The dynamics of globalization in the early modern world: new evidence from the Dutch-Asiatic trade, c. 1600-1800[1]

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Abstract

This paper examines whether there is evidence of 'hard globalization' (i.e. price convergence) during the early modern period. New data on prices were assembled for the 16 most important products transported by the Dutch East India Company (VOC) between Europe and Asia in the seventeenth and eighteenth centuries. Of these commodities, the majority show price convergence, five show divergence and two products reveal no significant trend. While there was some scope for advances in transport, most of the explanation for price convergence (or the lack of it) was sought in the various commodity markets. Where commodities were traded between competitive markets, price convergence took place. In many of the purchasing markets, however, prices were not (only) determined by supply and demand, but were set by long-term contracts or influenced by the VOCs complete control over production and trade. This paper thus finds there are indications of global market integration in the early modern period. Mark-ups and trends were mostly determined by the extent to which the VOC controlled the purchasing markets in Asia. It is suggested that the consequences of this global trade, and its associated institutions, on various economies around the Indian Ocean should be further explored.

1. Introduction

Between 1500 and 1800 intercontinental trade grew at 1.1 per cent annually.[2] While this growth may not be remarkable by today's standards, it was impressive compared with the development of world trade in the centuries before, as well as relative to the growth of other economic

[1] I thank Gerrit Knaap and Judith Schooneveld-Oosterling for early access to Bookkeeper-General database, and Jan Luiten van Zanden for the data on VOC auctions in Amsterdam. Together with Oscar Gelderblom and Elise van Nederveen Meerkerk, Jan Luiten also gave some valuable suggestions, while Henk Looijesteijn pointed me towards some useful literature. The usual disclaimer applies. This paper will be the first chapter of my dissertation on *Trade and Living Standards: The Dutch East India Company in the Indian Ocean, c. 1600-1800*.
[2] De Vries, 'Connecting Europe', p. 96.

indicators.[3] Did the 'Voyages of Discovery' thus usher in a first age of globalization? In a series of papers and books published between 2000 and 2009, Kevin O'Rourke, Jeffrey Williamson and co-authors addressed the issue.[4] They define globalization as the integration of markets across space, and commodity markets reflect one important dimension of this. The best evidence of commodity market integration is 'the extent to which prices of the same commodities converge over time worldwide.'[5] Since they do not find evidence of commodity price convergence before the 19th century, they conclude that no market integration took place during the early modern period. Instead, the 1820s should be seen as the starting point of globalization, as after that date technological innovations and declining trade barriers led to a decline in transaction costs and the integration of global commodity markets. Their work has become very influential and the nineteenth century is now generally referred to as the 'first era of globalization'.

Not everyone is convinced, however. Klas Rönnbäck found signs of global price convergence already from the late seventeenth century onwards.[6] A study by Paul Sharpe and Jacob Weisdorf finds some degree of long-term market integration in the wheat trade between the US and the UK from the eighteenth century. They stress, however, that this is not evidence of globalization *per se*.[7] Dennis O. Flynn and Arturo Giráldez have suggested that globalization started in 1571 with the foundation of Manila and the direct trade between the Americas and Asia.[8] While they raise serious doubts regarding the narrow definition employed by O'Rourke and Williamson, they also join the same game when they find several 'cycles' in which the price of silver converged globally. In his review of the debate, Jan de Vries also raises some serious objections against O'Rourke and Williamson's theses, which will be dealt with throughout the paper. In the end, he takes up a nuanced view suggesting that globalization in this period faced distinct limits, but that it was an era of globalization nonetheless.[9]

[3] Findlay and O'Rourke, *Power and plenty*, p. 305.
[4] O'Rourke and Williamson, 'When did globalisation?'; ibid: 'After Columbus', ibid: 'Did Vasco da Gama', ibid. 'Once More' ibid: 'From Malthus to Ohlin'; Findlay and O'Rourke, 'Commodity market integration'; Findlay and O'Rourke, *Power and plenty*.
[5] O'Rourke and Williamson, 'Once More, p. 109.
[6] Rönnbäck, 'Integration'.
[7] Sharp and Weisdorf, 'Globalization revisited'.
[8] Flynn and Giraldez, 'Born with a "Silver Spoon"', ibid., 'Cycles of Silver'; ibid., 'Path dependence'; ibid., 'Born again'.
[9] De Vries, 'The Limits', p. 731.

While Rönnbäck as well as Sharpe and Weisdorf have demonstrated evidence of transatlantic commodity market integration already during the eighteenth century, De Vries reasonably notes that because the institutions in the New World were specifically moulded to serve the interests of export and long distance trade 'the real test of early modern globalization, by any definition, requires a study of Eurasia.'[10] In this paper, the issue will therefore be taken up once more, employing new data from the Dutch-Asiatic trade.

The focus of this paper is further narrowed as it only investigates the Dutch-Asiatic trade between roughly 1600 and 1800. This is not to claim that this is the only important trade in this period. While substantial work has already been done by K. N. Chaudhuri,[11] further research is currently being undertaken regarding the Anglo-Asian trade.[12] The collection of more evidence from the Portuguese *Carreira da India* or the French *Compagnie des Indes* and other companies could certainly lead to important insights. There are, however, good reasons to study the Dutch trade with Asia, as the VOC was by far the most important trading company in the Euro-Asian trade between 1600 and 1800: 49 per cent of all ships sailing to Asia in the seventeenth and eighteenth century were Dutch. In the second part of the eighteenth century the English and French were catching up, but it lasted until the 1780s before they were able to exceed the Dutch in numbers of Asia-bound ships. At the same time, the average tonnage of goods was also continuously higher on Dutch ships.[13]

TABLE 1: NUMBERS (AND SHARES) OF SHIPS SENT TO ASIA, 1600-1800.

	1600-1700		1700-1800		Total 1600-1800	
	N	%	N	%	N	%
Dutch	1770	59	2950	44	4720	49
English	811	27	1865	28	2676	28
French	155	5	1300	20	1455	15
Portuguese	193	6	193	3	386	4
Danish	54	2	234	4	288	3

[10] De Vries, 'The limits', pp. 715-6. Rönnbäck also showed data on the Euro-Asian trade, but focussed on the Atlantic.
[11] Chaudhuri, *The Trading World*; ibid., *The English East India Company*.
[12] Noques-Marco, 'Euro-Asian globalization'.
[13] De Vries, 'Connecting Europe', pp. 46-51.

Swedish			61	1	61	1
Ostend			55	1	55	1
Total	2983	100	6658	100	9641	100

Source: Gaastra and Bruijn, 'The Dutch East India Company's Shipping'.

Despite the impressive amount of research that has been done on the VOC,[14] as well as on price history in the Netherlands,[15] the data from the Dutch-Asiatic trade that have been brought to bear on the issue of globalization have been meagre: decadal average prices for only 3 products: cloves, coffee and pepper.[16] While pepper and cloves were certainly of great importance to the VOC in the early seventeenth century, by the 1660s they had already been surpassed by textiles in terms of total invoice value of return cargos.[17] The importance of coffee did increase over the eighteenth century but the rise of a global market for coffee in the eighteenth century is still subject to debate.[18]

In this paper, I will put forward new annual price data on a greater variety of goods traded by the Dutch in the sixteenth and seventeenth centuries. The question of '*when* did globalization begin?' is not really addressed as the search for one starting date would require an even larger time frame. Instead it analyses whether there is evidence of globalization taking place between 1600 and 1800 and examines what drove these trends, thus viewing globalization as a *process* rather than an *event*. In the next section a brief discussion of definitions is followed by methodological considerations and an introduction to the sources. Section 3 discusses the price differentials between Europe and Asia, while section 4 attempts to explain these developments via (a) the possibilities of a reduction in transport costs and (b) the extent to which the VOC controlled the purchasing markets in Asia. Section 5 discusses the possible effects of this 'globalization' for the European and Asian economies and concludes.

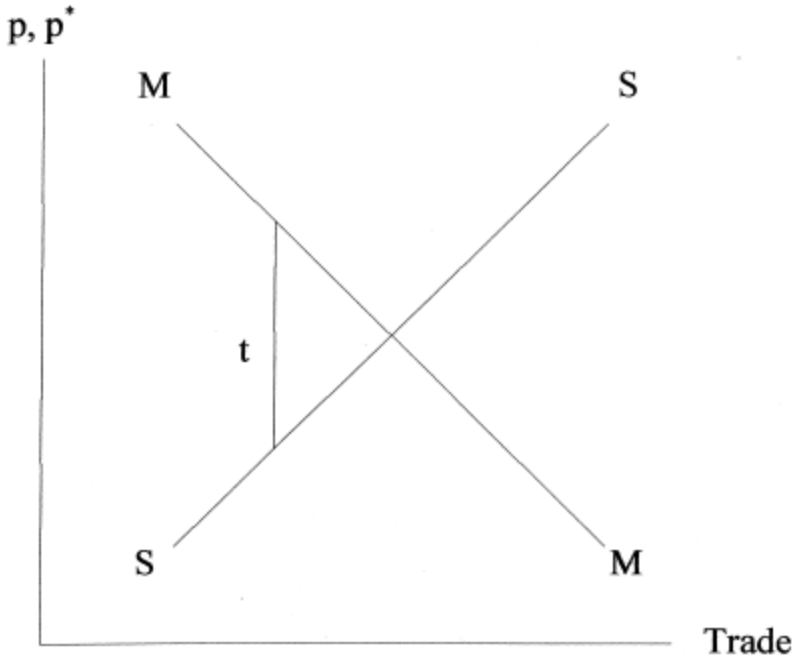
[14] E.g. Gaastra & Bruijn, *Dutch Asiatic Shipping*, Glamann, *Dutch Asiatic Trade*, Jacobs, *Merchant in Asia*.
[15] Posthumus, *Nederlandsche Prijsgeschiedenis*.
[16] O'Rourke and Williamson, 'When did globalisation begin?'; Rönnbäck, 'Integration'.
[17] Prakash, *European commercial enterprise*, p. 115.
[18] Bulbeck et al., *Southeast Asian exports*, p. 169; McCants, 'Poor consumers'; Topik, 'The integration'; Rönnbäck, 'Integration'.

2. Definitions, methodology and sources

'Globalization' is a widely used term, especially since the 1990s. As a result, numerous definitions have been given. I will focus on the discussion within the field of economic history.

Part of the dispute between Flynn and Giraldez on the one hand, and O'Rourke and Williamson on the other, originates from their definition of globalization. Flynn and Giraldez propose that 'globalization began when all heavily populated land masses initiated sustained interaction – both directly with each other and indirectly through other land masses – in a manner that deeply and permanently linked them.'[19] They suggest that a focus on purely economic globalization is 'doomed' and that globalization contains ecological, demographic, cultural as well economic elements. As their definition 'evades modelling and testing', De Vries christened it 'soft globalization'.[20]

FIGURE 1: TRADE BETWEEN HOME COUNTRY AND THE REST OF THE WORLD.



Source: O'Rourke and Williamson, 'When did globalisation?', p. 25.

Without joining this discussion, it can be noted that O'Rourke and Williamson's definition, and consequently their propositions, have the advantage that they can be measured.

[19] Flynn and Giraldez, 'Born again', p. 2.
[20] De Vries, 'The limits', p. 713.

According to them, globalization is equal to the integration of factor and commodity markets across time and space (dubbed 'hard globalization' by De Vries). Figure 1 illustrates the mechanism they propose: MM is the home import demand function. Domestic demand (minus domestic supply) declines if the home price (p) increases; and SS is the foreign supply function: foreign supply (minus foreign demand) rises if the price abroad p* increases. Globalization occurs as a result of falling transport costs or trade barriers, leading to increases in trade volumes, rising export prices and falling import prices. As trade volumes may also increase as a result of population growth, capital accumulation and/or other factors unrelated to market integration, the best evidence of globalization is thus the price gap (t) between the foreign export price and domestic import price decline; i.e. when price convergence takes place.[21]

O'Rourke and Williamson study what they call 'mark-ups'; the ratio of selling price to the purchasing price. While this is a straightforward measure, Rönnbäck criticized it as a somewhat unbalanced measure as 'a quite small absolute change in the price in the selling market translates into a rather big change in the mark-up ratio.'[22] Another disadvantage of the mark-up is that it can measure the price wedge between two different markets only. Therefore, the coefficient of variation is perhaps a more common measure of price convergence. The coefficient of variation allows measurement of price convergence across several markets at the same time and shows the size of the price wedge relative to the mean price between the markets. Some scholars have argued that price convergence alone is not 'a sufficient condition for market integration as prices may be determined or influenced by processes outside of the realm of transaction and exchange (e.g., large-scale climatological events).'[23] Therefore these scholars have looked at price adjustment and price volatility, as well as price convergence as measures of market integration.[24] Considering the limitations of the data (which are annual with gaps), this paper looks only at price convergence. Mark-ups are employed as the relevant measure as this paper only measures price convergence between two markets, thus studying the CV would lead to roughly the same results.[25] Furthermore, mark-ups have the advantage of straightforward interpretation and comparability with the data from O'Rourke and Williamson.

[21] Williamson and O'Rourke, 'When did globalisation?', pp. 25-26.
[22] Rönnbäck, 'Integration', p. 100.
[23] Jacks, 'Intra- and international', p. 383.
[24] Jacks, 'Intra- and international'; Bateman, 'The evolution of markets'; Persson, *Grain Markets*, 92.
[25] Using the mark-ups is biased against my own conclusions that there was scope for globalization in the early modern period. As we shall see later, the CV leads to a slightly different result in the case of pepper.

O'Rourke and Williamson admit that their sample of price data is limited and explicitly invite other scholars to challenge or confirm their findings by bringing in new data:

> We would be delighted if […] pre-industrial world economy specialists were to take this empirical challenge seriously, and produce more long-run price data that can speak to the issues of when globalisation started, and what drove the post-Columbus expansion of world trade.[26]

Over forty years ago, Kristof Glamann pointed out that the prices in Amsterdam provide an excellent source of information on globalization:

> The records show that there was competition…between alternative products, such as East Indian and European textiles; between identical products from different regions enjoying similar climates, e.g., sugar from Java and Bengal, sugar from Madeira and Sao Tome, and Brazilian and West Indian sugar; or between products grown in different climatic regions, as in the case of tobacco…Chinese, Persian and Italian silk; Japanese, Hungarian, Swedish and West Indian copper; the spices of Asia, Africa and America; coffee from Mocha, Java and the West Indies: all of these competed…The best barometer, however, is represented by the prices on the commodity exchange of Amsterdam.[27]

The prices fetched for various products at the auctions in Amsterdam are still available in the VOC archives.[28] While Glamann already assembled a few of these figures between 1650 and 1740,[29] the data from this source have now been systematically assembled in its entirety. These price series were augmented with the well-known data assembled by N. W. Posthumus in case of missing data.[30]

The 'General Ledgers' of the VOC Bookkeeper-General in Batavia constitute the main sources of prices in Asia.[31] In these general ledgers the trade in the entire VOC charter area was recorded. Fifty-five volumes of the eighteenth-century have been preserved which, for a single

[26] O'Rourke and Williamson, 'Once more', and: ibid. 'After Columbus', p. 428: 'Of course, our sample of commodities and routes is limited, and we would like to have more and better evidence to see whether other long distance routes, other commodities, and deeper evidence for the fifteenth and sixteenth centuries confirm the conclusions offered here.'
[27] Glamann, 'European trade', p. 451.
[28] VOC 4584-4597. These figures have been assembled by Peter Koudijs & ### ###, and kindly made available to me by Jan Luiten van Zanden. Only the data from the period 1761 – 1770 has not been entered yet.
[29] Glamann, *Dutch-Asiatic*, pp. 279-286.
[30] Posthumus, *Nederlandsche prijsgeschiedenis*; these were used to extrapolate the VOC auction series; in general these series do not differ much.
[31] NA.BGB 1.04.02.12. *Generale Journalen*. Made available online by the Huygens ING Project Bookkeeper-General Batavia: http://bgb.huygens.knaw.nl/

financial year, recorded all products and their quantities and values that were shipped between the Dutch Republic and Asia, and among the 'colonies' and trading posts in Asia themselves. Second, data were gathered from the *facturas* (export invoices), which are part of the general 'received letters and documents' series of the VOC archives.[32] These state the quantities of goods purchased in Asia, as well as the prices for which they were procured, per ship.[33] Additional observations stem from the *rendementen* (returns) which state the purchasing and sales prices of various goods at the establishments in Asia. These were employed for the seventeenth century (for which no General Ledgers exist) and to fill gaps resulting from missing general ledgers in the eighteenth century. Next to these data from the VOC bookkeeping, published sources (like the *Nederlandsch-Indische Plakaatboeken*, *Generale Missiven* and *Daghregisters* of Batavia) were employed to fill additional gaps.[34]

The purchasing prices for the products could be reported in different (old) units of measurement such as the Dutch *pond*, the *picol* and the *bahar*. Prices could be expressed in different currencies: e.g. *rial*, *rixdollars* and *guilders*. These were all converted to guilders per *pond* to compare with the auction price in Amsterdam.[35]

3. Was there any price convergence before the 19th century?

Figure 2 shows the mark-up ratios (sales price / purchasing price) on 16 products traded between Batavia and Amsterdam. As the VOC always noted down the purchasing price from where they acquired a product, purchasing prices in Batavia actually reflect prices for different parts of Asia; e.g. in the case of cloves, it reflects the purchasing price on Ambon. Alas, there were still some gaps in the series, especially in the seventeenth century. Nonetheless, these series are an improvement *vis-à-vis* the data available hitherto, and gaps are not detrimental to the analysis,

[32] VOC: *Overgekomen brieven en papieren* (OBP).
[33] For Batavia: VOC #### - ####.
[34] Heeres et al. (eds.) *Dagh-register;* Van der Chijs (ed.), *Nederlandsch-Indisch Plakaatboek,* Coolhaas et al. (eds.) *Generale Missiven*.
[35] See appendix for the details. Following Wolters, 'Heavy and light money', we have assumed for the entire period the following guilder value per coin: *rial*: 3, *rixdollar*: 2.4; *dubbeltje*: 0.10, *stuiver*: 0.05; *duit* = 0.0125. Wolters also discussed the issue of the difference between so-called heavy and light money used by the VOC. Most of the VOC bookkeeping was done in guilders, so the problem is not so big. Furthermore, the issue of 'heavy' versus 'light' guilders had to be dealt with: see appendix. Textiles are of course not converted to prices per *pond*, but in prices per piece.

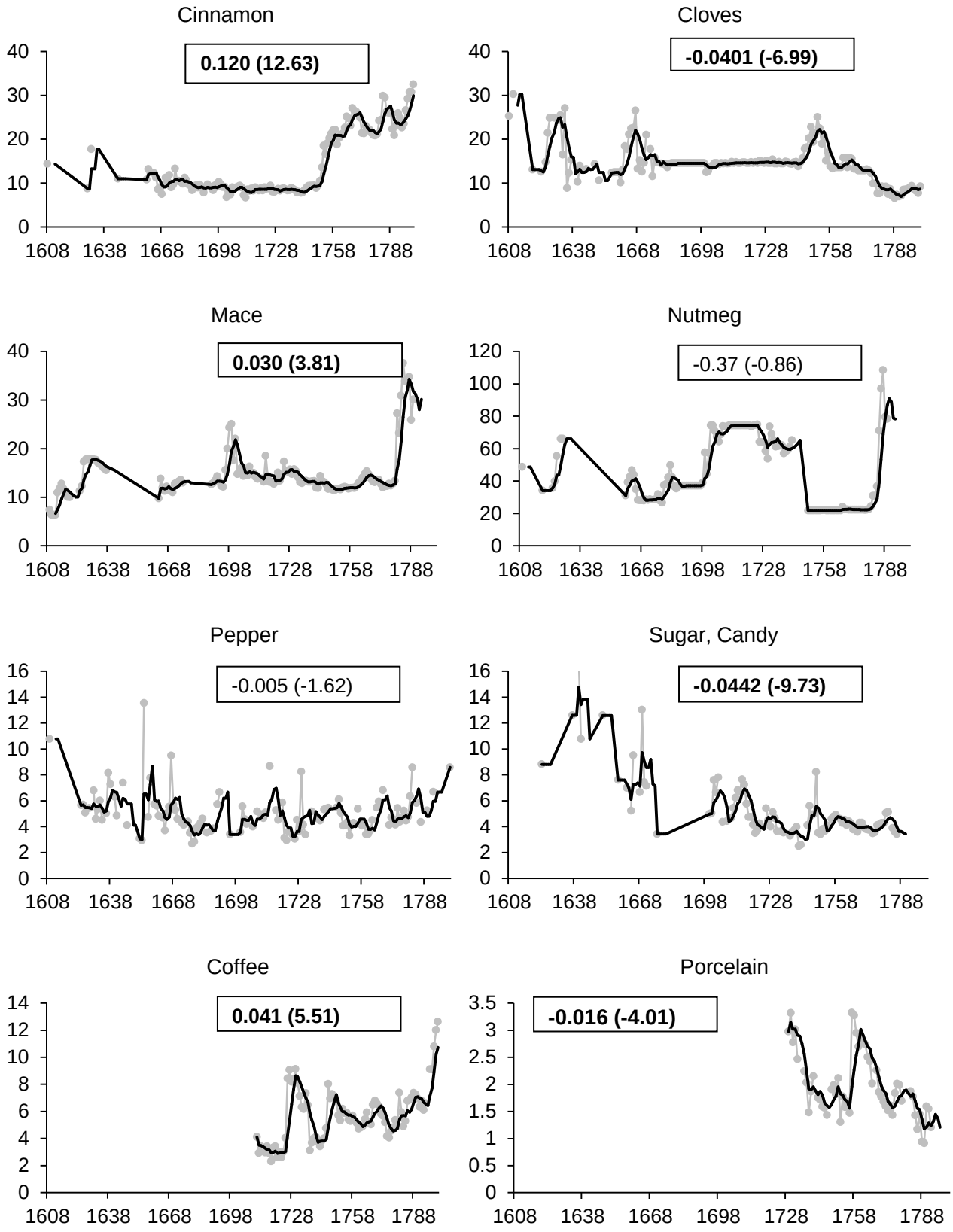
since they are assumed to be random (i.e. caused by the loss of source material, not missing because of the patterns in trade).[36]

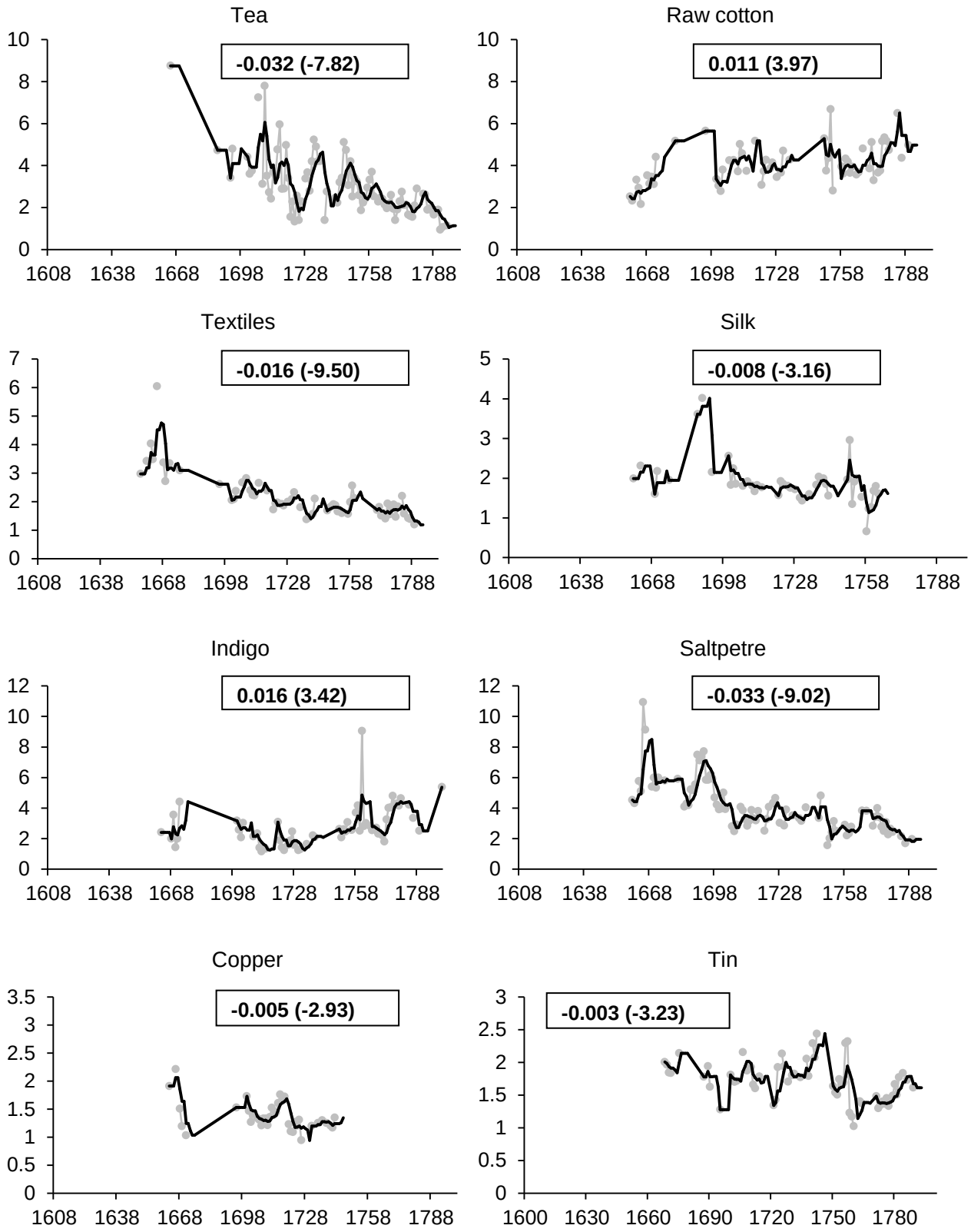
These figures show, next to the actual observations of the mark-ups also the trend in price convergence for the entire period for which we have VOC data. Following Rönnbäck,[37] and O'Rourke and Williamson,[38] it was tested whether these trends were statistically significant. A number of observations can be made from these figures. Nine products show price convergence, while five others show divergence between sales and purchasing prices. For two products the mark-ups show no statistically significant trend. Furthermore, not only could the trends in price convergence differ between products, the absolute size in the gaps between purchasing and sales prices could differ tremendously. Nutmeg made the most handsome profit, as for example at the beginning of the 18th century the sales price (fl. 3.72) was over 70 times the purchasing price (fl. 0.05).[39] While if the VOC would only have transported copper and tin from Asia to Europe, on the other hand, its demise would probably have come a lot sooner as the average mark-ups were only 1.4 and 1.7 respectively. Allowing for transport costs, such a route would surely have been operating at a substantial loss. Obviously, this trade constituted only a small proportion of the VOCs total trade.

These examples lead to the question of how to asses this array of data? Is price convergence for one product more important than that for another? While O'Rourke and Williamson have dismissed early modern globalization on the basis of evidence on pepper, coffee and cloves, Rönnbäck suggests that globalization cannot be dismissed because of evidence on prices for e.g. sugar, tobacco, and tea. De Vries notes that even if mark-ups for most commodities declined only marginally, or not at all, 'overall gross margins faced by the trading companies tended to decline nonetheless because of an additional effect of a continually changing mix of goods in a direction that involved them in progressively more competition, both in Asia and at home'.[40] He shows that the gross margins on the total trade of the VOC thus declined from almost 4:1 to below 2.5:1 after 1720.

[36] The series by e.g. Williamson and O'Rourke, 'When did globalization?' figure 5 on page 34, or Rönnbäck, 'Integration', figure 2 on page 104, also contain gaps.
[37] Rönnbäck, 'Integration', pp. 105-106.
[38] O'Rourke and Williamson, 'Did Vasco', p. 670.
[39] Dutch value: Indian price: fl. 0.0625. Source: see text.
[40] De Vries, 'The limits', p. 724.

FIGURE 2: MARK-UPS ON 16 PRODUCTS TRANSPORTED FROM ASIA TO AMSTERDAM, 1608-1800.





Sources: see text; porcelain: Jörg, *Porcelain*. T-statistics in parenthesis. Statistically significant (at 1 per cent level) trends are in bold.

In order to investigate his argument with the evidence on mark-ups, we can connect the data from figure 2 with figures on the composition of the total value of goods the VOC purchased in Asia and sold in Amsterdam between 1668 and 1780.[41] In table 2 mark-ups are weighted for 4 benchmark years. Two different weights are shown: those based on the sales proceeds in Amsterdam, and those based on the invoice value of the goods in Asia. Three different 'overall mark-ups' (average mark-ups for the entire package of goods) are then given: 1 non-weighted average and 2 weighted averages.

The overall average mark-up was highest in the period 1698-1700. This is to a large extent the result of the high mark-ups on especially mace and nutmeg around 1700, while much of the price convergence for many of the other products was to happen later in the eighteenth century. In the eighty years thereafter the overall mark-up declined by 20 to 45 per cent (depending on the weights). This table suggest that even if the VOC had not changed the mix of goods transported to Asia, there would still be a decline in the overall mark-up. If weighted by the sales proceeds in Amsterdam, the picture does not change dramatically, as the monopoly spices continued to amount to almost 25 per cent of the total sales even in the late eighteenth century. However, when taking the weights of the Asian invoice values the decrease in the mark-up is much larger; as in terms of invoice values the monopoly spices are overtaken by textiles, raw silk, as well as coffee and tea.

The VOC price data thus suggest price convergence for a majority (9 out of 16) of the products transported between Asia and Amsterdam. These trends led to a decline in the overall average mark-up for all products included in this study. When averaged by the invoice value of the products purchased in Asia, this decline is even over 40 per cent between 1668/70 and 1778/80. This evidence thus corroborates Rönnbäck's conclusion that the occurrence of price convergence in the early modern period cannot be dismissed. It will be difficult to uphold statements that 'there is absolutely no evidence of price convergence'[42] for the Dutch imports from Asia.

[41] Obtained from Prakash, *European Commercial Enterprise*, p. 115. Prakash also gives figures for 1618/20 and 1638/40 but there is insufficient evidence on mark-ups to include these in the calculations.
[42] Findlay and O'Rourke, 'Commodity Market Integration', p. 26.

TABLE 2: MARK-UPS, COMPOSITION OF VOC SALES PURCHASES IN ASIA AND SALES IN AMSTERDAM.*

	1668-70			1698-00**			1738-40			1778-80		
	Mark-up	**Weight A'dam**	**Weight Asia**	**Mark-up**	**Weight A'dam**	**Weight Asia**	**Mark-up**	**Weight A'dam**	**Weight Asia**	**Mark-up**	**Weight A'dam**	**Weight Asia**
Pepper	5.19	28.99	30.5	4.57	13.31	11.2	4.81	11.43	8.11	4.81	11.03	8.98
Other spices	15.67	28.43	12.1	24.52	24.71	11.7	23.48	23.63	6.14	16.35	24.43	3.09
Textiles and raw silk	2.91	23.77	36.5	2.49	43.45	54.7	1.7	28.27	41.14	1.72	32.66	49.45
Tea and coffee				3.35	4.1	4.2	3.34	24.22	32.22	3.6	22.92	27.18
Drugs, perfumes and dye-stuffs***	3.38	5.86	5.8	2.61	6.57	8.3	2.15	2.7	2.76	4.35	2.29	1.83
Sugar	9.02	2.02	4.2	5.42	0.2	0.3	3.09	3	3.69	3.71	0.61	0.64
Saltpetre	1.94	7.63	5.1	4.29	4	3.9	3.51	3.54	2.62	2.45	2.79	4.37
Metals	2.32	2.99	5.7	1.62	2.94	5.3	3.1	0.58	1.05	1.52	1.37	2.74
Unobserved***		0.28	0.1		0.65	0.4		1.93	2.25		1.9	1.72
Total		100	100		100	100		100	100		100	100
(Weighted) average	**5.78**	**7.27**	**5.35**	**6.11**	**8.34**	**5.39**	**5.65**	**7.83**	**4.00**	**4.81**	**6.24**	**3.07**

Sources: Prakash, *European Commercial Enterprise*, p. 115 and see text. *There is currently not enough data to weight the different mark-ups within each group, e.g. in the group 'tea and coffee' both get equal weight. This table is thus meant only to be indicative of general trends. **Due to the lack of mark-ups for 1698-00, mark-ups for the period 1700-02 were taken instead. ***This only includes the mark-ups on indigo, as there are no data for drugs and perfumes. ****This is Prakash' group 'sundries'.

At the same time, figure 2 shows that mark-ups on the prices of some commodities indeed remained remarkably high and for some we even find divergence over the eighteenth century. Furthermore, with prices in Europe for many of these products still over double those in Asia even in the late in the eighteenth century, this is obviously still very far from a situation of perfectly integrated markets. These series stop at 1800 or earlier: clearly the trends displayed here would have been disrupted by the Napoleonic Wars. However, this does not alter what can be said about trends over the seventeenth and eighteenth century, just like the disruptive effects of the First World War do not invalidate notions of globalization taking place in the nineteenth century.[43]

Considering the fact that of those price series that show convergence, one is for a monopoly product (cloves), while of the 5 series showing divergence, only 2 are for monopoly products (cinnamon and mace), monopolies alone cannot not explain the different trends. Since we have relatively detailed information on trends in prices and quantities for almost all products traded by the VOC, as well as the conditions under which these were purchased and sold, we can examine in greater detail what drove the differences in trends and absolute gaps in the mark-ups of these different products.

4. What drove these trends?

Price convergence may be caused by two things; declining transport costs and/or reduced barriers to trade.[44] In the first part of this section, it will be discussed whether price convergence may have been partly driven by advances in transport. After that, differences in the trends observed in figure 2 will be discussed with a focus on the extent to which the VOC was able to control prices in the purchasing markets.

4.1. Transport costs

A decline in transport costs may have taken place as a consequence of increased shipping productivity. There has been some discussion on whether shipping productivity increased over the early modern period. While several studies have shown that ocean freight rates declined in

[43] Also see: Ronnback, 'Integration', pp. 99-100.
[44] O'Rourke and Williamson, 'When did globalisation?'

the Atlantic trade during the early modern period,[45] others questioned whether these freight rates were properly deflated and whether the decline in ocean freight rates applied for other trade routes as well.[46] O'Rourke and Williamson suggest there were virtually no advances before the 'transport revolution' of the nineteenth century.

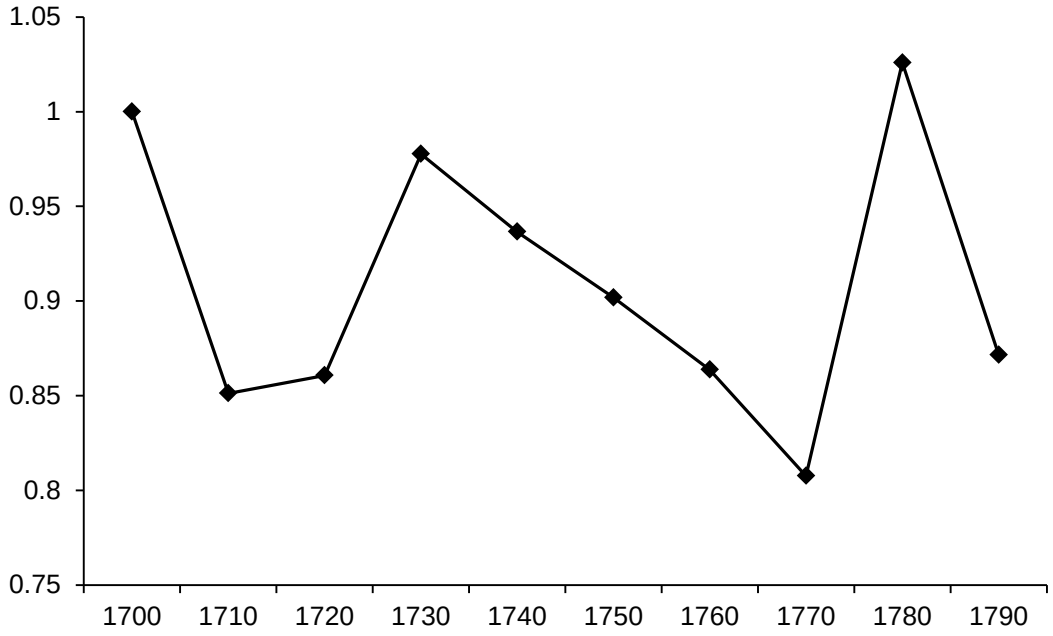
A survey of the recent literature suggests the possibility of advances in shipping productivity during the early modern period. Jan Lucassen and Richard Unger have shown that labour productivity in ocean shipping rose from the end of the Middle Ages up to 1800 with an (impressive) annual rate of 0.4 per cent per year.[47] Milja van Tielhof and Jan Luiten van Zanden recently suggested that only between 1550 and the 1620s freight rates declined in Dutch shipping.[48] Yet, after the 1650s freight rates increased and did not reach the low levels of the early 17th century over the entire 18th century. Rönnbäck demonstrated that the speed of shipping increased significantly in the trans-Atlantic slave trade,[49] while Peter Solar finds that shipping costs between Europe and Asia fell by two-thirds between the 1770s and 1820s as a result of changes in the composition of shipping, improvements in ship construction and navigation,[50] as well the increased speed of ships.[51] Another reason for declining transport cost may have been the decrease in piracy and privateering over the eighteenth century, which would have allowed a decline in labour and capital costs for soldiers and armaments.[52]

Focusing on the VOC trade between the Dutch Republic and Asia specifically, there is also a chance that transport costs declined. J. R. Bruijn has attempted to estimate shipping costs of the VOC per ton and finds that shipping costs remained relatively stable over most of the eighteenth century, and only increased during Fourth Anglo-Dutch War in the 1780s.[53] In addition, Bruijn speculated that VOC shipping costs mostly fell in the seventeenth century.[54]

[45] North, 'Ocean freight rates', and ibid. 'Sources of productivity change'.
[46] Menard, 'Transport costs'; Knick Harley, 'Ocean freight rates', O'Rourke and Williamson, 'When did globalisation?'.
[47] Lucassen and Unger, 'Labour productivity in ocean shipping'. Productivity increases were less impressive in almost all other sectors of the economy.
[48] Van Zanden and Van Tielhof, 'Roots of growth', and: Van Tielhof and Van Zanden, 'Productivity changes'.
[49] Rönnbäck, 'The speed of ships'. Rönnbäck warns that the speed of ships in the slave trade may not be representative for all ocean shipping at the time. However, Solar and Hens also found an increase in shipping in the late 18th century for English East India Company ships.
[50] Solar, 'Opening to the east'.
[51] Solar and Hens, 'The speed of East India Company ships'.
[52] Rönnbäck, 'The speed of ships', Hillmann and Gathmann, 'Overseas trade'.
[53] Bruijn, 'Productivity, profitability'.
[54] Bruijn, 'Productivity, profitability'.

Comparing his figures for the 18th century with the general inflation in the Dutch Republic,[55] we find a 20 per cent decline in freight rates relative to the general price level between 1730 and 1770 (figure 2). In general, it seems the Company's shipping 'was a rather safe business'.[56] Of all the voyages from the Republic to the East Indies, just over 2.5 per cent of all voyages ended in shipwreck.[57] In addition, piracy was limited: on a total of over 8000 journeys, only 36 ships to, and 24 ships from the East Indies were raided. Between 1674 and 1781 not a single returning ship was attacked east of the Cape of Good Hope.[58]

FIGURE 3: VOC FREIGHT COSTS RELATIVE TO CPI: 1700 = 1.



Sources: Bruijn, 'Productivity, profitability'; Van Zanden, 'Prices and wages'.

At the same time, Bruijn, Gaastra and Schoffers' shipping statistics do not show improvement in shipping in the 18th century compared with the 17th. While in the 17th century a total of 2.7 per cent of all voyages ended in disaster (due to capture or wreckage), this figure had

[55] Using figures from Van Zanden, 'Prices and wages'.
[56] Bruijn, 'Between Batavia', p. 261.
[57] Bruijn, 'Between Batavia', tables 1 and 2. All shipwrecks = 98. All voyages arrived in, departed from, Batavia = 3877. This includes only the shipping between the Dutch Republic and Batavia.
[58] Van Goor, *De Nederlandse Koloniën*, p. 50.

increased to 3.2 in the 18th century.[59] Furthermore, their data suggest that the average speed of Company ships in the Indian Ocean declined from 83.5 nautical miles per day in the 17th century to 78.1 in the 18th on the outward bound voyages, and from 74.2 to 70.5 on the return trips. The average days of the journey from the Dutch Republic to Batavia was 239 days in both centuries, but the return trip took almost three weeks longer in the 18th century (235 days *vis-à-vis* 216 days).[60] It is likely that risk-averse VOC shipping regulations have hindered shipping speed. Ships from other companies seem to have been slightly faster,[61] and in 1802, no longer hindered by VOC regulations, 4 Dutch ships made the journey in only 175 days (a decrease in transport time of almost 27 per cent).[62]

Thus, it is probable that decreasing transportation costs in the 17th and 18th century may account for a (small) part of the decline in some of the price differentials. However, considering the lack of uniformity in the trends of price convergence among the various products, it seems that the largest part of the explanation should be sought in the differences between the various commodity markets.[63]

4.2. Monopolies in Ceylon and the Moluccas

O'Rourke and Williamson suggest that even more than the lack of improvement in transport, it were 'monopoly, international conflict, piracy and government restriction'[64] that drove up price differentials. While the trading companies (by their charter) held exclusive rights on the wholesale of East Indian goods in their home countries, only for the four monopoly spices (cinnamon, cloves, mace and nutmeg) one company controlled the entire world production and was thus truly the only seller of these goods on the world markets and consequentially held complete control over prices. In all other cases, the companies sold their goods (at auctions) at their home markets to other merchants who were in competition with each other at markets throughout Europe.[65]

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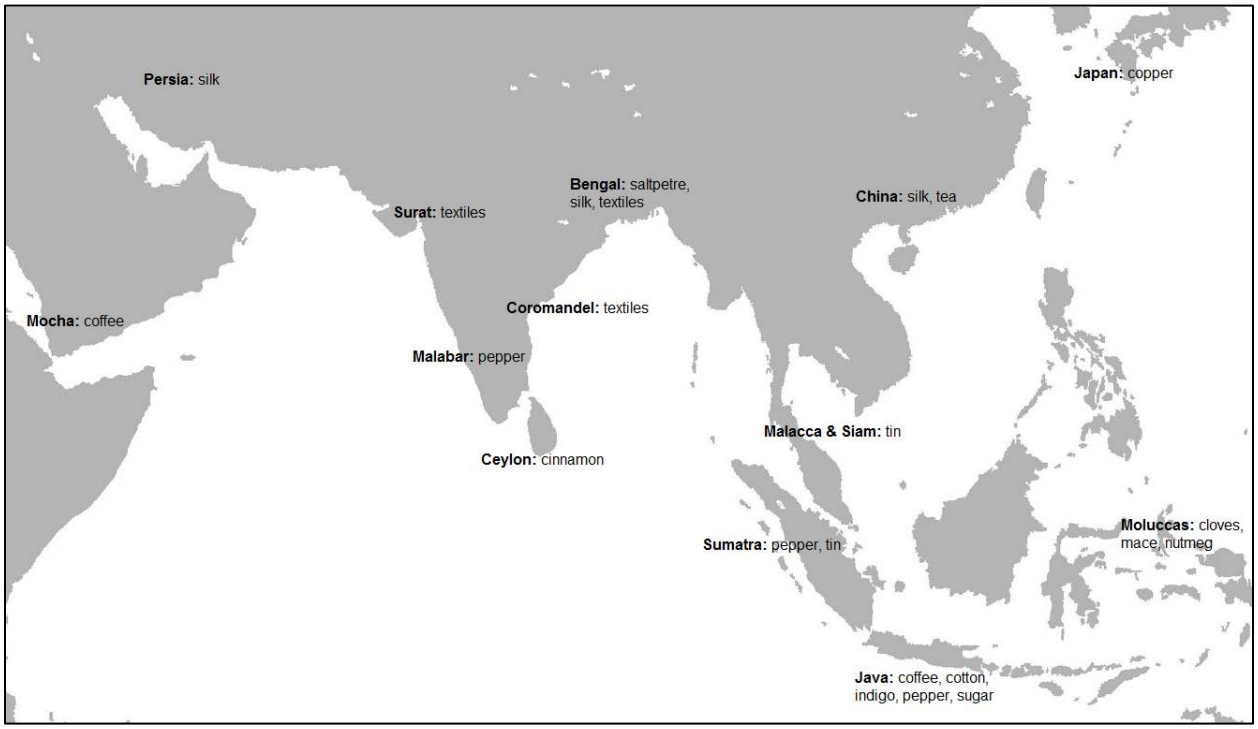
[59] Bruijn et al., *Dutch-Asiatic shipping*. Tables 3 and 22: 17th century: 75 ships lost *vis-à-vis* 2761 journey; 18th century 171 ships lost *vis-à-vis* 5317 journeys. In contrast to the figures above, this includes *all* Dutch-Asiatic shipping. Not just those between the Republic and Batavia (but also direct journeys to Ceylon, Bengal, Canton).
[60] Tables 1 and 2 from Bruijn, 'Between Batavia'.
[61] Bruijn and Gaastra, 'The Dutch', pp. 194-195.
[62] Bruijn, 'Between Batavia', p. 261.
[63] Lindert and Williamson, 'Does globalization', p. 232, also keep the option open that transport technology improved before the nineteenth century.
[64] O'Rourke and Williamson, 'After Columbus'.
[65] De Vries, 'Limits', p. 725.

FIGURE 4: PRODUCTS AND PRODUCTION AREAS OF THE VOC IN ASIA.



A brief look at the y-axes in figure 2 shows that mark-ups were clearly the highest on cinnamon, cloves, mace and nutmeg. But the story does not end there; figure 2 does not provide a single trend for these four products. With regard to cinnamon (which only grew on Ceylon in good quality) it can be seen that, while the data for the period before 1658, when the VOC secured its position on Ceylon, is fragile (only 4 price observations), mark-ups were not immediately higher after monopolization. Purchasing prices increased from 4 real per *picol* (fl. 0.08 per *pond*) in 1608 to fl. 0.30 per *pond* in 1660,[66] a level at which it would remain until 1800.[67] The trend in sales prices of cinnamon (which fluctuated) are not the result of price-setting by the VOC. Instead they were determined by forces of demand, but mostly, supply (or the lack thereof). In contrast to the other spices, the VOC did not actively try to limit supplies, instead supply was restricted by the limited availability of fertile lands and the fact that cinnamon production (peeling) was the task of only one of the (smaller) Sinhalese castes in

[66] VOC 603: This is in fact the price for which the VOC purchased the cinnamon in Bantam (Western Java), the purchasing price in Ceylon was probably even lower as otherwise the merchants bringing it to Bantam would have been operating at a loss.
[67] Roughly: the price in the VOC accounts could fluctuate slightly between fl. 0.31 and fl. 0.25.

Ceylon (the *Salagama*). In the 1740s population growth, social unrest and increasing tensions with the Kandyan King (the only remaining indigenous king on the island) led to a dramatic drop in cinnamon supply. Only after victory over Kandy in 1766 the VOC was able to increase cinnamon production as they broke with the caste system and allowed all Ceylonese to plant and peel cinnamon trees. Furthermore, now sovereign ruler over the entire Ceylonese coast, the Company was better able to secure the monopoly. These developments caused the significant rise in the mark-up from the later 1740s.

Nutmeg and mace came from the tiny Banda Islands in the Moluccas. After unsuccessful negotiations to secure contracts with the local heads (the *orangkaya*), the VOC used a terrible amount of force to get what it came for. By 1621 the Company had succeeded in killing or expelling the entire indigenous population, destroyed all nutmeg trees outside of Banda and implemented a plantation system.[68] The Company similarly secured the monopoly over cloves with the use of force in the 1650s. The data on cloves provide an interesting case of what happens to mark-ups with and without a monopoly. Bulbeck et al. found that in the sixteenth and early seventeenth century there was a significant growth in quantities, as well as local prices until the VOC monopoly started affecting prices in the 1640s.[69] In the 1770s French and English traders smuggled clove seedlings from the Moluccas and started growing clove trees elsewhere in Southeast Asia and East Africa.[70] Even though largely unsuccessful until the second half of the nineteenth century, mark-ups declined from a high level of 25 in the 1750s to below 10 at the end of the century.

With the exception of these spices, it has been claimed that all other commodities were bought in competitive markets 'in the sense that rival European companies vied with each other to acquire the Asian goods, but also […] vied with Asian traders for these goods.'[71] However, as we will find out, this observation is not completely accurate either.

[68] Mace and nutmeg came from the same tree. Interestingly, while mace was very valuable from early on, nutmeg, which turned out to be the VOCs main money maker, was not at all sought after in the sixteenth and seventeenth century. Pires, *Suma Oriental*, p. 207 wrote: 'they will not sell you mace and nutmeg except together, that is, if you want a bahar of mace you have to buy seven bahars of nutmeg.'
[69] Bulbeck et al., *Southeast Asian exports*, p. 21. This is also confirmed in the seminal work by Meilink-Roelofsz, *Asian Trade*.
[70] Bulbeck et al., *Southeast Asian exports*, p. 21.
[71] De Vries, 'Limits', p. 724.

4.3. Competitive markets in India and China

Starting with the commodity markets where European trading companies and Asian merchants did compete and mark-ups converged accordingly; saltpetre, silk, tea and textiles. These were products acquired in Bengal, Surat, on the Coromandel Coast and in Canton, China (see figure 4).

In Bengal, the VOC competed with the Danish, French, Ostend, and, most significantly, the English company,[72] but perhaps even more so with Asian merchants that were dominant in Bengal in the pre-Plassey period.[73] While around 1690 the VOC was the principal buyer and purchased a third of the entire saltpetre production in Bengal, competition with the EIC and the French increased especially from the 1730s.[74] Saltpetre purchasing prices increased accordingly: from fl. 0.04 to 0.07-0.08. The highest prices were recorded during the 1750s, when well-endowed indigenous merchants controlled large parts of the saltpetre market. That situation ended with the establishment of English power in 1757, after which the VOC was depending on the English for their saltpetre purchases.[75]

In order to procure textiles in Bengal the VOC also had to deal with various indigenous merchants,[76] who, after having received an order with cash-advancement, delivered the goods to the Company factory in Chinsura, where they were inspected and the merchants and VOC could (re-)negotiate the price. Om Prakash notes that the VOC tried to avoid breakdowns in these negotiations 'since the growing competition among the Europeans was increasingly creating a sellers' market'.[77] Similarly, the silk market was extremely competitive, and European companies were unable to control the silk market, and thus the silk price.[78] Purchasing prices were relatively high, while in Europe, Asian silk had to compete with Italian and French silk which was generally of better quality.[79] As a result, mark-ups were generally low, and declined over the 18th century as the VOC lost its leading position to the English.

[72] Hossain, *Company Weavers*, p. 74.
[73] Chaudhury, *From Prosperity*, p. 228.
[74] Jacobs, *Koopman in Azie*, p. 98.
[75] Jacobs, *Koopman in Azie*, pp. 98-100.
[76] The Company rarely purchased textiles from weavers directly: Prakash, *Dutch East India Company*, p. 107.
[77] Prakash, *Dutch East India Company*, p. 105.
[78] Chaudhury, *From Prosperity*, p. 228.
[79] Jacobs, *Merchant in Asia*, p. #

The Coromandel Coast and Surat were also important production areas of textiles, especially in the seventeenth century. In these places, the market was also characterized by fierce competition and the important position held by middlemen. Various studies on the textile trade and manufacturing have all documented a rise of textile prices in Surat (Northwestern-India),[80] Bengal and Coromandel,[81] while in Europe prices stayed roughly constant or declined as a result of the competition among the European companies.[82] As a result, mark-ups on Indian textiles, arguably the most important of all trades, declined.

The VOC purchased tea first from Chinese junks in Batavia which led to the problem of inconsistent supply. As a result the purchasing price paid for tea could be higher than 3 guilders per *pond* at the beginning of the 18th century. [83] After 1729 the VOC started to buy tea directly in Canton, and purchasing prices declined from around fl. 1.30 to around fl. 0.50 per *pond* of *bohea* tea and would remain around that level for the remainder of the 18th century.[84] In Canton, the Company again found itself in competition with the other European companies, as well as private European and Asian merchants and had to pursue its business via Chinese intermediaries. Consequentially 'prices fluctuated according to the pressures of supply and demand'.[85] However, as purchasing prices were stable in China in the long run, most of the decline in the mark-up was the result of the spectacular decline in the European price. This price decline was ushered by a spectacular increase in annual supply; this increased a 100-fold from a meagre 30.000 *pond* in the early 1700s,[86] to over 3.000.000 *pond* at the end of the eighteenth century.[87] The fees paid in Canton were based on the size of ships and one standard charge which were charged on all ships (the Emperors Present). This system favoured bigger ships (i.e. those sailing in the Euro-Asian trade) and since these charges held no connection with the value of the cargo, the fees declined

[80] For Surat also see Nadri, *Eighteenth-Century Gujarat*.
[81] Chaudhuri, *The Trading World*; Parthasarathi, *The Transition*, p. 40; Mukund, *The Trading World*, pp. 81-82; Hariharan, *Cotton Textiles*, pp. 298-305.
[82] Gupta, 'Competition and control', p. 286.
[83] Souza, *Survival of Empire*, pp. 142, 145-151.
[84] Glamann, *Dutch-Asiatic*, p. 225; Yong, *The Dutch*, pp. 212-222.
[85] Van Dyke, *The Canton Trade*, p. 15. Yong describes how the VOC used various Chinese merchants as middlemen in the purchases of tea in order to create some measure of competition; *The Dutch*, pp. 74-89.
[86] VOC auctions: VOC 4588.
[87] Yong, *The Dutch*, pp. 126-128. See, p. 130 for a dramatic decline in the gross profits on tea sales in the second half of the 18th century.

over the 18th century relative to inflation.[88] These duties amounted to around 2 to 4 per cent of the value of the cargo.[89] Tariffs in India also seem to have been relatively low before 1750.[90]

Thus in these cases, the VOC competed both with the other European companies and with Indian Ocean merchants. It procured products often via local intermediaries and had to pay a (relatively small) export tax. As the total trade volumes as well as competition increased in the 18th century, mark-ups declined. The situation was very different in the remaining commodity markets.

4.4. Contracts in Malabar and Southeast Asia

As a result of the widespread cultivation of pepper in the Southeast Asian archipelago and Malabar (southern India) monopoly of pepper and effective price control through limitation of production was 'out of the question at any time'.[91] Then why did prices not converge (as much)?

While in the late 16th and early 17th centuries, competition among European and Asian traders drove up the price for pepper in Southeast Asia significantly (just like in the case of cloves);[92] from the later 1640s the average price was relatively stable, though increasing steadily from roughly fl. 0.10 in the 1650s to fl. 0.13 per *pond* at the end of the 18th century. This was a consequence of the fact that on the pepper markets, the VOC did not pay according to a market price influenced by supply and demand, but paid a contract price agreed upon by the local potentates. In return for military support, the Company paid a low price for pepper to the Sultans of Palembang (a contract since 1642) and Jambi (a contract since the 1680s) on Sumatra (the main supplier of pepper in the world at that time).[93] Furthermore, in the early 1680s, the VOC conquered Banten, Southeast Asia's main international pepper port, situated only 13 miles east of Batavia.[94] The newly installed Bantenese Sultan was forced to agree to a contract to deliver pepper only to the VOC for a relatively low price (again in return for political and military support). Malabar (South-western India) was another important area of pepper cultivation. In the early 1660s the Company launched an extensive military campaign and managed to expel the

[88] Van Dyke, *The Canton Trade*, pp. 10-11, 103-115.
[89] Jacobs, *Merchant in Asia*, p. 187.
[90] Blachandran and Subrahmanyam, cited in Flynn and Giraldez, 'Born again', p. 364.
[91] Kathirithamby-Wells, *The British West-Sumatran*, p. 180.
[92] Also see: Meilink-Roelofsz, *Asian trade*.
[93] In 1666, local chiefs on the West coast of Sumatra (Padang & Aceh) also bound themselves to the Dutch Company.
[94] The pepper growing areas of Bantam were actually situated in the Lampung region of Southern Sumatra.

Portuguese from the region. In the process, the Company forced many local sovereigns into involuntary pepper deliveries. While certainly a dominant actor, the VOC was never able to completely control the Malabar Coast and deliveries remained variable. Especially after 1730, expansionist politics of one the local kings[95] undermined the Company's power. As a result of this, as well as numerous other factors,[96] the Company was not able to prevent a decline in pepper supply over the eighteenth century. The declining supply drove up pepper prices in Europe in the second half of the eighteenth century. In fact, when taking the CV as the relevant measure of price convergence, the trend in fact becomes statistically significant.[97]

A more or less similar story goes for tin. The prices for which the VOC purchased tin from the rulers of Palembang, Siam and Malacca was again based on contracts and power play and did not fluctuate much between 1660 and the late eighteenth century. The sales price in Amsterdam, however, was not only determined by the supply from the East Indies, but also by production in Europe. As prices in Amsterdam were consequentially relatively low, and hardly any profits were made, tin was much more important in the intra-Asian trade. The trends for both these products were thus both weakly converging, despite the contracts. The situation was different where the Company held administrative power.

4.5 Control in Java

In Java, the Company expanded its power, much against its will, from its small base at Batavia and its immediate surrounds at the beginning of the seventeenth century to govern over 2/3rds of the island at the end of the eighteenth. In order to gain some profit from these lands, the VOC introduced the cultivation of new crops on the island (indigo and coffee) and encouraged the cultivation of sugar and cotton.

Sugar was already cultivated in the island before the Dutch arrived. While initially of little interest to the VOC, around the mid-seventeenth century it was realized that there was big market for sugar in Asia. The Company demanded a certain quantity of sugar from the millers at a set price each year. If the Company was in control of the purchasing price, then why did prices converge? Due to a loss of markets and soil exhaustion, the sugar industry was threatened with

[95] The king of Travancore.
[96] Increasing pepper prices in Malabar, increasing social unrest and piracy around Batnam, a shift from the cultivation of pepper to the production of tin by the Sultan of Palembang. See: Jacobs, *Merchant in Asia*, pp. ##-##.
[97] Trend: -0.0003; T-statistic: -4.10. Due to decreased weight of the sales market.

extinction in the 1730s, and again the 1770s. Therefore, in order to save an industry that provided a livelihood for many people on the island,[98] purchasing prices were raised. At the same time, sugar from the West-Indies flooded the European market, resulting in lower sales prices in Amsterdam. Consequently, and as could also be seen in the study by Rönnbäck, global sugar prices converged.

Both indigo and cotton yarn were purchased in competitive Indian markets in the seventeenth century. At the end of the seventeenth century, in order to circumvent the high purchasing prices in India, the Company introduced the cultivation of indigo and encouraged cotton growing in Java. To acquire cotton, the Company imposed forced deliveries at set prices on Javanese Regents.[99] And order to stimulate indigo cultivation the VOC initially increased purchasing prices in the early 1730s. However, later in the century, as indigo did not fetch a good profit in the Dutch Republic purchasing prices were reduced, and the Dutch started to claim a more active role in overseeing indigo production.[100]

Likewise, coffee cultivation was introduced to Java in the early eighteenth century in a reaction to the high prices in Mocha. The company provided the regents in Java with coffee seedlings and offered a high purchasing price of fl. 0.50 per *pond* to stimulate cultivation in the 1710s. Coffee cultivation was so successful that total deliveries exceeded 4 million pounds already in the 1720s. In 1723 the VOC monopolized the market and obliged planters to deliver their entire crop to the Company. In fear of overflowing the European market, the purchasing price was drastically reduced in the late 1720s and 1730s, while in the 1740s the VOC set quotas for what each region was allowed to produce. However, the European market turned out to be insatiable and coffee consumption increased from less than 1 million to over 100 million *pond* per year, without significant decreases in prices after 1740. Realizing this (rather late), coffee production was transformed into a coercive system only in the late 1780s, and Javanese peasants were forced to cultivate and deliver a minimum amount of coffee beans each year.[101] Thus, while price differentials between different types of coffee in consuming markets may have declined,[102]

[98] As well as investments of high VOC officials on the island; Nagtegaal, *Rijden*, p. 138
[99] Van Niel, *Java's Northeast Coast*, p. 176. Hui Kian, 'Production, Consumption', pp. 25-29.
[100] Van Niel, *Java's Northeast Coast*, pp. 153-162.
[101] Jacobs, *Merchant in Asia*, pp. 260-275. The slave revolt in Santo Domingo and the French Revolutionary wars drove up Amsterdam coffee prices in the 1790s.
[102] Emphasized by Topik, 'The Integration'.

the gap between the price paid in Amsterdam and that paid in Batavia, most certainly increased as a result of VOC control over production and trade in Java.

De Vries wrote that 'what began as an age of globalization […] ended as an age of colonialism.'[103] Mostly as a reaction against the forces of globalization (competition and consequentially rising prices in purchasing markets) the Company attempted to control production and purchasing prices in its own territories. We can find a colonial system of production on Ambon and the Banda Islands from the middle of the seventeenth centuries,[104] and in Java and Ceylon from the middle of the eighteenth. Colonialism thus did not begin with the English in Bengal in 1757, as claimed by De Vries, but started already with Dutch rule over parts of Java and the Moluccas from the seventeenth century onwards.[105]

4.6 Conclusions

Finally, according to O'Rourke and Williamson, as well as Rönnback, wars were detrimental to process to market integration. This paper has focussed on the long-term trends, and wars seem to have pushed up mark-ups only briefly. It is however important to note that for e.g. tea, textiles and saltpetre, some of the first observations unfortunately coincide with the Second Anglo-Dutch War (1665-7), which drove up sales prices in Amsterdam.[106] Even excluding those years from the regression still shows a similar trend.[107] In the pepper mark-ups, peaks can be observed during the First (1652-4), Second and Fourth (1780-4) Anglo-Wars, but with seemingly no effects on the long-term trend. The Fourth Anglo-Dutch war did seem to further push up (long-term) mark-ups for mace, nutmeg and coffee, but this did not lead to a structural break in the trends as there was no convergence for those products in any case. Surprising is the absence of any significant effects on the Amsterdam sales prices in the Year of Disaster (1672).

By way of concluding this section, the discussion above is summarized in table 3 below. Per product it is noted what was the average mark-up in the 17th and the 18th century and whether the trend is significant and shows convergence or divergence. In column 5 is noted to which

[103] De Vries, 'The Limits', p. 731.
[104] In the sense that the local population was forced to deliver a certain amount of a product each year to the colonial government for relatively low, or no, pay.
[105] Jacbos also notes the rise of a colonial system in 18th century Java: *Merchant in Asia*, pp. 274-275.
[106] This can clearly be observed for saltpetre, for textiles, no real peaks can be observed (possibly the consequence of the fact that textiles can be stored for many years). For tea there are too few observations for surrounding years to conclude whether war time prices were dramatically higher.
[107] Test.

extent prices in the purchasing and sales market were determined by competition (supply and demand), contracts, or complete control of the market.[108] Column 6 shows whether the VOC was the sole supplier of a product in Europe or whether the sales prices were determined by competition.

TABLE 3: DUTCH-ASIATIC TRADE IN THE 17TH AND 18TH CENTURIES.

Product	Av. mark-up 17th (n)	Av. mark-up 18th (n)	Trend (entire period)	Determinant of purchasing price	Determinant of sales price
Cinnamon	10.3 (44)	15.9 (100)	Divergence	Control	Monopoly
Cloves	16.1 (63)	13.6 (100)	Convergence	Control	Monopoly[109]
Nutmeg	38.0 (46)	50.2 (82)	None	Control	Monopoly
Mace	13.7 (82)	15.4 (89)	Divergence	Control	Monopoly
Pepper	5.3 (49)	4.9 (64)	None	Contract	Competition
Tin	1.8 (9)	1.7 (51)	Convergence	Contract	Competition
Sugar	9.2 (14)	4.5 (73)	Convergence	Control	Competition
Cotton	3.5 (12)	4.2 (45)	Divergence	Control	Competition
Indigo	2.6 (6)	2.8 (51)	Divergence	Control	Competition
Coffee		5.7 (87)	Divergence	Control	Competition
Saltpetre	5.9 (28)	3.2 (53)	Convergence	Competition	Competition
Textiles	3.5 (11)	1.9 (50)	Convergence	Competition	Competition
Silk	2.5 (8)	1.7 (35)	Convergence	Competition	Competition
Tea	5.4 (4)	2.9 (82)	Convergence	Competition	Competition
Porcelain		2.0 (56)	Convergence	Competition	Competition
Copper	1.6 (6)	1.3 (30)	Convergence	Contract	Competition

[108] Regarding copper, the Dutch were the only buyers of Japanese copper at Deshima, and thus the only seller on the European market. Based on exclusive contracts purchasing prices in Japan were low, but since Japanese copper had to compete with Swedish, Hungarian and Norwegian copper on the Amsterdam market, selling prices were also low, resulting in low mark-ups in this trade. Demand was high for Japanese copper in Asian markets, and in the intra-Asian trade, on the other hand, copper made a handsome profit: Shimada, *The Intra-Asian Trade*.
[109] After 1770; competition.

5. The consequences of globalization and concluding remarks

This paper examined the notion of 'globalization' in the early modern period. While one may extensively debate about the definition of 'globalization', this paper is written mostly as a reaction to the work by O'Rourke, Williamson and co-authors, and their definition of 'hard' globalization is therefore employed. Their statements are put to the test with new price data from the Dutch-Asiatic trade, put in their appropriate context based on an extensive literature. This paper is limited in time, focussing on the period between 1608 and 1800, and scope, focussing only on the Dutch-Asiatic trade. As such, it does not answer the question 'when did globalization begin?' but instead examines whether we can find evidence of the process of globalization taking place, as suggested by price convergence, in this particular period and on this particular trade route. This is not the final word in this debate. Evidence from other Companies and routes may suggest different patterns, while the data series presented here, despite efforts to the contrary, still contained gaps, or could sometimes reflect only a limited number of observations, raising questions about reliability and representativeness. With these limitations in mind, what have we learned from this exercise?

It has been demonstrated that for a majority of commodities in the Dutch-Asiatic trade, prices in Europe and Asia converged. While for some products prices diverged and for again others mark-ups may have remained 'stubbornly high', the overall price gaps of the entire package of goods transported between Asia and the Republic declined. A survey of the recent literature on transport in the early modern period suggests that improvements in transport, however small, cannot be dismissed as easily as O'Rourke and Williamson have done. Considering the large differences in the trends between the different products traded, most part of the explanation of these trends was to be found in the different commodity markets.

Convergence could be observed in the trends for porcelain, saltpetre, silk, tea and textiles. These products were procured in India and China, where the VOC competed with other European companies, as well as private European and Asian merchants. Increasing demand in Asia pushed up purchasing prices, while the growth of supply put downward pressure on sales prices in Europe. Customs duties probably did not amount to over 5 per cent of the cargo value. Similar competition had characterized the pepper trade until the second half of the 17th century. By the end of the century, however, the Dutch had established contracts with the rulers of many of the major pepper producing regions in Malabar and Sumatra, providing them with pepper at

low purchasing prices. Where diplomacy failed, the VOC employed its guns to evade competition and high prices. In the Moluccas, Ceylon and Java established itself as a military and political power and became in complete control of the purchasing markets. The VOC was a reluctant imperialist, however, as an extensive military and administrative apparatus dramatically increased overhead costs. Where it did exert such power, it tried to make up for the expenses by keeping purchasing prices as low as possible via control over production and trade.

It can thus be concluded that neither claims that the Euro-Asian trade remained effectively monopolized before the nineteenth century, nor the suggestion that besides the monopoly spices all other goods were bought in competitive markets, are entirely accurate. Rather than stubbornly high transport costs, tariffs, or wars, it was the extent of VOC control over the commodity markets in Asia that determined trends in price convergence.

One crucial element of the discussion on globalization has thus far been left out of this paper, namely the consequences of this trade for the economies in Europe and Asia. In fact, O'Rourke and Williamson's work started out as a contribution to that big issue. While some scholars, like Andre Gunder Frank, emphasized the importance of long-distance trade in the period between 1500 and 1800 for the rise in global inequality: intercontinental trade led to capital accumulation and intercontinental specialization.[110] While the periphery concentrated on the production of primary goods, resulting in low levels of per capita income, the European core could shift part of its production into more productive sectors of the economy, such as manufacturing, thereby pushing Europe towards industrialization and higher standards of living. Other have downplayed the importance of intercontinental trade, like Patrick O'Brien who coined the catchy phrase that 'for the economic growth of the core, the periphery was peripheral'[111] as he estimated that the contribution of intercontinental trade to western European GNP was at the most 1 per cent, and to gross investment at the most 10 per cent.[112]

O'Rourke and Williamson are on the same boat as O'Brien, as they suggest that as commodities in intercontinental trade before the 19th century were non-competing and luxuries rather than necessities in Europe: 'the vast majority of the "exotic" imports from Asia and the

[110] Frank, *World Accumulation*; ibid., *ReORIENT*.
[111] O'Brien, 'European Economic Development', p. 9.
[112] O'Brien, 'European Economic Development', p. 5.

Americas were out of reach of any but the rich.'[113] Therefore this trade did not influence resource allocation and factor prices in Europe and consequentially had no 'significant impact on the structure of production or on economic welfare.'[114]

While this paper does not investigate this issue at length, it might be illuminating to note that some recent research has reemphasized the importance of international trade for Europe. Acemoglu et al. emphasized that intercontinental trade induced institutional changes that were central to the economic growth of Western Europe between 1500 and 1800.[115] At the same time, Bob Allen has argued that trade led to urbanization and larger cities as it offered job opportunities in certain trade hubs. Because larger cities have a more refined division of labour than smaller rural towns, urbanization led to greater efficiency and higher wages, which provided the crucial incentive for industrialization.[116] Research on consumption patterns has put forward evidence of the relatively widespread availability and consumption of e.g. coffee and tea in Europe in the eighteenth century.[117] The availability of these products, not only raised living standards,[118] but also 'enlarged the aspiration to consume and increased the incentive to work and earn high income'[119] thereby inducing a revolution in work ethics.[120]

While many scholars have thus focussed on the impact of intercontinental trade on Europe, equally important is the question what the consequences were for the different economies in Asia. Findlay and O'Rourke suggest that in China and India the increased inflow of silver, when it did not lead to inflation, had positive effects on commercialization and economic growth.[121] Where intercontinental trade was accompanied by colonialism and monopolization, the effects may not have been equally beneficial. Anthony Reid, for example, has suggested that the Dutch intrusion in the trade system caused a reversal of economic fortunes in Southeast

[113] O'Rourke and Williamson, 'After Columbus', p. 434.
[114] Ibid., 'When did globalisation', p. 46.
[115] Acemoglu et al., 'The Rise'.
[116] Allen, *The British Industrial*; ibid. 'Progress and poverty'.
[117] McCants, 'Poor consumers'.
[118] Hersh and Voth, 'Sweet Diversity'.
[119] Allen, *The British Industrial*, p. 22.
[120] De Vries, *The Industrious Revolution*.
[121] Finlay and O'Rourke, *Power and Plenty*, pp. 219-221: following the theory: M (money supply) = kPY. If P (prices) did not increase: k (commercialization) and/or Y (income) did.

Asia.[122] Such claims have not remained undisputed, and consensus in these kinds of discussions has hitherto been seriously hindered by the paucity of data on relevant economic indicators before the 19th century. The economic consequences of this early 'globalization', and the institutions associated with it, for different regions around the Indian Ocean are the subject of the remainder of this dissertation.

Appendix

Prices were converted to guilder per *pond*. The value of the guilder used by the VOC in Asia was lower than the guilder in the Dutch Republic and the Asian currency was therefore referred to as 'light money'. The value of the Asian relative to the Dutch guilder fluctuated throughout the seventeenth and eighteenth centuries. According to Els Jacobs one Asian guilder was worth 20 per cent less than the Dutch guilder prior to 1743, 16.35 per cent less between 1743 and 1768, while after 1768 the value differences disappeared (see table A1).[123]

TABLE A1: VALUE OF ONE ASIAN GUILDER. Source: Jacobs, *Koopman in Azië*, 225-228.

Period	Expressed in Dutch Guilders	Expressed in Grams of Silver
1652 – 1680	0.80	7.84
1681 – 1742	0.80	7.69
1743 – 1768	0.84	8.04
1769 – 1795	1	9.61

There is some confusion regarding the value of the rix-dollar in Asia. Some suggest it is valued at 3 guilders in Asia, while others suggest 2.4/2.5 guilders. In fact, these values could differ according to time and place, depending on whether it concerns 'light' or 'heavy' money. When not specifically mentioned otherwise, I assume 2.4 guilders, as do others who worked with the VOC accounts (e.g. Yong 2006).

The Bookkeeper-General often stated several prices of a good per year (as several ships departed for the Republic every year and for every ship the value and quantity of products was

[122] Reid, *Southeast Asia*; Reid's thesis, which rests on shaky data, has been adopted recently by Acemoglu and Robinson, *Why nations fail*.
[123] Jacobs, *Merchant in Asia*, p. ##.

recorded. I took the arithmetic mean price of several observations. These prices were not weighted with the amount of goods transported, as this would entail a lot of extra work, while not leading to any substantial differences in the prices (as these were generally the same throughout the year). Furthermore, in the Bookkeeper-General the data are ordered per accounting year, which runs from September 1 to August 31. While the database does contain information on the exact data of the departure or arrival, these cannot be extracted from the database in the excel sheets, and thus would have to be linked to the data manually. Considering the thousands of observations this would be a daunting task, which would not lead to any significant changes in the results. I have organized these prices in the first year; e.g. if the accounting year was 1701/2, the data were entered in year 1701.

1. Cinnamon

Asia: Barbosa (1563, pt. 2, p. 112) notes that cinnamon cost 10 *cruzados* per *quintal*. Following Souza (1986, p. xv-xvii) 1 *quintal* = 119.3 *pond* and 1 guilder = 0.32 *cruzados*. 1 guilder = 16.32 grams of silver in 1563 (Van Zanden, 2009). For 1608: In VOC 603 it is noted that the VOC purchases 1 picol (125 *pond*) cinnamon for 4 real (2.5 *guilders*). In 1631 (VOC 1099) 15.3 guilder is paid for a picol. All other observations are noted in guilders per *pond*. Considering the stability of the prices the years: 1664-5, 1667-8, 1670-4, 1676-88, 1690-9, 1709, 1727, 1729-30, 1741-51, 1790-99, were linearly interpolated.

To compare this price with a European price, I took the Antwerp price for 1563 (Van der Wee, 1963: pp. 314-317) of 333 Brabant *groats*. 1 Brabant *groat* = 0.27 grams of silver (ibid., pp. 125-129). For the period 1609-1800 I averaged the price from the VOC sales accounts and Posthumus (1948).

2. Cloves

Asia: Bulbeck et al. (1998) provide some data for the sixteenth century. They provide data in *reals* per ton. On page 32 they suggest 1 Spanish Dollar = Real. On page 174 they suggest 1 Spanish Dollar = 2.65 Guilder. For these conversions I follow them. Additional data were found in reals/*cruzados* per bahar (Pires 1515, Barbosa 1563, Meilink-Roelofsz, 1962, Souza 1982, Prakash 1991). These were converted on the basis on a *bahar* of 436 *pond*, a real of 2.5 guilder and 1 *cruzado* = 1.25 *real*. This leads to similar prices as Bulbeck et al. (1998). For the

remainder of the period all prices from the VOC accounts were in guilders per *pond*. These were combined with the prices from Bulbeck et al. (1998) to fill some gaps. These price series were largely similar. However, whereas they find prices increased after the 1770s, the VOC data suggests on the other hand prices declined from fl. 0.40 per pond to fl. 0.30-3 in the period 1770-1800. No interpolation.

European prices in the sixteenth century I used Van der Wee (1961). For the 17th and 18th century, I averaged prices from the VOC sales accounts, Glamann (1982) and Posthumus (1948). These series were very similar, but all showed some gaps which could thus be filled.

3. Coffee

Asia: All prices were given in guilders or *rijksdaalders* (2.5 *rijksdaalder* per guilder) per *pikol* or *pond*. Prices for coffee were also available from Hoadley (1994, pp. 220-1) but these diverged from those found in the VOC accounts (those were very similar before 1750, but were much higher after 1750). I have used only the VOC figures. Considering the stability in price (which was fixed by the VOC) the following years were linearly interpolated: 1713, 1715-8, 1719-20, 1729, 1732-3, 1743-5, 1757, 1764, 1769-70, 1785, 1787-8, 1790, 1793-99.

4. Copper

Asia: copper prices given in guilder per *picol*, *pond* or *kati*. 1 *kati* = 1/100 picol (VOC Glossarium, 2000) = 1.25 *pond*. One outlier (1747) from the *Rendementen* was removed as the price was (supposedly) given per *rixdollars*, but was over twice as expensive as the surrounding observations. The series was supplemented by data from the *rendementen* from Surat assembled by Nadri (2008). No interpolation.

For Europe, copper prices were taken only from the VOC auctions as Posthumus does not offer a price series for Japanese copper. Probably as a result of the small mark-ups, Japanese copper was sold in Amsterdam only for a short period.

5. Cotton

Asia: all prices were in guilder per *pond*. There were a number of different varieties of raw cotton: from Bengal, Broach/Cambay/Surat, Coromandel, and Java, as well as observations only stating that it concerned white cotton, or a variety of cotton. There is not enough data to say

anything about price differentials between these differentials, but they seem to be in a similar price range. In fact, since the Amsterdam sales only note down 'cotton yarn', with no specifications regarding the variety, suggesting that, as with pepper, they threw the different varieties together. Therefore, I have built one series of average prices. Prices from the *Rendementen* later in the eighteenth century were consistently below those from the BGB. These observations were dropped from the analysis. Doing so does not affect the conclusions and including them would only strengthen the observation that there was no price convergence (lowering prices in Java would lead to an increased price gap). As with coffee, Hoadley (1994) offers a diverging price series for cotton which are not included in the calculations. No interpolation.

Europe: the series from the VOC auctions and Posthumus could differ somewhat. I have taken only those prices from the VOC auctions. However, in order to fill a significant gap (1761-1770) in those prices, Java cotton prices from Posthumus were extrapolated via the equation:

$$p\ VOC = 0.2269\ p\ POSTHUMUS + 0.8724 \qquad R^2 = 0.47$$

6. Indigo

Asia: All prices for indigo given in guilders per *pond*. As in the case with cotton, there were different varieties and the average price was taken. Hoadley (1994) again offers a competing price series which is not used. The outlier of 1761 is based on 13 observations (reflecting a total of 124,884 pond of indigo shipped to the Republic) and is therefore assumed to be genuine.

Europe: the VOC series were extrapolated with Posthumus.

$$p\ VOC = 0.7795\ p\ POSTHUMUS + 0.1036 \qquad R^2 = 0.56$$

7. Mace

Asia: Some early price evidence was available in reals per *bahar* for: 1515: Pires (1515); 1603-1615: Meilink-Roelofsz (1962, p. 275-276, p. 401 note 74); 1599: Keuning (1938, p. 204); 1603: De Jonge and Deventer (1862-1888, vol.3, p. 157); 1608: VOC 652. For some of the seventeenth century observations from the VOC accounts prices could be noted including and excluding

expenses on ‘sockels’, the baskets in which the mace was transported. The difference in price was negligible (0.003 guilder per *pond*). Prices for could also be noted down per *kati Banda*, which was equal to 5.5 *pond*.

Europe: The prices from the VOC auctions and Posthumus differed a little bit. The VOC series was preferred and the gap (1761-1770) filled via extrapolation:

$$p\ VOC = 0.8537\ p\ POSTHUMUS + 0.6991 \qquad R^2 = 0.98$$

8. Nutmeg

Asia: early observations were given in real per bahar: 1515: Pires (1515); 1596-7: Rouffaer and IJzerman eds. (1923); 1599: Keuning (1938, p. 204); 1612: Meilink-Roelofsz. Conversion based on 2.5 guilder per real and 436 pond per bahar. The remaining observations were in guilders per *pond*. Prices could be the same for years on end, which allowed interpolation.

Europe: see mace. Extrapolation:

$$p\ VOC = 0.9717\ p\ POSTHUMUS + 0.023 \qquad R^2 = 0.98$$

9. Pepper

Asia: One prices was given in *maravedi* (Barbosa 1518), it is assumed that 1 *maravedi* = 1/34 real (Wikipedia). 1 real = 0.4 guilder. Unless stated otherwise, following Bulbeck et al. (1998, p. 182) 1 *bahar* pepper = 180 kg = 364 *pond*. A quintal = $1/4^{th}$ bahar = 91 *pond*. I created a time series using all observations for pepper from different locations (Palembang, Bantam, Priaman, Banjarmasin etc.) and varieties (but excluding white pepper and long pepper). In order to get the average price each year, the data was regressed on year dummies.

Europe: gaps in the VOC price series were extrapolated with Posthumus:

$$p\ VOC = 0.928\ p\ POSTHUMUS + 0.0205 \qquad R^2 = 0.82$$

10. Saltpetre

Asia: all prices given in guilders per *pond*. Prices for the 17^{th} century could be given in a few varieties; refined, unrefined, Bengal or Agra. Refined saltpetre from Bengal was the dominating

kind, and it can be assumed that in case no further specification was given, it concerned Bengal refined saltpetre. For a few years when prices were completely stable gaps were linearly interpolated (1684-5, 1687, 1691-4, 1696-9, 1707 and 1713-7).

Europe: gaps in the VOC price series were extrapolated with Posthumus (removing the outlier 1745):

$$p\ VOC = 0.735\ p\ POSTHUMUS + 0.0546 \qquad R^2 = 0.73$$

11. Silk

Asia: prices were given in guilders or real (fl. 0.4) per *pond* or *kati* (1.25 *pond*). There were 3 different varieties of silk: Persian, Bengal and Chinese. For Persian silk there were so few observations that only for 1 year the mark-up ratio could be calculated and therefore omitted from the analysis. No interpolation.

Europe: for the same three varieties of silk we have prices from the VOC auctions and Posthumus for Amsterdam. However, in the earliest auctions there is a price series of silks with no further specification. These were used to extrapolate the Bengal silk series:

$$p\ SILK\ BENGAL = 0.9024\ p\ SILK + 0.8633 \qquad R^2 = 0.91$$

The VOC Chinese silk series were extrapolated with the Posthumus data:

$$p\ VOC = 0.6608\ p\ POSTHUMUS + 2.4509 \qquad R^2 = 0.81$$

12. Sugar, Candy

Asia: All prices given were in guilders per *pond*. Hoadley (1994) also gave sugar prices which were not used. As those prices were slightly higher at the end of the 18th century and including them would only strengthen the picture of price convergence.

Europe: here we are confronted with the same issue as with *poedersuiker*. Gaps in the Posthumus sugar price series were extrapolated with the VOC sales series:

$$p\ POSTHUMUS = 2.3373\ p\ VOC + 0.0806 \qquad R^2 = 0.45$$

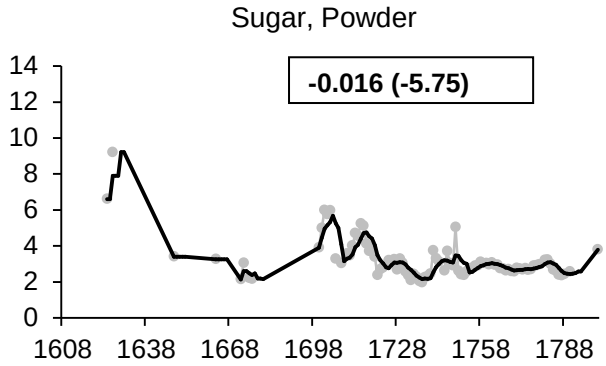
13. Sugar, Caster (not included in figure 2, same trends as sugar, candy).

Asia: *poedersuiker* all prices given were in guilders per *pond*. For the seventeenth century, different specifications could be given, such as 'white', 'diverse', 'from Japara' or 'from Batavia'. Price differentials were negligible and due to limited observations I have used all to create a single price series (taking the arithmetic average in case of multiple observations). To fill gaps in the eighteenth century, the series from the Bookkeeper General were extrapolated with data on Surat from Nadri (2008):

$$p\ VOC = 0.7742\ p\ NADRI + 0.0178 \qquad R^2 = 0.65$$

Europe: price series for sugar are available from the VOC sales and Posthumus. Only Posthumus noted that it concerned *kandijsuiker* or sugar candy. Considering the fact the prices of the VOC auction prices were much below that price, it can be assumed this concerns *poedersuiker* (powdered sugar, or caster sugar). Missing observations from the VOC were extrapolated with Posthumus:

$$p\ VOC = 1.933\ p\ POSTHUMUS + 0.1049 \qquad R^2 = 0.45$$



14. Tea

Asia : all prices were given in guilders per *pond*. There were several types of tea: *bohea*, *bing*, white. In the early observations some were referred to only as 'Chinese' tea. Since all teas were Chinese and the price differences in the VOC data between were not very big I averaged the prices of the different varieties (in case of multiple observations). The price series were merged

with data from Souza (1982, p. 144), which also seems includes different varieties as well as the average price taken from the data on *bohea* tea by Yong (2006, pp. 212-222). No interpolation.

Europe: I combined the series from Posthumus and the VOC auctions. In case prices from both series were available in one year the arithmetic average was taken. The correlation was weak, but the differentials small (Average CV = 0.25).

15. Textiles (preliminary)!

Asia: the VOC traded in a variety of textiles, *baftas*, *guinea cloth*, *salempuris*, of different colours, sizes and qualities. I took average prices on the guinea (average quality, bleached) cloth from the Coromandel Coast as found in the *rendementen*, invoices and BGB. Qualities and specific sizes could differ per batch, but is not specified in the sources. Therefore these series are tentative.

Europe: in the VOC auctions the 'because of lack of acquaintance with a number of textiles' the VOC accountants put the information for textiles in the 'undeterminable category' of *catoene lijwaten* (Glamann 1982, p. 143). These were linked to the price level on guinea cloth from Glamann via the equation (increasing the prices).

$$p\ GUINEA = 0.3057\ p\ CATOENE\ LIJWATEN + 4.886 \qquad R^2 = 0.27$$

These figures are clearly not ideal, yet, considering the importance of textiles in the Euro-Asian trade it is believed still worthwhile to give some estimates of general trends and it seems quite certain that over the period 1650 – 1800 prices for textiles in Amsterdam fluctuated around the same level, while in India prices increased (also see Gupta, 2009). According to Hossain, sales prices in London were stable or declined in the later 18th century.[124]

16. Tin

Asia: All prices given in guilders per *pond*. There could be observations for three types of tin, Bancas, Malaysian, or Siamese. Price differentials were generally small or not existent, and since for Europe it was not defined which of these varieties was sold, it is assumed that, as in the case of pepper and cotton yarn, they mixed these varieties. Therefore these series were combined, and

[124] Hossain, *The Company Weavers*, p. 68.

in case of multiple observations in a year, the arithmetic mean price was used. NB: there was only one observation for a purchasing price for tin in 1746 from a *rendement* for China (VOC 2710, ff. 1208-1263), since this was an outlier this data point was of questionable reliability and representativeness and therefore omitted from the analysis: this has no effects on the observed trends or conclusions based on these series.

Europe: the VOC auction prices were extrapolated with Posthumus:

$$p\ VOC = 0.7912\ p\ POSTHUMUS + 0.0329 \qquad R^2 = 0.7732$$

17. Porcelain

On the basis of Jörg, *Porcelain*, pp. ##-##. No interpolation.

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