Trade Imbalances or Silver Arbitrage? Anglo-Asian Bullion Flows in the Early Modern Period, 1664-1811

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Literature Review

RESEARCH IS ABOUT THE ROLE OF SILVER IN EURO-ASIAN TRADE IN THE EARLY MODERN PERIOD: **Trade Imbalances or Silver Arbitrage?**

WHAT? Silver was the most significant commodity money that connected global exchanges in the early modern period.

- Between 1500 and 1800, nearly 85 per cent of the world's silver was produced in America (Merrill 1930, TePaske 2010)
- Large amounts of silver were transferred from America to Asia, with Europe being the major transhipment region of global trade (Cape route became the most important route)

There is a long tradition of scholars quantifying intercontinental flows of precious metals: see Krishna (1924), Chaudhuri (1963, 1968, 1978), Dermigny (1964), Garrard (1980), Attman (1981, 1985, 1986), Cross (1983), Gaastra (1983), TePaske (1983, 2010), Yamamura and Kamiki (1983), Morineau (1985), Barrett (1990), Steensgaard (1990), García-Baquero (1996), Gupta (1997), Chuan (1997), Pearson (2001), De Vries (2003), Prakash (2003), Bowen (2005, 2010)

Literature Review

Despite the vital role of silver in sustaining global trade, there is no agreement on **WHY** it moved constantly from Europe to Asia for three centuries.

Two narratives:

- Scholars who are specialised in **European companies trading with Asia** consider intercontinental **silver as money** transferred to pay for the large and persistent European trade deficit with Asia (EUROCENTRIC NARRATIVE)

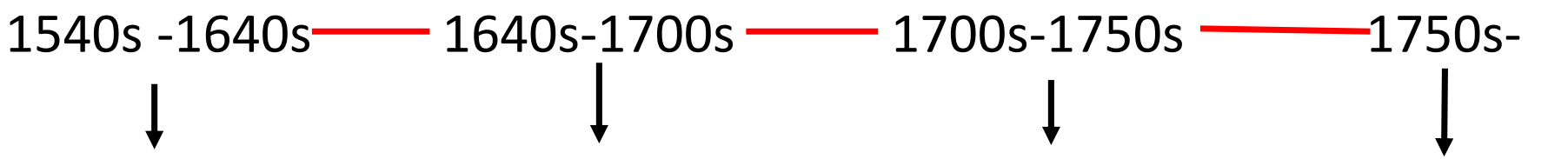
Trade between Europe and Asia was driven by *European demand for Asian commodities*: the bulk of profits from European companies' trade did not come from the sale of European exports to Asia (mainly silver), but from Asian imports sold in the markets of Europe (tea, pepper, Indian cottons, raw silk…) *[but the profits on silver exports have never been measured]*

Literature Review

Despite the vital role of silver in sustaining global trade, there is no agreement on **WHY** it moved constantly from Europe to Asia for three centuries.

- Scholars who are specialised in the **global history of silver** argue that silver was THE **commodity traded due to large arbitrage profits** as it was cheap in the Western producing regions and expensive in the East because of *China's demand for silver* (to be used domestically as money) (SINOCENTRIC NARRATIVE – California School)

[causality reversion: export of Chinese good to Europe was the counterpart of silver imports to China]



'Potosi-Japan Cycle of Silver'

Trigger: Chinese taxation in silver specie (from second half 15th century)

Bimetallic ratio (1590s):
Canton 1:5.5 or 1:7
Spain 1:12.5 or 1:14

INTEGRATION

'Mexican Cycle of Silver'

Cause: Chinese population growth

Bimetallic ratio (1700):
China 1:10 or 1:11
Europe 1:15

INTEGRATION

But… scholars in favour of the silver arbitrage argument have never quantified the **arbitrage gains** to demonstrate that silver arbitrage was the main cause of Euro-Asian trade

Research Question

These scholars conceptualise arbitrage gains according to differences in the gold-silver **bimetallic ratio** between Europe and Asia, which is an equivalence between the physical quantities of the two commodities; i.e. one ounce of gold is equal to a certain number of ounces of silver. But this approach hides the actual price of silver, as well as that of gold, to require (by definition) that gold and silver must always flow in the opposite direction; that is, silver was exchanged for gold - or for commodities - as a barter exchange in which the monetary values of silver and gold have been removed from the analysis.

The challenge in measuring the profitability of silver arbitrage in monetary terms lies in defining in which money the price of silver is expressible: (1) define **prices** in the units of account, and (2) unpack the "hidden variable" **exchange rates** in a historical period in which the bill-of-exchange market is still in process of development.

Research Question

We need **precious metals' prices (and exchange rates)** to measure the profitability of arbitrage and, therefore, the role of silver in Euro-Asian trade.

I have hand-collected prices of all transactions for both gold and silver from 1664 to 1811 by origin and destination centres, that is, London, Mocha, Bombay, Malabar Coast (Surat), Coromandel Coast (Madras), Bay of Bengal, South-East Asia, [Saint Helena] and China.

I disaggregate data by Asian destination centre because: (1) it facilitates the inclusion of the different monetary systems of the Asian regions, which are key to interpret results on arbitrage gains (to unpacking the "hidden variable" exchange rate) (2) it permits distinguishing between silver flows (quantities) to China and India.

Parthasarathi (2011: 46-47) claims that the California School has misinterpreted India's central place as an end-market for precious metals in the early modern global trading system because they are mistaken in assuming that the bulk of the silver that entered in India was re-exported to China

Methodology

Law of one price (*i*= gold, silver)

[specie-point mechanism when transaction costs are zero]

P_i^L(£)= P_i^j(*Asian currency*)· exchange rate $\left(\frac{£}{Asian\ currency}\right)$

- if $P_i^L > P_i^j \cdot x$,
  the profit of sending metal i from centre j to London is equal to $P_i^L - P_i^j \cdot x$
- if $P_i^L < P_i^j \cdot x$,
  the profit of sending metal i from London to centre j is equal to $P_i^j \cdot x - P_i^L$

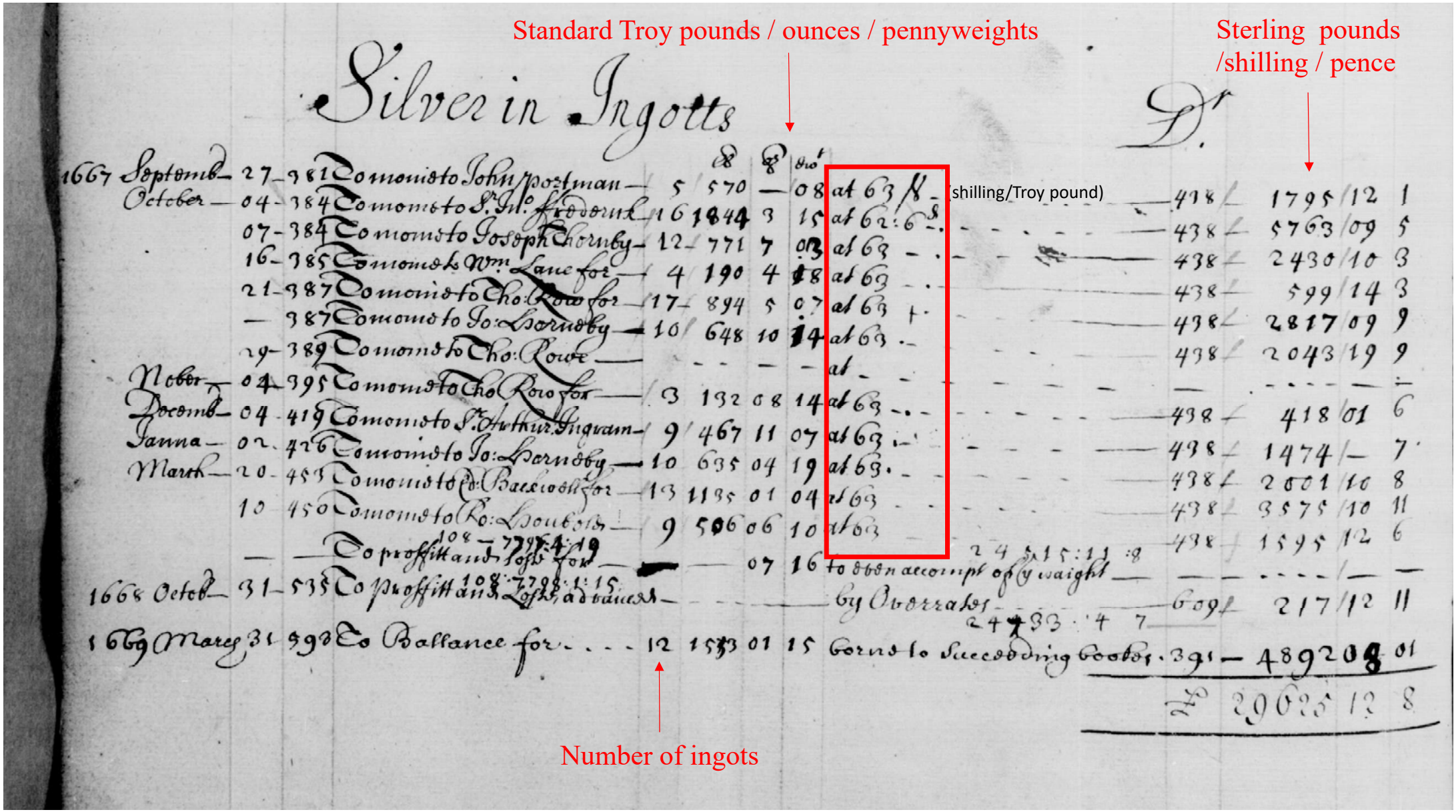
j = I have aggregated Asian centres as follows: Malabar Coast comprises EIC entries as Surat and Malabar. Coromandel Coast appears in the EIC accounting as Madras, Coromandel, St. David, and St. George. Bay of Bengal was registered as Bay or Bay of Bengal, Calcutta, and Williams. South-East Asia refers to Bantam, Bencoolen, Fort Marlborough, Fort York, Borneo, Sumatra and Pryaman. Destinations in China appeared as China, Canton, Amoy, Ningpo (Limpo), and Tonkin (Gulf of).

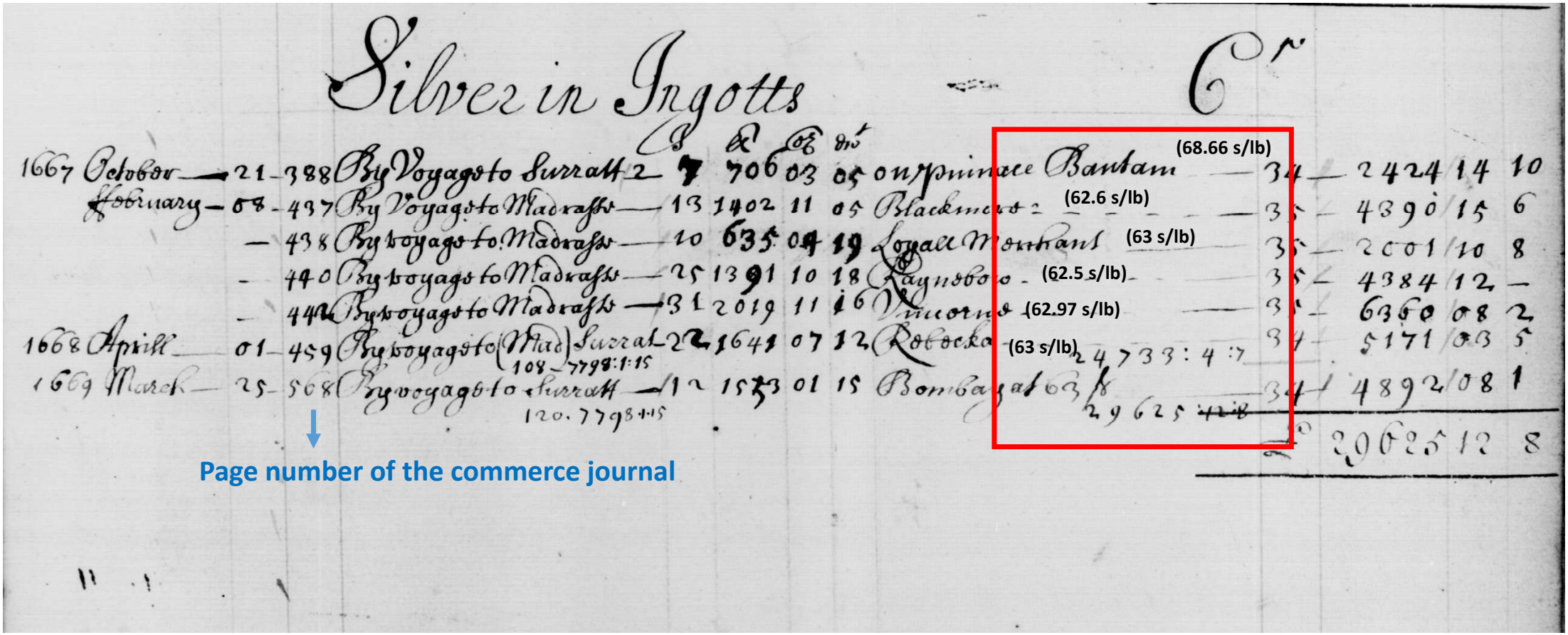
My approach… empirical – Accountant General Records of the EIC:

a daily record of the Company's transactions was registered in the General Commerce Journal. The Commerce Journals transformed the value of local currencies in sterling pounds according to the exchange rates defined by the Company. The General Ledgers compiled transactions for each commodity from entries in the General Commerce Journals

+ Correspondence, and retrospective reconstructions of the Asian monetary systems to define exchange rates and intrinsic parities.

The ledgers recorded gold from 1664 to 1676 in three ledger accounts, named **“specie”**, **“ingots”** and **“ducats”**. After that, all the accounts were consolidated in one named **“gold”**, which aggregated specie, ingots and foreign coins. Silver was recorded from 1664 to 1703 in four ledger accounts, named **"cruzadoes"** (Portuguese coin), **"reals of eight"** (Spanish-American coin), **“silver”** and **“ingots,”**. From that moment, accounts were consolidated in two accounts: **“silver”** until 1796, plus **“bullion”** from 1705 to 1720 which comprised silver and also a few entries for gold. The “bullion” ledger account appears again in the ledgers from 1796 to 1813 to record silver as well as a few entries for gold.

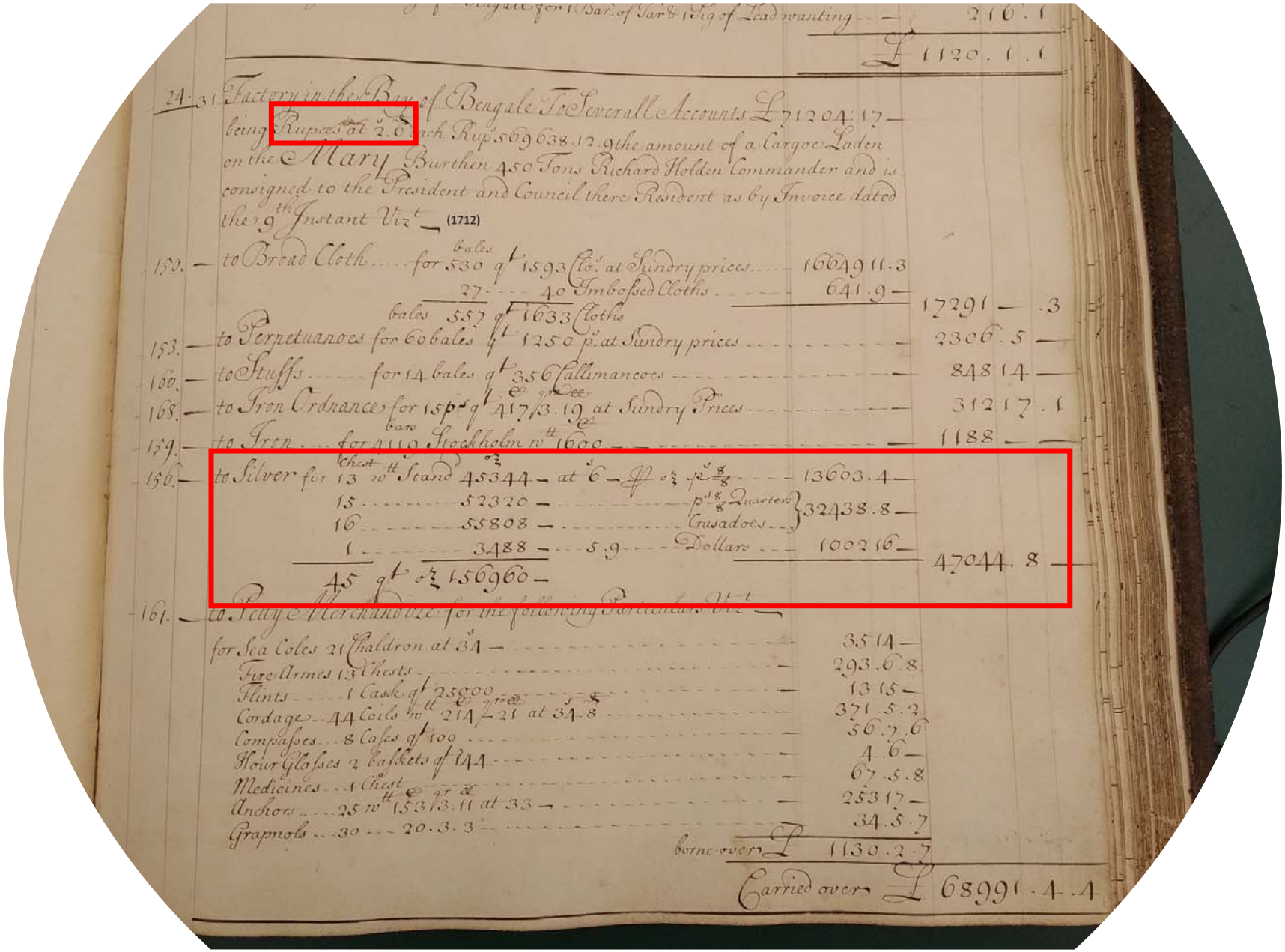

Standard Troy pounds / ounces / pennyweights
Sterling pounds /shilling / pence
Silver in Ingotts
Dr
(shilling/Troy pound)
Number of ingots



Silver in Ingotts

1667 October	21	388	By Voyage to Surratt	2	7	706	03	05	on ye Pinnace Bantam	(68.66 s/lb)	34	2424	14	10
February	08	437	By Voyage to Madrass	13	1402	11	05		Blackmore	(62.6 s/lb)	35	4390	15	6
		438	By voyage to Madrass	10	635	04	19		Loyall Merchant	(63 s/lb)	35	2001	10	8
		440	By voyage to Madrass	25	1391	10	18		Raynsboro	(62.5 s/lb)	35	4384	12	—
		442	By voyage to Madrass	31	2019	11	16		Unicorne	(62.97 s/lb)	35	6360	08	2
1668 April	01	459	By voyage to (Mad) Surrat	22	1641	07	12		Robocka	(63 s/lb)	34	5171	03	5
			108 7798:1:15							24733:4:7				
1669 March	25	568	By voyage to Surratt	12	1573	01	15		Bombay	63/8	34	4892	08	1
			120.7798:1:15							29625 42/8	£	30825	12	8

Page number of the commerce journal



Bar. of Sard & 1 Pig of Lead wanting — 216. 1

£ 1120. 1. 1

24. 31 Factory in the Bay of Bengale To Severall Accounts £ 71204. 17 —
being Rupees at 2. 8 each Rup. 569638. 12. 9 the amount of a Cargoe Laden
on the Mary Burthen 450 Tons Richard Holden Commander and is
consigned to the President and Council there Resident as by Invoice dated
the 9th Instant Viz.t — (1712)

152. — to Broad Cloth ... for 530 bales q.t 1593 Cl.s at Sundry prices ... 16649 11. 3
27 — 40 Imbossed Cloths ... 641. 9 —
bales 557 q.t 1633 Cloths 17291 — .3

153. — to Perpetuanoes for 60 bales q.t 1250 p.s at Sundry prices ... 2306. 5 —

160. — to Stuffs ... for 14 bales q.t 356 Callamancoes ... 848 14 —

168. — to Iron Ordnance for 15 p.s q.t 417 ℔ 3. 19 ℔ at Sundry Prices ... 31217. 1

159. — to Iron ... for 4 bars 119 Stockholm w.t 1600 ... 1188 — —

156. — to Silver for 13 chest w.t Stand 45344 — at 6 — ℔ ℥ p.s 2 8/8 ... 13603. 4 —
15 ... 52320 — ... p.s 1 8/8 Quarters } 32438. 8 —
16 ... 55808 — ... Crusadoes }
1 ... 3488 — ... 5. 9 ... Dollars ... 1002 16 —
45 q.t ℥ 156960 — 47044. 8 —

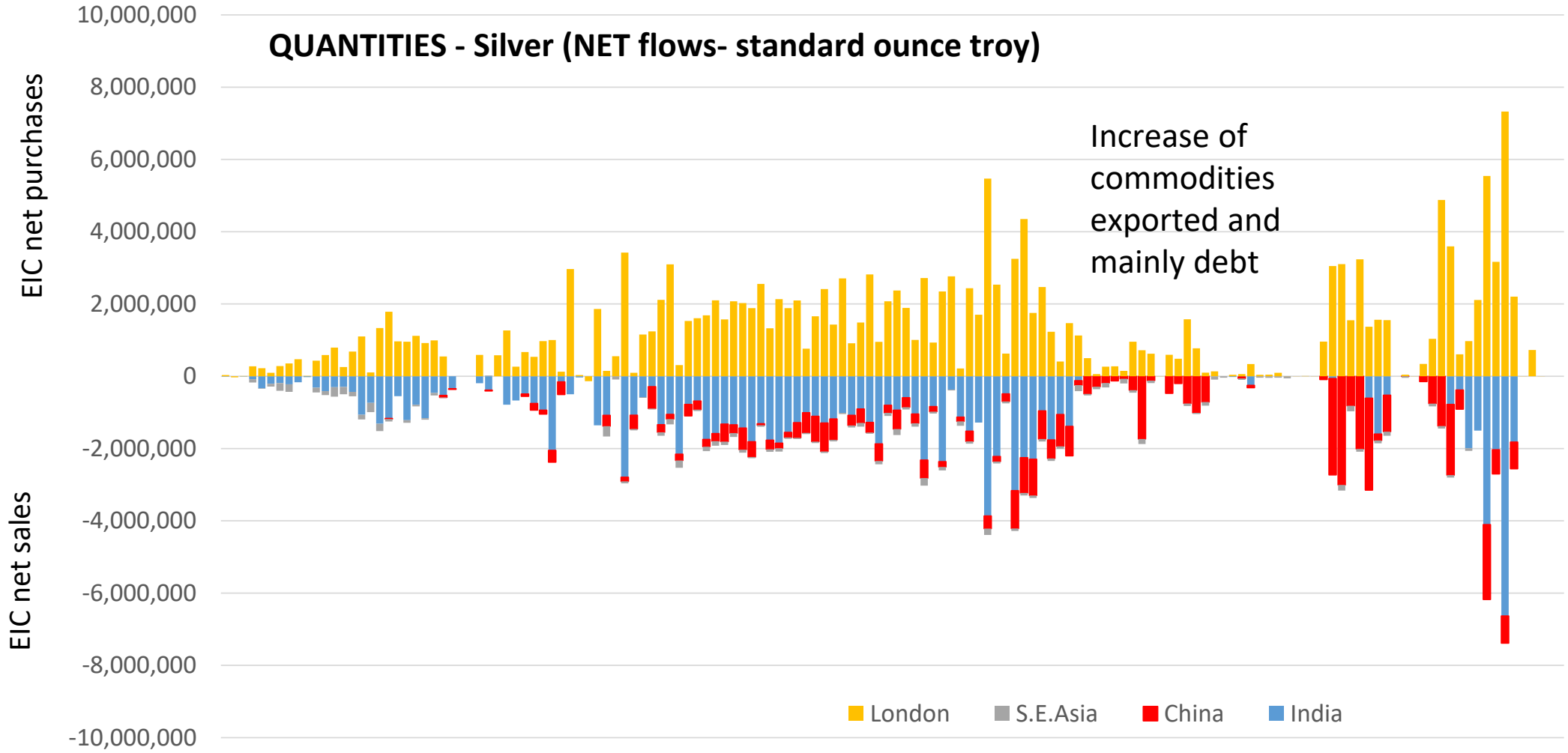
161. — to Petty Merchandize for the following Particulars Viz.t

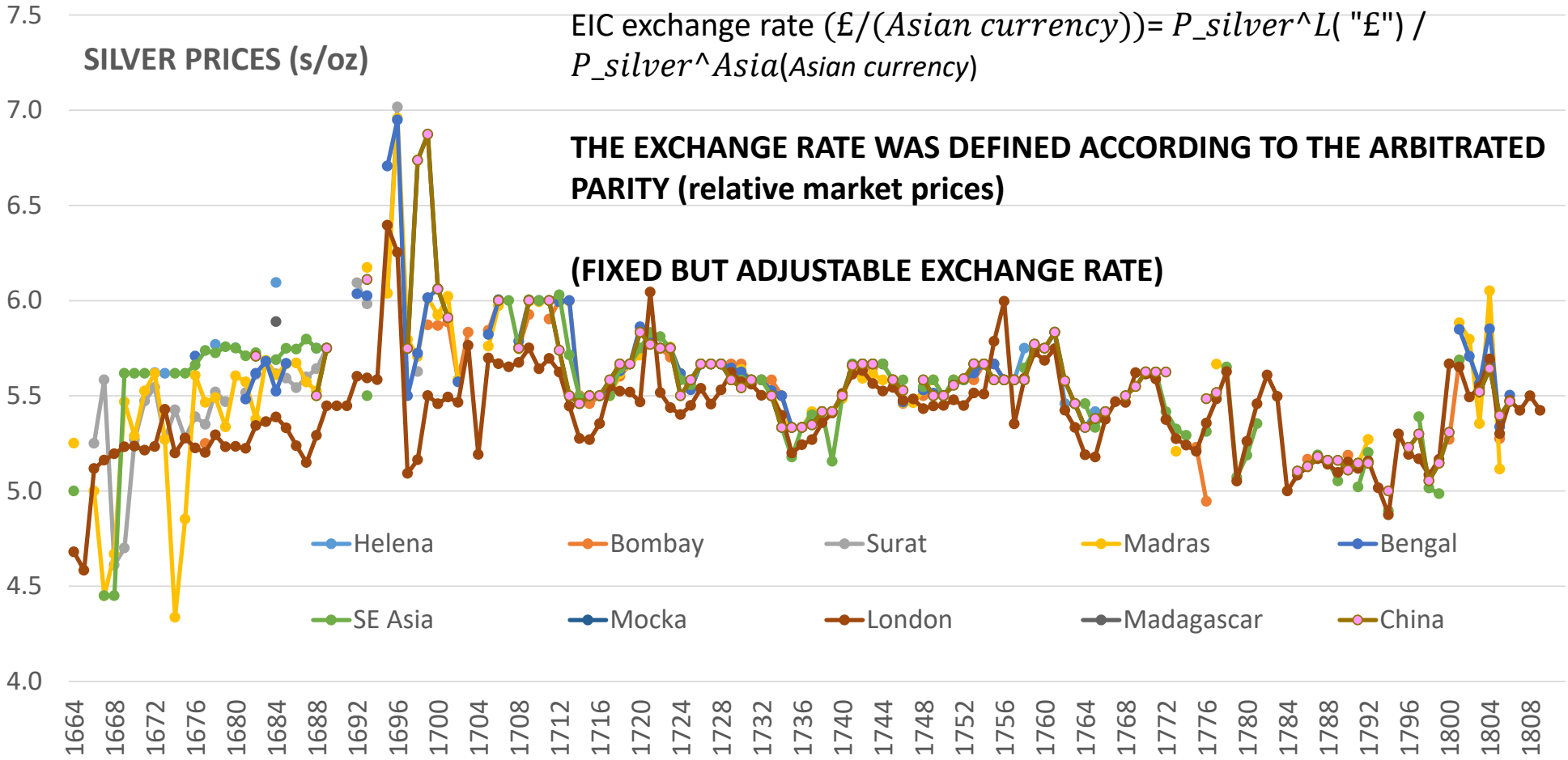
for Sea Coles 21 Chaldron at 34 — ... 35 14 —
Fire Armes 13 Chests ... 293. 6. 8
Flints ... 1 Cask q.t 25600 ... 13 15 —
Cordage ... 44 Coils w.t 214 — 21 at 34. 8 ... 371. 5. 2
Compasses ... 8 Cases q.t 100 ... 56. 7. 6
Hour Glasses 2 baskets q.t 144 ... 4. 6 —
Medicines ... 1 Chest ... 67. 5. 8
Anchors ... 25 w.t 153 ℔ 3. 11 at 33 — ... 253 17 —
Grapnols ... 30 ... 20. 3. 3 ... 34. 5. 7

borne over £ 1130. 2. 7

Carried over £ 68991. 4. 4

Long-distance silver arbitrage. Defining exchange rates




SILVER PRICES (s/oz)
EIC exchange rate (£/(Asian currency))= P_silver^L("£") / P_silver^Asia(Asian currency)
THE EXCHANGE RATE WAS DEFINED ACCORDING TO THE ARBITRATED PARITY (relative market prices)
(FIXED BUT ADJUSTABLE EXCHANGE RATE)
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
Helena
Bombay
Surat
Madras
Bengal
SE Asia
Mocka
London
Madagascar
China
1664
1668
1672
1676
1680
1684
1688
1692
1696
1700
1704
1708
1712
1716
1720
1724
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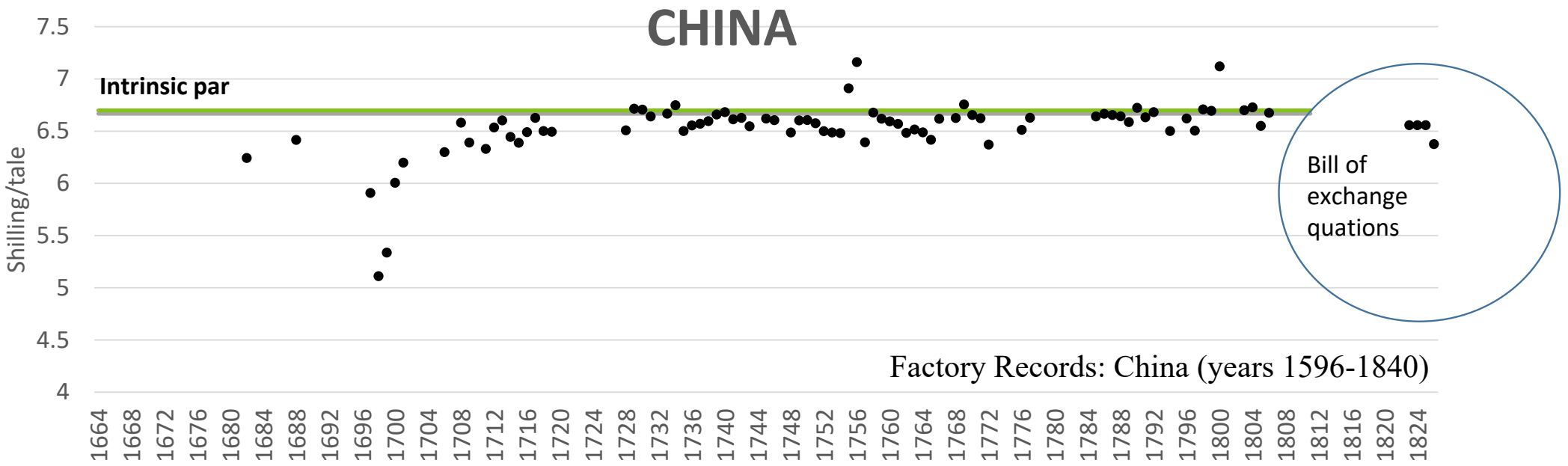
1744
1748
1752
1756
1760
1764
1768
1772
1776
1780
1784
1788
1792
1796
1800
1804
1808

EXCHANGE RATE – THE HIDDEN VARIABLE:

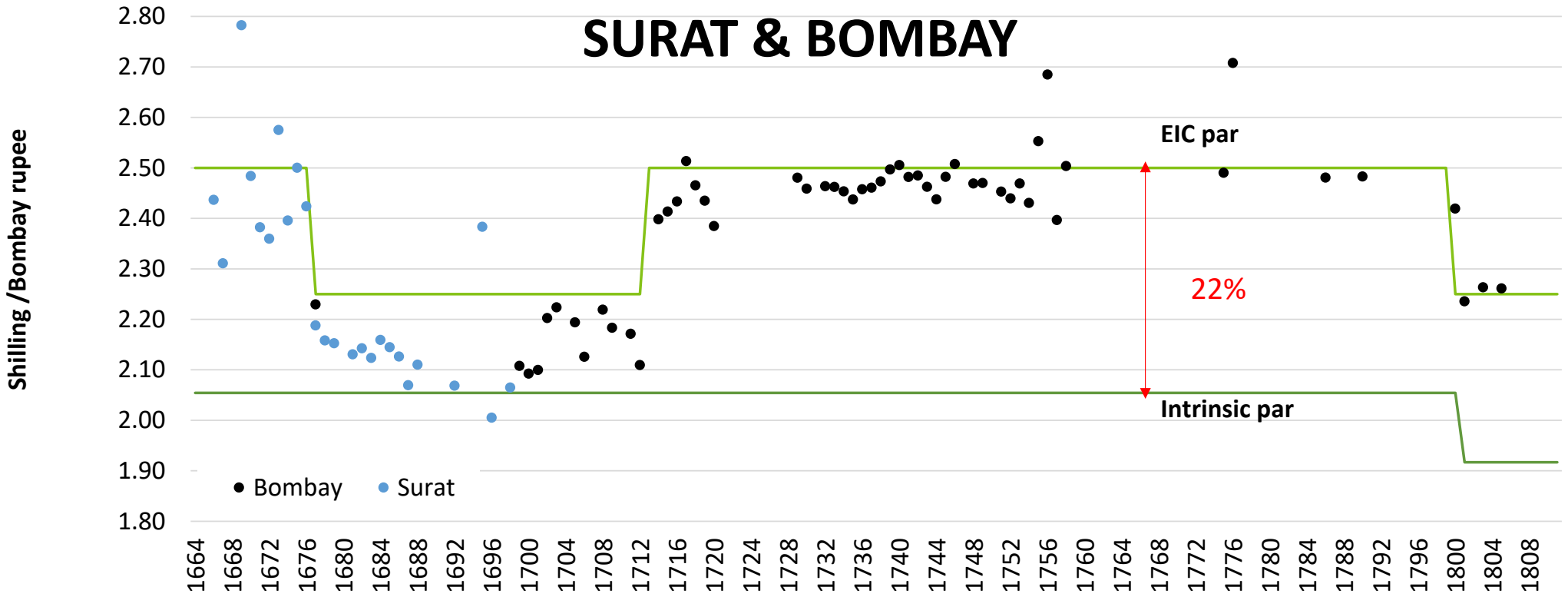
What is the exchange rate
before the emergence/consolidation of bills of exchange market?

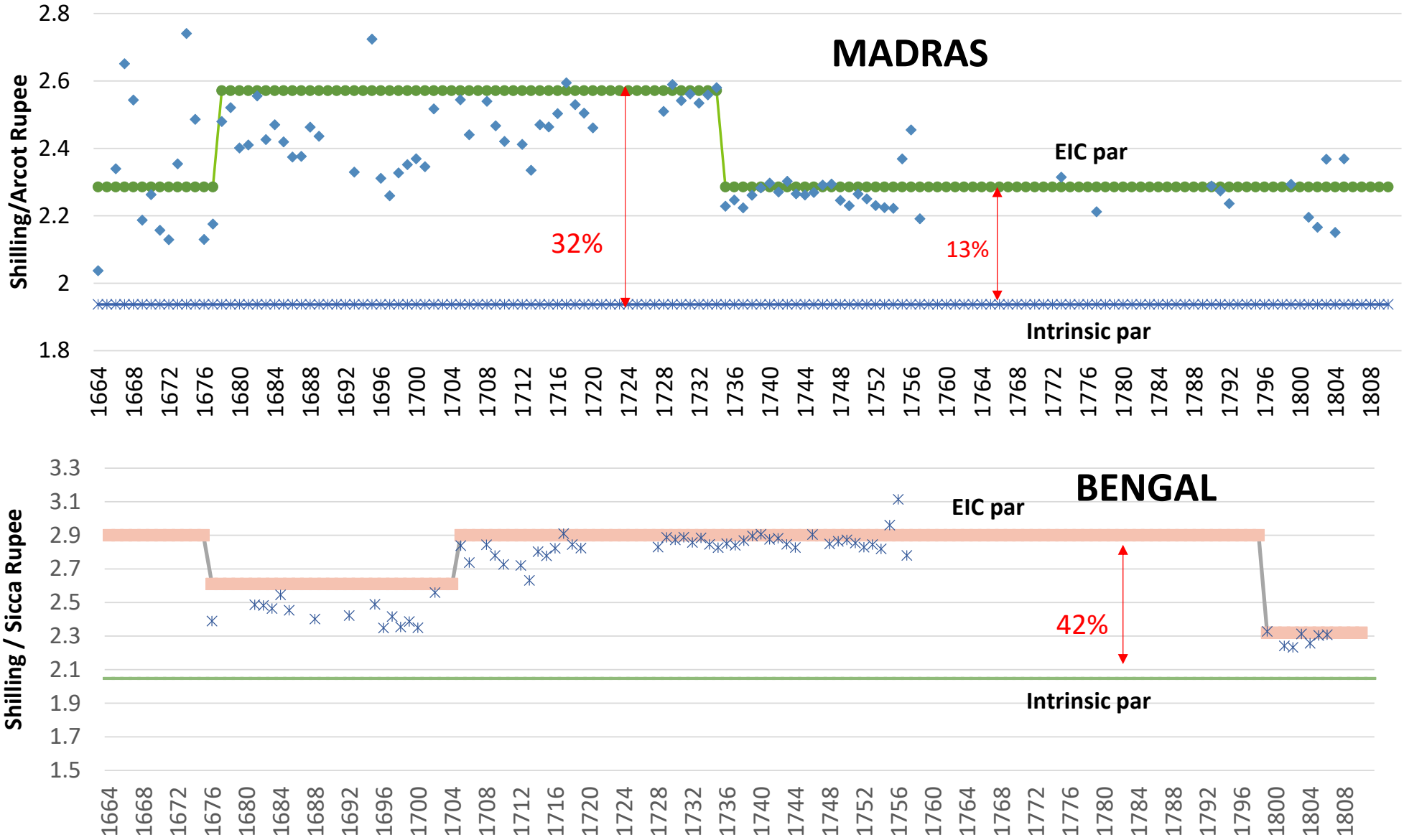
EIC exchange rate $\left(\frac{£}{tale}\right)$= P^{L}_{silver}(£) / P^{China}_{silver}(*tale*)→ the Law of One Price holds *by definition*



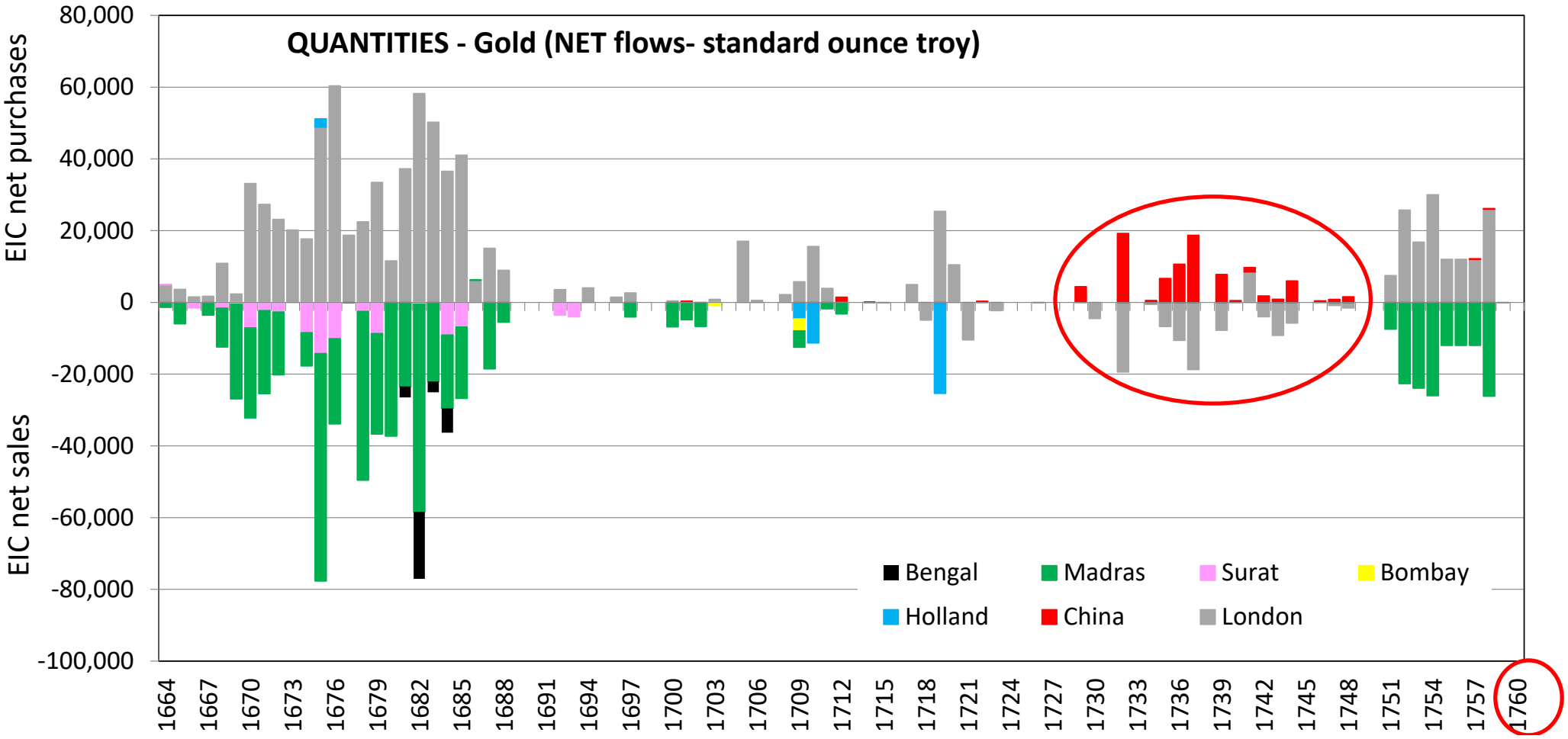
EIC exchange rate $\left(\frac{£}{Bombay\ Rupee}\right)$= P^{L}_{silver}(£) / $P^{Surat-Bombay}_{silver}$(Bombay *Rupee*)→ the Law of One Price holds *by definition*

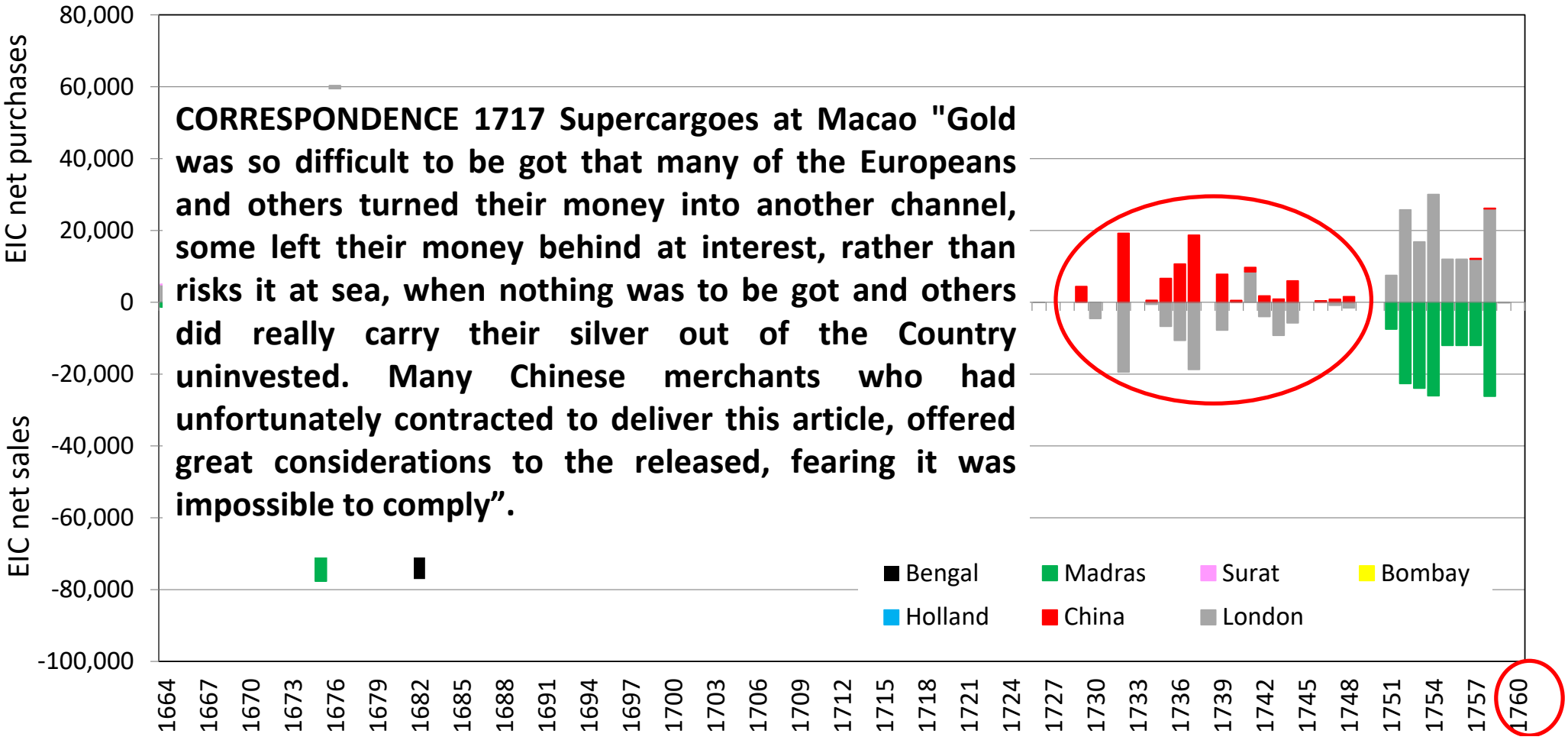
The EIC exchange rate is defined according the arbitrated par (commercial par) and not the intrinsic par (political par) →EIC exchange rate was a fixed BUT adjustable exchange rate (exchange rate ≠ intrinsic par)




MADRAS
Shilling/Arcot Rupee
2.8
2.6
2.4
2.2
2
1.8
EIC par
32%
13%
Intrinsic par
1664 1668 1672 1676 1680 1684 1688 1692 1696 1700 1704 1708 1712 1716 1720 1724 1728 1732 1736 1740 1744 1748 1752 1756 1760 1764 1768 1772 1776 1780 1784 1788 1792 1796 1800 1804 1808
BENGAL
Shilling / Sicca Rupee
3.3
3.1
2.9
2.7
2.5
2.3
2.1
1.9
1.7
1.5
EIC par
42%
Intrinsic par
1664 1668 1672 1676 1680 1684 1688 1692 1696 1700 1704 1708 1712 1716 1720 1724 1728 1732 1736 1740 1744 1748 1752 1756 1760 1764 1768 1772 1776 1780 1784 1788 1792 1796 1800 1804 1808

Gold versus silver arbitrage. The ‘Mexican Cycle of Silver’




EIC net purchases
EIC net sales
80,000
60,000
40,000
20,000
0
-20,000
-40,000
-60,000
-80,000
-100,000
1664
1667
1670
1673
1676
1679
1682
1685
1688
1691
1694
1697
1700
1703
1706
1709
1712
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1721
1724
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1730
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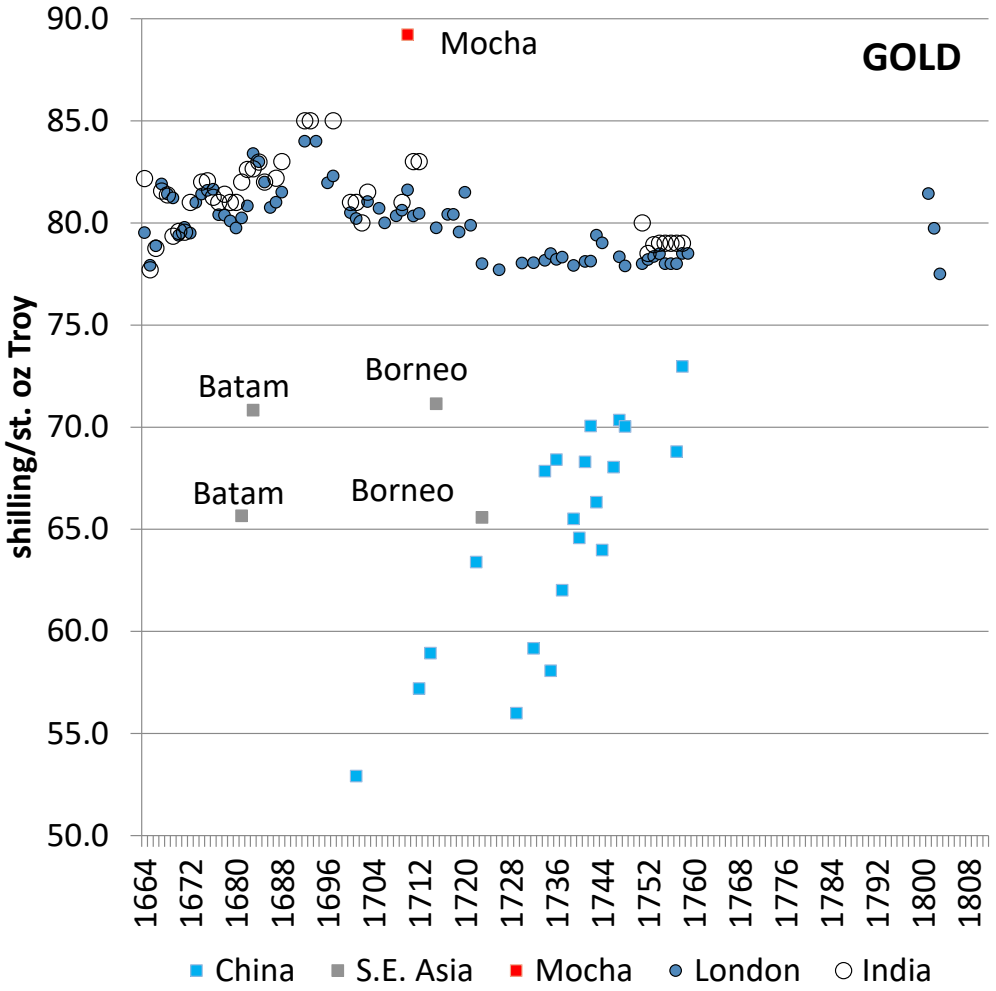
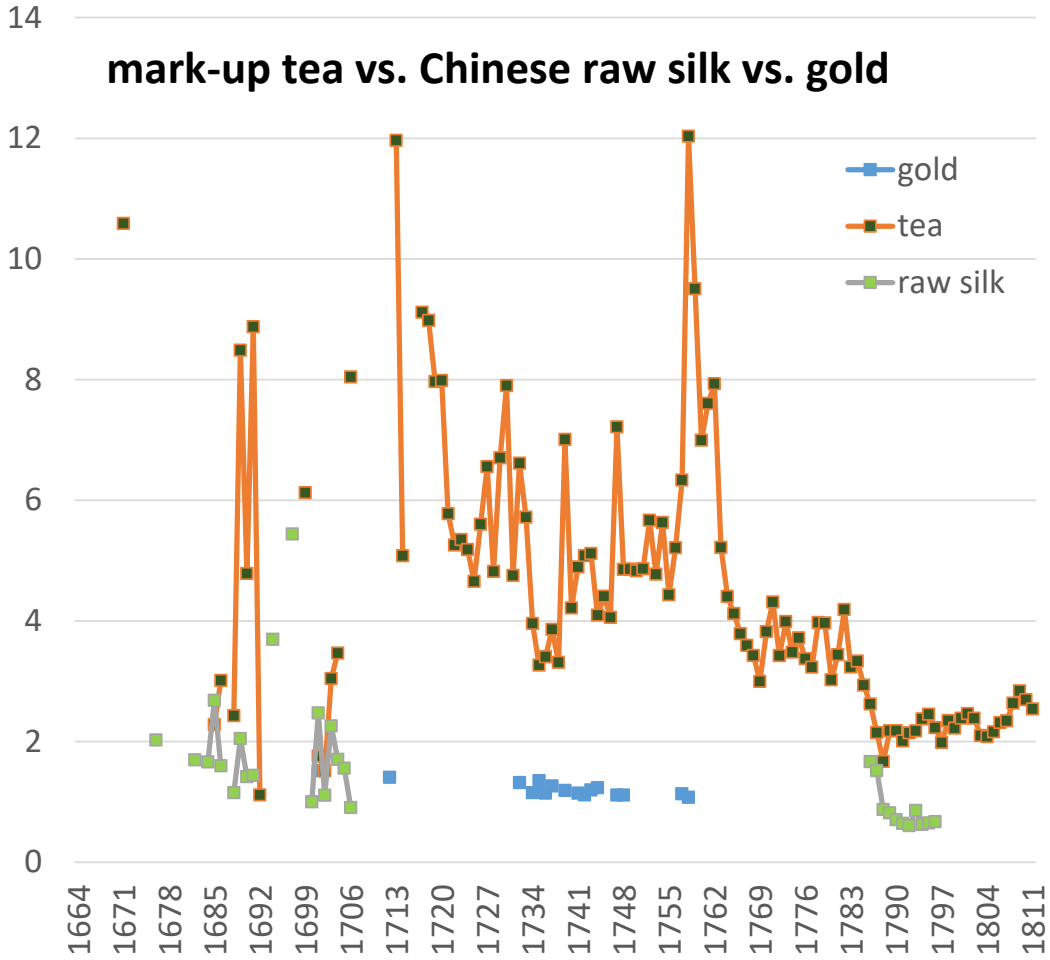
1760
CORRESPONDENCE 1717 Supercargoes at Macao "Gold was so difficult to be got that many of the Europeans and others turned their money into another channel, some left their money behind at interest, rather than risks it at sea, when nothing was to be got and others did really carry their silver out of the Country uninvested. Many Chinese merchants who had unfortunately contracted to deliver this article, offered great considerations to the released, fearing it was impossible to comply".
Bengal
Madras
Surat
Bombay
Holland
China
London

the Law of One Price holds *by definition WITH SILVER → PROFITS FOR GOLD*





Conclusions

- SILVER GAINS AS THE PRIMARY CAUSE OF WEST-EAST TRADE IN THE EARLY MODERN PERIOD IS EXAGERATED :
  - Silver arbitrage was not profitable because the EIC exchange rate gravitated around the arbitrated parity. There were episodes of arbitrage by which the EIC exported silver to China in exchange for gold for profit, but the vast majority of silver (and gold) was exported without profit to pay for imports.
  - When we compare profits of gold trade with other commodities, the results are mixed: gold was so profitable as raw silk, but tea was much more profitable.
- SINOCENTRIC NARRATIVE HAS MISINTERPRETED INDIA'S CENTRAL PLACE AS AN END-MARKET FOR PRECIOUS METALS
- HOWEVER, I TOTALLY AGREE THE ASIAN DYNAMICS SHOULD BE TAKEN INTO ACCOUNT TO UNDERSTAND ANGLO-ASIAN TRADE. Notably, this research develops a conceptual framework based on the empirical evidence to understand the meaning of exchange rate (≈arbitrated par)