THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Economic History Working Papers No: 266/2017

Great divergence, consumer revolution and the reorganization of textile markets:

Evidence from Hamburg's import trade, eighteenth century

Ulrich Pfister
Westfälische Wilhelms-Universität Münster

Economic History Department, London School of Economics and Political Science, Houghton Street, London, WC2A 2AE, London, UK. T: +44 (0) 20 7955 7084. F: +44 (0) 20 7955 7730

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DEPARTMENT OF ECONOMIC HISTORY
WORKING PAPERS
NO. 266 – AUGUST 2017

Great divergence, consumer revolution and the reorganization of textile markets: Evidence from Hamburg's import trade, eighteenth century

Ulrich Pfister
Westfälische Wilhelms-Universität Münster
Email: pfister@uni-muenster.de

Abstract

The study combines information on some 180,000 import declarations for 36 years in 1733–1798 with published prices for forty-odd commodities to produce aggregate and commodity specific estimates of import quantities in Hamburg's overseas trade. In order to explain the trajectory of imports of specific commodities estimates of simple import demand functions are carried out. Since Hamburg constituted the principal German sea port already at that time, information on its imports can be used to derive tentative statements on the aggregate evolution of Germany's foreign trade. The main results are as follows: Import quantities grew at an average rate of at least 0.7 per cent between 1736 and 1794, which is a bit faster than the increase of population and GDP, implying an increase in openness. Relative import prices did not fall, which suggests that innovations in transport technology and improvement of business practices played no role in overseas trade growth. Real imports of colonial groceries grew at 1.6 per cent annually, which is slightly below the growth rate of a crude measure of European Atlantic trade during the early modern era (about 2 per cent). During the last third of the eighteenth century sugar and coffee alone accounted for more than 60 per cent of total recorded overseas imports. By contrast, real imports of wine and Mediterranean groceries, which had constituted the most important group of imported commodities in 1678, declined at a rate of -0.7 per cent p. a. in 1736–1798. Relative prices of Mediterranean beverages and groceries increased over time, and import demand of wine in particular showed positive cross-price elasticity with American groceries. Thus, New World goods whose production benefited from unlimited land supply and the availability of forced labour substituted for land-intensive Old World Goods whose supply was increasingly constrained by rising marginal cost. However, the positive time trend of imports of colonial goods remains when taking into account shifts in relative prices, and it cannot be explained by changes in real income per factor unit, which declined (day wage of unskilled workers, land rent) between the 1730s and early 1790s. After strong growth during the first three decades of the eighteenth century imports of cotton goods declined continuously until reaching a trough in 1771–1786. Thereafter imports rose again rapidly as a reflection of the British Industrial Revolution. Between 1753 and c. 1790 there was a strong rise of imports of raw cotton through the northern Netherlands (but not through Hamburg), suggesting import substitution. The expansion of domestic textile production can partly explain the positive time trend in import demand for colonial groceries: Rural households compensated for the fall of the real wage by a mobilization of seasonal labour reserves to engage in market-related activities. Incremental income was spent on stimulants and easily absorbable carbohydrates to accommodate for meagre grain rations. The results lend qualified support for the Great Divergence and Industrious Revolution theses.

Keywords: Trade and growth, import demand, European trade in colonial goods, consumer and industrious revolutions, great divergence.

JEL codes: D13, F14, N13, N33, N73

1. Introduction

This study combines information on some 180,000 import declarations for 36 years in 1733–1798 with published prices for forty-odd commodities to produce aggregate and commodity specific estimates of import quantities in Hamburg's overseas trade. In order to explain the trajectory of import quantities of specific commodities the study also estimates simple import demand functions. Since Hamburg constituted Germany's principal sea port already during the period under study, information on its trade can be used to derive statements on the aggregate evolution of the foreign trade of a large hinterland, although many conclusions must remain tentative and are subject to many qualifications and uncertainties.

Four partly interrelated considerations motivate this investigation. The first objective is simply to find out whether real import quantities grew or not. This is not as trivial as it sounds. A tentative reconstruction of Germany's aggregate economic performance in the pre-statistical era suggests that output per capita was maintained roughly constant during the second half of the eighteenth century despite a declining marginal product of labour as indicated by the fall of the real day wage. The apparent paradox is related to the rapid growth of the urbanization rate and of non-agricultural employment in rural areas, which suggests that the decline of the real wage was offset at least in part by the mobilization of seasonal and other labour reserves for market-related activities (Pfister 2011). On the background of standard theory that relates import demand to income one would expect real imports per capita to have remained constant in the period under study. However, if indeed output growth of tradable products and of trade-related services compensated for diminishing returns to labour in agriculture imports per capita should have increased.

The second issue refers to the relative weight of changes in trade costs and supply and demand factors, respectively, in trade growth. In their seminal study on early modern intercontinental trade O'Rourke and Williamson (2002) argue that before the first wave of globalization that set in during the second quarter of the nineteenth century there were few improvements of transport technologies and business practices that promoted trade growth through a reduction in trade costs (see also Menard 1991). To the extent that trade growth took place in the early modern era it stemmed mainly from outward shifts in supply and/or demand. More recent work on price convergence and other indicators of market integration has qualified O'Rourke and Williamson's conclusions in a number of respects (Rönnbäck 2009; de Vries 2010; de Zwart 2016; on intra-European commodity markets see Özmucur and Pamuk 2007; Bateman 2011; Chilosi et al. 2013). Therefore, the relative weight of changes in trade costs in explaining observed trade growth merits to be considered explicitly in each particular case. As it will turn out later on, in the case of Hamburg it suffices to study the prices of imports relative to domestic goods: If reductions of trade costs matter in trade growth, they should translate into a decline of the relative price of imports.

The third and the fourth considerations explore specific hypotheses relating to supply and demand shifts that might be relevant for trade growth in Hamburg's hinterland during

the eighteenth century. The Great Divergence thesis seeks to explain the favourable economic development of Europe relative to China from c. 1800 with the availability of natural resources that relieved land scarcity in the former region: Coal and unlimited land supply in the New World enabled Europe to reap the positive externalities from population growth without incurring supply constraints that resulted from diminishing marginal returns to labour in the production of land-intensive goods (Pomeranz 2000). To be sure, this study is unable to conduct an analysis of the effects of Atlantic trade on economic growth in Europe. It is nevertheless possible to test several hypotheses relative to trade patterns: If the Great Divergence thesis holds, the weight of land-intensive Old World goods in total long-distance trade should decline over time in favour of goods imported from America. Relative prices of the former goods should increase, and land-intensive Old World goods and New World commodities should be substitutes. Relative price changes should be capable to account for changes import patterns relative to land-intensive Old World goods and colonial groceries imported from the Americas.

The fourth and final argument is derived from the Industrious Revolution thesis (de Vries 2008). Around 1700 state regulation of consumption began to break down, and the private vice of luxury was increasingly valued a public virtue in that it contributed to market growth and employment. At around the same time, improvements in commercial techniques, most notably the distribution of goods through business correspondence rather than periodic fairs and the spread of the bill of exchange as a means of cashless payment beyond financial centres, facilitated the marketing of differentiated consumer goods. The availability of differentiated consumer goods and the newly-acquired freedom of their use enhanced the utility of consumption: Wearing fashionable clothes increased social status, and a tasteful adornment of the interior of houses contributed to personal identity. The increase in the utility of consumption entailed a shift of time preference from leisure to labour: For the same remuneration households were prepared to engage longer hours in market-oriented activities in order to acquire consumption goods. Hence, the consumer revolution of the eighteenth century occurred in close connection with an industrious revolution.

Several predictions regarding trade patterns follow from this argument: If the Industrious Revolution thesis holds, differentiation of traded goods should increase over time, and the weight of consumer goods in total trade should grow. Estimation parameters in import demand functions should leave room for increases in demand beyond relative price shifts and changes in per unit income. Finally, trade patterns should reflect the growing importance of market-oriented production of rural households, such as an increase of the weight of industrial inputs and semi-finished goods in total trade. Note that the Industrious Revolution thesis adds a flavour of New Trade Theory to the analysis of early modern trade: Whereas neoclassical trade theory focuses on the exploitation of comparative advantage through regional specialization New Trade Theory stresses the benefits from trade resulting from product differentiation and exploitation of economies of scale.

The study is organized as follows: Section 2 gives an overview of Hamburg's position in the economy of central and northern Europe as well as the institutional context governing mercantile activities in this sea port. Section 3 presents the toll registers that form the basis

of the subsequent analysis and discusses their limitations and weaknesses. Section 4 presents evidence relative to the evolution of the commodity and regional composition of Hamburg's import trade during the eighteenth century. Section 5 introduces the price data used to deflate import values and constructs an import price index. Section 6 presents results concerning the evolution of aggregate imports at constant prices and commodity-specific import quantities, respectively. Section 7 uses the price and quantity series for individual commodities to estimate simple import demand functions. Section 8 gives a brief account of changes in the regional patterns of textile production and the ways in which these were reflected in patterns of trade. Finally, section 9 provides an extensive summary of the findings.

2. The economic and institutional context of Hamburg's overseas trade

Hamburg constitutes the north-eastern end of a string of sea ports located on river estuaries of the western European mainland bordering on the north-eastern Atlantic and the North Sea. Distinguished members include Sevilla/Cadiz, Lisbon, Bordeaux, Nantes, Rouen/Le Havre, Antwerp, Rotterdam and Amsterdam. London is the major complement of this string on the British Isles. Bremen and Emden are minor port towns of a similar type in northern Germany. The development of these urban locations is partly owed to the fact that many river estuaries provide good natural harbours, which was conducive to the emergence of shipping activities and entrepôt trade. In addition, however, the rivers on which these harbours are situated also provide access to a hinterland of variable size. Thus, ports situated on estuaries also have a variable potential to fulfil gateway functions between inland transport networks and maritime trade (Hohenberg and Lees 1995: 62–4; for Germany, see Scott and Scribner 1996: 129–35). As a result of the growth of intercontinental trade, which surpassed European income and population growth, the sea ports of Western Europe constituted the most important arena of urban growth during the early modern era; about 38 per cent of the incremental urban population in the period c. 1600–1750 was concentrated in only 15 Atlantic port cities (de Vries 2010: 712).

Within this larger group of Western European sea ports Hamburg rose to some prominence around the middle of the seventeenth century. Between 1636 and 1668–1671 the real wage rose by 57 per cent, and during the early decades of the eighteenth century it was on the same level as in Amsterdam and London. The buoyant demand for labour seems to have attracted a number of immigrants; judged by the number of entries into the baptismal registers of select parishes the population must have increased by some 75 per cent between 1643 and 1660. At the present state of research it is impossible to attribute this positive shock to a specific force apart from the vigorous expansion of the North Sea economy after the end of general warfare with the conclusion of the Westphalian Peace in 1648 (Mauersberg 1960: 47; Israel 1989: 197–207; Pfister 2017: 21–2; for general background information on the development of Hamburg during the seventeenth century, see Loose 1982; Poettering 2013: 21–43; for the comparison with Bremen, see von Witzendorff 1951).

From the middle of the seventeenth to the early eighteenth century Hamburg comprised about 70 to 75 thousand inhabitants; until the early nineteenth century population rose to some 130 thousand (Loose 1982: 265). While Hamburg was thus about 50 per cent larger than the principal sea ports on the west coast of France, namely, Bordeaux, Nantes and Rouen, its population size remained well below the one of the North Sea metropolises of Amsterdam (200–220 thousand in the eighteenth century) and London, whose population exceeded half a million already in 1700 (Bairoch et al. 1988: 6, 24–29, 33, 53). This can be taken as a reflection of the fact that Hamburg was not a prime importer of colonial goods. Rather, it imported the latter from European harbours affiliated with the merchant empires of the Northern Netherlands, England, France, Portugal and Spain. The provisioning of Germany with colonial goods was thus divided into three trade networks, namely, inter-continental trade, trade within the Eastern Atlantic and the North Sea, and inland distribution networks. Hamburg served as a gateway between the latter two systems of trade (Kikuchi 2013); before the American Revolution it did not enter the first circuit. As will be shown below, trade with colonial groceries was complemented with imports of agricultural products, salt and industrial inputs from the Mediterranean and manufactures mainly of English and French origin (for overviews of Hamburg's trade patterns in the seventeenth and eighteenth centuries, see Jeannin 1971; Pohl 1963: 123–234; Newman 1985; North 1996; Weber 2004: 37–86, 225–39; Rössner 2008: 78–82; for general overviews of Germany's external trade in the eighteenth century, see Zorn 1961; Kellenbenz 1964; Kriedte 1996; Pfister 2015).

Conversely, Hamburg mediated German exports to Western Europe and, to a small extent, the Mediterranean. According to the only fragmentary records of the town's overseas exports known so far, linen accounted for a full two third (66.7 per cent) of all specified exports in 1702–1713. German linen was widely distributed in England and the Iberian Peninsula, but it was also used for buying African slaves and clothing them in the New World. Iron goods and copper accounted for another 15.2 per cent. Wood made up 6.5, grain 2.3, wax 1.5 and alcoholic beverages 0.9 per cent (own calculation based on Baasch 1929: 117–43). By the early eighteenth century the German economy had thus become specialized on the production of labour and natural resource intensive goods. It appears that this basic pattern of exports remained roughly stable until the early nineteenth century (cf. Kriedte 1996: 112). Only grain exports gained in importance from the last third of the eighteenth century, probably as a result of British industrialization and the declining consuming power of German lower classes in the wake of a fall of the real wage (Soetbeer 1846: 162).

Since this study aims at generalizations about German external trade at large one would like to know something about the extent of the hinterland served by Hamburg. This holds in particular in relation to the Dutch entrepôt: First, through the Rhine and its tributaries the seaports of the United Provinces possessed a large hinterland in western and south-western Germany. Second, Amsterdam in particular also exported goods into Northern and Eastern Germany via the North Sea and the Baltic.

The location on the estuary of the Elbe provided Hamburg with a large hinterland extending into northern Bohemia, and the construction of the Müllrose channel between the Spree and Oder Rivers (1668) established a direct waterway between Hamburg and Silesia.

While no region that specialized in the production of non-agricultural exportables existed in Hamburg's neighbourhood this seaport was thus well placed to handle the external trade of major manufacturing regions, namely, the linen districts of Saxony, Lusatia, Northern Bohemia and Silesia, as well as the metallurgical complexes in the Harz mountains and some parts of Saxony (Zeuske and Ludwig 1995: 272–5, 288–92; Denzel et al. 2000: 246–247; Boldorf 2006: 51). Whereas Bremen handled the majority of Westphalian linen exports (Küpker 2008: 119) a minor share also seems to have been channelled through Hamburg as well; the prices of linen from Ravensberg, Tecklenburg and Osnabrück were regularly quoted by the Hamburg stock exchange (see also Soetbeer 1846: 176).

On the basis of an inspection of a variety of sources Jeannin (1971: 56–8, 72) places the value of overseas trade handled by Bremen during the second half of the eighteenth century at about a third and the trade of Lübeck at a tenth of Hamburg's trade. For a large zone north of Germany's central mountain range (*Mittelgebirge*) and between Westphalia and the Oder River (including Silesia) Hamburg was thus the dominant gateway that handled possibly about three quarter of its external trade. In 1750 this zone comprised a population of about 6.5 million, in 1790 8.3 million. This was 43.3 and 45.1 per cent, respectively, of total German population in these years (Gehrmann 2000: 97, complemented with Behre 1905: 462; Schirmer 1996; national population according to Pfister and Fertig 2010: 5). This rough estimate of the size of the hinterland of the Hanseatic towns overestimates its extension towards the west in that most of Westphalia was probably oriented towards the Northern Netherlands. On the other hand, it omits Thuringia, for which no population estimate exists for to the eighteenth century, and Northern Bohemia. Population growth followed an exponential trend of about 0.4 per cent p. a.

Based essentially on written correspondence Newman argues that Hamburg's hinterland extended farther south than northern Germany broadly defined, mainly because the transport route of the Rhine was burdened by many duties (Newman 1985: 63–77; see also Weber 2004: 82; Rössner 2008: 79). However, given the lack of quantitative evidence the relative weight of the Hanseatic ports in the external trade of southern Germany and the Habsburg lands during the eighteenth century must remain obscure. A faint hint can be gained from French trade statistics which suggest that in 1787–1789 on average 64.6 per cent of all exports to Germany were handled via the three Hanseatic towns and that only 24.4 per cent went directly to states other than Prussia (Kutz 1974: Table 30). Combined with what has been said above about the regional distribution of Germany's population around this time it follows that about half of Southern Germany's imports from France might have been channelled through the Hanseatic towns or roughly a third through Hamburg alone.

Hamburg and other Hanseatic towns rivalled with the Dutch entrepôt with respect to the gateway function between Germany and maritime long-distance trade. During the period under study the value of goods entering Germany via the Hanseatic towns and via the Rhine must have been at a similar order of magnitude: In 1753 the value of Dutch exports to Germany via the Rhine exceeded recorded overseas imports in Hamburg by 13 per cent; in 1790 the difference was 44 per cent (de Vries 1965: 28, assuming a silver content of the guilder of

9.61 g). The increase of the relative weight of Dutch trade with its German hinterland suggests that c. 1750–1790 the western import route developed more dynamically than import trade via Hamburg. However, the occupation of the United Provinces by France and the establishment of the Batavian Republic in 1795 reversed fortunes in that it severely dislocated the trade network of the northern Netherlands, which in turn led to a re-routing of Central Europe's maritime trade through Hamburg and other German sea ports. Already between 1790 and 1795–1798 the value of recorded overseas imports of Hamburg jumped up by 119 per cent.

The explosion of Hamburg's import trade at the end of the eighteenth century mark the end of an emancipation from the Dutch staple market that began much earlier. Since the toll registers analysed by this study do not cover imports from the Northern Netherlands some of the trade growth found below for the eighteenth century before 1795 may actually reflect this emancipation process and a corresponding displacement of trade, rather than a true growth of overseas trade of the hinterland of the Dutch and the Hanseatic sea ports as a whole. Thus, in 1678 20.9 per cent of all imports assessed by the Elbe toll of Stade (a town located farther down the Elbe estuary) still came from Holland (Newman 1985: 59). By the late 1770s, when systematic records of Hamburg-Dutch bilateral trade set in, eastward flows of goods had become small. Only for items of minor importance in Hamburg's import trade did the United Provinces provide a third or more of total imports, such as paper, madder, white lead, herring and hides. Exceptions are *drogues* (essentially dyes and other inputs for the finishing of textiles), of which about a quarter came from the Netherlands as late as in 1791 (Röhlk 1973: 105, 107, 109, 114–5, 124, 129). The French consul in Hamburg estimated that in 1777 about 10 per cent of all imports into the town came from Holland and Jutland; for 1788–1791 the share of these proveniences was put somewhat higher, namely, at 15 per cent (Jeannin 1971: 45). The emancipation of Hamburg from the Dutch entrepôt had obviously gone a far way before the latter's collapse at the end of the eighteenth century (see also Baasch 1910b: 94–8).

Beyond serving as a gateway between a large inland area and western European long distance trade Hamburg also functioned as an entrepôt in its own right. It thereby mediated between prime importers of colonial goods and the economies of southern Europe on the one hand and the Baltic, Scandinavia and Russia on the other. This included the sale of Mediterranean and colonial goods as well as of western European manufactures in Russia. Conversely, German exports to southwestern Europe were complemented with northern goods, notably Russia leather and fish. In addition, an undetermined share of iron and copper exports mentioned earlier probably consisted of re-exports of Swedish and Russian products (Newman 1985: 60–1; Israel 1989: 49). In the eighteenth century Hamburg mediated international trade with a variety of differentiated types of semi-finished copper some of which originated in Latin America (Denzel et al. 2000). The weight of this entrepôt trade in the total trade of Hamburg is difficult to determine since with the exception of the Archangel trade there were no tolls or levies on commercial exchanges with the north-east. From what is known it appears that during the eighteenth century it was small by comparison with the import-export trade. After the early eighteenth century recorded Archangel trade faltered for

unknown reasons (see Table 3 below), and the port cities of the Baltic, Gdansk in particular, possessed independent commercial relationships with Western Europe. Many colonial goods could also be procured through Denmark. According to Jeannin the commercial links with North-eastern Europe made up one tenth if not less of the total trade of Hamburg during the second half of the eighteenth century (Jeannin 1971: 64; cf. Vogel 1932: 130–41; Zeuske and Ludwig 1995: 278; Kikuchi 2013: 210–26). Roughly speaking, trade recorded by Hamburg's toll ledgers mostly refers to German imports rather than to Hamburg's function as a staple market for a wider area.

Hamburg's trade both rested on and nurtured the development of related manufacturing and service activities. The latter include payment services, which in the first instance were provided by the Bank of Hamburg, a public bank founded in 1619 according to the model of the Venice and Amsterdam banks (Sieveking 1933; Denzel 2012: 51–62). It offered the cashless settlement of local balances, and its bank currency, the *Mark banco*, developed into the currency used in most business transactions of Hamburg's mercantile community. Second, the settlement of international balances was aided by a growing trade in bills of exchange. During the eighteenth century Hamburg's stock exchange quoted the greatest range of other money markets in Germany, and bills on Hamburg were the financial instrument of any German market that was mostly frequently quoted elsewhere (Denzel 1996: 76–80). Finally, trade-related financial services included maritime insurance. In 1611/23 the town authority created a chamber of maritime insurance, and from 1765 several companies were founded to facilitate risk distribution (Denzel 2014).

Eighteenth-century Hamburg was not only a major commercial centre and seaport, but also a manufacturing town. A product market characterized by high liquidity in trade with a broad range of differentiated commodities created locational advantages for specialized manufacturing activities. The most important ones appear to have been sugar refining, calico printing, whaling and tobacco processing. Moreover, between Hamburg and Lübeck several mills processed copper and silver (Schneider 1985: 1–3; Meyer 2014). Note that most of these branches were present in the Northern Netherlands and Bremen, too, which underscores the structural analogy between the Dutch and the German coastal regions (von Witzendorff 1951: 345, 364, 372, 384–5; Israel 1989: 111–2, 264–8, 285–6, 305–7; de Vries and van der Woude 1997: 295).

From the 1640s Hamburg, together with other eastern Frisian sea ports, participated in whale hunting between Spitsbergen and Davis Strait (west of Greenland). After peaking at 83 ships in 1675 the town's whaling fleet stabilized at 50 to 60 ships for the remainder of the seventeenth century. The War of the Spanish Succession (1701–1713/4) and overfishing depressed profitability, and over the remainder of the century the industry underwent gradual decline. On the shore of the Elbe between Hamburg and Altona there existed several works to boil blubber employing a considerable workforce during the seventeenth century; until 1810 their number shrank to two, however (Oesau 1955: 65–82, 233–9). Blubber and whale bone constituted industrial inputs that were the object of an important trade, and the shrinking returns of Hamburg's own whaling fleet were increasingly compensated by imports from the British Isles, Portugal, Russia and, from the 1780s, Northern America (cf. below, Table

2). While the whaling industry was on the decline in the eighteenth century, the great era of tobacco processing still lay ahead. Even though tobacco constituted a major item of Hamburg's import trade already in the eighteenth century few firms engaged in tobacco processing have been retrieved so far (Baasch 1928; Knorr 1979: 33).

With between 200 and 365 workshops Hamburg possessed the single most important concentration of sugar refineries in eighteenth-century Europe. Most workshops were probably small; whereas at the beginning of the century numerous refiners employed between 20 and 40 labourers only about ten workshops are said to have contained more than a dozen workers later on. Since sugar refineries required great quantities of water and energy their location was concentrated on the town's waterways. In comparison to French refineries sugar processing in Hamburg benefitted from good access to energy supply from inland Germany and British coal (Petersson 1998: 41–75; Weber 2004: 228, 252; for the general context, cf. Stein 1988: ch. 7). The strong position of sugar refining in Hamburg should be seen in close connection with the fact that sugar constituted the most important import commodity in the town's trade from the 1730s (see below, Table 2).

Finally, during the 1780s Hamburg possessed between ten and twenty calico printing manufactories, which made the town into one of the most important locations of the early German cotton industry during late eighteenth-century (Chapman and Chassagne 1981: 11; Knorr 1978, vol. 1: 88, 99–100). Other important concentrations of cotton printing manufactories included Saxony and Northern Bohemia, which by all probability received at least part of their inputs in the form of dyestuffs, mordant, rubber as well as raw and semi-finished cotton through Hamburg (see also below, Table 2, "industrial inputs"). Market thickness in these inputs and finished cotton made Hamburg into a favourable location for cotton printing during the initial phase of the industry's development, despite high labour costs. White cottons were imported from England, from the mid-1750s increasingly from Saxony, to be printed locally (Knorr 1978, vol. 1: 146; Hahn 1996: 121, note 3, 122, 123, note 1).

Apart from the Batavian Revolution in 1795, which destroyed the Dutch entrepôt and proved a durable positive shock to Hamburg's overseas trade, there are few changes in the institutional environment that influenced the course of the town's commercial activities over the eighteenth century. Nevertheless, the fact that Hamburg was an independent town within the (German) Holy Roman Empire rather than being part of a larger state, such as Amsterdam and London, had important economic implications. Three of them deserve a brief outline.

First, the independence of the town and its gateway function between inland and maritime trade was repeatedly threatened by a neighbouring state. The crown of Denmark, being united with the Duchy of Holstein, had acquired the position of Hamburg's overlord in the fifteenth century and did not accept its belated accession to the status of an Imperial free town (*Reichsstadt*) in 1618. Until the Gottorp settlement of 1768 the relationships between Hamburg and the crown of Denmark were often tense. The king repeatedly used his supreme military power to extort large sums from the town. His endeavours to expand revenues from seigniorage by minting debased coin led to disputes over monetary matters and to monetary

disorder even in Hamburg itself, notably during the period 1717–1736 and the years immediately preceding the Gottorp treaty, which brought a final settlement of the relationship between the two parties (1768). The Danish crown also weakened the Hamburg emporium by creating alternative seaports on the lower Elbe River and by supporting the development of a commercial infrastructure there. These competing port towns included Glückstadt (founded in 1616) and Altona (1664); but also Harburg, situated on the southern arm of the mouth of the Elbe River and receiving systematic support by the Duchy of Celle from the 1660s, later on by the Hanoverian government, should be classified among these rival satellite sea ports. Thus, a minor proportion of Germany's foreign trade through the lower Elbe, whose exact size is impossible to determine, actually bypassed Hamburg (Kellenbenz 1964: 25–7; Höfer 1977: 35–40, 176–185; Loose 1982: 289, 292–303; Schneider 1986: 55–60, 91–104; Schneider et al. 1993: 13; Rössner 2008: 87–9).

Second, before the development of the *Zollverein* from 1834 Hamburg and its hinterland did not constitute a unified market. Territorial division went hand in hand with mercantilist policies that sought to develop independent external trade links and import substituting activities within each state. Around the middle of the eighteenth century Prussia in particular inaugurated a number of political measures that disrupted transit trade on the Elbe River, established alternative trade routes through Baltic seaports, limited domestic consumption of colonial groceries and attempted at an import substitution of cloth, sugar, tobacco and porcelain (Zeuske and Ludwig 1995: 268–83).

Possibly as a reaction to mercantilist policies in the continental hinterland the port region of the North Sea experienced a free trade movement (or free-port movement, as early writers used to call it) in the 1750s and 1760s (Baasch 1910b: 98; de Vries 1959: 49). In the Netherlands, the *stadholder* proposed the introduction of a limited free-port regime in 1751 as a means to revive trade. Concrete measures were rather limited, however. In 1754 tariffs on Russia leather and indigo were abolished; in 1767 tariff reductions followed for tea, coffee and cochenille. Bremen followed the Dutch in 1756 by abolishing a number of duties, which presumably boosted its trade (von Witzendorff 1951: 363). In reaction to all this, the merchant community of Hamburg staged a petition to the town authorities demanding the reduction or outright abolition of a number of tariffs (1756). The main argument behind this move was that the measures introduced by the Dutch had increased competition and had diverted trade via the lower Elbe to Altona and Glückstadt, where tariffs were lower or non-existent (Baasch 1910a: 493–509). Town authorities were reluctant to comply with these demands, and the material presented later in this study suggests that trade with several commodities declined temporarily or definitely during this period, possibly as a result of comparatively high trade costs in Hamburg.

Third, the absence of a connection with a strong state implied weak protection of overseas trade, in particular the exclusion from intercontinental trade. Only around 1760 did direct imports from Western India become relevant, and in 1764/67 Denmark liberated trade with its possessions (todays Virgin Islands). From the 1780s the United States and in the 1790s Havanna emerged as important sources of imports (Pohl 1963: 236–46; cf. Table 3 below). Before this period colonial powers largely prevented direct trade of foreigners with

their colonies, and even the protection of its trade on the seas surrounding Europe constituted a formidable challenge for Hamburg. To be sure, in 1623 the town authorities created an admiralty board to prevent infringement of Hamburg's sea trade by pirates and privateers. To finance its activities, notably the armed protection of convoys, the admiralty levied tolls whose ledgers form the basis of the analysis of this study. The forces were insufficient to wield protection beyond Cadiz, however. At least the armed protection of convoys, together with the modern town fortifications erected in 1616–1626, sufficed to maintain trade during wartime and to pursue a policy of armed neutrality largely respected by major powers. This also enabled Hamburg to provide valuable financial and diplomatic services to powers engaged in war. As a result, its trade probably evolved smoother and was less subject to power shifts between states than the trade of other major sea ports (Baasch 1896; Loose 1982: 260–2, 329–30; Weber 2004: 166, 225–6).

The town's independent position made also possible the conclusion of treaties with foreign powers even after the final demise of the Hanse during the first half of the seventeenth century. In particular, Hamburg, together with the remaining Hanseatic towns of Bremen and Lübeck, was capable to reach a favourable treaty with France in 1716. It provided the Hanseatic towns with the most favoured status reserved until now for the Dutch and protected their freedom of movement and property rights in French seaports (Huhn 1952: 88–101; Weber 2004: 166–7). Combined with the emergence of Hanseatic merchant communities in French seaports and a Huguenot community in Hamburg from the late seventeenth century (Weber 2004: 172–224, 239–55), this treaty constituted a major institutional basis for the enfolding of Hamburg's sugar-coffee complex as evidenced by the toll registers.

The close relationship with France was put to a severe test during the Seven Years' War, leading the former power to cancel the treaty of 1716 in 1760. It took almost ten years to reach a new agreement that re-established the privileged relationship between French sea ports and Hamburg (1769; Huhn 1952: 130–147; Weber 2004: 167–168). The unfavourable institutional conditions of the 1760s may have delayed the recovery of trade after the end of War for several years.

3. The Admiralty and Convoy Toll registers

To finance the activities of the admiralty board Hamburg charged most incoming goods (and a number of outgoing products as well) with the so-called Admiralty and Convoy Tolls (*Admiralitätszoll und Convoygeld*; for their institutional history, see Pitz 1961: 338–62). The collection of the toll rested on the self-declaration of the value of each imported item by the individual merchants. The voluminous registers resulting from this procedure constitute the most important source relative to Hamburg's trade in the eighteenth century (Krawehl 1991: 56–7; Weber 2000; Schneider et al. 2001: 9–13; Rössner 2008: 53–7; Denzel 2015: 134–8, 155–9).

An early group of records exists for the years 1702–1713 and has been analysed by Baasch (1929). However, the ledgers of this period are complete only for a few years (1703,

1707 and 1713); furthermore, Baasch does not present his material in aggregate form. Aggregation of Baasch's figures shows that on average 20 per cent of total import values reported by Baasch consists of unspecified goods, which is very high compared with later periods (cf. Table 2 below). While records may have been kept less carefully in these early years than later (Baasch 1929: 90–1), Baasch does not explicitly distinguish between goods left unspecified by the source and miscellaneous goods that cannot be treated individually. Given this inconsistency I have decided not to integrate Baasch's figures into the later analysis; instead, my aggregation of his information will be referred to as a background for discussing findings relating to later years.

In 1733–1798 records are complete for 36 years, and this information has been exhaustively transcribed and published in semi-aggregative form by Schneider et al. (2001). An electronic version of this database, which comprises about 187,000 declarations of individual items, was kindly provided by the authors and constitutes the basis of the present investigation into Hamburg's import trade. In this database imported goods are described with almost 6900 different terms. This includes variations in the spelling of identical products by the officials who kept the ledgers as well as varieties of abbreviations and typing errors by the coders. To arrive at a description of the commodity structure of imports these terms were reduced to somewhat less than 2300 standard designations of individual items or composites of several items declared jointly. These individual items were then coded into 262 groups. This includes notably the aggregation of individual types of textiles, iron goods, goods made of non-ferrous metals, less important dyestuffs, household goods and medicaments. The later analysis will partly relate to a further aggregation of individual categories to about forty broad categories, partly to individual commodities of major importance. The aggregation of the regional origin of imports was essentially taken over from Schneider et al. (2001).

The toll registers are beset with three shortcomings that limit their use in assessing Hamburg's import trade during the eighteenth century.

1) The first and major one relates to coverage. Not all imports were subject to the Admiralty and Convoy Toll; notably, coal and grain were exempt. The same holds for goods destined for the non-commercial use by town burghers (*Bürgergut*) and for transit trade. While initially small the share of transit goods may have increased at least for select goods towards the close of the century. As to geographical coverage, only imports from Archangel, the British Isles and all regions west of the mouth of the Scheldt River were subject to the tax. This implies that maritime trade with the Northern Netherlands, the neighbouring German seaports, the Baltic and Scandinavia as well as the whole of river and overland trade is left undocumented by the toll ledgers (Schneider et al. 2001: 11–2). It is however interesting to note that the toll ledgers register some imports from west of the Scheldt and the British Isles as transit through Altona. Their share in total imports is close to nil until the 1770s, but rises to 1.3 per cent in the years 1781–1789 and 0.6 per cent in 1790–1798. This suggests some variability in the proportion of trade that was channelled through Hamburg and the rival seaports on the lower Elbe, respectively, and that in the last two decades of the eighteenth century the pressure to use the commercial infrastructure of Hamburg may have been stronger than before.

It was noted earlier that Hamburg became gradually emancipated from the Dutch staple market in the course of the seventeenth and early eighteenth centuries. To the extent that the town's imports from the United Provinces grew slower than imports from other proveniences and since the toll registers do not record these trade flows import growth assessed through the toll registers overestimates the true growth of Hamburg's overseas trade. An assessment of the possible measurement error can be gained from the information that the value of the exports of the Admiralty of Amsterdam to Hamburg, Bremen and the neighbouring seaports (the so-called *Kleine Oost*) grew by 43 per cent in 1753–1790 (Roelhk 1977: 180). In what follows I assume that Hamburg's share in this trade flow remained stable over time. During the same period, the import values recorded by Hamburg's toll registers grew by 92 per cent (cf. also Jeannin 1971: 51–3). Taking into account that contemporaries estimated the Dutch share in Hamburg's imports at 6.9 per cent on average in 1788/1790 (Roelhk 1977: 181) the inclusion of trade with the Northern Netherlands results in a reduction of import growth in 1753–1790 from 92 per cent to 88 per cent. Compared to other sources of errors explored below this correction appears minor, and since other factors, notably the probable increase of transit trade mentioned earlier, contribute to an underestimation of trade growth no correction is made for the non-registration of imports from the Netherland in the subsequent analysis.

Given the limitations in coverage what is the share of Hamburg's total import trade that can be traced through the toll registers? An answer to this question can be gained by comparing them with information derived from the trade statistics of trading partners. In what follows I briefly summarize the conclusions that emerge from putting the toll registers of Hamburg side by side with British and Dutch exports to Germany as a whole and reports on Hamburg's foreign trade established by the French consul in the port city, respectively.

Several authors have used the reports by French consuls on Hamburg's trade for the years 1752 and 1789–91 as benchmarks to assess the reliability of the toll statistics (Jeannin 1971: 51–3; Krawehl 1998: 66; Denzel 2015: 155–9). Denzel (2015), finds that except for the Mediterranean trade, for which coverage was largely complete, around 60 per cent to two thirds of the likely true value of trade from import sources covered by the toll registers was actually registered, with little change over time. The remainder represents a combination of transit trade and simple fraud.

Consequently, the two sources show a consistent picture regarding main trends of both aggregate trade and trade with principle commodities. In concrete terms, the growth rate of overall import values suggested by Jeannin on the basis of French data for the period between the early 1750s and c. 1790 is replicated by the toll registers. The relative weights of imports from France and the British Isles between the late 1760s and 1780s reported in Table 3 below are also consistent with the French estimates — this finding is remarkable given that earlier writing suspected the French consul to overestimate trade relations with his own country (Jeannin 1971: 61; Krawehl 1991: 66; cf. also Weber 2000: 95). As to the evolution of the commodity composition of imports Jeannin (1971: 53) believes that over the period c. 1750–1790 the import values of coffee increased substantially whereas those of sugar and wine largely followed commodity prices. The analysis below identifies these goods as the

three most important items in Hamburg's imports and yields a more nuanced picture that is nevertheless broadly consistent with Jeannin's statement. With respect to sugar, the most important import commodity, I actually paint a more optimistic picture than Jeannin, but the estimate for the growth rate of sugar imports still remains much below the one for coffee (cf. Tables 4 and 5 below).

If the toll registers can be considered as broadly reliable with respect to changes in the absolute value of trade, the geographic pattern of import sources and the composition of the principal commodities this is not true for commodities that had only minor shares in import trade. In his analysis of international trade with dyestuffs Engel (2009: 151) finds that in 1736–1768 Hamburg's imports of dyestuffs from Britain correspond to only about 15 per cent of British exports of these commodities to Germany. Given Hamburg's pre-eminence among German sea ports this certainly implies massive under-registration at least of dyestuff imports. Engel also finds that the share of British dyestuff exports to Germany covered by Hamburg's toll registers varies between about 10 and 50 per cent so that the extent of under-registration may differ among commodities (see also Rössner 2008: 55–7). Given the considerable differentiation of dyestuffs and the non-negligible portion of imports that were left unspecified (see below) it may also be that the issue is mainly related to production classification rather than the documentation of total import trade.

A similar conclusion emerges from a comparison of the commodity-specific growth rates of exports from the Admiralty of Amsterdam to the German hinterland between 1753 and 1789–1792 (van Nierop 1915) with the growth rate of recorded imports in Hamburg during the same period. If both sea ports shared a homogeneous hinterland and if trade costs were of similar magnitude, growth rates of the trade of the two emporia should be identical. These assumptions are certainly somewhat heroic, but the comparison can yield a yardstick as to the compatibility of the information derived from the two sources. Table 1 lists the growth rates for nine commodities that were relevant both in Dutch trade with Germany and Hamburg's overseas imports with a share in total trade value 1736–1798 of at least 0.5 per cent serving as a criterion on the side of Hamburg. The major omission is coffee on the grounds that Amsterdam and the surrounding region exported only very small quantities of this commodity to the German Rhineland in 1753.

Table 1 shows that with few exceptions annual growth rates of recorded imports in Hamburg are smaller than those of exports from Amsterdam to its German hinterland. As for rice the growth rate of imports through Hamburg collapses from 8.7 per cent to 1.7 per cent if average imports in 1747–1755 are taken as a starting point instead of imports in 1753. We are thus left with almonds and tea as the only commodities for which the import growth rate in Hamburg exceeds the growth rate of exports from the Admiralty of Amsterdam into the German hinterland. To be sure, a major finding of the later analysis, namely, that imports of Mediterranean goods declined whereas imports of colonial commodities grew vigorously, is preserved. Moreover, I am not aware of a detailed critique of the Dutch trade statistics of 1753; if the rate of under-reporting is higher in 1753 than in the years around 1790 then Table 1 overestimates the true growth of trade with the German hinterland. Finally, it is impossible to separate under-registration from trade diversion to Altona and other satellite

sea ports on the Elbe estuary as a result of heightened competition from the 1750s (see above). In any case we must conclude at the present moment that the toll ledgers of Hamburg may underreport trade growth at least for certain commodities. The discrepancy is particularly large for indigo (5.0 vs. -2.0 per cent), the most important colorant in international trade before the advent of chemical dyes, which confirms Engel's (2008) observation of a massive under-registration of dyestuff trade in Hamburg's toll registers.

Table 1:
Commodity-specific growth rates of exports from the Admiralty of Amsterdam to the German hinterland (Rhineland) and recorded imports in Hamburg, 1753 to 1789–1792 (annual growth rates in per cent)

	Exports from Amsterdam to hinterland	Recorded imports in Hamburg	Share in total imports in Hamburg, 1733–1798
Almonds (quantity)	-2.9%	-0.2%	0.5%
Cotton raw (quantity)	1.7%	0.3%	0.6%
Drogues (value)	1.4%	0.4%	0.6%
Indigo (quantity)	5.0%	-2.0%	2.1%
Raisins, currants (quantity)	-0.3%	-1.3%	2.6%
Rice (quantity)	3.1%	8.7%	1.6%
Sugar (quantity)	2.1%	0.6%	38.0%
Tea (quantity)	0.4%	14.4%	0.5%
Tobacco (value)	3.5%	1.5%	3.1%

Sources: Admiralty of Amsterdam: Own calculation based upon van Nierop (1915); Hamburg: as below, Table 4.

2) A second issue relates to the procedure followed in deriving import values. Some of the discrepancy between contemporary estimates of Hamburg's import trade and the figures derived from the toll ledgers may in fact result from differences relative to the method used in assessing import values. Foreign consuls tried to collect information on import quantities on the basis of incoming ships and their cargos, and then commissioned brokers with producing a value estimate out of the quantity information. The toll ledgers, by contrast, rest on the self-declaration of value by importers, and it has been suggested that customary prices — and not market prices quoted in the stock exchange — were applied in assessing taxable value (Schneider et al. 2001: 11). Gentlemen's agreements between merchants and officials may have led to under-declaration, which would explain some of the discrepancy between contemporary estimates of total imports and sums derived from the toll registers. Furthermore, using price quotes from the stock exchange to deflate values derived from the toll registers to get real import quantities, as is done below, is subject to two caveats: First, given a potential discrepancy between prices used for tax assessment and price quotes the resulting series may fail to capture short-term fluctuations of import quantities correctly. Second, to the extent that prices applied in fixing taxable value were below market prices, use of the latter in deflating import values introduces a downward bias to the estimate of real import quantities.

3) The third major shortcoming of the toll ledger relates to the absence of a standardized categorization of commodities. Consequently, there exist relatively large categories of vaguely specified or unspecified groups of commodities, of which one would like to know more in detail. These include retail goods (2.5 per cent of total recorded imports 1733–1798), colonial and East Indian goods (1.3 per cent), manufactures (0.6 per cent), and *drogues* and *Materialwaren*, vague contemporary terms that relate to dyestuffs, chemicals and medicaments (0.6 per cent). Another 0.8 per cent of total import value was designated as diverse goods or diverse merchandise, or it was impossible to interpret the contemporary term (category "undefined" in Table 2). Finally, 1.1 per cent of total imports relate to a number of scattered goods that record small values and could not be classified into another category (category "not classified" in Table 2).

Under unspecified colonial goods were pulled together explicit declarations of colonial goods in general and composite items consisting of several colonial goods, as for example a joint declaration of tobacco, indigo and sugar. Such composite items became more frequent during the 1780s and particularly the 1790s, which inflates the share of the category of unspecified colonial and East Indian goods. Possibly the uncertain trade conditions and strong price fluctuations during this period (cf. Figures 1 and 2 below) rendered it difficult for importers and officials to reach a consent over the taxable value of individual items. This phenomenon leads to a slight underestimation of the growth of imports of colonial goods. To minimize this effect, a particular composite, namely the joint declaration of sugar and coffee, which comprises an additional 1.1 per cent of total imports (2.4 per cent during the 1790s) was split into sugar and coffee according to the relative proportion of the import values of these commodities in each individual year.

Apart from the declarations referring to unspecified colonial commodities and unclassified goods the categories with vague specifications make up about 5.6 per cent of total import value over the whole period of observation. This is too small to overturn findings relating to aggregate trends or major commodity groups. At the same time, however, the data set contains only nine individual commodities with import shares above one per cent over the whole observation period, plus cotton cloth, woollens and worsteds, and whale products as aggregate categories. Most of these goods could also be contained in one of the unspecified categories, and their total size of 5.6 per cent thus implies a considerable imprecision of the import values even for major goods with import shares of about one per cent. In particular, unspecific registration of *drogues* and *Materialwaren* may partly explain the low and variable coverage of dyestuff imports noted earlier. The magnitude of the categories relating to vaguely specified commodities implies that the analysis of import quantities of individual goods must be largely confined to those with large import shares.

The bottom line of all this is that the toll registers have gaps relative to select commodities whose weight in total trade probably increased over time (coal, grain) as well as with respect to regional coverage. In particular, imports from the United Provinces were exempt from tolls. As Hamburg progressively emancipated itself from the Dutch entrepôt this branch of trade grew below average so that its exclusion contributes to an over-estimation of aggregate trade growth. With respect to the trade flows that were subject to tolls, the

source covers between 60 per cent and two thirds of the likely true import values, with probably only limited change over time. The remainder relates to transit trade and, possibly, fraud. Thus, for the trade flows that were subject to import tolls, the registers are broadly reliable with respect to changes in the absolute value of trade, the geographic pattern of import sources and the composition of the principal commodities. However, the presence of relatively large categories of vaguely specified goods implies that on the level of individual commodities the analysis must be confined to those with large import shares. The toll registers may fail to track changes in import values of minor commodities with accuracy; the available evidence suggests that this the case in particular with respect to dyestuffs.

4. The changing composition of imports

Table 2 shows the commodity composition of imports in various sub-periods between 1733 and 1798, Table 3 does the same for regions of origin, respectively (see Denzel 2015: 138–55 for a similar analysis). Note again that throughout the remainder of this study imports refer to imports from origins west of the Scheldt River, plus the British Isles and the White Sea (mainly Archangelsk). The discussion of the commodity and regional structure of imports provides the background for the analysis of the evolution of real trade quantities in later sections. From the 1730s to the 1790s the commodity composition of imports displayed four salient features:

1) First, colonial goods increasingly dominated overseas imports, combining somewhat less than half of total recorded import values in the 1730s and early 1740s and slightly above 70 per cent during the last three decades of the eighteenth century. The high level and steady growth of the share of colonial goods must have resulted from a profound restructuring of Hamburg's import trade that occurred sometime between the War of the Spanish Succession (1701–1713/4) and the early 1730s: Back in 1678 the three most important consumption goods from intercontinental trade — sugar, tobacco and ginger — amounted to merely 24.2 per cent, and all colonial commodities together made up only 22.8 per cent of all recorded imports in 1702–1713 (own calculation from Baasch 1929; Newman 1985: 58).

With a third or more of total recorded import value sugar constituted the single most important commodity of Hamburg's overseas import trade between the 1730s and 1800. The dominant position of sugar mirrors the town's importance in European sugar refining mentioned earlier. Whereas the weight of this commodity in total overseas imports increased substantially during the last quarter of the seventeenth and the first quarter of the eighteenth century, that is, during the so-called sugar revolution in the Caribbean and neighbouring mainland America (10.3 per cent in 1678, 16.0 per cent in 1702–1713; Baasch 1929; Newman 1985: 58), its share rose only little after the 1730s. At least in terms of its value recorded sugar imports increased only slightly faster than total trade over the latter two thirds of the eighteenth century.

Table 2:

Commodity composition of recorded imports in Hamburg, 1733–1798 (mean values per year in 1000 Mark banco)

	1733–1742 (1733/4, 1736–40, 1742)		1753, 1755		1756–1763 (1756, 1760, 1762/3)		1769–1773 (1769–71, 1773)		1781–1789		1790–1798 (1790–2, 1794/5, 1797/8)	
	Value	per cent	value	per cent	value	per cent	value	per cent	Value	per cent	value	per cent
Mediterranean commodities	**1722.9**	**15.5%**	**2061.9**	**15.0%**	**2301.5**	**17.9%**	**1741.6**	**12.1%**	**1919.6**	**9.4%**	**2023.4**	**5.5%**
Wine	729.8	6.6%	1055.5	7.7%	1016.0	7.9%	737.3	5.1%	768.1	3.8%	1011.5	2.8%
Raisins, currants	463.3	4.2%	426.2	3.1%	566.2	4.4%	567.7	3.9%	508.9	2.5%	490.1	1.3%
(Olive) oil	345.7	3.1%	407.3	3.0%	488.1	3.8%	262.0	1.8%	387.6	1.9%	289.9	0.8%
Almonds	100.5	0.9%	72.0	0.5%	112.8	0.9%	69.6	0.5%	125.1	0.6%	103.2	0.3%
Fruit (incl. fruit skins, juice)	83.7	0.8%	100.8	0.7%	118.4	0.9%	105.0	0.7%	129.8	0.6%	128.7	0.4%
Colonial commodities	**5224.0**	**46.9%**	**7945.7**	**57.9%**	**7120.0**	**55.4%**	**10148.7**	**70.5%**	**14779.0**	**72.7%**	**26296.2**	**71.9%**
Sugar	3713.9	33.3%	5264.7	38.3%	4742.8	36.9%	6176.4	42.9%	8242.0	40.6%	13446.3	36.7%
Coffee	648.9	5.8%	1615.8	11.8%	1405.7	10.9%	2967.3	20.6%	4858.7	23.9%	9370.8	25.6%
Tea	54.2	0.5%	11.1	0.1%	9.5	0.1%	26.9	0.2%	148.0	0.7%	214.1	0.6%
Cacao, chocolate	16.3	0.1%	7.5	0.1%	9.9	0.1%	13.6	0.1%	47.5	0.2%	123.7	0.3%
Tobacco	423.5	3.8%	448.9	3.3%	431.4	3.4%	534.1	3.7%	693.7	3.4%	939.2	2.6%
Rice	122.4	1.1%	200.6	1.5%	219.2	1.7%	246.7	1.7%	391.5	1.9%	625.9	1.7%
Spices	216.0	1.9%	336.9	2.5%	285.1	2.2%	153.9	1.1%	269.0	1.3%	576.5	1.6%
Colonial goods, East Indian goods	28.7	0.3%	60.3	0.4%	16.3	0.1%	29.7	0.2%	128.7	0.6%	999.8	2.7%
Textiles (including yarns)	**2268.6**	**20.4%**	**1358.1**	**9.9%**	**847.8**	**6.6%**	**523.7**	**3.6%**	**533.6**	**2.6%**	**2067.6**	**5.7%**
Cotton goods	1535.2	13.8%	833.8	6.1%	348.9	2.7%	274.7	1.9%	183.0	0.9%	1534.0	4.2%
Woollens, worsteds	643.2	5.8%	458.8	3.3%	451.3	3.5%	206.2	1.4%	297.4	1.5%	434.2	1.2%

(Table 2, cont.)

	1733–1742 (1733/4, 1736–40, 1742)		1753, 1755		1756–1763 (1756, 1760, 1762/3)		1769–1773 (1769–71, 1773)		1781–1789		1790–1798 (1790–2, 1794/5, 1797/8)	
	Value	per cent	value	per cent	value	per cent	value	per cent	value	per cent	value	per cent
Other textiles	90.1	0.8%	65.5	0.5%	47.6	0.4%	42.8	0.3%	53.2	0.3%	99.3	0.3%
Other manufactured goods (including inputs)	**140.6**	**1.3%**	**175.7**	**1.3%**	**200.4**	**1.6%**	**162.7**	**1.1%**	**294.1**	**1.4%**	**942.5**	**2.6%**
Iron goods	4.0	0.0%	22.8	0.2%	25.0	0.2%	26.4	0.2%	33.1	0.2%	69.5	0.2%
Other metal goods	77.6	0.7%	74.3	0.5%	76.7	0.6%	39.5	0.3%	82.9	0.4%	162.6	0.4%
Paper, glas, glasware	17.1	0.2%	12.1	0.1%	26.5	0.2%	25.7	0.2%	37.2	0.2%	45.3	0.1%
Home goods	11.4	0.1%	22.0	0.2%	27.7	0.2%	24.5	0.2%	45.3	0.2%	78.5	0.2%
Plaited goods, mats, straw goods	11.9	0.1%	33.0	0.2%	26.9	0.2%	23.3	0.2%	41.8	0.2%	58.8	0.2%
Soap	4.2	0.0%	8.3	0.1%	13.6	0.1%	7.9	0.1%	9.6	0.0%	61.6	0.2%
Manufactures unspecified	14.3	0.1%	3.1	0.0%	4.1	0.0%	15.4	0.1%	44.3	0.2%	466.2	1.3%
Industrial inputs (apart from metals)	**757.8**	**6.8%**	**973.6**	**7.1%**	**661.3**	**5.1%**	**634.9**	**4.4%**	**927.8**	**4.6%**	**2397.2**	**6.6%**
Textile fibres	67.8	0.6%	67.3	0.5%	44.6	0.3%	53.0	0.4%	152.0	0.7%	487.6	1.3%
Dyestuffs	537.7	4.8%	708.2	5.2%	429.7	3.3%	419.9	2.9%	546.2	2.7%	1594.9	4.4%
Rubber	36.6	0.3%	85.5	0.6%	48.7	0.4%	35.2	0.2%	51.6	0.3%	69.9	0.2%
Terpentine, vitriol	17.1	0.2%	19.0	0.1%	19.8	0.2%	8.6	0.1%	24.6	0.1%	49.6	0.1%
Potash	1.2	0.0%	7.5	0.1%	34.1	0.3%	47.0	0.3%	30.5	0.2%	30.0	0.1%
"Drugs", "Materialwaren"	97.3	0.9%	86.1	0.6%	84.4	0.7%	71.1	0.5%	122.8	0.6%	165.2	0.5%

(Table 2, cont.)

	1733–1742 (1733/4, 1736-40, 1742)		1753, 1755		1756-1763 (1756, 1760, 1762/3)		1769-1773 (1769-71, 1773)		1781–1789		1790–1798 (1790-2, 1794/5, 1797/8)	
	value	per cent	value	per cent	value	per cent	value	per cent	value	per cent	value	per cent
Other, specified	**535.0**	**4.8%**	**672.9**	**4.9%**	**888.5**	**6.9%**	**724.2**	**5.0%**	**937.8**	**4.6%**	**1325.1**	**3.6%**
Alcoholic drinks other than wine, mineral water, vinegar	160.7	1.4%	221.0	1.6%	267.2	2.1%	121.7	0.8%	226.7	1.1%	358.7	1.0%
Furs, hides, leather	123.6	1.1%	129.0	0.9%	102.2	0.8%	57.8	0.4%	135.9	0.7%	430.3	1.2%
Whale and fish goods: blubber etc.	92.6	0.8%	182.9	1.3%	89.6	0.7%	127.9	0.9%	323.2	1.6%	224.9	0.6%
Other fats (butter, cheese, tallow, lights etc.)	60.9	0.5%	81.9	0.6%	306.6	2.4%	339.1	2.4%	122.7	0.6%	115.2	0.3%
Wood, wooden goods (incl. cork)	39.0	0.4%	18.7	0.1%	76.1	0.6%	20.5	0.1%	28.3	0.1%	74.0	0.2%
Medicaments	22.5	0.2%	35.2	0.3%	30.5	0.2%	9.0	0.1%	51.3	0.3%	65.9	0.2%
Salt	4.6	0.0%	1.1	0.0%	7.7	0.1%	12.0	0.1%	40.6	0.2%	30.3	0.1%
Tar	31.0	0.3%	3.1	0.0%	8.6	0.1%	36.2	0.3%	9.0	0.0%	25.7	0.1%
Other, unspecified	**489.5**	**4.4%**	**540.5**	**3.9%**	**833.0**	**6.5%**	**453.6**	**3.2%**	**927.6**	**4.6%**	**1538.8**	**4.2%**
Retail goods	235.4	2.1%	383.1	2.8%	508.5	4.0%	305.6	2.1%	505.4	2.5%	826.0	2.3%
Not classified	121.5	1.1%	122.9	0.9%	145.0	1.1%	106.7	0.7%	241.8	1.2%	417.4	1.1%
Undefined	132.7	1.2%	34.5	0.3%	179.5	1.4%	41.3	0.3%	180.4	0.9%	295.4	0.8%
Total	11138.4		13728.4		12852.4		14389.3		20.319.4		36590.8	

Source: Schneider et al. (2001); electronic database kindly provided by Markus Denzel.

Table 3:

Regional composition of recorded imports in Hamburg, 1733–1798 (share in total imports)

	1733–1742	1753, 1755	1756-1763	1769-1773	1781–1789	1790–1798
Mediterranean	10.8%	11.0%	12.0%	10.1%	9.0%	5.4%
France	2.3%	3.0%	2.1%	1.9%	2.2%	0.7%
Italy	2.4%	2.4%	2.6%	1.9%	2.6%	2.2%
Spain	3.9%	3.7%	5.3%	3.7%	2.3%	1.7%
Continental Atlantic	54.9%	63.2%	32.6%	65.9%	64.7%	32.4%
France	46.5%	56.8%	24.5%	55.9%	50.8%	19.2%
Portugal	6.3%	4.5%	5.6%	9.8%	12.6%	8.8%
Spain	2.1%	1.9%	2.5%	0.3%	1.1%	3.4%
British Isles	31.3%	23.1%	47.9%	20.8%	18.9%	37.3%
England	31.2%	22.8%	46.4%	19.0%	18.2%	36.1%
Russia	1.6%	1.9%	2.0%	2.7%	1.6%	1.1%
Other continents	1,2%	0.8%	5.4%	0.5%	5.3%	23.5%
East Atlantic Islands	0.6%	0.4%	0.4%	0.3%	0.2%	0.1%
North America	0.2%	0.0%	0.2%	0.0%	1.7%	17.6%
West India	0.3%	0.4%	4.7%	0.2%	3.5%	3.8%
Other	0.1%	0.1%	0.1%	0.0%	0.4%	0.4%
Sum	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: See Table 2.

The importance of colonial goods in Hamburg's imports grew primarily because of a spectacular rise of coffee trade: While virtually absent from the toll lists at the beginning of the eighteenth century (0.5 per cent in 1702–1713; Baasch 1929) coffee already made up for 5.8 per cent in total overseas imports during the 1730s and early 1740s. From then until the last decade of the eighteenth century the value of coffee imports increased by a factor of fifteen, and their share in recorded imports rose to a quarter. Together with cocoa, tea and sugar, coffee has been considered as a bundle of colonial commodities that added a new element of bitter-sweet tastes to the European diet and thus contributed to the consumer revolution (Mintz 1985: 18, 137, 148–50). The evidence of Table 2 suggests that imports of cocoa and tea, while experiencing considerable growth in absolute values, remained marginal items in Hamburg's long-distance trade as a whole; their combined share in total imports never surpassed one per cent. German consumers thus appear to have developed mainly into coffee drinkers during the eighteenth century. The contrast in import values between coffee and tea in particular is mitigated only modestly by the fact that contemporaries considered four times the quantity of coffee relative to tea being required to prepare a fully flavoured cup of the respective beverage (Menninger 2004: 315). Coffee could be stretched by surrogates *ad libitum*, and the price of coffee per pound was about half the price of tea during most of the period under study.

The most important colonial good apart from sugar and coffee was tobacco, but its share in total imports tended to decline over the period under study (from 3.8 per cent in the first sub-period to 2.6 per cent in the last). This decline must have begun in the period of the War of the Spanish Succession if not earlier. In 1678 Hamburg imported tobacco for 636 thousand Mark — a value reached again only in the 1780s —, which constituted 9.1 per cent of total overseas imports; already in 1702/03, before general war set in, tobacco's import share had declined to an average of 5.5 per cent (Baasch 1929; Newman 1985: 58). We should also note, however, that tobacco is one of the few commodities experiencing drastic reductions of freight charges in the seventeenth and eighteenth centuries, which reduced its relative price in Europe (Menard 1991: 253–64; Figure 4 below). Even a growth rate of import quantities above average (Table 5 below) is then compatible with a declining share in total trade value.

Also note that spices, which had constituted a major object of European intercontinental trade up to the first half of the seventeenth century, were rather unimportant in Hamburg's import trade from the 1730s; their share in total recorded imports never exceeded 2.5 per cent (1753/55). Amsterdam continued to play its role as a major distributor of Asian spices on continental Europe until 1795. Since trade with Holland was not liable to import tariffs, important quantities of spices provided by Amsterdam may have gone unreported by the toll registers. However, even in a normal year such as 1790 imports from Holland accounted for only 18.7 per cent of the total pepper imports, so that the general conclusion that trade values of spices were modest in comparison remains valid (Röhlk 1973: 89–90; cf. Steensgaard 1990: 121–3, 146 for the general context).

2) Second, Mediterranean beverages and groceries constituted an important part of Hamburg's overseas imports, sometimes surpassing textiles in value. However, import values

of this category of commodities grew little over the period of observation (11.4 per cent from the first sub-period to the 1780s), and its share in total imports declined over time, particularly during the three decades following the Seven Years' War. In some sense, the decline in the relevance of Mediterranean goods in Hamburg's overseas trade mirrors the rise of colonial groceries, and this trend must have begun already around the turn of the eighteenth century: In 1678 six of the fifteen most important items listed by Newman (1985: 58) were Mediterranean goods; their combined share in total recorded import value was 34.7 per cent, with raisins alone accounting for 15.3 per cent. By 1702–1713 the share of Mediterranean consumption goods had declined to the level recorded for the 1730s and early 1740s, namely, 16.4 per cent (calculated on the basis of Baasch 1929). The decline was most spectacular for raisins, but it affected all major Mediterranean goods alike. Obviously, the rise of the sugar and coffee trades from the late seventeenth century and the 1720s/early 1730s, respectively, corresponded to a shift of the provenience of imported consumption goods from the Mediterranean to the Americas.

Third, textiles and inputs for textile production dominated trade with manufactures, making up between two thirds and more than nine tenths of total imports of manufactured goods and related inputs. Since Germany had specialized on the production of iron and metal goods from an early time on, this segment was of marginal relevance in import trade. Another class of partly manufactured goods looming large in European long-distance trade in general, namely, furs, hides and leather, seems to have lost its importance over the first third of the eighteenth century. In 1702–1706, this category accounted for 18.5 per cent of total recorded imports, with Russia leather imported via Archangel being the most important item among these commodities (Baasch 1929); in 1733–1742 the share of furs, hides and leather had dropped to 1.1 per cent. Since Hamburg and Amsterdam continued to be rivals in the distribution of Russia leather over the eighteenth century (Baasch 1910b: 96) it may be that after 1706, when the import toll registers cease to record imports from Archangel for some time, trade with Russian furs, hides and leather was never registered completely anymore.

Recorded import trade with textiles suffered a spectacular decline both in absolute value and as a proportion of total import value between the 1730s and the 1780s, followed by a strong recovery during the 1790s. This development was primarily driven by cottons but to a weaker extent imports of woollens and worsteds followed a similar trajectory. In 1733–1742 Hamburg imported cotton goods for about 1.5 million Mark on average, rendering these products the most important item in the town's import bill after sugar. This period saw the culmination of a trend that must have started at the beginning of the eighteenth century: In 1702, 1703 and 1713 — years at the beginning of the eighteenth century when the impact of war was weak or non-existent — cottons worth only about 150 thousand Mark entered the sea port, and in 1702/03 (not in 1713) the import value of woollens and worsteds still exceeded the one of cotton goods by a factor of about 3.5 (computed on the basis of Baasch 1929). Thus, cotton acceded to the status of fashion's favourite (Lemire 1991) not only in Britain but also in Hamburg and its hinterland during the first three decades of the eighteenth century (cf. with British re-export figures for Indian calicoes in Steensgaard 1990: 127–8).

Recorded trade with woollens and worsteds, by contrast, remained roughly stable in this period.

After the early 1740s imports of cotton goods declined continuously both with respect to value and to its share in total import value; during the 1780s average value exceeded barely the level recorded at the beginning of the century. Since the figure includes yarns and semi-finished cottons imported for being printed it is difficult to disentangle the effects of changes in consumer demand and industrial relocation in the North Sea area during the second half of the eighteenth century. For instance, the spectacular rebound of the 1790s, which led to a quadrupling of the annual average share of cotton goods in total imports relative to the 1780s, was probably to a large part due to the beginning invasion of British machine yarn and the fact that the British industrial revolution also cheapened the main input for the calico printing manufactories in Hamburg, Saxony and possibly northern Bohemia, namely, white cottons. On this background, I shall devote a separate section to exploring the processes underlying Hamburg's trade with cotton goods (section 8 below).

Imports of industrial inputs apart from metals (which are included in the "other metal goods" category) were also dominated by inputs required by the textile industry. Dyestuffs in particular were highly differentiated, but as a group they constituted the sixth (1733–1742) or fifth (1790–1798) most important category of imports by value, despite evidence of serious under-registration of dyestuff trade (cf. section 3 above). Note also that the through observed for imports of cottons during the 1750s–1780s is less severe and ends in the 1770s. This leaves room for import substitution as at least partial explanation of the trajectory of trade with finished cotton.

Fourth, household consumption goods apart from textiles ("home goods" in Table 2), comprising items such as clocks and watches, porcelain and furniture, were marginal items of trade in that they never accounted for more than 0.2 per cent of total imports. Luxurious household goods constituted an important element of the consumer revolution in Britain and the Netherlands (Schama 1988; Berg 2005), and their irrelevance in Hamburg's import trade suggests that in Germany changes in consumption patterns beyond the spread of colonial groceries was confined to a very narrow elite, which was perhaps in part due to the absence of major metropolitan centres in Hamburg's hinterland. It may well be though that important volumes of French luxury items were transported overland and thus bypassed the emporium of Hamburg or the assessment of the town's toll authorities (Butel 1990: 65; cf. also Baasch 1910a: 168 [31.12.1790]). Output from quite a number of state-sponsored manufactories also substituted for imports of porcelain, so that cultural transfers of *chinoiseries* occurred through status display of rulers, rather than via trade fostered by demand from a larger clientele (for the archetypical case of Meissen, see Pietsch and Ufer 2008: 8–29, 96–113). But despite these qualifications there would have remained sufficient space for imports of luxury goods, notably from Britain. The fact that "other textiles", which refer to silk, stockings and (partly old) garments remain marginal items of trade with a share in total imports never surpassing 0.8 per cent confirms the impression that consumption of luxury items was confined to very narrow circles.

While small in absolute value, imports of consumer goods apart from textiles experienced vigorous growth over the period under study. Over the whole period 1733–1798 import values of household goods showed an exponential trend of 2.9 per cent p. a., whereas imports of plated goods, mats and straw goods grew at 2.3 per cent annually. Also noteworthy is the finding that import values of substances used as medicaments and for bodily well-being increased at an annual rate of 1.9 per cent, albeit with strong fluctuations. Since the population in Hamburg's hinterland grew at an annual rate of 0.4 per cent between 1740 and 1790 and the prices of traded goods rose at a rate of 0.7 per cent p. a. in 1736–1798 (import price index from Figure 1 below), these increases in values point to considerable growth in per capita consumption of differentiated consumer goods. Import quantities of soap (calculated with the methodology explained in the next section) also increased with a rate of 2.1 per cent p. a. between 1736 and 1798, albeit with a long phase of decline between 1763 and 1785. Finally, there occurred a marked increase of the diversity of traded goods over time: After standardizing spelling and excluding composite items, toll registers record 653 different items in 1733–1742 but 983 items in 1790–1798 — despite an increasing concentration of trade on relatively homogeneous commodities such as coffee and sugar. All this suggests a trend towards product differentiation among traded goods and an increase of per capita consumption of the paraphernalia of a bourgeois lifestyle. The small share of these items in total imports at the same time implies the restriction of this consumption pattern to a very narrow elite (see also Fertig and Pfister 2016 for a detailed discussion).

I conclude this section with a short discussion of the regional composition of trade displayed in Table 3. France and England were Hamburg's two most important partners in overseas trade, accounting for 80 per cent and more of all recorded imports from beyond the mouth of the Scheldt up to c. 1790, when trade with France collapsed due to war and the United States emerged as an important supplier of colonial groceries. Britain complemented Mediterranean ports with supplying groceries and industrial inputs such as raw cotton, silk and oak apple. Particularly during the Seven Years' War Britain substituted continental suppliers of colonial groceries, which explains her high share in total imports during this period (47.9 per cent). Finally, Britain was also the most important supplier of manufactures; the decline of her share until 1780s apart from the war period 1756–1763 must be considered as a reflection of the trajectory of trade with textiles.

Apart from the Seven Years' War France was the dominant source of overseas imports before the Revolution of 1789 and the ensuing war era. During the 1730s and early 1740s her share in total recorded imports was about one half, from the early fifties 60 per cent. Atlantic sea ports dominated French trade with Hamburg by a ratio of over 10 to 1 relative to the Mediterranean ports, which mirrors the importance of colonial groceries in trade relations between France and Hamburg. In 1678 France held an import share of only 12.9 per cent France and ranked fourth after Britain and Spain (23.6 per cent each) and Holland (20.9 per cent; Newman 1985: 59). It was the rise of the plantation economy in the French Caribbean, first based on sugar during the late seventeenth century, then increasingly complemented by coffee during the two decades following the War of the Spanish Succession, that

created the basis for the close symbiosis between the Atlantic sea ports of France and Hamburg during the remainder of the pre-revolutionary period. To a substantial extent, then, Hamburg's overseas trade during this era appears as an appendix to the French plantation and colonial trade complex (Butel 1990: 160–8; Menninger 2004: 179–81; Weber 2004: 154–224). Only the trade patterns of the 1790s presage the sea port's conversion from a 'French' into a 'British' town whose foremost function consisted in the mediation of intra-industry trade among two developing industrial economies (Krawehl 1977).

The analysis of import values undertaken in this section is useful to trace patterns and temporal shifts of the composition of trade. In addition, however, we would like to know how much trade growth there was both on the aggregate level and on the level of individual commodities. To get this information we need to deflate import values declared in the toll ledgers by commodity prices. The next two sections carry out this task, the first by construction price series and price indices, the second by constructing and series of real imports.

5. Import prices

Price information is required to convert import values into real quantities. From 1736 Hamburg's trade board published weakly price lists for a large number of commodities in the so-called *Preiscourant* (Baasch 1902). For most commodities price data take the form of lower and upper bounds of prices actually paid in a particular week according to the reports of the brokers that were charged with supplying the relevant information. The price margins could be fairly wide and remain sticky over longer time periods (cf. Figure 7 in Appendix 2 for an example). Thus, the *Preiscourant* allows only tracing mid-term price movements with a considerable margin of uncertainty. Annual averages for price series distinguished by their continuity over a long period of time have been published by Gerhard and Kaufhold (2001). 44 commodities for which we possess price series were also regularly reported as imports; additional goods for which no continuous series of import values could be established were not considered in the analysis. The share of the 44 commodities in total import value varied between 60.9 per cent (1736) and 90.6 per cent (1771); it was below 75 per cent in all years before 1757 and above 85 per cent in all years but two between 1769 and 1795. The fluctuation of this share implies that the 44 commodities with price information are not representative of total recorded import trade.

Depending on business practice prevailing in the trade with a particular commodity, prices were quoted in two different currencies, either in bank money (*Mark banco*) or courant money (*Courant*). *Banco* was the bullion-backed paper currency that was used for the transactions of the Bank of Hamburg. After the monetary reform of 1725 *Courant* was used as a standard denomination for circulating coin based on Hamburg's own coinage. The silver content of the *Mark banco* exceeded the one of the *Mark courant* by 22 per cent. To render the melting of coin unattractive the exchange rate between the two currencies, the so-called *agio* of Bank money against *Courant*, was originally fixed at 16 per cent, which overvalued *Courant* against *Banco*. However, the fixed exchange rate had to be given up in 1737 and until

the close of the century the market exchange rate gradually converged towards the intrinsic exchange rate, albeit with great fluctuations (Schneider 1986; Schneider et al. 1993: 9–15; cf. also McCusker 1978: 61–4). The toll ledgers noted import values in *Mark banco*, so that all prices were converted to this currency using the annual average rate given by Schneider et al. (1993: 192–5). Goods whose price was quoted at the stock exchange were not always identical with goods mentioned in the toll ledgers, and the price series have occasional gaps. Appendix 1 describes the conventions applied to the conversion of the information of the *Preiscourant* into price series used for deflating import values and documents the few interpolations that were necessary to obtain continuous series.

In their present version the price data are flawed with respect to three commodities with a high weight in total trade, namely, indigo, raisins and sugar. Gerhard and Kaufhold (2001: 377) give the price for indigo from Guatemala. However, before the French Revolution the overwhelming part of recorded indigo imports came via France and originated mostly from San Domingo (on average 79.0 per cent in 1736–1788). This probably explains the large gaps in the price series for Guatemalan indigo (see Appendix 1). By contrast, the *Preiscourant* regularly quoted prices of indigo from French San Domingo, although the denomination of specific types changes over time. Similarly, the present version uses prices of currants from Zante to deflate import values for both, currants and raisins. Raisins dominated imports of dried grapes and originated from the Spanish Mediterranean, particularly the region around Malaga. The *Preiscourant* gives prices for raisins, but the unit of measurement changes over time. Finally, the sugar price underlying the present analysis refers to white sugar from Brazil, whereas the overwhelming majority of sugar came from French West India, at least until 1791. Moreover, there occurred a shift to brown sugar (muscovado) over the period of observation; brown sugar was about 30 per cent cheaper than white sugar. The *Preiscourant* lists prices for a considerable range of types and proveniences of sugar, but with the exception of Brazilian white sugar denominations change considerably over time.

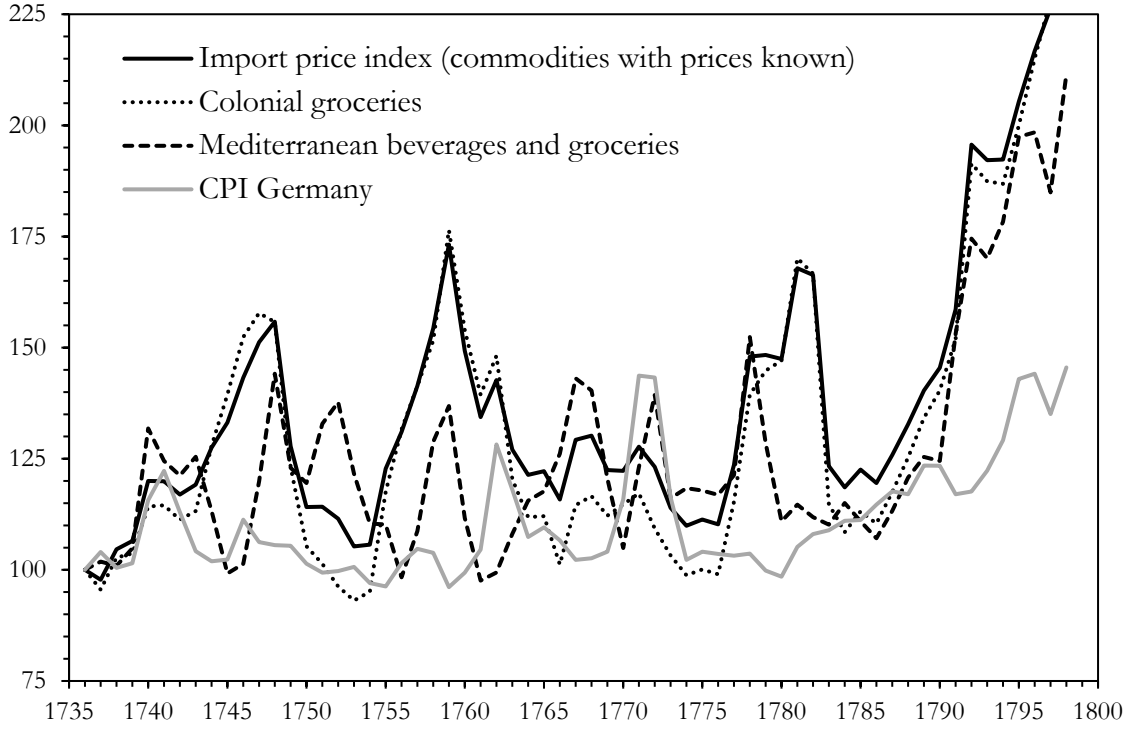
For all three commodities sensitivity tests were carried out on the basis of ten to twelve years up to 1790 with a time interval between data points of about five years. In each year one issue of the *Preiscourant* was selected arbitrarily.[1] A major result is that with the exception of raisins the coefficient of variation of the ratio between alternative prices and the prices used in this study remains below 0.1, implying stability of relative prices. Prices of raisins experienced an increase until c. 1765 (when the unit of measurement changes) similar in magnitude as those of currants, although the timing of this increase varies somewhat between the two commodities. The construction and use of alternative price series thus has the potential to increase the precision of computations of an aggregate price index and real quantities but it will not overturn the main results of the present analysis.

An additional observation should be made concerning wine, also a major item of import trade. Gerhard and Kaufhold (2001: 72) give the price of ordinary French white wine. This is in fact the only type of wine for which the *Preiscourant* provides continuous quotes with

[1] For this exercise I mostly worked with a copy of the *Preiscourant* made kindly available by Markus Denzel; the original is Commerzbibliothek Hamburg S/49.

reasonably narrow price margins. Cursory inspection of the *Preiscourant* suggests that denominations for other wine types change frequently and show wide price margins. Beyond ordinary white wine from France, wine traded in Hamburg thus constituted a differentiated product rather than a commodity. Since it is neither possible to trace the weight of ordinary white wine in total wine trade nor the change of relative prices of wines of differing quality I do not see at present a way to improve the precision of this price and quantity series.

Figure 1:
Silver price indices of total imports of commodities with price information and broad commodity groups, 1736–1798 (1736=100)

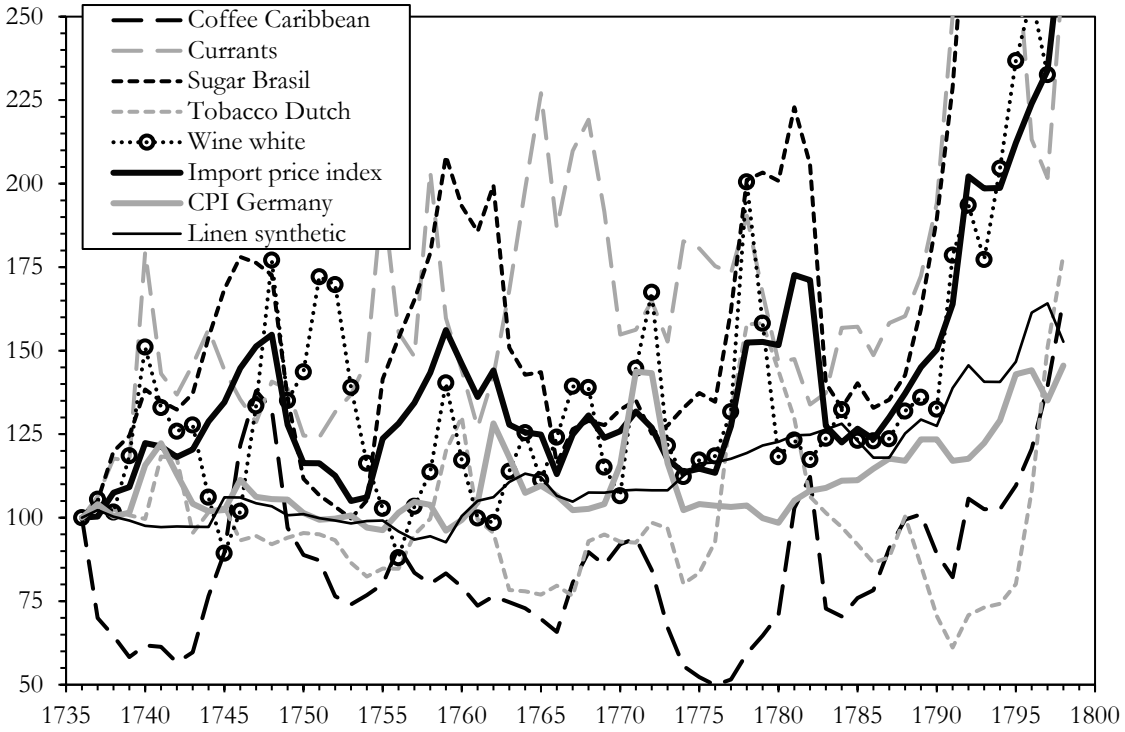


Sources: Own calculation based on Gerhard and Kaufhold (2001), see text and Appendix 1 for details; agio of bank money over courant money from Schneider et al. (1993: 192–5); CPI Germany from Pfister (2017, online appendix S3).

Price indices for aggregate imports and for individual commodity groups were constructed as chain indices in that the weight of each commodity in the index was adjusted in every year with known import values. All indices are specified as Fisher indices, that is, the geometric mean of Laspeyres and Paasche indices. Finally, for comparative purposes, indices and price series for individual commodities were deflated by the price of silver (Gerhard and Kaufhold 2001: 304). These are the series presented in Figures 1 and 2 and Table 4, whereas the analysis of real import quantities in the following sections rely on the original indices and price series referring to *Mark banco*. Figure 1 plots the indices of the two most important commodity groups, colonial groceries and Mediterranean beverages and groceries, whereas Figure 2 displays the silver price indices of the five most important import commodity plus the one of linen manufactured for export in the hinterland of the Hanseatic towns. Both figures include the aggregate import price index for the 44 commodities with known prices

and a consumer price index (CPI) for Germany. Finally, Table 4 presents relative prices of traded commodities against the German CPI indexed on 1736–1739, when prices of major commodity groups as well as the CPI moved largely in parallel (Figure 1). Changes of relative prices against the reference years 1736–1739 are shown for later periods that exclude years of major wars (1756–1763, 1781/82), which produced spikes in the relative prices particularly of colonial goods (see Figure 1 and below).

Figure 2:
Silver price indices of individual commodities, 1736–1798 (1736=100)



Sources: See Figure 1; synthetic price index of linen based on Appendix 2.

Three stylized facts stand out from these price series and price indices:

1) First, the aggregate price level of imports was largely driven by the prices of colonial groceries. This can be explained by the great weight of this commodity group in the segment of trade for which prices are known. At the same time, wars appear as a major source of fluctuations in the price level of traded goods, at least to the extent that these had to cross the Atlantic: The War of Austrian Succession (1740–1748), the Seven Years' War (1756–1763), the American War of Independence (1776–1782), which escalated into the fourth Anglo-Dutch War (1780–1784) and the French Revolutionary Wars from 1792 were all associated with strong spikes in the aggregate price level of imports and the prices of colonial goods; during war periods the price level of colonial groceries exceeded the peacetime level by 37.7 per cent. It should be stressed that war shocks were largely confined to the Atlantic theatre; prices for Mediterranean beverages and groceries display much more regular fluctuations that seem little connected to major wars.

2) Second, there is limited support for the Great Divergence thesis. If New World goods were capable to mitigate land scarcity in Western Europe, the relative prices of calorie-rich

colonial goods should decline relative to the CPI, in which non-traded land-intensive and calorie-rich goods such as grain assume great weight. This does not appear to have been the case during the period under study: Until c. 1790 the relative price of rice grew steadily, and even before the breakdown of the French plantation complex in the wake of the revolt on Saint-Domingue/Haiti (1791) the relative price of sugar against the CPI was always higher than in 1736–1739 (Table 4). This contradicts a major tenet of the Great Divergence thesis; calorie-rich goods from the Americas did not become cheaper over time relative to land-intensive Old World goods and therefore were unable to relieve land scarcity in Europe.

A different picture emerges when we focus on soft drugs, that is, coffee and tobacco. After the Seven Years' War, the relative price of coffee against the German CPI fluctuated in a band of ±10 per cent compared to the base period 1736–1739, and the one of tobacco continued its fall that must have originated in the seventeenth century right until the end of the period of observation (Menard 1991: 253–64).

The trajectory of the relative prices of the two most important soft drugs gains in stature if it is put in perspective against the one of wine and other Mediterranean goods. Abstracting from the Seven Years' War, goods originating from the Mediterranean world did not only become more expensive than domestic goods but also relative to Colonial commodities after 1750 (Table 4). Prices of Mediterranean goods also seem to be affected by the great European subsistence crises of the early 1740s and 1770s, respectively (Post 1985, 1990; Figure 1). Thus, there developed a wedge between two different types of exotic goods that is consistent with the Great Divergence thesis: Supply from overseas territories with ample land resources and efficient use of forced labour was more elastic than from the densely settled Mediterranean suffering from supply constraints. The resulting shift in relative prices created an incentive to reduce the use of currants, raisins and sultanas in baking cakes and puddings, and to accompany consumption of the possibly less savoury cakes with coffee drinking and tobacco smoking.

Table 4:

Relative prices of imports, commodity groups and individual colonial commodities against the German consumer price index (average of indexed ratios, 1736–1739=100)

	1740–1749	1750–1755	1764–1780	1783–1789	1790–1795
Import price index	120	112	113	109	144
Mediterranean goods	110	123	113	99	132
Colonial goods	122	103	106	103	142
Coffee	114	113	90	102	109
Rice	99	107	121	130	118
Sugar	127	102	120	111	188
Tobacco	93	90	93	81	57

Sources: Same as Figure 1.

3) The third and final observation relates to the development of the terms of trade. We do not know the exact commodity composition of exports, but we know that they were largely dominated by linen and copper. Figure 2 shows that the nominal silver price of linen

manufactured in Hamburg's hinterland stayed roughly stable until 1760 and then rose moderately. The nominal silver price of refined copper from the Harz region (Gerhard and Kaufhold 2010: 310) remained more or less stable until about 1770 and fell by -19.7 per cent between 1770 and 1790. Relative to the import price index the linen price fell by -18.4 per cent from 1736 to 1767 and the price of copper by -26.6 per cent. Terms of trade of linen fluctuated widely thereafter, and resumed their downward trend only in the 1790s, possibly as a consequence of the industrialization of cotton processing. The relative price of copper, by contrast, shows a further strong decline of -36.1 per cent until 1791, when the series ends. The bottom line is that the terms of trade of German exports fell by at least 20 per cent in 1736–1767 and probably continued to fall thereafter. Relative to other traded goods, German exports thus became cheaper in the course of the eighteenth century.

6. The evolution of real imports

The price series and price indices developed in the preceding section can be used to deflate the import values derived from the toll declarations to imports at constant prices and to estimate import quantities of select commodities. It should be noted that these estimates of real imports are beset with a considerable margin of error resulting from the imprecision of the toll registers and the failure of the price information to do justice to product differentiation and variable supply conditions of individual proveniences. The series of real import quantities should be used with caution, therefore, and the results of the analysis below must be considered as necessarily tentative.

Table 5 presents aggregate indices of imports at constant prices as well as indices of estimated import quantities of individual commodities; Table 6 shows the magnitude of the trends of the aggregate indices, and Figures 3 and 4 present the same information in graphical form. It was shown in the previous section that the goods for which we possess price information are not a representative selection of total trade and that their value experienced faster growth than the value of the goods for which no price information exists. Goods for which we have prices are relatively homogeneous commodities traded on the stock exchange. Goods for which no price series exist are mostly industrial products, essentially textiles, whose import value declined until the 1780s (cf. Table 2 above). Due to their high labour content and due to the secular rise in population size the real price of many textiles declined in the long run (Shammas 1994; Hoffman et al. 2002: 333). On this background I construct an index of total imports at constant prices in two variants (Figure 3 and top panel of Table 5): In the first variant total import value is simply deflated with the import price index developed in the previous section. This assumes that the prices of the goods without price information followed the prices of the commodities for which prices are known. Since real prices of goods with unknown prices probably declined this variant may underestimate trade growth and thus presents a lower bound for the trajectory of real import quantities. The second variant deflates the value of the goods for which no prices are known with the price for linen. As is visible from Figure 2 above the price for this product remained below the

import price index until the mid-1770s. Additional information suggests that nominal prices of German and East Indian cottons, which are listed in the Hamburg *Preiscourant* from 1763, remained more or less stable during the last third of the eighteenth century.[2] Hence, the second variant probably represents more adequately the trajectory of imports of goods for which no prices are available than the first variant.

There are two benchmarks to assess the growth performance of aggregate imports. The first is the annual number of folios in the ledgers of the Bank of Hamburg, which we know for fifteen years within the period under study (Sieveking 1933: 82; see Figure 4 below). The number of folios used in a given year should correlate with the number of payment transactions and can therefore be used as a proxy for the bank's business volume (not value). In a wider sense it is an indicator of the real business activity of the financial industry of the town. While the settlement of commercial balances certainly constituted a major service of the bank it should be stressed that there existed a number of financial activities only indirectly related to trade. One was maritime insurance, whose progressive organisation in companies from 1765 implied that idle cash balances developed that were invested in bills of exchange (Sieveking 1933: 82–3). Another important financial activity that partly followed from Hamburg's political neutrality consisted in the transfer of official payments, particularly of war subsidies. Note that the number of bank folios displayed in Figure 4 not only displays strong growth (2.4 per cent p. a.) but that the data points in 1745, 1757, 1761, 1763 and 1781 are seemingly unaffected by war, in stark contrast notably to imports of colonial groceries. This results in a very steady trend (R^2=0.91), which is only broken in 1795/96, a clear reflection of the transfer of financial activities following the Batavian Revolution from the Northern Netherlands to Hamburg. Removal of the last two years from the series reduces the growth rate to 2.1 per cent per annum and increases the trend's strength slightly to R^2=0.94. It is interesting to note that the growth rate of bank portfolios more or less equals de Vries (2010: 718–20) rough estimate of the long term growth rate of European transatlantic trade during the early modern era (2.2 per cent).[3]

Comparison of real import quantities with the evolution of the number of bank folios allows tracking the extent to which recorded trade was able to follow the development of the financial sector. It should be noted in this context that while an essential part of financial activities constituted of trade-related services, not all trade relied on banking services. An investigation into a trading firm that took up tobacco processing during the third quarter of the eighteenth century suggests that using the bill of exchange tended to be avoided whenever possible, that sending money by mail was widespread and that segments of business existed where payment in cash was current practice (Baasch 1928: 4, 12–4). The transaction

[2] Commerzbibliothek Hamburg S/49. The construction of annual price series of cottons follows the methodology as described for individual linen price series in Appendix 2.

[3] Sieveking (1933: 83) also reports contemporary estimates of bank turnover in 1751 (182 million *Mark banco*), 1774 (232), 1781 (343) and 1798 (900 million *Mark banco*). These for data points imply an exponential trend of 3.3 per cent p. a. If they are deflated by the import price index to obtain a measure of "real" turnover the growth rate shrinks to 1.5 per cent (1.6 per cent if the war year 1781 is omitted). Given the paucity of information on turnover and the difficulty to specify an adequate deflator these figures should not be interpreted.

volume of the Bank of Hamburg can thus be taken as an indicator of trade activity mainly of segments characterized by large turnover volumes and heavy involvement in long-distance trade.

Table 5:
Real imports, aggregate and select commodities (yearly average of index values, 1736=100)

	1736–42	1753, 1755	1756–63	1769–73	1781–89	1790–98
Aggregate indices						
Goods with known prices	111.7	145.3	114.8	156.4	176.9	217.0
Goods without price information, assuming price index of goods with known prices	76.2	54.1	39.9	29.2	37.0	65.7
Goods without price information, assuming synthetic linen price	81.9	63.0	52.8	33.2	40.3	91.5
All goods, assuming price index of goods with known prices	97.4	109.3	85.6	107.0	124.0	163.0
All goods, assuming synthetic linen price for goods without price information	99.9	114.9	91.9	111.9	125.7	168.7
Colonial groceries	121.7	161.5	120.8	192.3	228.2	288.8
Mediterranean beverages and groceries	88.9	107.8	97.4	80.0	72.8	60.7
Individual commodities						
Coffee	184.3	344.7	289.0	598.3	852.8	1377.5
Currants and raisins	60.2	43.1	57.9	55.9	47.8	31.7
Indigo	129.5	164.4	70.5	-	51.3	245.7
Olive oil	123.9	159.3	200.9	85.5	88.9	69.5
Rice	166.8	269.5	240.9	300.9	286.2	544.5
Sugar	119.2	154.5	98.1	172.3	180.8	173.6
Tobacco	108.6	131.1	113.5	141.1	161.2	267.3
Wine	96.9	134.3	143.5	92.0	82.2	76.1

Sources: Own calculation based on the sources for Table 2 and Figure 1.

The second benchmark relates to the mean growth rate of linen exports from Silesia, Bielefeld and Tecklenburg, which was 0.8 per cent p. a. (1740s–1795; Pfister 2015: 202–6). As noted in section 2, linen constituted Germany's chief export in the period under study, so that market turnover or export growth of major manufacturing regions can be taken as a proxy for export development of the Hamburg's hinterland as a whole. In equilibrium state the growth rate of exports should equal the growth rate of imports. Germany's external balance probably was not in equilibrium during the eighteenth century, however. The trade balance appears to have been negative, and remittances from migrants and foreign subsidies

were possibly insufficient to equilibrate the balance on current account (Kellenbenz 1964: 51–6; Schneider 1998: 574–5; Rössner 2008: 76–7). The low silver inflation in comparative context and the decline of the terms of trade are compatible with this statement (see above the discussion of Figure 1 in section 5).[4] To the extent that the external deficit was structural the growth rate of exports constituted an upper ceiling on import demand to keep the deficit on current account sustainable.

Table 6:
Growth rates of Hamburg's import trade aggregates, 1736–1798, in constant prices (per cent growth rate and R^2 of exponential trends)

	Total imports	Colonial groceries	Mediterranean beverages and groceries
Growth rate (per cent)	0.9	1.6	-0.7
R^2	0.47	0.68	0.38

Sources: Own calculation based on the sources for Table 2 and Figure 1. Trend for total imports refers to series where goods without price information are deflated with linen price index.

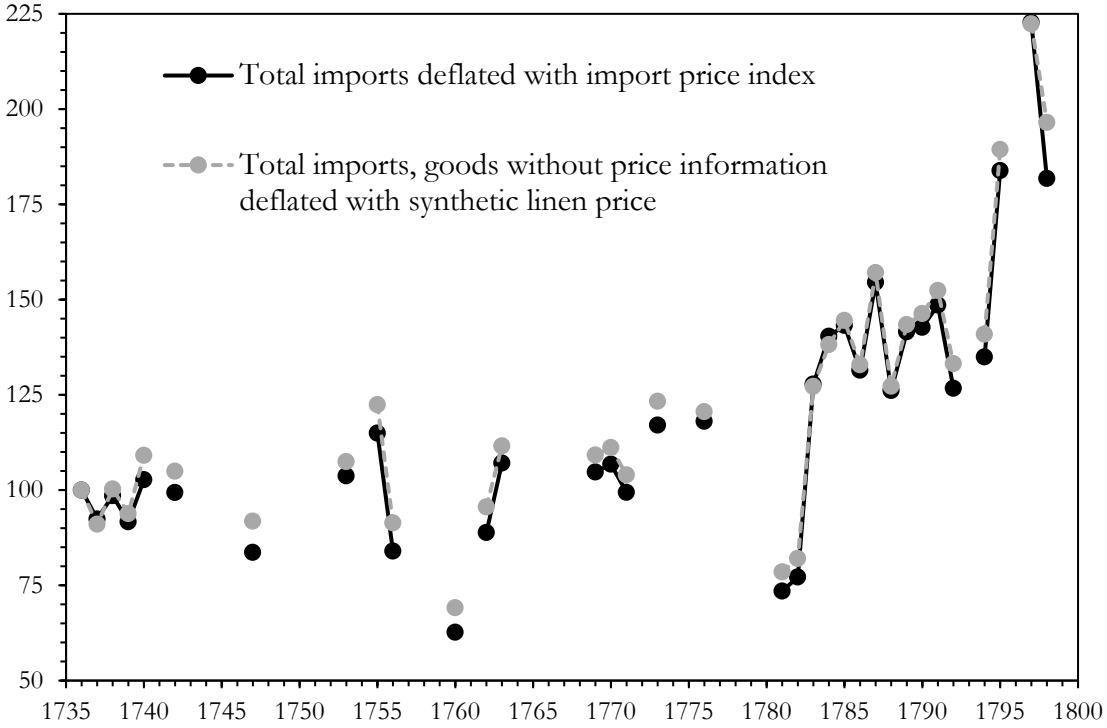
The indices shown in Table 5 suggest that, depending on the assumption relative to the prices of the goods for which no prices are available, total import volumes increased by 7–12 per cent from 1736 to 1769–1773, by 24–26 per cent to 1781–1789 and 63 to 69 per cent if the whole period from 1736 to 1790–1798 is considered. The exponential trend over the whole period of observation is 0.9 per cent per year for both variants of the import quantity index. Fluctuation around this trend is stronger if goods without price information are deflated with the import price index than when import values for this category are deflated by the price of linen (R^2=0.44 and R^2=0.47, respectively). The trend's magnitude is strongly influenced by the positive shock resulting from French occupation of the Netherlands in 1795. If the three years from 1795 are omitted, the exponential time trend shrinks to 0.68 per cent (with R^2=0.34) for the first and 0.65 per cent p. a. (with R^2=0.37) for the second variant of the import quantity index.

Since we cannot exclude that the information contained in the toll registers underrates trade growth we can say that in 1736–1794 real overseas imports of Hamburg increased at an annual rate of at least 0.7 per cent. This is more than population growth in the sea port's hinterland (0.4 per cent) so that imports per capita increased. Given that income per capita probably remained stable during the second half of the eighteenth century (Pfister 2011) the finding also implies an increase of openness. The estimated rate of import growth is of the same order of magnitude as the available information on export growth, which suggests mu-

[4] In England, consumer prices rose by 52.7 per cent between c. 1730 and 1790, and Italy recorded an increase of 66.2 per cent between 1729–1731 and 1789–1791 (Clark 2010: 99; Malanima's price index for Italy from http://www.paolomalanima.it/DEFAULT_files/Italian%20Economy/CPI_Italy_1250_2007.pdf). In Germany consumer prices increased by 27.7 per cent in the same period (Pfister 2017, online appendix S3).

tual consistency of the figures for the two sides of the trade balance. At the same time, however, recorded imports volumes grew much less than the transaction volume of the Bank of Hamburg and European transatlantic trade at large (about 2 per cent p. a.). Overseas trade of Hamburg and its hinterland was thus unable to follow the development of the most advanced segment of the service sector, and also failed to fully participate in the expansion of the Atlantic economy.

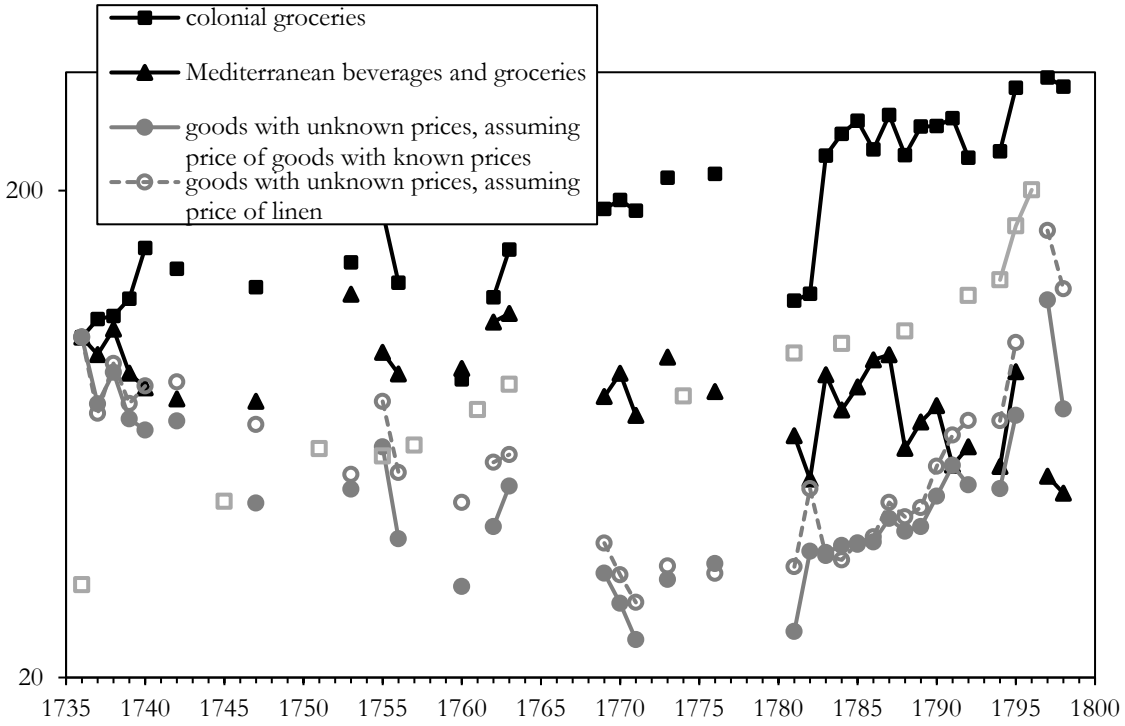
Figure 3:
Indices of aggregate imports in constant prices, 1736–1798



Sources: Own calculation based on the sources for Table 2 and Figure 1.

The moderate R^2 values of different computations of the exponential trend indicate that the trend was far from uniform. In concrete terms, the two periods of vigorous expansion between the 1730s and the mid-1750s and during the last quarter of century, respectively, were separated by roughly two decades of stagnation; real volumes in 1769–1773 were about 2–3 per cent below those in 1753/55. Recovery after the Seven Years' War, which brought a contraction of recorded imports by 20.0 to 21.7 per cent relative to 1753/55, was thus apparently followed by at best sluggish recovery, unlike the experience made after other wars. The stagnation of Hamburg's trade and economy in general during the 1760s and 1770s was already noted and documented with casual evidence relating to the real estate sector by a well-informed contemporary, Büsch (1797: 128–35), but has received little attention from later research so far.

Figure 4:
Indices of import of major commodity groups at constant prices and number of bank folios, 1736–1796/98 (logarithmic scale)



Notes: All values are in logs. The base year for the import indices is 1736. The number of bank folios has been divided by 10 to adjust scales.
Sources: Own calculation based on the sources for Table 2 and Figure 1; number of bank folios from Sieveking (1933: 82).

Modest growth with strong fluctuations on the aggregate level resulted from highly divergent trajectories of imports of major commodity groups (Figure 4): Apart from war-related shocks imports of colonial groceries grew at a fairly steady rate of 1.6 per cent p. a. Since I shall adduce evidence showing that the growth of sugar imports may actually have been somewhat higher than suggested by the present version of the series it can be said that imports of colonial groceries more or less followed the dynamic of Hamburg's financial sector and of European Atlantic trade in general. By contrast, imports of Mediterranean goods fell at a yearly rate of -0.7 per cent, albeit with strong fluctuations around this trend (its strength is only R^2=0.38). The decline becomes particularly noteworthy after 1763 (see also the trade shares reported in Table 2 above). One may object that the negative trend may have been caused by a decline of coverage by the toll registers. It should be remembered, however, that also Dutch exports of almonds and raisins into Germany experienced a contraction between 1753 and 1789–1792 (see Table 1 above). Whereas the exact magnitude of the decline of imports of Mediterranean goods is difficult if not impossible to determine its existence should be considered as certain. Finally, there is a substantial category of goods for which no price series exist and which consisted mainly of textiles. Estimated annual import quantities of this category fell by and large continuously from the beginning of the observation period until the early 1770s, but the fall was particularly rapid after 1753/55, namely, -

46.0 to 47.4 per cent depending on the deflator chosen. The final two decades of the century, by contrast, saw a rapid recovery.

How can one account for the contrasting trajectory of major categories of goods and in particular for the apparent trade slump of the third quarter of the eighteenth century? The remainder of this study explores four potential explanations:

1) First, the import slump of the third quarter of the eighteenth century may have been caused by a slack in demand. Ongoing research suggests that the real land rent in Westphalia declined by about one fifth between 1753 and 1770, possibly as a consequence of poor climate, which produced widespread erosion. The land rent constituted the single most important source of income of pre-industrial elites in Europe, and since high-income households spent higher shares of their budget on traded goods, the size of the land rent exerted a strong influence on import demand during this era (cf. O'Rourke and Williamson 2002).

2) The second explanation refers to a temporarily unfavourable institutional context of Hamburg's trade. Changes in trade policies inaugurated in the middle of the eighteenth century may have led to trade diversion (cf. section 2 above). Mercantilist policies inaugurated by the Prussian state promoted import routes through the southern Baltic and impaired trade on the Elbe River. The free-port movement in the Northern Netherlands and the failure of Hamburg to carry out similar measures must have led to a relocation of German import trade to the Rhine route, to Bremen and to satellite sea ports on the Elbe estuary, Altona in particular. Thus, in contrast to the sluggish development of Hamburg's imports, the volume of Dutch trade with the German hinterland roughly doubled between 1753 and 1790 (de Vries and van de Woude 1997: 489–90). In a petition to the town magistrate in 1756 the merchant community singled out trade with linen, copper, wax, Russia leather, wine, brandy, indigo and currants as being particularly affected by heightened competition (Baasch 1910a: 495). The commodity that fits best into this account is indigo whose estimated import quantity fell by about two thirds between 1753 and 1755 (see below, Figure 6). Whereas an immediate effect of heightened competition is hard to discern for currants (or, rather, raisins) and wine, it may be that part of the wine trade was subsequently diverted from Hamburg (Pohl 1963: 177–82). The general revival of trade during the last two decades of the eighteenth century is compatible with signs of weakening competition: As noted earlier the toll ledgers increasingly registered goods in transit from Altona and other satellite harbours, which suggests that Hamburg's trade infrastructure had again become indispensable. The institutional argument is compatible with the demand argument, as one would expect that a decline in import demand would put competitive pressure on rivalling trade networks.

Hamburg's situation was aggravated by an additional factor, namely the termination of the treaty with France in 1760, which was only renewed in 1769. Moreover, it is noteworthy that the value of Silesian linen exports followed a falling trend between 1751/52 and 1765/66 (albeit with strong fluctuations), and began sustained recovery only in 1770/71 (Zimmermann 1885: 460–7; cf. also Boldorf 2006: 52). This suggests that external trade was depressed during the 1750s and 1760s by factors beyond a possible decline of home demand and increased competition between rivalling networks of import trade.

3) The third explanation relates the contrasting trajectories of the import trades with Mediterranean goods and colonial groceries to the Great Divergence thesis. The shift of relative prices noted in the previous section led to a displacement of import demand from Mediterranean goods whose supply was increasingly constrained by rising marginal cost to New World goods whose supply could expand easily given abundant land supplies and the availability of forced labour. As this was a zero-sum game driven by supply constraints in the Old World the shift of proveniences was accompanied with at least temporary stagnation of total trade volumes.

Before continuing an alternative hypothesis for the explanation of the decline of Mediterranean trade should be mentioned briefly, namely, the increase of protection costs. From the 1730s infringements by corsairs became progressively more severe in the western Mediterranean, which led to an increase of insurance rates and a decline of Hanseatic shipping into that area. It remains unclear however, whether this had a decisive long-term effect on Hamburg's Mediterranean trade, since the overwhelming part of the town's overseas trade was carried out by foreign ships. By the mid-1760s the situation had calmed again, but as Figure 3 shows there occurred no reversal of the falling trend of imports from the Mediterranean (Beutin 1933: 58–9; Pohl 1963: 80–6).

The fourth explanation is inspired by the Industrious Revolution thesis and links import growth of colonial groceries with the decline of textile imports, the most important category among the goods for which we have no price information. It argues that the decline of textile imports reflects a process of import substitution. Textile production was to a large part carried out by rural households whose land was inadequate to provide for self-sufficiency relative to food. A large proportion of incremental income earned through proto-industrial work was spent on traded goods, notably coffee and sugar to supplement meagre food rations. The decline of textile imports and the growth of imports of colonial groceries were thus both a reflection of the shift of household labour from subsistence-related activities to market-related work, which implied a shift of demand from non-traded to traded goods. To the extent that this explanation holds the evolution of Hamburg's import trade mirrors a profound restructuring of the German economy and the textile industries in the North Sea basin in general.

There is thus no simple explanation of the trade slump that hit Hamburg between the mid-1750s and 1770s, nor is it easy to disentangle the four hypotheses. Institutional factors will not be considered further but should be borne in mind when examining the other explanations. Whereas the effect of the spatial reorganization of textile industries on trade patterns will form the subject of section 8 below the section that follows explores the consequences of relative price shifts and income growth for import demand.

7. Estimate of import demand functions

What follows employs the quantity and prices series developed so far to estimate simple import demand functions. The setup follows the logic of a general consumption function:

$$C = a \cdot I^{e} \cdot P^{f} \cdot S^{x} \tag{1}$$

where C denotes total consumption of a particular good, a a scaling factor, I income, P the good's price, S the price of the good's substitutes, and e, f, x the income, own price and cross-price elasticities. With respect to food consumption in early modern Europe existing research considers values of 0.4 to 0.5 for the income elasticity, -0.5 to -0.6 for own price elasticity and x=0.1 as highly probable (Federico and Malanima 2004: 443–4).

Estimates of import demand functions for specific goods are based on the logarithmic transformation of this consumption function; the full model has the following specification:

$$\ln(M_t) = c + \beta \cdot Z_t + \sum_{k=1}^{K} \gamma_k X_{kt} + f \cdot \ln(P_t) + \sum_{l=1}^{L} x_l \cdot \ln(S_{lt}) + \varepsilon_t \tag{2}$$

where M represents the import quantity of a particular commodity, Z year, X a vector of non-random shocks, P the commodity's price, S a vector of prices of substitutes and ε a random error process, all at time t. c, β, f and the vectors γ, x are estimation coefficients, where β is the exponential time trend, f the own price elasticity and the vector x the cross-price elasticities of import demand for a particular good relative to substitutes. K refers to the number of non-random shocks and L to the number of substitutes considered. Regressions based on this model are estimated with OLS. Because of the small number of observations involved individual effects were added subsequently starting with the time trend and continuing with adding non-random shocks and own price. The results for seven commodities with substantial import shares are displayed in Table 7.

The principal non-random shock considered was war. I experimented with two dummy variables capturing potential war shocks: The first, a war year dummy, takes the value of one in the war years 1740–1748, 1756–1763 and 1776–1784, and zero otherwise. The second was derived from visual data inspection (Figure 3) and assumes the value of one only in the years 1760, 1780 and 1781, and zero otherwise; it can be designated as war peak dummy. The first variable, the war year dummy, proved insignificant in all estimates, particularly when it was introduced jointly with the war peak dummy. Therefore, it was dropped from the analysis, and the number of relevant non-random shocks K considered effectively collapsed to one. As observed in the course of the visual inspection of the data it was mainly trade with American goods that was affected by severe war shocks (the exception is rice). The estimates in Table 7 show that in the three years 1760, 1780 and 1781 import quantities of coffee and sugar fell by 60 to 70 per cent on average, those of tobacco by 40 to 50 per cent. By contrast, no effect of the war dummies was detected in the case of Mediterranean groceries and beverages. In order to save degrees of freedom the war shock variables were omitted from the estimate of price elasticities for the latter group of commodities.

The time trend β captures combined effects of income growth and shifts in tastes net of relative price changes. Given our scant knowledge of aggregate income growth in the era before national unification no attempt has been made in this study to explicitly measure income and to estimate income elasticities. It is however useful to interpret the time trend in the light of existing information about population growth and factor incomes. Population in Hamburg's hinterland grew at an annual rate of about 0.4 per cent in 1740–1790 (see above). A trend growth rate above this value thus points to an increase in per capita consumption.

The real day wage of unskilled urban construction workers declined by a quarter between 1733/7 and 1788/92 and followed a downward trend of -0.4 per cent p. a. (Pfister 2017, online appendix S3). Hence, changes in labour income cannot account for import growth, at least as long as one rules out the possibility of a massive increase of the number of days worked per year.

The land rent constituted the main source of income of the elite, and we should expect that wealthy household spend higher income shares on traded goods than the lower classes. Ongoing research on five estates in Westphalia suggests that real leasehold rent fell by 19 per cent between 1733/7 and 1788/92 and followed a negative trend of -0.2 per cent p. a. The decline was concentrated on the period between the mid-1730s and c. 1770; in the 1770s and 1780s the real land rent recovered at an annual rate of 0.7 per cent. This tallies well with aggregate imports in constant prices, and there is a modest positive correlation of Pearson r=0.27 between them in 1736–1792 (n=30; products without price information deflated with linen price).[5] However, when added to equation (2) for the estimate of demand functions of individual commodities the effect of the land rent always turned out as insignificant.

The tentative conclusion emerging from this discussion of both, real wages and real land rent, is that the income elasticity of demand bore little relevance for the development of German imports in the eighteenth century. This implies that a positive time trend of real imports of a given commodity that exceeds 0.4 per cent p. a. (the rate of population growth) points to an increase of import demand resulting, first, from changes in relative prices, second from a shift of preference in favour of a particular commodity, and third, from an increase of the annual labour input as posited by the Industrious Revolution hypothesis. What follows tests the effects of changes in relative prices and thereby develops a benchmark from where it is possible to speculate about changes in preferences.

Possible substitutes of individual commodities were identified on the background of the following considerations: First, with a view to testing the Great Divergence hypothesis colonial groceries were introduced as possible substitutes of Mediterranean groceries and wine, and vice versa. Similarly it was checked whether colonial groceries substituted for grain. Second, it was checked whether colonial groceries substituted or complemented each other. This is inspired by Mintz's (1985) observation that bitter exotic beverages were adapted to European taste by their combination with sugar. Third, specific natural substitutes of a particular commodity were taken into consideration wherever possible, such as alcoholic beverages for coffee and butter for olive oil, respectively. Given the low number of available degrees of freedom potential substitutes were introduced one by one into a regression that already contained, apart from the constant, the effects for the time trend, war shocks and own price elasticity.

Demand functions were estimated for seven of the eight commodities with aggregate import shares above one per cent listed in the bottom part of Table 5. The exception is indigo, which has many gaps in the price series (see Appendix 1). Table 7 presents select

[5] The onset of the Revolutionary Wars in 1792 was associated with a decline of both real wages and land rent. Hence I cut the period of observation in 1792 in this part of the analysis.

results for these commodities; the results obtained for rice and raisons and currants do not add additional information. The dependent variable series are shown in Figure 5.

Let us start the discussion of the results with sugar, the most important commodity of Hamburg's overseas import trade during the era under study. Panel a of Table 7 suggests a statistically robust but relatively small positive time trend of import quantities of 0.9 per cent p. a., which is about double the rate of increase of population in Hamburg' hinterland but less than the growth rate of imports of other colonial commodities. Comparison with Stein's (1980: 11) figures on French re-exports of sugar suggests that the present series possibly underrates import growth: In 1742 I place Hamburg's imports from France at 17.5 million pounds, which corresponds to the total of French re-exports to Germany in 1741–1743 (17 million pounds). In 1773 and 1776 recorded sugar imports of Hamburg from France stagnated at 16.9 million pounds, whereas estimated French re-exports of sugar in 1774–1776 had vastly increased to 41 million pounds.

However, Stein (1980: 11) also shows that except for an interruption in the 1760s the composition of French sugar exports to Germany tended to shift over time from clayed sugar to muscovado (brown sugar). On average, muscovado from Brazil and the French Caribbean was about 30 per cent cheaper than white sugar. Since sugar from British and Danish West Indies fetched a similar or lower price in Hamburg it must have consisted largely of muscovado. Thus, Hamburg's sugar imports shifted away from white sugar imported through France and towards cheaper varieties of brown sugar imported from other proveniences so that the average import price declined over time relative to the price of Brazilian white sugar used in the present version of this study. Nevertheless, the effect of this structural shift was probably quite limited. A very preliminary re-estimate of real quantities of sugar imports that draws on very few data points on the price different sugar varieties, qualities and proveniences suggest an upward revision of the trend growth of sugar imports to 1.0 per cent.[6]

[6] This exercise applies Stein's (1980: 11) ratio of clayed to muscovado sugar exports of France to Germany to Hamburg's sugar imports from France and Portugal. The ratio is given only for a few years; for the bulk of the observation period the ratio is interpolated. Price ratios to Brazilian white sugar are obtained from the *Preiscourant*. As explained in the previous section I arbitrarily chose an issue about every five years up to 1790.

Table 7:
Import demand functions for select major commodities (OLS regressions, n=34, regression coefficients, t-values in parentheses)

	(equ. 1)	(equ. 2)	(equ. 3)	(equ. 4)
a. Dependent variable: ln (quantity of sugar)				
Constant c	1.259 (0.28)	-7.909 (2.77)	-8.607 (2.62)	
Time trend β	0.009 (3.50)	0.014 (8.75)	0.013 (7.42)	
War peak dummy γ_1		-0.703 (7.93)	-0.638 (6.37)	
Ln (own price f)		-0.422 (4.36)	-0.660 (5.30)	
Ln (price of wine x_1)			0.364 (2.28)	
Ln (price of tobacco x_2)			0.160 (1.23)	
Ln (price of rye x_3)			0.024 (0.19)	
R^2 (adj.)	0.254	0.825	0.855	
b. Dependent variable: ln (quantity of rice)				
Constant c	-26.260 (2.55)	-39.461 (3.85)	-27.213 (2.02)	
Time trend β	0.020 (3.53)	0.014 (8.75)	0.023 (3.03)	
Ln (own price f)		-1.332 (2.96)	-1.450 (3.21)	
Ln (price of rye x_1)			0.772 (1.38)	
R^2 (adj.)	0.257	0.402	0.419	
c. Dependent variable: ln (quantity of coffee)				
Constant c	-50.146 (11.18)	-55.033 (16.83)	-52.686 (16.13)	-55.516 (13.95)
Time trend β	0.037 (14.60)	0.040 (21.73)	0.038 (19.17)	0.039 (17.24)
War peak dummy γ_1		-0.682 (5.86)	-0.622 (5.40)	-0.609 (5.28)
Ln (own price f)		-0.371 (2.60)	-0.481 (3.30)	-0.475 (3.19)
Ln (price of wine x_1)			0.329 (1.98)	0.308 (1.84)
Ln (price of beer x_2)				-0.392 (0.35)
R^2 (adj.)	0.865	0.944	0.949	0.949
d. Dependent variable: ln (quantity of tobacco)				
Constant c	-9.551 (1.95)	-9.687 (2.53)	-2.675 (0.55)	
Time trend β	0.014 (5.01)	0.013 (6.11)	0.009 (3.50)	
War peak dummy γ_1		-0.453 (2.75)	-0.506 (3.22)	
Ln (own price f)		-0.568 (2.52)	-0.675 (3.09)	
Ln (price of sugar x_1)			0.357 (2.15)	
R^2 (adj.)	0.422	0.649	0.687	
e. Dependent variable: ln (quantity of wine)				
Constant c	21.915 (5.23)	16.135 (3.75)	20.436 (4.26)	
Time trend β	-0.007 (2.81)	-0.002 (0.85)	-0.004 (1.43)	
Ln (own price f)		-0.583 (2.84)	-0.872 (3.45)	
Ln (price of sugar x_1)			0.476 (2.11)	
Ln (price of coffee x_2)			-0.200 (0.94)	
R^2 (adj.)	0.173	0.322	0.372	

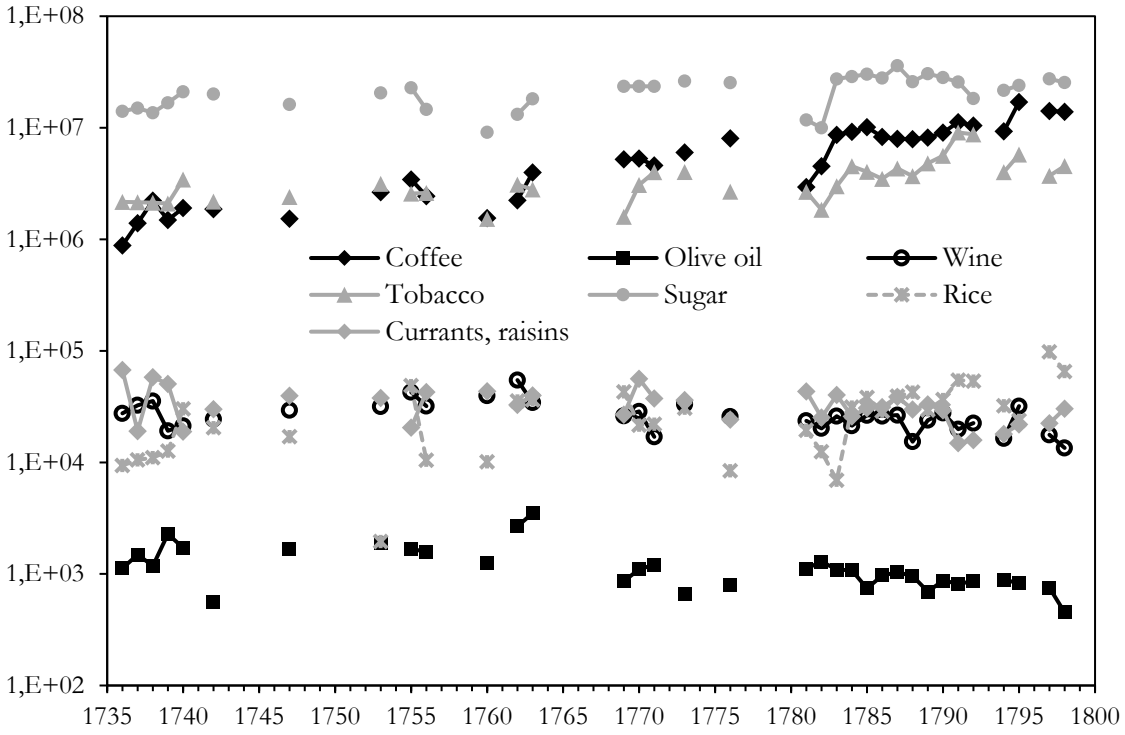
(continued)

Table 7 (continued):
Import demand functions for select major commodities

	(equ. 1)	(equ. 2)	(equ. 3)
f. Dependent variable: ln (quantity of currants and raisins)			
Constant *c*	23.395 (4.43)	10.552 (1.94)	11.904 (1.99)
Time trend β	-0.007 (2.47)	0.001 (0.42)	0.001 (0.24)
Ln (own price *f*)		-0.980 (3.98)	-1.078 (3.59)
Ln (price of sugar x_1)			0.135 (0.58)
R^2 (adj.)	0.134	0.408	0.396
g. Dependent variable: ln (quantity of olive oil)			
Constant *c*	28.350 (5.03)	11.152 (1.59)	23.723 (2.60)
Time trend β	-0.012 (3.79)	0.002 (0.42)	-0.008 (1.15)
Ln (own price *f*)		-1.381 (3.42)	-1.164 (2.91)
Ln (price of butter x_1)			0.922 (2.02)
R^2 (adj.)	0.288	0.466	0.514

Sources: Same as Table 2 and Figure 1; beer price in Hamburg: Pfister (2017, online appendix S1, p. 7, S4); price of rye from Mecklenburg and price of butter from Holstein, both in Hammburg, from Gerhard and Kaufhold (1990: 56, 170).
Note: The war peak dummy assumes the value of 1 in 1760, 1781 and 1782, and 0 otherwise.

Figure 5:
Estimated import quantities of select commodities, 1736–1798 (logarithmic scale)



Notes: All values are in logs. Units are pounds for coffee, currants and raisins (100s), rice (100s), tobacco and sugar, measure of 820 pound for olive oil, *oxhoft* for wine (223 metric litres). The parameters of the exponential trend estimations are as in equation (1) of Table 5.
Sources: Own calculation based on the sources for Table 2 and Figure 1.

The growth rate of sugar imports appears low compared to other colonial groceries; however, it is consistent with what is known about the size of Hamburg's sugar refining industry. It is possible to compare contemporary estimates of the number of sugar refining plants relating to nine separate years in 1784–1807 with guesses concerning the number of establishments in 1727 (200) and 1750 (300). The implied growth rates do not exceed 0.6 per cent p. a. if 1750 is taken as the year of reference and 1.1 per cent p. a. with 1727 as point of departure (Petersson 1798: 293). Since plant size did not grow over time and may actually have fallen (see above) these growth rates mark an upper bound of the growth rate of the capacity of Hamburg's sugar refining industry, and sugar imports grew at the same order of magnitude. This suggests that the information provided by the toll registers on sugar imports can be trusted, at least insofar as rates of change are concerned. Finally, it should be noted that this study suggests a more positive picture than Jeannin (1971: 53), who believed that import quantities increased only little between 1753 and c. 1790.

If imported sugar quantities adjusted for changes in composition as described above are related to population in Hamburg's hinterland one gets a figure for sugar imports per capita in the order of magnitude of 2.1 kg in 1789–1791. Taking total German population as denominator and adding Dutch sugar exports to Germany one gets a figure of 1.5 kg (van Nierop 1915; de Vries 1964: 285). To be sure, sugar refined in Hamburg had a market that extended well beyond Germany and notably included the hinterland of the Baltic and Russia (Baasch 1910a: 352, 358, 361–406, 574), but the discussion above makes it clear that by this time much more sugar entered central and north-eastern Europe than the quantities recorded by the toll registers of Hamburg. An amount of 1.5 to 2 kg should therefore be considered rather as a minimum value of sugar imports per capita towards the close of the eighteenth century. This compares with values of about 8 kg in England (1771–1775, 1794–1796) and 1 kg in France (1788–1790; Mokyr 1988: 75; Austen and Smith 1992: 187–8). The fact that at least in some parts of central and north-eastern Europe sugar consumption per capita must have exceeded the level observed for France throws light on the character of French trade with colonial goods: Unlike British colonial trade it was not underpinned by large home demand but constituted largely an entrepôt trade, similar to the Northern Netherlands (Stein 1980: 10).

Estimated own price elasticity of import demand for sugar is around -0.5 to -0.6. This is of the same order of magnitude as the imputed own price elasticity for the demand of foodstuffs in general, which would imply that already by this time sugar consumption would have lost its status as a luxury item. The only cross-price elasticity with a stable effect is the one with the price of wine. Since there exists a cross-price elasticity of similar magnitude of wine import demand on the price of sugar (panel e in Table 7) there apparently existed a robust substitutive relationship between these two goods. Whereas it is difficult to see how this relationship operated in daily consumption practices it supports the Great Divergence thesis in that New World goods could substitute for European goods whose supply was characterized by rising marginal cost. There is also a weak positive cross-price elasticity of sugar import demand on the price of tobacco, which is also reciprocated in the import de-

mand function estimates for tobacco (panel d). This suggests that consumers switched flexibly between new goods according to relative price. By contrast, there is no cross-price elasticity with the price of rye, which implies that sugar did not substitute for carbohydrates from land-intensive grain during this early period, at least not in the short-run. Neither is there a complementary relationship with coffee consumption as one might expect (results not shown).

Another traded good with the potential to provide carbohydrates and to relieve land-scarcity in Central Europe was rice (panel b in Table 7). Small quantities of rise were imported from the Mediterranean, but the bulk came via England and, from the mid-1780s, directly from the United States. The large absolute magnitude of own price elasticity of import demand (-1.3) suggests that for most Europeans living in the northern half of the continent rice was still a luxury item in the eighteen century. Nevertheless, during the food crisis of the early 1770s public authorities tried to ease tension on grain markets by subsidizing rice imports (Post 1990: 56), and in the present dataset there is a fairly strong positive bivariate correlation between rice imports and the rye price (Pearson r=0.45).[7] However, the relationship is not robust; in equation (3) of Table 7.b the cross-price elasticity of rice imports with the rye price has the right sign, but it fails to attain statistical significance. The import demand equation estimates for both, sugar and rice, thus provide at best tenuous evidence for the Great Divergence thesis that land resources in the New World relieved land scarcity in Europe.

As became apparent already with the discussion of Table 2 above coffee epitomizes Hamburg's import boom of colonial groceries during the eighteenth century. According to panel c of Table 7 import quantities grew at a very steady trend with an annual rate of 3.7 per cent over the period under study (R^2=0.86). Depending on the assumption one makes about Bremen's coffee trade coffee consumption per caput in the hinterland of the two Hanseatic towns reached 0.8 kg or a bit more than 1 kg around 1800 (Table 8; cf. section 2 above for the delineation of the hinterland of the two port cities). If one assumes that the remainder of the German population was served by exports from the Dutch Admiralties of Amsterdam and op de Maaze to the Rhine area coffee consumption there is estimated at 0.82 kg per head in 1789/91, which corresponds to the mean of the two estimates for the hinterland of the two Hanseatic towns for the same years.[8] Note also that the figure of per capita coffee consumption given for Calenberg/Göttingen (Lower Saxony) in 1785/86 — 0.69 kg — is close to the average of the four figures given in Table 8 for c. 1780/90 (0.66 kg). Finally, the mean of the two estimates for c. 1800 is close to the 1.01 kg given for coffee imports per caput in the *Zollverein* in 1836–1840 (Albrecht 2000: 140, 178). The latter comparison makes it unlikely that the present estimate underrates the level of coffee consumption in the late eighteenth

[7] Estimates both of the sugar and the rice demand equations do not change when the rye price is lagged.

[8] Coffee exports of the Admiralities of Amsterdam and op de Maaze are from van Nierop (1915) and de Vries (1964: 247). Note, however, that this estimate omits overland trade of coffee from France into Southern Germany through the Belfort gap of unknown magnitude (cf. Denzel 2002: 14–6, 22).

century. This is noteworthy because contemporary estimates place Hamburg's coffee imports in 1791/2 at double the figure suggested by this study.[9] Probably, this discrepancy reflects the importance of Hamburg's transit trade (that was not subject to import tolls) rather than a fundamental flaw of the consumption estimates.

Table 8:
Coffee imports per capita in the hinterland of Hamburg and Bremen, c. 1740–1790 (kg per capita)

	1740	1750	1765	1770	1780	1790	1800
years with information on import quantities	1739/40, 1742	1747, 1753	1763	1769 -71	1776, 1781-2	1789 -91	1798
Coffee imports per capita							
Estimate 1	0.17	0.19	0.36	0.44	0.43	0.72	0.80
Estimate 2		0.20	0.40	0.48	0.57	0.93	1.11

Sources: Own calculation based on estimates for Table 4; for population data, see section 2.
Notes: Estimate 1 assumes that Bremen's coffee trade amounted to 30 per cent of Hamburg's coffee imports (cf. Jeannin 1971: 56–58, 72); thus, the estimated import quantities of Hamburg are inflated by the factor of 1.3. Estimate 2 uses von Witzendorff's (1951: 384) statement that Bremen imported 6000 *Zentner* of coffee in 1750 and that import volumes grew by the factor of 14 until 1798. A *Zentner* weighed 116 pounds (von Witzendorff 1951: 392). A pound is assumed to weigh 0.484 kg.

It thus appears that coffee developed into an item of mass consumption among the German population well before the onset of rapid industrialization during the 1840s. This was probably unique on the European mainland (cf. Schneider 1998: 571). A rapid increase of per capita consumption levels set in particularly in the years after 1750 (Table 8). Own price elasticity of coffee imports was in the order of magnitude of -0.4 to -0.5, which roughly corresponds to the own price elasticity of basic foodstuffs in general (Table 7, panel c). In the course of the period under study coffee thus rapidly lost its character as a luxury item and became integrated into popular diet (cf. Teuteberg and Wiegelmann 1972: 236–7).

Coffee had the potential to substitute for alcoholic beverages; to some extent, coffee-houses complemented taverns (cf. Menninger 2004: 323–31, 352–4; Hochmuth 2008). Therefore, equations (4) and (5) in panel a of Table 7 test for the cross-price elasticities of coffee import demand with respect to the prices of imported French white wine and beer. The coefficients for both variables have the expected positive sign, but they fail to achieve statistical significance; if the price of wine is included alone its effect is a bit stronger and comes close to statistical significance. The power of the beer price in a quantitative analysis is limited, first, by the difficulty to construct a continuous price series and by the stickiness of retail prices. Second, the beer price is strongly influenced by subsistence crises that also

[9] Information given by Soetbeer (1840: 17) implies average imports of 20.75 million pounds in 1791/2, whereas the estimate of this study is 10.85. From 1795 the discrepancy increases, no doubt because of the heightened importance of Hamburg as a major entrepôt after the creation of the Batavian Republic. A similar pattern holds for sugar.

reduced import demand. Omitting 1771 from the analysis — 1771/72 was the worst subsistence crises of the period under study[10] — strongly increases the effect of the beer price but at the same time reduces its significance level. It must be concluded that there was some tendency for coffee to substitute for land intensive alcoholic beverages but that the evidence for an effect of this relationship on import demand is far from robust.

The results for the third colonial good represented in Table 7, tobacco, offer few new insights (panel d). Own price elasticity is a bit higher than for basic foodstuffs (-0.8 to -0.9) and, as mentioned earlier, there exists a positive cross-price elasticity with sugar.

A salient result common to all import demand functions for colonial groceries is that the time trend cannot be explained by relative price change. By contrast, a major finding for Mediterranean goods, here represented by wine, currants and raisins, and olive oil (panels e through g), is that the negative time trend can be largely explained by relative price shifts: the time coefficient becomes insignificant as soon as price variables are added to the estimation equations. Wine has a positive cross-price elasticity with sugar (but not with coffee), which corroborates the impression that American groceries could substitute for Mediterranean goods. Olive oil for its part could be substituted by butter. Both the own price and cross-price elasticity are large in absolute magnitude, suggesting that olive oil was a luxury item. We do not know, however, to what extent olive oil was part of food consumption and how much it also served as an industrial input. Olive oil and butter were alternative fats used for greasing short-stapled wool to make it easier to card and spin. Perhaps the high absolute values of the own price and cross-price elasticities result from the character of wool cloth as luxury items and that the type of fat used for greasing mattered little. In Hamburg, imports of Irish butter rose rapidly from low levels until the 1770s when it collapsed again. The capacity of Northern regions to specialize in milk processing rendered it obviously possible to substitute at least in part for increasingly scarce grease of Mediterranean origin (Rasmussen 2010).

Taken together, the estimation of import demand functions suggest, first, that the decline of imports of Mediterranean goods was largely caused by an increase in their relative price. There exist some positive cross-price elasticities between Mediterranean goods and American groceries. This supports the idea implicit in the Great Divergence thesis that American goods supplied at constant marginal cost substituted for products from the old world characterized by a steep rise of marginal cost. Relative price shifts and substitutive relationships between Mediterranean and American goods can also explain at least in part the stagnation of total import quantities in Hamburg from the 1750s to the 1770s; import growth of American groceries during this era primarily substituted for progressively expensive Mediterranean goods. Second, however, New World goods could not substitute in the short run for basic foodstuffs such as grain, and evidence that import demand for coffee reacted on wine and beer prices is tenuous. Growing imports of colonial goods thus could not relieve land scarcity in Germany itself. It that sense, support for the Great Divergence

[10] In 1770/71 estimated quantity of coffee imports fell by 13.1 per cent, which documents that imports of this commodity had become sensitive to demand from the middle and lower classes.

hypothesis is moderate at best. This does not exclude that in the long run coffee, sugar and tabacco consumption had the potential to help lower-class households to subsist on meagre rations of grain, potatoes and meat. This is indicated by the low own price elasticities of these goods, which are notably below those of the Mediterranean products. Third and finally, relative price shifts are unable to explain import growth of American groceries. Given stagnating incomes per unit of labour and land, it required a massive shift of preferences and/or an increase of labour time to increase demand for these commodities.

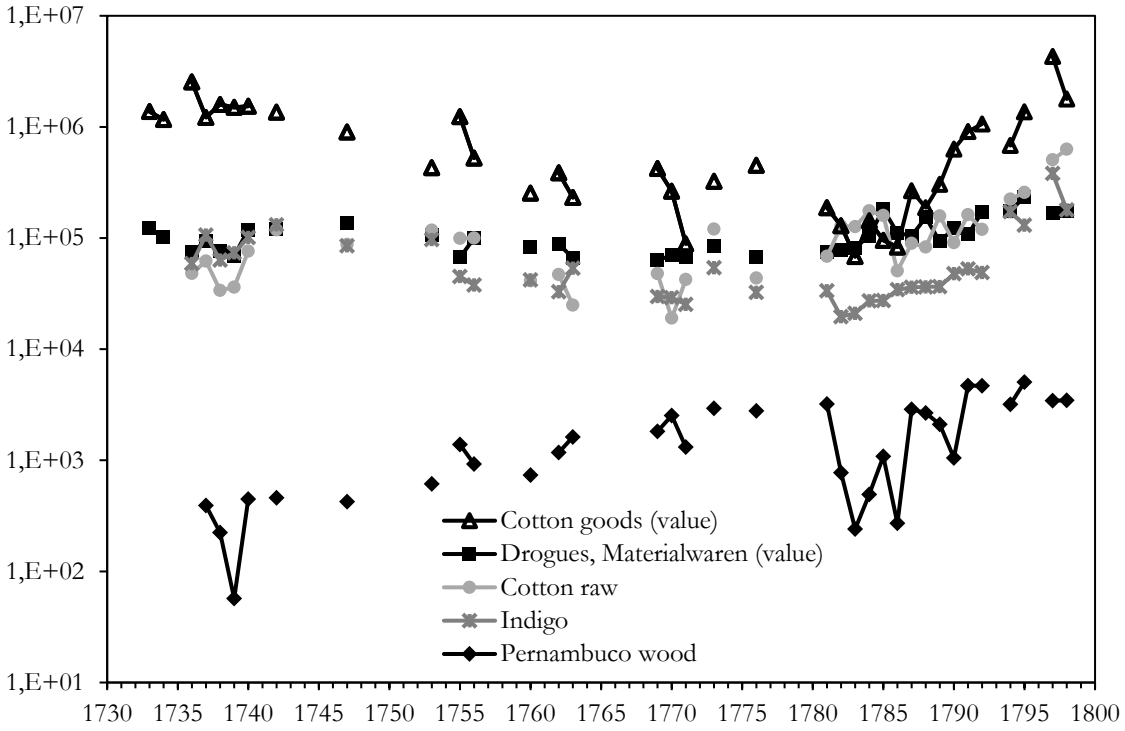
8. The development of North-western European cotton industries and its effects on Hamburg's import trade

An important aspect of the trade slump that hit Hamburg during the third quarter of the eighteenth century is the decline of textile trade, in particular with cottons. As mentioned in section 3 above, cotton goods rapidly gained an important share of textile markets during first three decades of the eighteenth century; in 1733–1742 they constituted the second most important item in Hamburg's import trade, surpassing the value of woollens and worsteds by a factor of 2.4. By contrast, between 1740 and 1786 the import value of cotton goods fell by 94.6 per cent; in 1733–1786 it followed a steady exponential trend of -5.4 per cent p. a. (Figure 6). Import values of woollens and worsteds also fell by half between 1733–1742 and 1781–1789, but the reduction was less drastic than in the case of cotton goods. Since we lack information on the specific composition of textile imports and prices of individual types of textiles we cannot be certain that movements of values followed real quantities exactly. Since at least German textile prices experienced a similar overall change between 1736 and c. 1785 as both, import prices and domestic consumer prices, the evolution of values can be expected to reflect major trends in quantities as well (Figure 2 above).

There are four potential explanations of the virtual disappearance of cottons from Hamburg's import bill between the 1730s and the 1780s:

1) First, it cannot be ruled out that part of the decline stemmed from a temporary reduction of demand. As mentioned above, the real land rent fell during the 1750s and 1760s. Since traded textiles were mainly if not exclusively consumed by the social elite, this might have had a depressing effect on textile trade. The decline of textile imports began before the 1750s and continued for another one-and-a-half decade after 1770, however. The explanatory power of faltering elite demand is thus very limited at best. Moreover, it is noteworthy that imports of cotton goods fell drastically in 1771, when a major subsistence crisis occurred (-66.4 per cent). A harvest failure reduced the purchasing power of the middle and lower classes rather than the land-owning elite, and the contraction of imports of cotton goods during a subsistence crisis thus indicates how far cotton goods must have become integrated into popular consumption styles in Germany by that time. Imports of woollens and worsteds, by contrast, experienced only a mild decline (-8.8 per cent).

Figure 6:
Import values and quantities of select goods relating to the cotton industry, 1733/36–1798 (logarithmic scale)



Sources: Own calculation based on the sources for Table 2 and Figure 1.

2) The second potential explanation refers to shifts in trading networks. Heightened competition between different sea ports seems to have led to the diversion of parts of German import trade from Hamburg to competing trading routes particularly during the 1750s. This also might have affected import trade with cottons. Complaints staged by Hamburg's merchant community in 1756 singled out indigo as one branch of trade having particularly suffered from displacement. Indeed, recorded import values of indigo contracted by -36.0 per cent in 1753–1756 (cf. also Figure 6 on real import quantities), whereas those of cotton goods increased by 22.2 per cent. Also note in Figure 6 that despite the complaints by contemporaries import quantities of indigo and raw cotton fell much less than import values of finished cottons, which were not mentioned explicitly as being re-routed through other sea ports. Therefore, trade diversion can account for the decline of textile imports only to a limited extent, too.

3) The third explanation refers to shifts in locational advantages and policy changes that led to a reorganization of the spatial economy of the European cotton industry. Hamburg had experienced an early development of cotton printing manufactories. Since cotton printing first emerged in major sea ports — aside from Hamburg notably Amsterdam, London, Antwerp and Nantes — this probably reflected positive externalities of market thickness. As the industry and markets for its inputs developed these initial advantages vanished, and the gravity of development shifted to the hinterland, where labour and energy costs were lower. In fact, the middle decades of the eighteenth century saw the development of a number of

cotton printing works in the interior of Central Europe. Moreover, the liberalization of cotton manufacture in France (1759) led to a boom of cotton printing in this country and temporarily reduced business opportunities for cotton printers elsewhere on the continent. All this should have negatively affected old locations of the industry in the port cities of the North Sea rim (Chapman and Chassagne 1981: 7, 108).

Since the toll registers no not distinguish between finished cotton goods and semi-finished cloth destined for printing it is impossible to determine to what extent import demand for cotton cloth was determined by cotton printing manufactories located in Hamburg itself. Nevertheless, there exists a quite strong relationship between the estimated annual quantity of imported raw cotton and the import value of *drogues* and *Materialwaren*, whose main purpose was to serve as inputs for cotton printing (Pearson r=0.60, 1736–1794; the relationship stays almost unaltered if an exponential time trend is introduced). Domestic cotton manufacture and cotton printing thus followed the same short-run fluctuations. By contrast, the relationship between the annual import values of *drogues* and *Materialwaren* on the one hand and cotton goods on the other hand is nil. Since it is not known that cotton was spun in Hamburg and its immediate vicinity import values of *drogues* and *Materialwaren* reflect the town's role in provisioning the cotton printing industry of a wider area, which probably included Saxony, Northern Bohemia and possibly Berlin, rather than just import demand of the printing works located in Hamburg itself.

4) The fourth explanation, and this is the one that is supported best by the available evidence, relates to import substitution. To show this, one has to rely on information of Dutch trade statistics; possibly because Hamburg was unable to lower trade costs to the level prevailing in rival mercantile networks — as posited by explanation two — much of the incremental trade in inputs for the cotton industry apparently bypassed the town or its toll assessment system (Table 9).

Table 9:
Annual import quantities of raw cotton of Germany through separate trade routes, 1753 and 1789–1792 (in metric tons)

	Amsterdam → Rhine	op de Maaze → Germany	Amsterdam → Kleine Oost	Imports Hamburg	Total	Total excl. op the Maaze
1753	150		179	57		386
1789–1792	282	54	220	64	620	567
growth rate p. a.	1.7%		0.6%	0.3%		1.0%

Sources: Own calculation based on the sources for Table 2 and Figure 1; cotton exports of the Admiralities of Amsterdam and op de Maaze from van Nierop (1915) and de Vries (1964: 246). One pound is assumed to weigh 0.484 kg.

In 1789–1792 the Northern Netherlands exported on average about 556 tons of raw cotton to Germany via the Rhine and the German North Sea ports. Recorded imports of Hamburg from other sources (remember that trade with the Netherlands was not subject to

tolls) added only 64 tons, that is, little over ten per cent of the quantities originating from the Dutch entrepôt. If 1753 was a representative year for Dutch cotton trade, growth between that year and c. 1790 concentrated mainly on the Rhine route; exports through that route increased by 1.7 per cent annually over this period. Exports to the German North Sea ports (*Kleine Oost*) expanded only at 0.6 per cent, which is but slightly more than population growth in the hinterland of the Hanseatic towns. Together, exports from Amsterdam through the Rhine route and to the *Kleine Oost* plus Hamburg's raw cotton imports increased at an annual rate of 1.0 per cent between 1753 and 1789–1792.

Presumably, cotton imports through the North Sea ports were mainly destined for the developing cotton-processing industries in the lower Rhineland and Saxony, particularly in the regions around Elberfeld and Chemnitz (Adelmann 2001: 14, 17–22, 37–44; Hahn 1996; Karlsch and Schäfer 2006: 19–21). In Prussia, Berlin developed an early concentration of cotton weaving and calico printing (Straubel 1995: 32–5). Cotton and fustian manufacture in South Germany, by contrast, seems to have obtained raw cotton and inputs for dyeing mainly, if not exclusively, from the French Atlantic, from Marseilles and from Italian sea ports (Denzel 2002: 14–6). Since Saxony showed the most important concentration of calico printing works in Germany during the late eighteenth century (Chapman and Chassagne 1981: 11) the finding that growth of cotton imports through the Hanseatic sea ports was slower in the second half of the eighteenth century than through the Rhine route is a bit puzzling. Of course, it cannot be excluded that Bremen, which emerged as a leading cotton market by the middle decades of the nineteenth century, began to handle large imports of raw cotton from other sources than the Northern Netherland already in the second half of the eighteenth century. The available evidence suggests, however, that even by the early 1790s cotton trade was still a marginal segment of Bremen's mercantile activities (Rauers 1913: 14, Table 29; von Witzendorff 1951: 390; Beutin 1963: 65). It may also be that inland trade grew quicker than overseas trade. Denzel (2002: 13, 19–21) has documented the rise of a trading firm from Schaffhausen (northern Switzerland), which between c. 1750 and the 1770s vastly expanded its supplies of raw cotton and indigo to Franconia and central Germany. We also know that manufacturers in Silesia obtained raw cotton overland from the Balkans during this period (Nolte 2004: 238). Perhaps Hamburg's poor performance with respect to trade with inputs for the textile industry was connected to the rising efficiency of specialized overland trade.

On this background it is safe to conclude that c. 1750–1790 cotton processing in the manufacturing districts of the northern half of Germany increased with an annual rate of 1.0 per cent, possibly somewhat faster. Thus is consistent with the trend growth rate of the number of fustian cloths handled by the export market of Bocholt, an important semi-rural textile manufacturing centre in the Westphalian hinterland of the lower Rhine, namely 1.0 per cent between 1706/7 to 1789/90 (computed from information on 18 years provided by Reekers 1976: 188). A growth rate of the cotton processing branch of 1 per cent or somewhat more is above the one for population (0.4 per cent) but less than the growth rate of the cotton branches in France and Britain: Cotton imports of Marseille from the Levant expanded at 2.0 per cent annually during the three decades preceding the French Revolution

and they were increasingly complemented with raw cotton from the New World (Chassagne 1991: 23). British imports of raw cotton increased at an exponential trend of 3.0 per cent p. a. already in 1740–1779, that is, before the strong acceleration of growth around 1780 (Mitchell 1988: 330–1). Thus, Germany joined other North Sea economies in developing a local industry that substituted for imports of Indian cotton goods. At the same time, however, her involvement in this process was less intense than the one of other early industrializing countries. The finding is important with respect to the characterization of the early stages of industrialization in Germany, but an explanation is beyond the scope of this study.

Textile printing must have expanded at a more rapid pace than cotton processing per se. Amsterdam's exports of indigo, the most important dye used in calico manufacture, into the German hinterland expanded at an annual rate of 5.0 per cent between 1753 and 1789–1792 (Table 1 above); if exports to the *Kleine Oost* and recorded imports of Hamburg are added, the growth rate is still 1.3 per cent, that is, higher than the lower bound of the growth rate of raw cotton imports. In addition, the evidence on the rapid growth of inland trade with indigo during the third quarter of the eighteenth century should again be added to the picture (Denzel 2002). Finally, Hamburg's imports of Pernambuco (or Fernambuco) wood, a red dye also used in textile printing, grew fairly steadily at an annual rate of 3.7 per cent in 1736–1798 (Figure 6). Trade with Pernambuco wood seems to have been the only substantial segment of the trade with colorants that seems not to have been diverted from Hamburg during the early 1750s, but absolute quantities were low compared to indigo.

Already the finding that imports of important dyestuffs used in textile printing grew faster than imports of raw cotton implies that import substitution of cotton goods did not necessarily displace existing manufacturing activities but implied some sort of industrial upgrading: In the early decades of its existence the European textile printing branch used as inputs not only cottons but also linens and mixed fabrics. In other words, existing activities of textile manufacture could be built upon to arrive at import substitution with little technological change beyond the adaptation of textile printing. Moreover, in Saxony at least the share of rural non-agricultural employment grew from 29 per cent in c. 1720 to 37 per cent in c. 1780 and 44 per cent c. 1810, implying that the rise of cotton processing created additional employment (Weiss 1993: 104).

There is also some evidence that import substitution took place in the case of woollens, too, in particular from the directory of the fairs of Leipzig. Until the Seven Years' War merchants originating from the region of Aachen and Verviers constituted the most import group of dealers in woollens. From then until the last decade of the eighteenth century their number fell by more than half, and the market became increasingly dominated by houses from Saxony, to a lesser extent from Brandenburg and Silesia. Whereas wool manufacture in the Verviers-Aachen district processed imported Spanish wool, manufacturers in eastern Germany could rely on domestic wool supply, particularly since merino sheep had been bred into local stock by the 1760s (Sammler 2004: 235–42).

The demonstration that the decline of textile imports through Hamburg between the 1740s and the 1780s must have been related at least in part to import substitution has two major implications: First, given that Germany had a structural deficit on current account

import substitution of textiles liberated currency to pay for continuously increasing quantities of imported colonial groceries. Put in another perspective, limited export growth created incentives for import substitution because the resulting deficit on current account slowed German inflation compared to other parts of Europe (cf. section 5 above), thus allowing manufacturers of import-competing goods to undersell foreign competitors.

Second, the fact that import substitution of cottons, possibly also of woollens and worsteds, occurred without displacing existing export activities expanded domestic income and thereby created a possible source of demand for colonial groceries. This is because in order to increase textile output per capita rural households must have mobilized labour reserves, for instance in the slack season of the agricultural year, to engage in market-oriented activities. Thus, growing per capita imports of raw cotton and dyes in the absence of imports of food imports of relevance suggest an increase of the annual labour input of households, and the incremental income earned through market-related activities constituted a possible source of demand for colonial groceries. Together, the trajectory of imports of textiles and textile inputs on the one hand and the increase of import demand for colonial groceries beyond relative price changes on the other hand point to the possible relevance of mechanisms posited by the Industrious Revolution thesis.

The first phase of import substitution of cottons drew to a close in the late 1780s, which saw a quick rebound of recorded import values of cotton goods through Hamburg (Figure 6). This reflects a gain in momentum in the development of the British cotton industry as reflected in British imports of raw cotton (Mitchell 1988: 330–1). At least until 1798, when the period analysed by this study ends, growing exports of cotton goods by Britain were apparently not detrimental to Germany's cotton sector, however. During this initial period, machine-spun twist — yarn still made up only 3.7 per cent of the total recorded value of cotton goods in 1798 — and plain cottons woven with machine yarn in Britain selectively cheapened inputs and thus expanded supply of the German cotton sector as a whole (Karlsch and Schäfer 2006: 26–7). This helps to explain why recorded import quantities of raw cotton, indigo and Pernambuco wood increased during the 1780s and 1790s as well. Only at the beginning of the nineteenth century did British imports substitute for domestic cotton processing (Kirchhain 1973).

9. Summary of findings and conclusion

This study uses the toll registers of Hamburg (the so-called *Admiralitätszoll- und Convoygeld-Einnahmebücher*) to gain insights into the aggregate development of a major segment of Germany's external trade during the eighteenth century. The source contains important information, but it suffers from at least three major weaknesses: First, coverage is limited to overseas trade beyond the mouth of the Scheldt River, including the British Isles and the White Sea. This implies the lack of information on inland trade as well as on overseas trade with the United Provinces, with the Baltic and with Scandinavia. Hence, the source essentially

documents imports from the eastern Atlantic and the Mediterranean. Moreover, transit traded was not subject to tolls and thus failed to be recorded.

Second, cross-checks with other sources point to under-registration of import values. It is not entirely clear, however, to what extent discrepancies result from the omission of major trade flows, including transit, from under-declaration, fraud and smuggling and from difficulties with identifying imports of particular commodities. Comparison with reports by the French consul in Hamburg for the period c. 1750–1790 suggest nevertheless that the broad patterns of regional and commodity composition as well as growth patterns of import trade observed by the probably best-informed contemporary are reproduced by the toll registers. By contrast, during the same period Hamburg's recorded imports of a number of commodities grew slower than Dutch exports into the German hinterland. Under the assumption of a homogenous hinterland of the two port regions this implies that Hamburg's capacity to extract tolls from German import trade declined over time.

Beyond under-declaration, fraud and smuggling two other explanations of this phenomenon can be invoked. First, commodities with minor trade volumes, which include many dyestuffs, were sometimes poorly specified in the toll ledgers (see below). Second, Hamburg stood in competition with satellite port towns on the Elbe estuary, most notably Altona. Possibly in connection with mercantilist policies of territorial states and temporarily faltering import demand competition between alternative gateways for German import trade increased during the early 1750s. Since Hamburg's town authorities were reluctant to relieve the tax burden on external trade, some trade was diverted to rival sea ports offering lower trade costs. To some extent diversion was temporary; during the last two decades of the eighteenth century the toll ledgers register some imports in transit from Altona and incidentally from other neighbouring ports, which suggests that some trade was re-routed through Hamburg. However, contemporaries also complained that some branches of trade had gone lost for Hamburg's merchant community, but apart perhaps from indigo it is currently impossible to track specific commodities for which this holds.

A third major weakness of the toll ledgers is that the registration of commodities did not follow a pre-defined categorization. Consequently, about 5 per cent of total import value in 1733–1798 is poorly specified. This percentage appears modest at first sight, and it is too small to overturn conclusions derived for the trajectory of aggregate trade and major commodities. Recorded imports were concentrated on very few categories of goods, however: Only eight individual commodities plus cottons as well as woollens and worsteds had a share of at least 1 per cent in total trade value from 1733 to 1798. Goods traded in minor quantities could be registered either explicitly or under an unspecific heading. Dyes, for instance, could be subsumed under *drogues* or *Materialwaren*, colonial goods or general merchandise. It is thus difficult if not impossible to study trade with commodities that account for low shares in total import value.

The bottom line of this discussion of the Hamburg toll registers is that trends with respect to aggregate imports, regional composition and commodity composition relative to major items of trade (except for indigo) are rendered broadly correctly by this source. The

existence of relatively large categories of vaguely specified goods implies that goods accounting for only small shares in total trade volumes are difficult to track individually, and the disaggregate analysis of this study has essentially been confined to commodities with import shares above 1 per cent. Since it is not certain, however, whether absolute levels of import trades are rendered correctly by the toll registers and since the erratic registration of minor commodities introduce an element of uncertainty into the aggregate analysis as well, the results obtained on the basis of this source are and probably must remain tentative.

Declarations in the toll registers refer to the value of imported goods. In order to estimate real import quantities values were deflated with published prices from Hamburg's official price lists, the *Preiscourant*, which become available from 1736. An uncertainty that is impossible to resolve stems from the fact that toll assessments were not based on market quotes but on mutually agreed prices. Moreover, the price series that have been published so far do not necessarily refer to the product qualities and proveniences that were imported most frequently. Hence, future versions of this study will make use of unpublished price information to improve the adequacy of the price deflator both for individual goods and the aggregate level. The potential for improvement is particularly evident for sugar, indigo and raisins, which were all major items of trade. Sensitivity tests based on a small set of about a dozen data points for each commodity reveal, however, that relative prices of different varieties of the same commodity remained roughly stable in the long run. Therefore, drawing on additional price information will improve the precision of the estimate of import quantities but will probably produce only minor revisions of the conclusions arrived at in the present version of this research.

Hamburg fulfilled two major functions in European long-distance trade between the seventeenth and early nineteenth centuries. On the one hand, it constituted an entrepôt that mediated the exchange of a broad range of goods across a wider area that included south-western and north-eastern Europe as well as central Europe. Most notably, this involved the distribution of Northern goods such as Russia leather and iron and copper from Sweden and Russia. On the other hand, Hamburg served as a gateway linking inland Germany with overseas markets in the British Isles, the Northern Netherlands, the east Atlantic and the Mediterranean. The gateway function for Germany's import-export trade gained in importance over the eighteenth century, and the present study focuses on this aspect of Hamburg's mercantile activities.

With respect to both functions as an entrepôt and a gateway for German import-export trade Hamburg maintained a competitive relationship with the Northern Netherland, Amsterdam in particular. The comparison of urban population — around 1700 Amsterdam numbered about three times as many inhabitants as Hamburg — indicates the very junior position of Hamburg in this relationship over much of the period studied here. French occupation of the United Provinces and the ensuing Batavian Revolution in 1795 dealt a fatal blow to the Dutch trading network, however. These events produced a positive shock for Hamburg's trade (cf. Figure 3) and inaugurated Hamburg's ascendancy in handling Germany's overseas trade. Nevertheless, already during the century before 1795 the trade relations between the Northern Netherland and Hamburg became gradually more loose: In 1678

about one fifth of all overseas imports, only slightly less than the shares of the British Isles and Spain, came from the United Provinces; around 1790 the latter's import share had declined to less than 10 per cent. The gradual emancipation from the Dutch entrepôt did not necessarily imply that Hamburg's role in German import trade increased, however. Existing information on the years 1753 and c. 1790 suggest that Hamburg's overseas imports and Dutch exports into the German hinterland grew at around the same pace — for several commodities trade via Hamburg actually increased less than via the Northern Netherlands — and that probably still a higher share of total German imports took the Rhine route rather than the route of the Hanseatic sea ports around 1790.

Hamburg also competed with other German sea ports on the coast of North Sea, less with those in the southern Baltic. In particular, the rulers of neighbouring territorial states promoted the development of rival satellite sea ports on the Elbe estuary, Altona being the most important one. From the sources currently known it is impossible to assess the relative shares of Hamburg and these other ports in total trade conducted via the lower Elbe; the discussion of the Hamburg toll registers above suggests that relative shares shifted over time. With respect to the relative position of other port regions this study essentially follows Jeannin's (1971) assessment that during the second half of the eighteenth century Bremen's overseas trade amounted to roughly 30 per cent and the one of Lübeck around 10 per cent of Hamburg's overseas trade; thus, Hamburg's recorded import trade should mirror about 70 per cent of all overseas imports of an area stretching from Westphalia to the Oder River (but including Silesia) and confined on the southern side by Germany's central mountain range (*Mittelgebirge*). It should be stressed that this assumption is very schematic: Hamburg's hinterland also extended into Southern Germany and Northern Bohemia, and what is regarded here as the Hanseatic town's hinterland also entertained trade relations with the Dutch entrepôt.

Hamburg's mercantile exchanges developed in close symbiosis with other activities, which is partly reflected in trade patterns. First, the town developed a vibrant financial industry. Its basis was constituted by the Bank of Hamburg, a public bank providing for the cashless settlement of balances. These services were progressively complemented by trade in bills of exchange and a business in maritime insurance. Second, thick and diversified markets created locational advantages for specialized industries. During the eighteenth century the two most important ones included sugar refining and cotton printing.

The evolution of Hamburg's overseas imports during the eighteenth century can be divided into three distinct phases. Phase One corresponds to the last quarter of the seventeenth and the first quarter of the eighteenth century and it is characterized by the beginnings of the displacement of Mediterranean goods by colonial groceries as well as a geographical shift away from Spain, Britain and the United Provinces to France as the dominant trading partner. In 1678 raisins alone accounted for over 15 per cent of overseas imports; other Mediterranean goods, most notably wine, brandy and fruit, added another 21.5 per cent. By contrast, only one tenth of all imports consisted of sugar, a bit less of tobacco. During the first decade of the eighteenth century, the weight of sugar was already somewhat higher, but the real breakthrough came with the establishment of the French plantation economies in

the West Indies during the two decades following the end of the War of the Spanish Succession (1701–1713/4): In 1733–1742 almost half of Hamburg's recorded overseas imports consisted of colonial groceries (Table 2). Sugar alone made up a full third, which must be considered in the context of the sizeable sugar refining sector that had developed in the town.

In Phase Two, which lasted from the 1730s to c. 1790, Hamburg's role consisted mainly in distributing and partly processing colonial goods. France was the principal trading partner; except for times of war (notably the Seven Years' War, 1756–1763) her share in total imports fluctuated between 50 and 60 per cent (Table 3). Hamburg thus functioned as the downstream end of France's merchant empire for central Europe. After their spectacular rise particularly at the end of phase one imports of colonial groceries continued to expand at a slower pace during Phase Two; the annual growth rate of recorded import quantities was 1.6 per cent in 1736–1798 (Figure 4). Probably this understates true growth somewhat, however, mainly because the current estimate for sugar imports does not do justice to the shift to cheaper qualities. Making allowance for this fact it can be stated that import quantities of colonial groceries approximated the growth rate both of the transaction volume of the Bank of Hamburg (measured by the annual number of folios used) and of European Atlantic trade as measured by the number of African slaves sold into the Americas (de Vries 2010), namely, about 2 per cent.

Total recorded import quantities grew much slower, namely at 0.7 per cent p. a. in 1736–1794, which surpasses the rate population growth in Hamburg's hinterland only by a modest amount (0.4 per cent p. c. between c. 1740 and c. 1790). This implies that the share of colonial goods in total recorded overseas imports continued to grow and attained slightly more than 70 per cent on average during the last third of the eighteenth century; sugar and coffee alone accounted for more than 60 per cent of total recorded overseas imports on average in this period. Around 1790 per capita imports of coffee both in Hamburg's hinterland and in Germany as a whole were at the order of magnitude of 0.7–0.9 kg, as against 1.0 kg in the early years of the *Zollverein* (1836–1840). Within few decades, coffee had obviously become integrated into popular consumption patterns.

Phase Three refers to the 1790s and consists of a series of structural shocks that profoundly transformed Hamburg's functions in the long run. It is marginal relative to the period covered by the data underlying this study and, therefore, it suffices to summarize the main points. First, as already mentioned, the French occupation of the Northern Netherlands in 1795 permanently increased Hamburg's weight in mediating Germany's overseas trade. Second, the revolt of slaves on Saint-Domingue/Haiti in 1791 and the onset of the Revolutionary Wars in Europe also led to a drastic decline of France's re-exports of colonial goods. Third, Britain replaced France as the most important trading partner. In part, the British Empire substituted France as a provider of colonial goods. Moreover, the trade pattern of the 1790s reflects the growing momentum of the British Industrial Revolution in that cotton goods — finished goods, yarn and semi-finished cloth destined for printing —, whose share had become negligible by the 1780s, rose to an import share of 4.2 per cent in 1791–1798.

Fourth and finally, Hamburg's external trade began to develop a global reach from the 1790s. In Phase Two, Hamburg remained largely confined to intra-European long-distance

trade in that it distributed colonial goods that others had brought from foreign continents to the emporia of the north-eastern Atlantic. The absence of protection by a strong state and the mercantilist policies of the colonial powers rendered it impossible for the town's mercantile community to engage in intercontinental trade. The Canaries, a valuable entry point into smuggle trade with Spanish America, were the only non-European location with which there existed limited but regular connections already before the mid-eighteenth century. Modest imports from the Danish West Indies, whose trade was liberalized in the course of the 1760s, mark the beginnings of direct intercontinental relations. In the 1790s the United States suddenly emerged as Hamburg's third most important trading partner (after Britain and France) with a considerable share of 17.6 per cent in total recorded imports (1791–1798). Taken together, the 1790s saw the re-orientation of Hamburg from an appendix of the merchant empire of France towards the Anglo-Saxon world; at the same time, colonial groceries and other raw commodities were increasingly imported directly from other continents, and their trade began to be complemented with intra-industry trade.

What explains the sustained growth of imports of colonial groceries and the contrasting trajectory of trade with other goods during Phase Two (1730s to c. 1790)? The growth of trade in colonial goods mirrors in part the decline of Mediterranean beverages — wine and some types of brandy — and groceries; real import quantities of this category declined with an exponential trend of -0.7 per cent p. a. between 1736 and 1798 (Figure 4 and Table 6). Despite the caveats expressed earlier about the prices underlying both the assessment of import values by contemporaries and the construction of deflators by this study, estimation of import demand functions return plausible own price and cross-price elasticities of import quantities (Table 7).

In concrete terms, import quantities of most individual commodities reacted negatively to a change in own price. For soft drugs imported from the New World — sugar, coffee and tobacco — own price elasticity of demand was of a similar magnitude as for food, which reflects their rapid integration into popular diet. By contrast, own price elasticities of demand for Mediterranean goods (and rice) were higher in absolute magnitude, which testifies to their limited accessibility for lower-class consumers. Moreover, there existed positive cross-price elasticities between wine and sugar, to a weak extent also between wine and coffee. Finally, own price and cross-price elasticities largely account for the negative time trend in import demand functions for Mediterranean goods. Separate analysis of prices shows that over time the relative price of Mediterranean goods increased whereas the price of some colonial groceries, notably coffee and tobacco, fell (Figure 4).

All these results are consistent with the Great Divergence thesis in several respects: Population growth led to the rise of the relative price of land-intensive goods in Europe; consequently, their consumption fell. New World goods acted as partial substitutes; because of unlimited land supply in the Americas and the availability of forced labour rising quantities could be produced at constant marginal cost. Hence, their price declined relative to Old World goods, and transatlantic trade grew whereas intra-European long-distance trade shrank. The argument goes a long way to explain why aggregate overseas imports of Ham-

burg between the 1730s and c. 1790 grew much less than import quantities of colonial groceries. However, the results of this study do not support the more general argument that transatlantic trade substituted for land-intensive non-traded Old World goods, at least not in the short run: Import demand function estimates are incapable to demonstrate a robust positive effect of beer or grain prices on imports of sugar, coffee, and rice.

In contrast to Mediterranean goods own price and cross-price elasticities cannot account for sustained import growth of colonial groceries. The results are particularly striking with respect to coffee, whose import quantities increased by 3.7 per cent annually in 1736–1798 independent of whether own price and cross-price elasticities are taken into consideration or not (panel c of Table 7). This conforms to the argument by O'Rourke and Williamson (2002) that genuine globalization forces in the form of innovations in transport and communication technology and business practices that lowered trade costs are of little relevance in explaining the growth of intercontinental trade before the nineteenth century.

It is difficult to identify a source of income growth that might account for an increase in import demand, however. The real day wage of unskilled urban construction workers declined by a quarter between 1733/7 and 1788/92, and provisional evidence suggests that the real land rent also fell during this period, albeit less strongly. Since coffee consumption in particular also spread among the rural population, particularly in proto-industrial regions, the existence of a positive time trend of imports net of changes in relative prices implies that demand for colonial groceries partly expanded as the result of a shift of preferences towards traded goods, which in turn necessitated an increase of market oriented activities on the household level. In concrete terms, households could use idle periods of the agricultural year, when labour had little opportunity cost, to produce manufactures and spend the additional income on traded goods. This argument constitutes a major element of the Industrious Revolution thesis, and to the extent that it holds, changes in labour allocation behaviour of rural households in Hamburg's proto-industrial hinterland have a high potential to explain the sustained growth of Hamburg's imports of colonial groceries.

Thus far, evidence for the relevance of the Industrious Revolution thesis rests on the exclusion of alternative explanations of import growth. The argument can be strengthened by looking at Hamburg's trade with textiles and textile inputs, respectively. Comparison with the fragmentary toll registers relating to the period of the War of the Spanish Succession the consumption of cotton goods must have experienced a spectacular expansion during the two decades following the treaties of Utrecht and Baden; from an average of 2.0 per cent in 1702–1713 the share of cotton goods in recorded imports increased to 13.8 per cent on average in 1733–1742; after sugar, they represented the second most important category in Hamburg's overseas imports. Until the 1780s, by contrast, import values of cotton goods fell by 89 per cent, and their share in total overseas import was reduced to less than one per cent. The decline of imports of cotton goods and to a lesser extent of other textiles is the second proximate cause (apart of the declining weight of Mediterranean goods) of the slow growth of total trade relative to imports of colonial goods.

The most plausible explanation of the decline of imports of cotton goods relates to import substitution. Trade with inputs for the cotton industry seems to have largely bypassed

Hamburg, but Dutch trade statistics show a robust increase of raw cotton exports to Germany between 1753 and c. 1790 with an annual growth rate of 1.2 per cent. In addition, the parallel growth of Dutch indigo exports to Germany and even of imports of Pernambuco wood flowing through Hamburg testify to the vigorous expansion of the cotton printing industry in Germany. As a result, the decline of imports of cotton goods until c. 1780 was offset by a growth of domestic cotton processing. This also implies that sustained import growth of colonial groceries, to the extent that their consumption spread beyond the urban bourgeoisie among the rural population, was made possible by a shift of household labour to market-oriented activities.

But does this make a consumer revolution in the sense of the Industrious Revolution thesis? At the core of this hypothesis is the notion that product differentiation led to an increase of the utility of consumption, which in turn led to a shift of household preferences from leisure to market-oriented production. Colonial groceries are rather homogeneous products, however, and lower-class households largely lacked the means to link their consumption with differentiated pottery or porcelain. Moreover, in many rural regions of Hamburg's hinterland there seems to have existed a close symbiosis between the organization of export-oriented textile production and the retail trade of colonial groceries. This led to a situation in which colonial goods were often given in payment for textiles (Flügel 1993: 56; Weber 2004: 42–5, 277–80). On the level of individual households choice was rather limited, therefore. The symbiosis between export-oriented textile production and retailing of colonial groceries also implied that the conversion of the worker's wage into non-traded foodstuffs was connected with high transaction costs, which lowered the price of colonial groceries relative to domestic foodstuffs for final consumers and entailed a shift of demand from the latter to the former. Finally, we do not know whether households expanded market-oriented production simply to compensate for a fall of the real wage through the mobilisation of seasonal labour reserves whose use was connected with little opportunity cost. The evolution of patterns of external trade thus suggest that increased consumption of stimulants and easily absorbable carbohydrates helped members of the lower classes to work longer hours and to subsist on meagre grain rations in the face of diminishing labour productivity in agriculture, rather than a Consumer and Industrious Revolution per se. While New World goods did not substitute for non-traded land-intensive Old World goods in the short run (see above on import demand function estimates) they provided means to cope with land scarcity in central Europe in the long run.

Whereas these findings give ground for strong reservations relative to the Industrious Revolution thesis in the narrow sense, the fact that trade patterns point to changes in labour allocation on the household level nevertheless has important implications for understanding economic development in Germany between the 1730s and the onset of the Revolutionary Wars in 1792. As mentioned in the introduction an investigation into aggregate economic growth suggests that during this period real income per capita was maintained on a constant level despite the decline of labour productivity as indicated by the fall of the real day wage. The rationale behind this apparent paradox rests on the observation of a strong increase of

the urbanization rate and of non-agricultural employment in the countryside; given the absence of sizeable imports of basic foodstuffs a massive expansion of the labour input must have taken place to compensate for the fall in the marginal return on labour (Pfister 2011).

Since trade is usually related to income, the finding of this study that aggregate import quantities flowing through Hamburg increased faster than population in the sea port's hinterland supports the statements that growth of income per capita was non-negative in the period of observation and that sectors related to services and the production of traded goods expanded. Sustained import growth of both colonial groceries and raw cotton in addition points to the development of specific branches of economic activity and changes in consumption patterns that rendered possible the stability of real annual income despite a fall in labour productivity.

The interpretation of rising imports of colonial groceries within the context of endeavours to cope with diminishing returns in the production of land-intensive goods also does not imply that a consumer revolution in the narrow sense was totally absent in Germany. Despite an increasing concentration of trade on sugar and coffee the number of individual items showing up in the toll registers increased by about one half between 1733–1742 and 1791–1798 — a clear sign that product differentiation occurred in at least some segments of trade. Import values of home goods, which in many ways epitomize the new consumption culture of the eighteenth century, but also of soap and goods related to bodily well-being all increased with an exponential trade of about 2 per cent p. a. over the period under study. Since population growth and known import prices increased at barely over 1 per cent p. a. there must have occurred a significant increase of per capita consumption of these goods. There was a consumer revolution taking place in eighteenth-century Germany, but the fact that its paraphernalia remained marginal items in recorded import trade suggests that it remained confined to a very narrow elite. This finding should also be seen on the background that due to her decentralized political structure Germany lacked a metropolitan centre that could set new trends in fashionable consumption.

In conclusion, this study on Hamburg's import trade in the eighteenth century exposes the forces of trade growth before the onset of the first wave of globalization in the second quarter of the nineteenth century. The fact that the prices of imports did not decline relative to non-traded goods points to the irrelevance of reductions of trade costs and improvements of transport technologies and business practices as factors of trade growth, at least with respect to overseas trade. Nevertheless, import quantities per capita increased, and since real income per capita remained static during the period of observation openness rose as well. Trade growth occurred very uneven, however. Sustained growth of imports of colonial goods from the Americas, notably of sugar and coffee, was partly counterbalanced by a decline of imports of Mediterranean beverages and groceries. Mediterranean and New World goods could partly substitute for each other, and relative prices of Mediterranean goods rose during the period of observation. Hence, growth in trade with New World goods partly compensated for traded land-intensive Old World goods whose production increasingly suffered from rising marginal cost. The evidence of this study that relates to trade with cottons and with inputs in textile production are also consistent with the notion that in order to cope

with diminishing marginal returns of labour relative to the production of basic foodstuffs households mobilized seasonal labour reserves to engage in market-oriented activities. A high portion of the incremental income gained from these activities was spent on stimulants and easily absorbable carbohydrates that facilitated subsistence on meagre grain rations. Overall, supply and demand conditions were important factors behind patterns of long-distance trade before the first wave of globalization, and trade growth, however modest it was, constituted a central element in Germany's economic development even during the century prior to the onset of industrialization.

Appendix 1: Construction of series of real import quantities of individual goods and of an import price index

All prices are from Gerhard and Kaufhold (2001). In the following description of the quantity and price series for individual commodities parentheses specify the broad category in which a good was placed as well as its share in total import value 1733–1798. To smooth weights in price and quantum indices zeros in import values were replaced with means of adjacent years. With the exception of brandy and sugar lumps (one year each) zeros occur only among goods with a share in total trade value of less than 0.6 per cent. The description also specifies the price series used for deflating import values of individual commodities and the creation of the price index, respectively. Missing prices were interpolated using the mean of adjacent years.

Almonds (Mediterranean goods, 0.52%); price refers to almonds from Provence; price in 1795 is interpolated.

Alum (industrial inputs, 0.08%); imports from England deflated with price for English alum, other imports deflated with price for Alum from Rome (on average 1736–1798 the latter cost 74.8 more than the former, and 69.2% of alum from other proveniences than the British Isles came from Italy); zeros 1747, 1770, 1771 (British Isles), 1736, 1738, 1740, 1753 (other proveniences); interpolated prices 1741, 1744–1752, 1755–1759; imports from other proveniences are only recorded from 1737.

Blubber (northern industrial inputs, 0.53%); zero 1762; price refers to blubber from Hamburg.

Brandy (Mediterranean goods, 0.86%); zero 1738. Up to 1790 the mean price of Cognac is 11.7% higher than the mean price of brandy from Bordeaux. While some French brandy is explicitly described as Cognac in a few cases the majority of brandy from the Atlantic side of France (share in total 49.6%) came from the region of Bordeaux. Therefore, the Bordeaux price is used. Interpolated prices 1774, 1777, 1780–1782, 1788, 1791.

Butter (no category, 0.31%); price refers to butter from Holstein, whereas the dominant provenience of imported butter is Ireland (76.4% of import value 1733–1789).

Cochenille (colonial dyestuffs, 0.20%); zeros 1760, 1769, 1771, 1781.

Cocoa (colonial groceries, 0.22%); price refers to cocoa from Martinique, prices in 1741 and 1742 are interpolated.

Coffee (colonial groceries, 20.07%); includes proportional share in composite items that mention both coffee and sugar; price refers to coffee from Saint-Domingue and Martinique.

Copper acetate / verdigris (Mediterranean industrial inputs, 0.07%); zero 1792; imported almost exclusively from France, and price refers to French verdigris.

Cotton (industrial input, 0.60%); cotton imported from the Mediterranean is deflated with price for cotton from Smyrna, cotton from all other proveniences with price for cotton from the West Indies; zeros 1762, 1770 (cotton from other places than the Mediterranean); price for West Indian cotton in 1744 is interpolated.

Currants and raisins (Mediterranean goods, 2.59%); the majority of import value consists of raisins (56.9 per cent) coming mostly Spain (89.4%); prices of currants from Zante are used to create deflated series and price indices.

Fruit skin (Mediterranean goods, 0.09%); price refers to orange skin. From 1769 to 1770 the price falls from 13.2 to 7.4 *Mark banco*; this price is maintained until 1774 thereafter information lacks until 1779. The price fall in the early 1770s implies an improbably high level of real volumes. For this reason, the information for 1770-1774 is discarded and the prices 1770-1779 are defined by linear interpolation. For 1784 the price is interpolated, too.

Ginger (colonial groceries, 0.52%); price series: mean price of brown and white ginger.

Indigo (colonial dyestuffs, 2.12%); until the early 1780s usually more than 80 per cent of imports are from France, but price refers to Guatemalan indigo; prices had to be interpolated for 1739–1746, 1750/51, 1754/55, 1766–1780.

Iron (northern industrial inputs, 0.06%); price refers to Russian iron. In many years Russian and Swedish iron had almost the same price, Swedish plate iron fetching a slightly higher price. However, the price of Swedish iron fluctuated strongly between 1740 and 1753 and was therefore not used for extrapolating the price of Russian iron in the years with missing data. Prices for 1741–1745, 1748–1752 are interpolated.

Lead (northern industrial inputs, 0.10%); price refers to English lead; 71.0 per cent of import value originated in England, 15.3 per cent from other ports of the British Isles.

Lead II oxide (german term: "(Blei-)glätte"; northern industrial inputs, 0.04%); deflated with price of lead II oxide from England.

Lead tetroxide (minium; northern industrial inputs, 0.04%).

Lights (no category, 0.10%); deflated with price of tallow since tallow is the major input. Before 1742 recorded import values are marginal or zero; therefore the price and quantum indices start only in 1742.

Oak apple (Mediterranean industrial inputs, 0.13%); price refers to oak apple from Aleppo.

Olive oil (Mediterranean goods, 1.83%); price series: white oil. White oil was slightly more expensive than yellow oil; the series is more complete.

Pepper (colonial groceries, 0.57%); deflated with mean price of white and black pepper.

Pernambuco wood (Fernambuco wood; colonial dyestuffs, 0.34%); zeros 1736 (consequently, indices relating to this commodity start in 1737), 1738, 1742, 1756, 1762; prices in 1768, 1783 and 1784 are interpolated.

Potash (northern industrial inputs, 0.12%); no imports are recorded until 1740 so that indices start only in 1742; prices in 1756 and 1746 are interpolated.

Potassium bitartrate (cream of tartar; Mediterranean industrial inputs, 0.13%); price refers to Italian cream of tartar.

Prunes (Mediterranean goods, 0.23%); price series: French prunes.

Rice (colonial groceries, 1.65%); price refers to Carolina rice. With the exception of war periods and 1791 the share of imports from Britain and Northern America in total import values of rice is always above 90 per cent.

Rubber (colonial industrial inputs, 0.28%); prices of rubber arabicum are available only from 1748.

Russia leather (no category, 0.08%).

Saffron (Mediterranean goods, 0.07%); price refers to saffron from Orange (Provence); price in 1794 is interpolated.

Soap (no category, 0.10%); recorded imports of soap came exclusively from France and Italy; price refers to French soap.

Sugar (colonial groceries, 35.35%); excludes sugar lumps and small values of sugar explicitly defined as refined sugar and includes proportional share in composite items that mention both coffee and sugar (see text for explanation); price series: sugar from Brazil. Figure 5 and Table 5 refer to the sum of import quantities of sugar and sugar lumps.

Sugar lumps (colonial groceries, 2.60%); imports are only recorded from 1762; zero 1773.

Sumach (Mediterranean industrial inputs, 0.09%); price refers to Portuguese sumach.

Tallow (northern industrial inputs, 0.35%). There are two price quotes: tallow for lights from Russia and tallow for soap, the first being slightly more expensive. In 1786 the weight unit of tallow for soap changes, so the price of tallow used for lights was used for index construction.

Tar (northern industrial inputs, 0.10%); zeros 1747, 1753, 1789, 1794; price refers to Swedish tar; prices in 1739–1744, 1762–1764, 1768–1780 had to be interpolated, and exponential interpolation was used to fill the last gap.

Tea (colonial groceries, 0.54%); zero 1740; price series: *Boue* (probably *Bohea*) tea.

Tin (northern industrial inputs, 0.15%); mean price of tin blocks and tin bars (both from England) is used to construct indices.

Tobacco (colonial groceries, 3.14%); price refers to best Dutch tobacco.

Turpentine (Mediterranean industrial inputs, 0.06%). 90.9% of total import value of turpentine is from France. Due to the strong price difference between turpentine from France and from Italy only imports from France were included, and the price of French turpentine was used for index construction.

Vinegar (Mediterranean goods, 0.05%).

Whalebone (northern industrial inputs, 0.41%); zero 1782; prices in 1776 and 1777 are interpolated.

Wine (Mediterranean goods, 4.44%); price refers to French white wine.

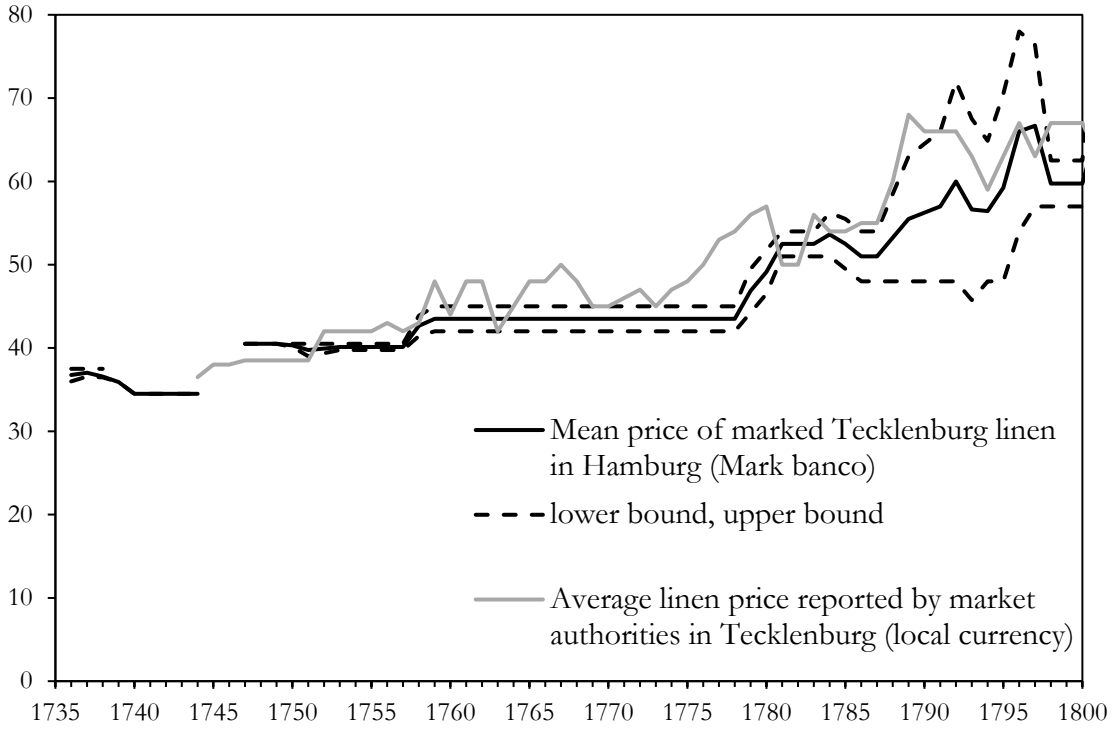
Zinc sulfate (vitriol; Northern industrial inputs, 0.07%); price refers to white zinc sulfate.

Appendix 2: A synthetic index of linen prices, 1736–1798

The index combines prices of linen from Silesia, Northern Bohemia, Lusatia, Saxony and Westphalia in a composite index. It can be considered as representative of the mid-term silver price movement of major categories of linen produced for export in the hinterland of the Hanseatic towns.

The basis is the *Preiscourant* of Hamburg.[11] Annual average prices were constructed on the basis of four data points, namely, from the last issues in February, May, August and November, respectively. The *Preiscourant* usually indicates a (large) price range within which sales contracts had been concluded during a week according to the brokers that were charged with supplying the respective information. These price bands were rather sticky over several months and often several years. Local prices, available for Tecklenburg, for instance, are actually more volatile than the quotes given by the *Preiscourant* (cf. Figure 7). The mean of the lower and upper bound has been used to create price series. All prices have been converted to *Mark banco*.

Figure 7:
Comparison of Hamburg price and local price: The example of Tecklenburg linen (1736/42–1800)



Sources: Hamburg: Commerzbibliothek Hamburg S/79; Tecklenburg: Küpker (2008: 464–5).

The following individual series underlie the synthetic index (starting and ending years in parentheses; occasional gaps were not closed):

- Breslau, blaue Ballen (1736–1760)

[11] Commerzbibliothek Hamburg S/49. Cf. section 5 for a discussion of this source.

- Engelsberg, Silesia (1736–1798)
- Friedland, Northern Bohemia (1736–1798)
- Hartmannsdorf 8/4, near Chemnitz, Saxony (1736–1761)
- Rouens Lusatia (1763–1798)
- Herford, Westphalia (1736–1785)
- Osnabrück, historic Westphalia (today Lower Saxony, 1736–1798)
- Ravensberg, region of Bielefeld, Westphalia (1736–1790)
- Tecklenburg, marked, Westphalia (1736–1798)

A synthetic index was estimated using the following unbalanced panel regression with fixed effects:

$$\ln(P_{ij}) = c + \alpha_i C_i + \beta_j T_j + \varepsilon_{ij}, \quad i \neq l,\ j \neq k$$

with P_{ij} being the price of linen type i in year j, C representing a vector of city- or region-specific dummy variables and T being a vector of time fixed effects. After estimation with OLS the synthetic price for year j is calculated as $\exp(c + \beta_j)$. For the presentation in Figure 2, the series is deflated by the price of silver and set to the value of 100 in 1736.

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