turned into gold or silver, shows the proportion of the metals to every other commodity whatsoever at that time: such and such only is the nature of an invariable scale.
Evidence of fiatness
Removal of Bank capital post-1683

Adjusted monthly AWB asset ratios, 1666:2 to 1703 :2
Impact of 1683 reform

Higher frequency of deposits and withdrawals

Monthly AWB coin deposits and withdrawals, 1666:2 to 1703:2
Impact of 1683 reform
Bank more willing to engage in open market sales

Monthly AWB bullion purchases and sales, 1666:2 to 1703:2
Impact of OMOs post-1683
More/ less sterilization of movements in VOC debt/ deposits

(Choleski) impulse responses post-1683
Impact of 1683 reform
Mean agio now centered around statutory value

Density of the agio vs. \textit{rijder} no-arbitrage bounds, 1666:2-1703:2
Agio dispersion after 1683
Partial explanation

- 1676: outlying Dutch provinces produce new “junk” coins
  - Junk coins *not eligible for deposit at Bank*
    - *junk circulates as current money*
    - *heavy coins (rijders) stay in the bank*
  - $\Rightarrow$ agio fluctuates

- 1694: coinage reform
  - agio driven closer to steady-state no-arbitrage range
Impact of 1694 coinage reform
Mint production shifts to heavy coin

Annual coin production at Dutch provincial mints

1Source: derived from Polak (1998, 103-164).
Impact of 1694 coinage reform
Agio distribution closer to steady-state bounds

Density of the agio vs. *rijder* no-arbitrage bounds, 1683:8-1703:2
Bank of Amsterdam: legacy

Monetary system

- centered around a “hyper-liquid” fiat asset, where
- stable value of fiat asset ensured through
  - credit policy
  - discretionary OMOs
  - repo facility
Challenges for monetary theorists

- devise models of original, “market liquidity” role of fiat money
- examine effects of monetary policy on this functionality