How Amsterdam Got Fiat Money

(and why, as a monetary theorist, you should care)

Stephen Quinn[1] William Roberds[2]

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[1]Texas Christian University
[2]Federal Reserve Bank of Atlanta

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

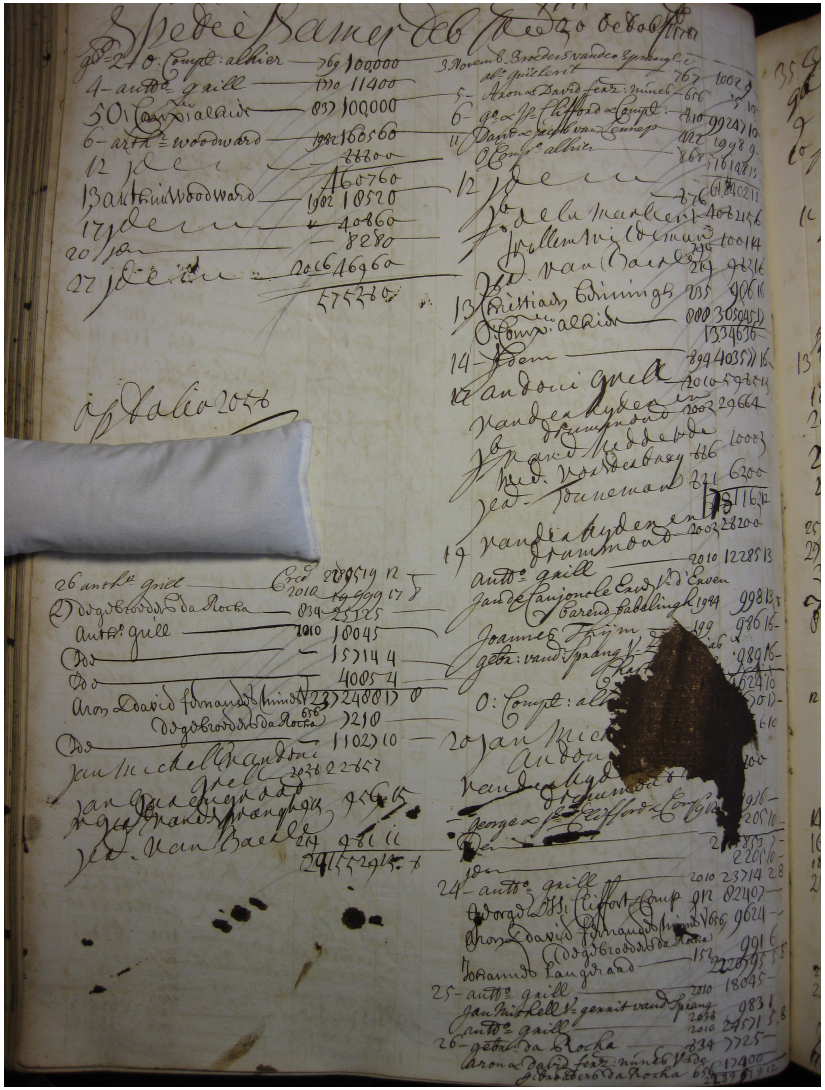
- 1609 – chartered
- 1638 – distinct unit of account
- $\sim$ 1650 – market in bank funds
  1683 – right of withdrawal curtailed
- 1795 – collapse
- 1819 – liquidation

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

Settlement of financial trades in Amsterdam, ca. 1609

- 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
    - ★ $\Longrightarrow$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

Rixdollar (1619)

Patagon (1656)

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

Assets	Liabilities+NW
Loans^{A}	Deposits^{D}
Coins & bullion^{A}	Capital^{A} (retained earnings)
–Coins deposited^{U}	
–Metal purchased^{U}	

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

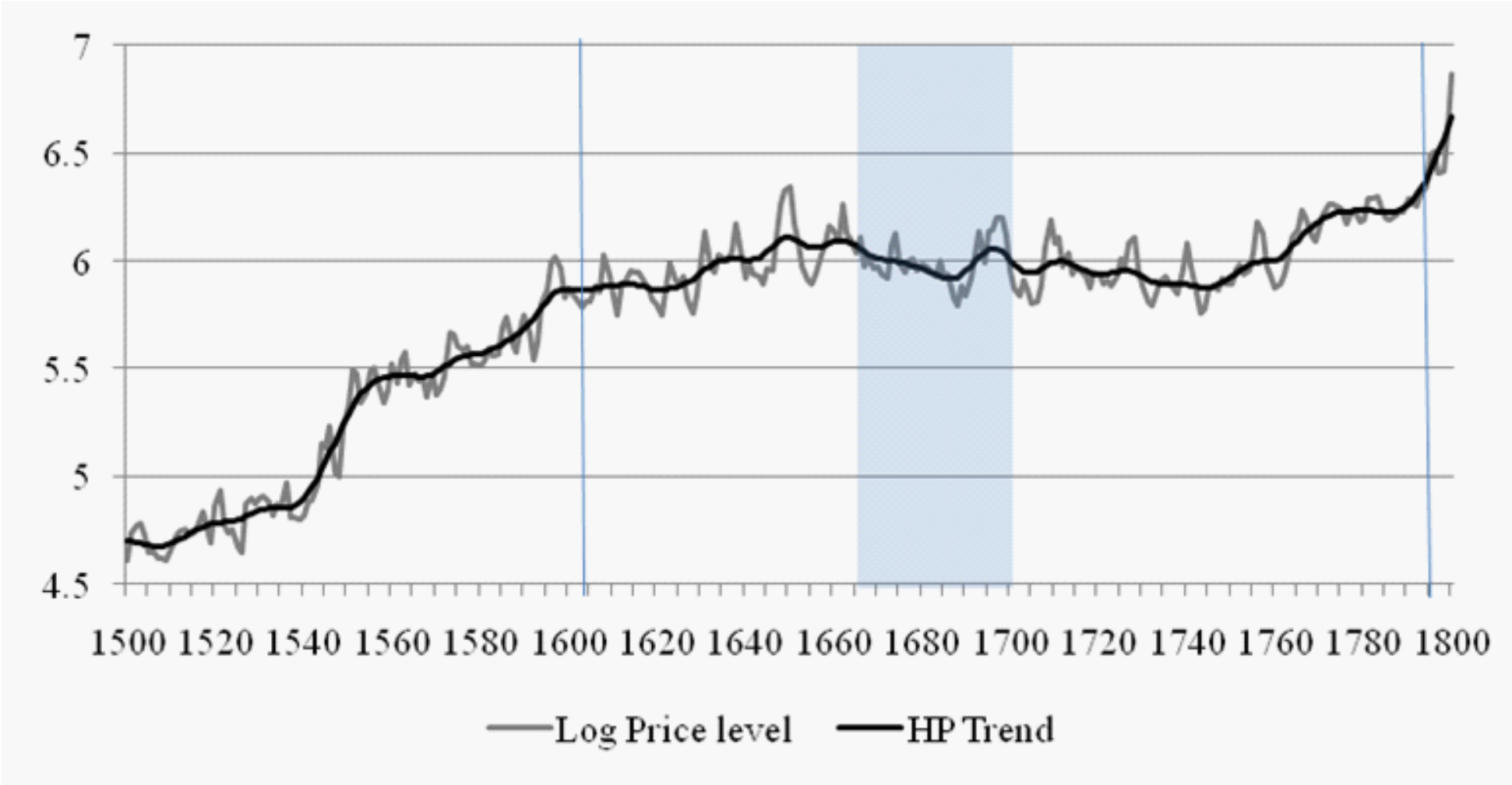
Outline

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



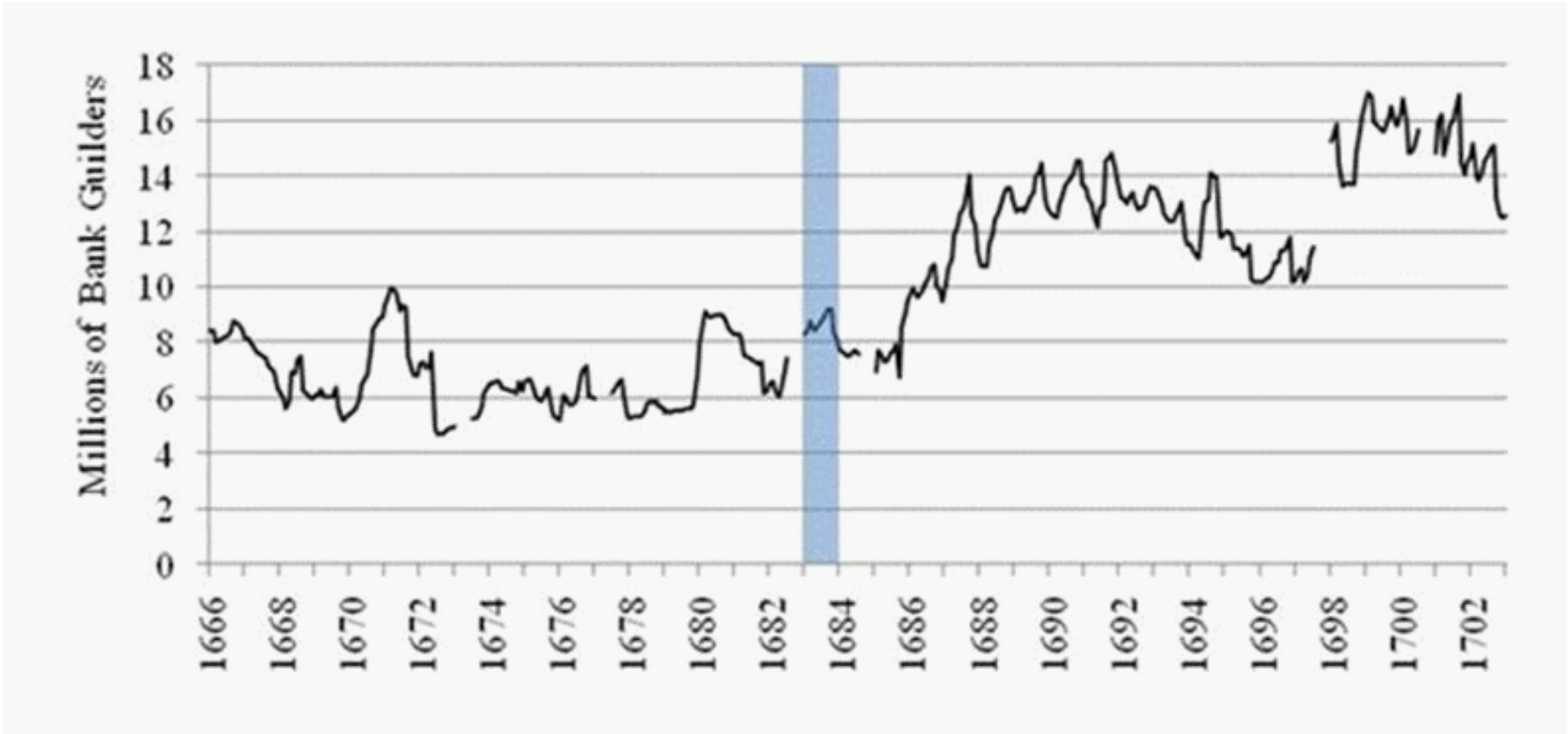
Problems and solutions, 1609-1683

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)
  - $\Longrightarrow$**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??)

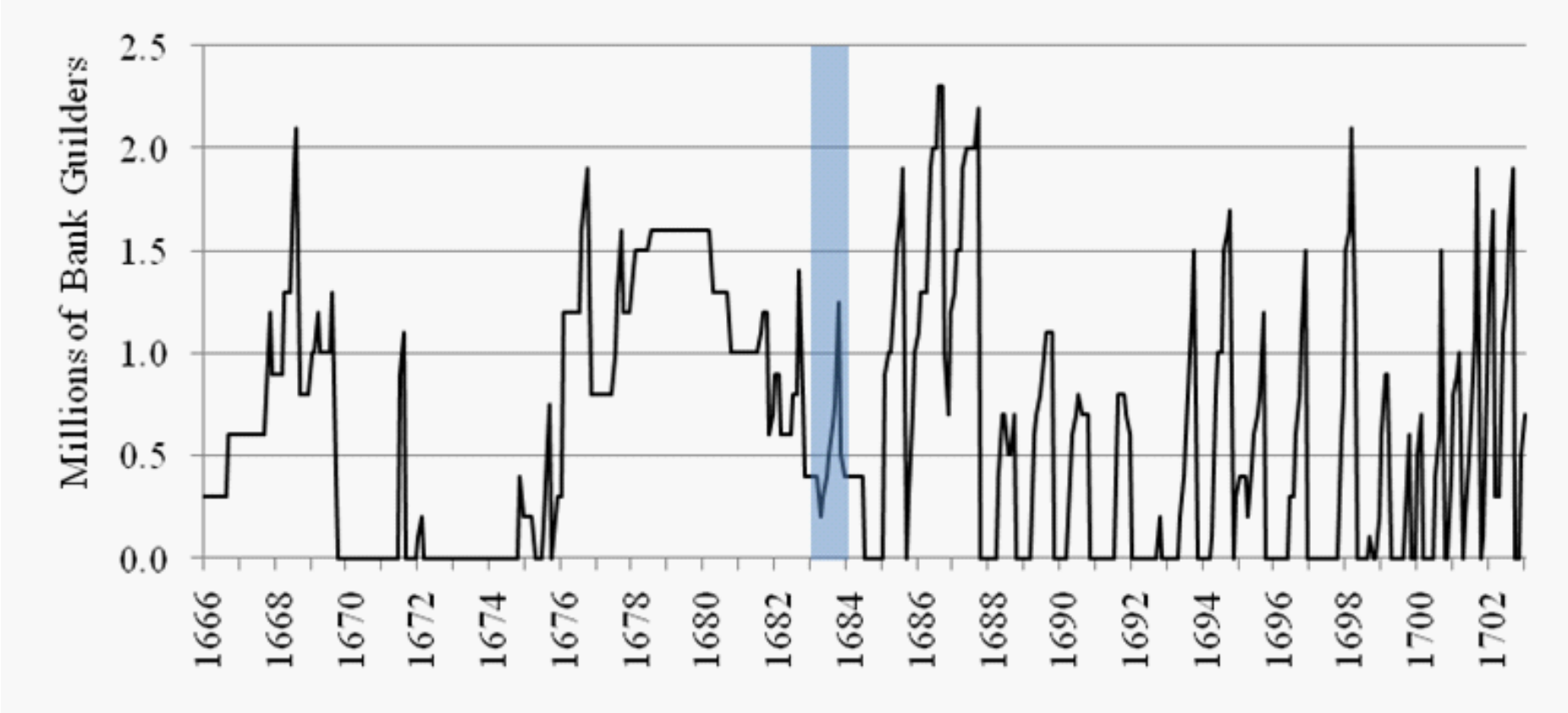
Sources of funds

Monthly AWB balances, 1666:2-1703:2



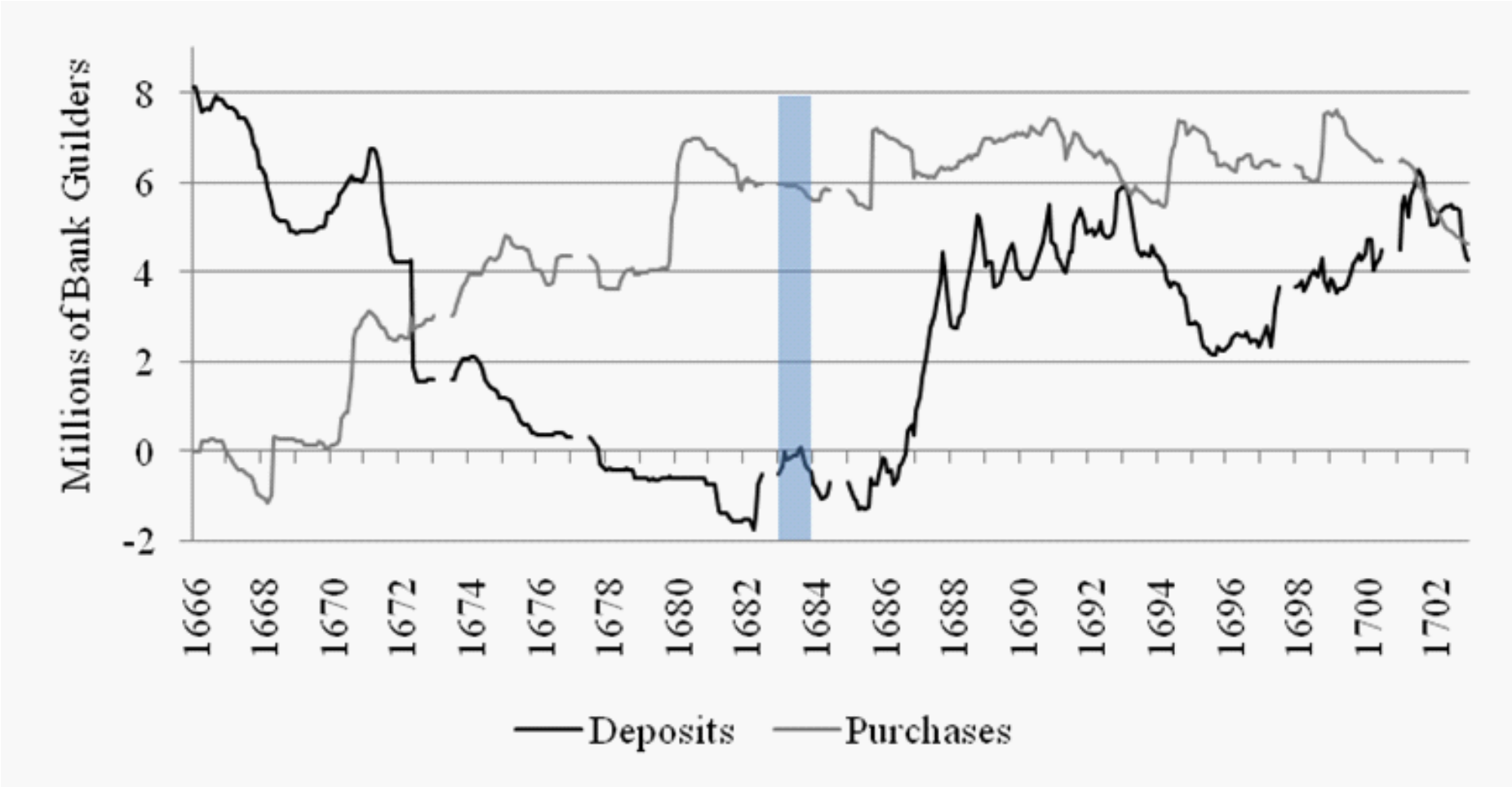
Uses of funds

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



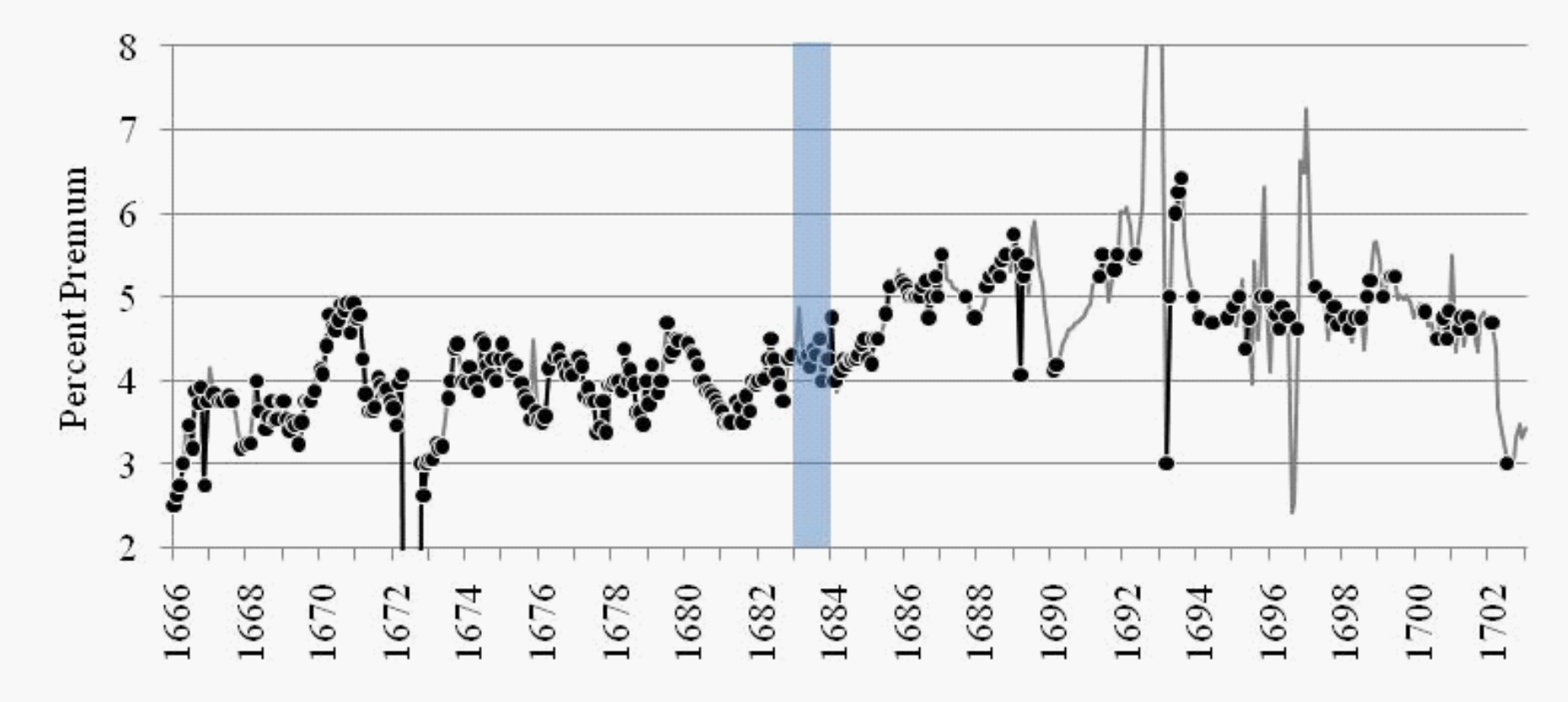
Uses of funds

(Normalized) coin deposits and net metal purchases, 1666:2-1703:2



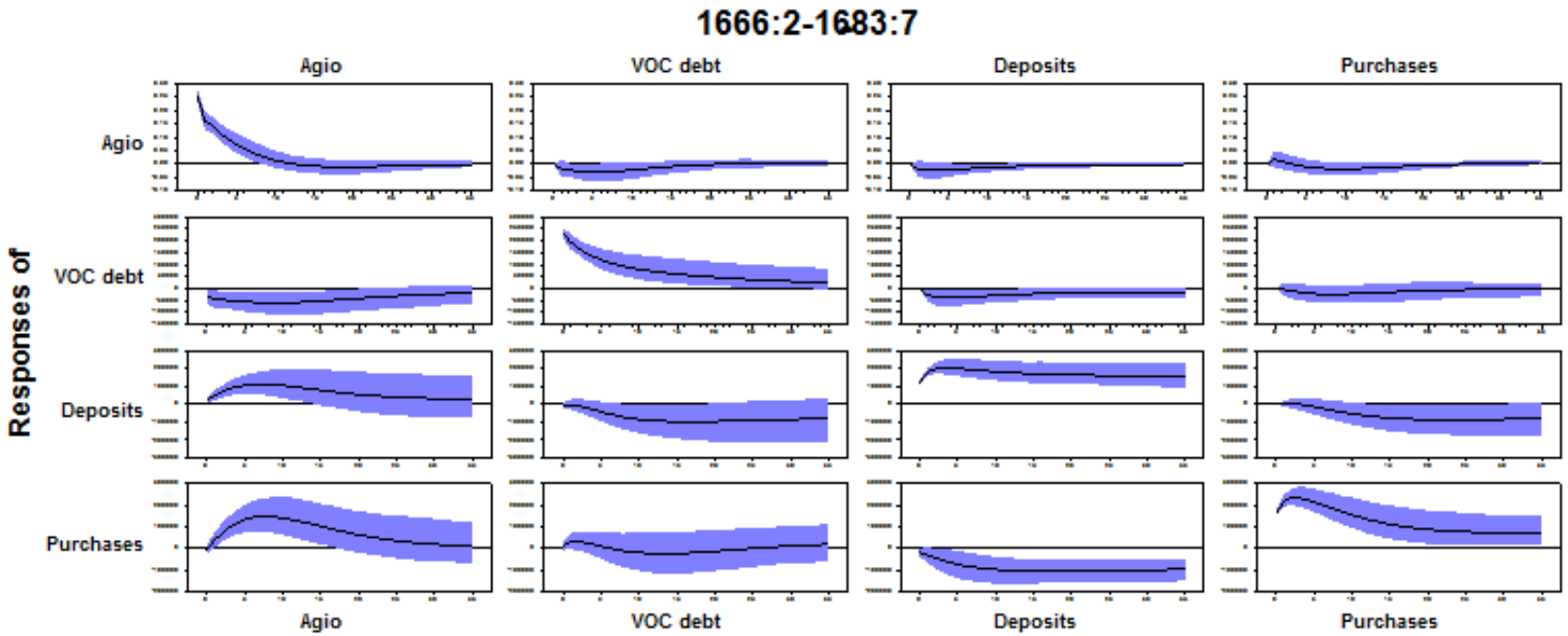
Market price of bank funds

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

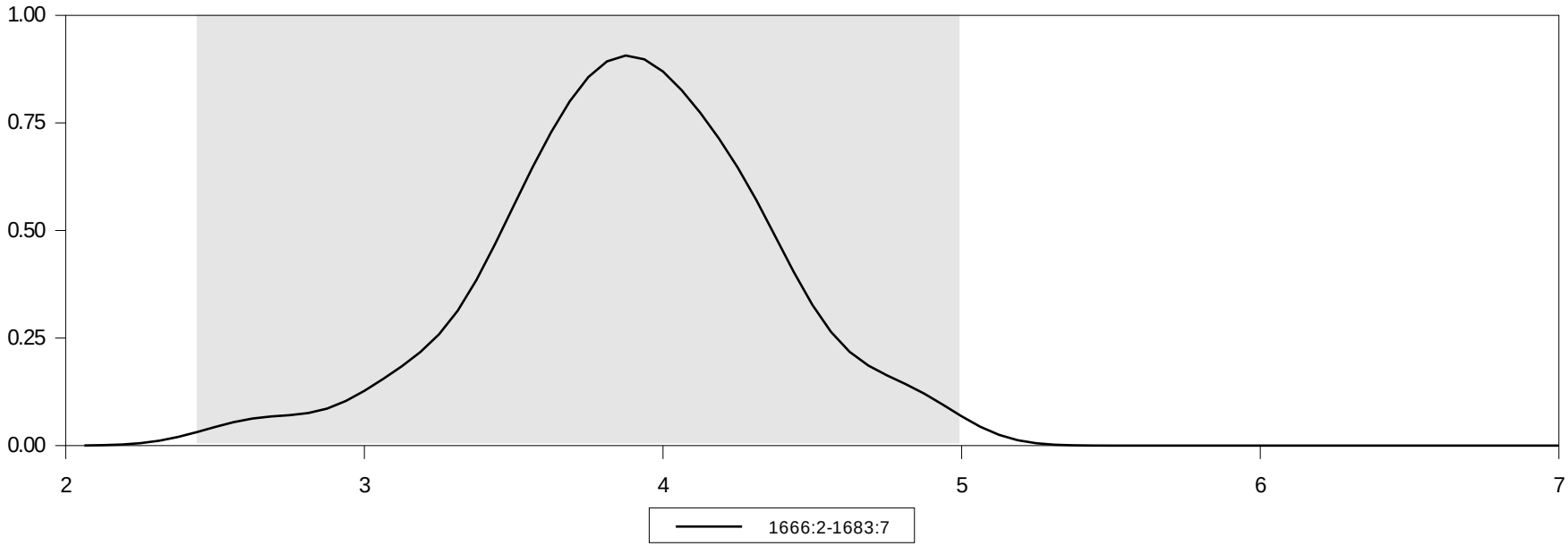
	Dukaat	*Rijder*
Statutory Values		
in current guilders	2.5	3.15
in bank guilders	2.4	3.0
Implied deposit (statutory) agio (α)	4.17%	5.00%
Implied withdrawal agio $\left(\frac{1+\alpha}{1+w}-1\right)$		
with w = 1.5%	2.63%	3.45%
with w = 1.5%, and a *rijder*-specific fee of 1%		2.44%
with w = 0.25%	3.91%	4.74%

(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 ($\leq$ 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
- $\Longrightarrow$ No demand for traditional withdrawal
- Traditional withdrawal (quietly) abolished $\Longrightarrow$ bank balances become *fiat money*

Evidence of fiatness

Description of AWB money by James Denham-Steuart, 1767

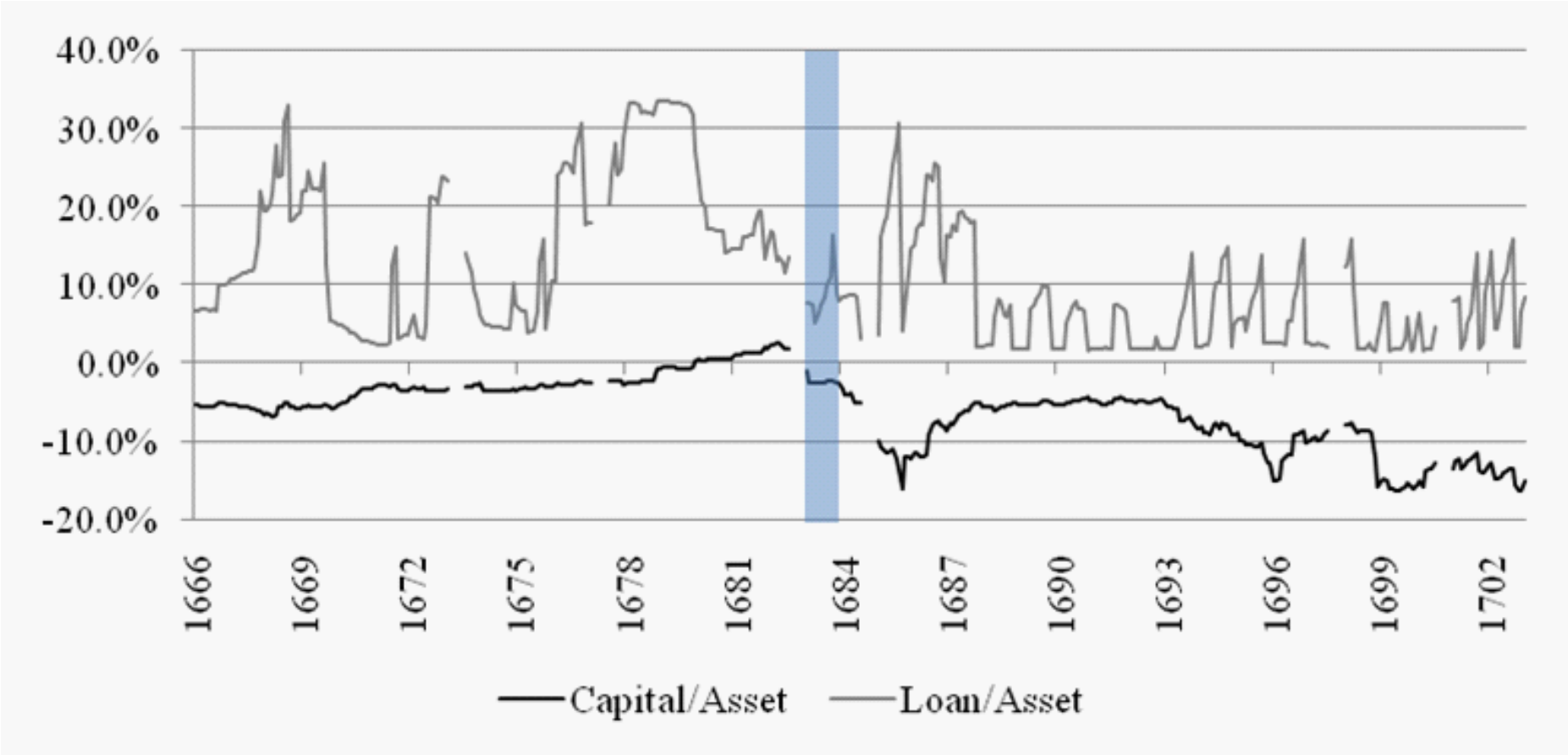
The bank of Amsterdam pays none in either gold or silver coin, or bullion; consequently it cannot be said, that the florin banco [bank guilder] is attached to the metals. What is it then which determines its value?

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

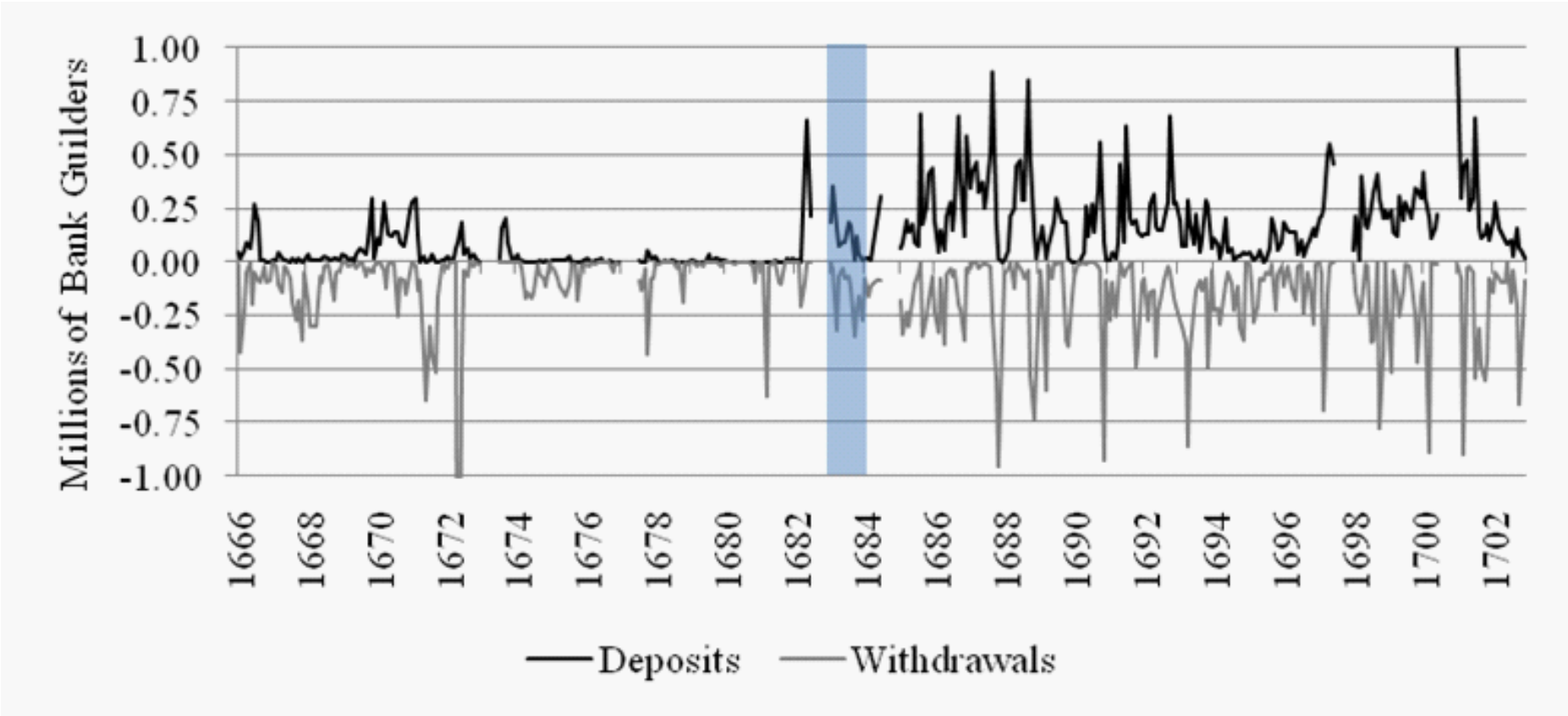
Adjusted monthly AWB asset ratios, 1666:2 to 1703 :2



Impact of 1683 reform

Higher frequency of deposits and withdrawals

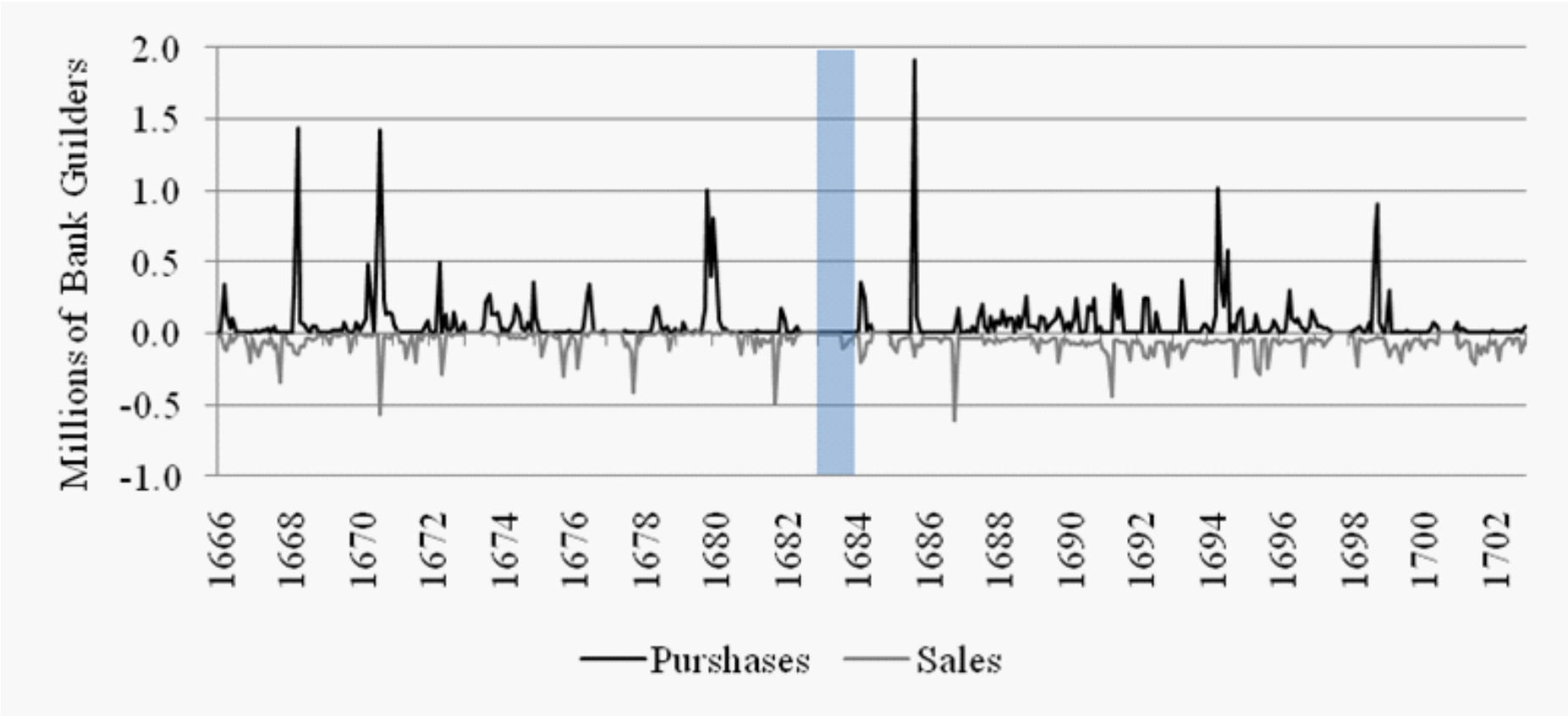
Monthly AWB coin deposits and withdrawals, 1666:2 to 1703:2



Impact of 1683 reform

Bank more willing to engage in open market sales

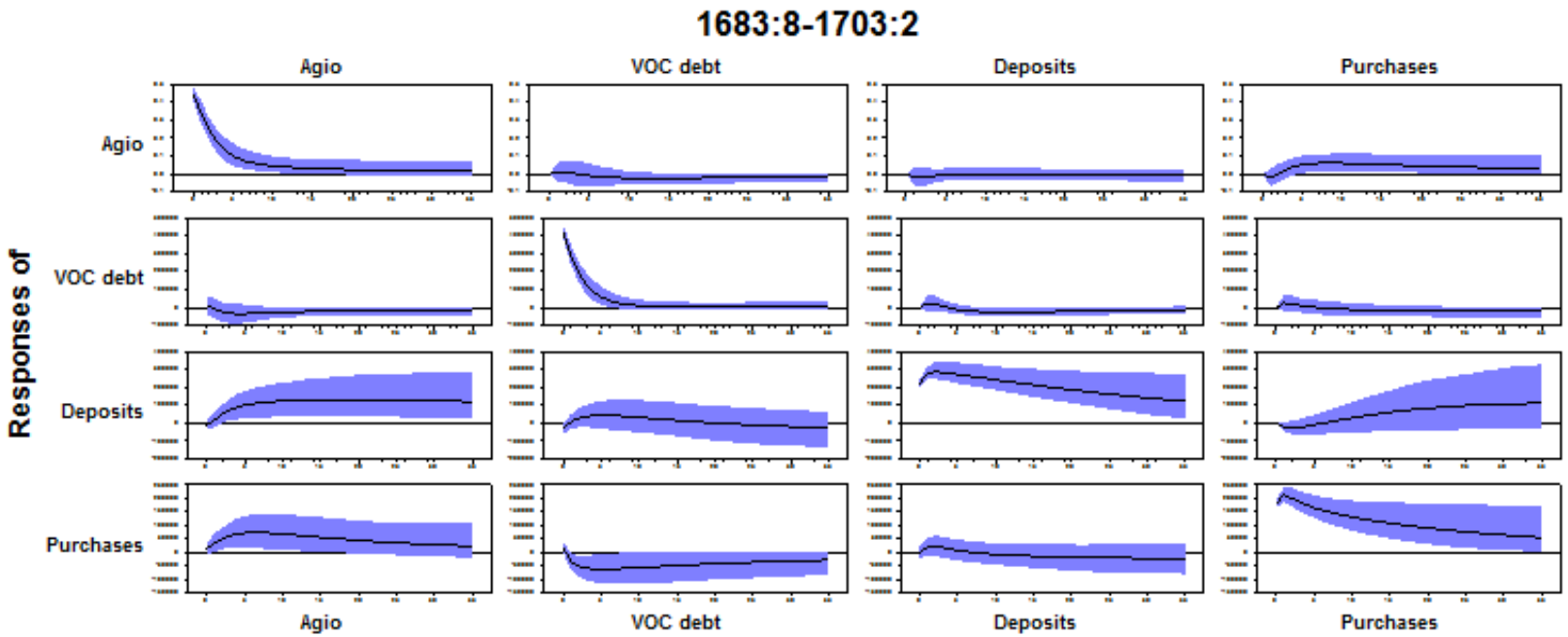
Monthly AWB bullion purchases and sales, 1666:2 to 1703:2



Impact of OMOs post-1683

More/ less sterilization of movements in VOC debt/ deposits

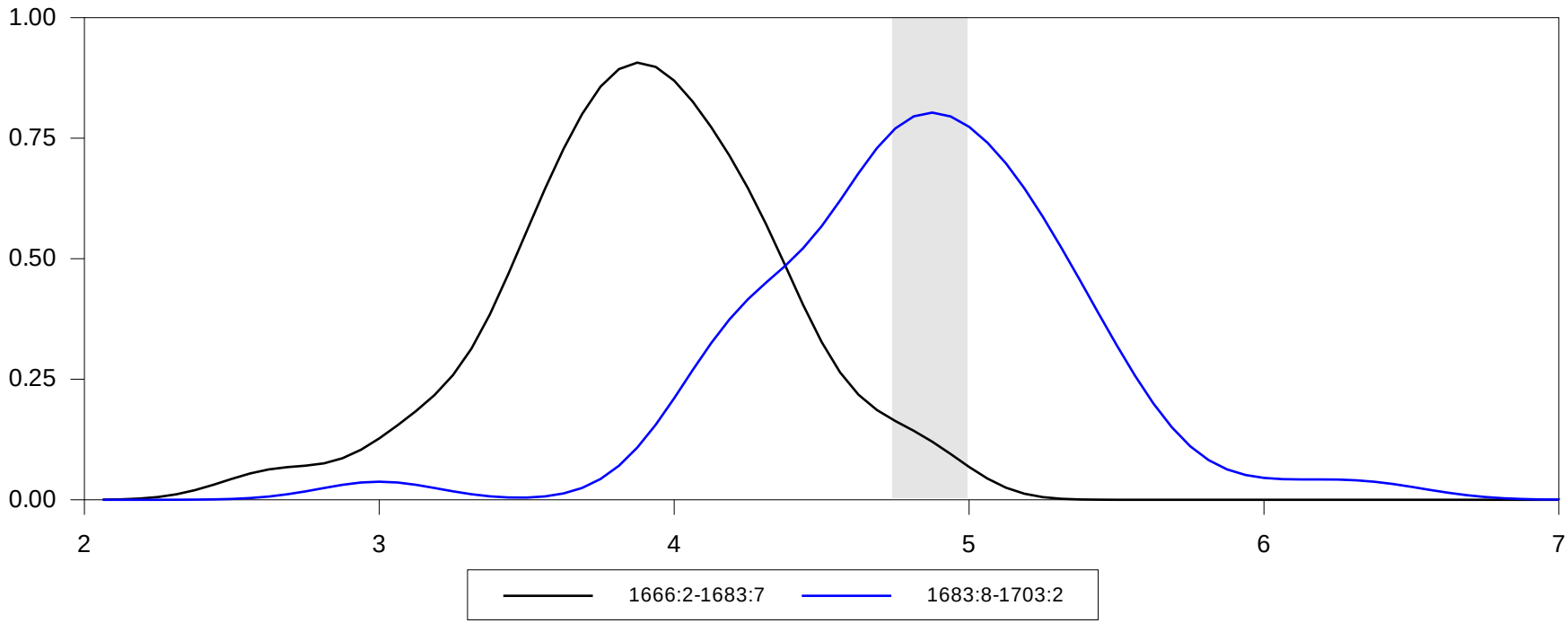
(Choleski) impulse responses post-1683



Impact of 1683 reform

Mean agio now centered around statutory value

Density of the agio vs. *rijder* no-arbitrage bounds, 1666:2-1703:2



Agio dispersion after 1683

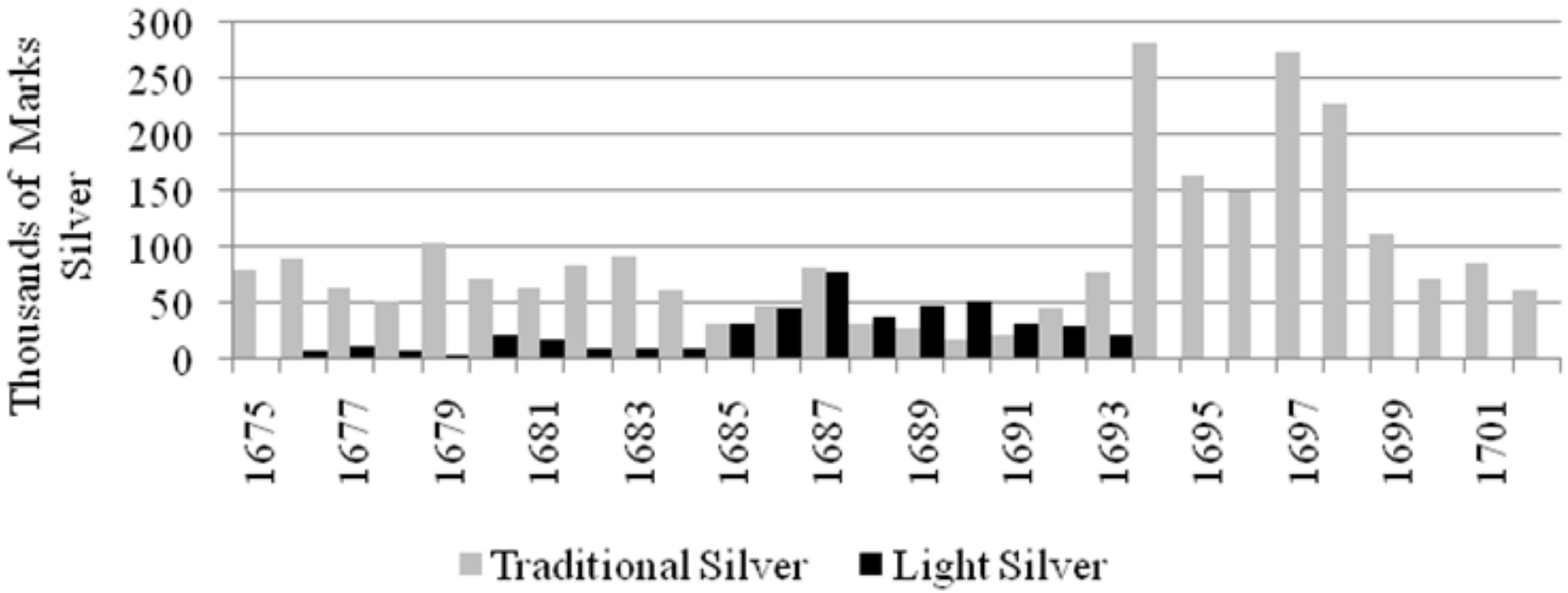
Partial explanation

- 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
  - ⇒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[1]

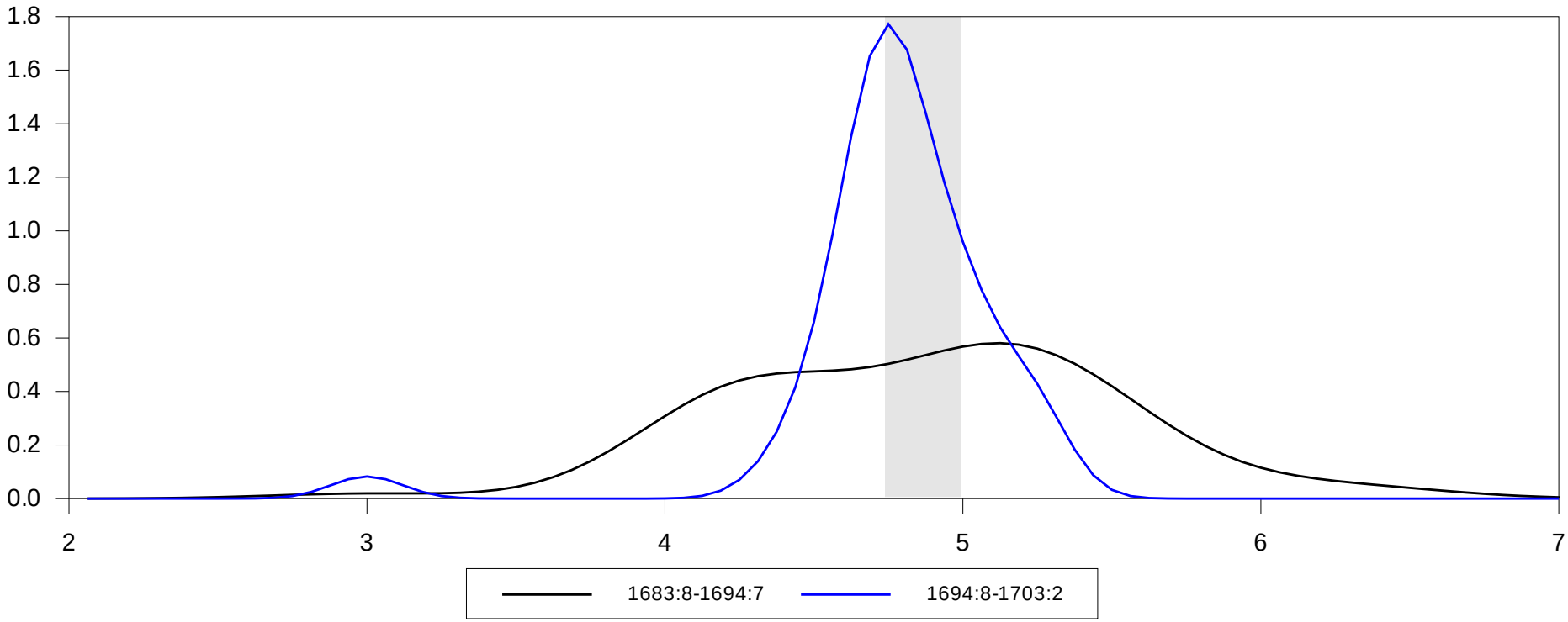


[1] Source: derived from Polak (1998, 103-164).

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