ORIGINAL PAPER

Testing the "trickle-down" theory through GECEM database: consumer behaviour, Chinese goods, and trade networks in the Western Mediterranean, 1730–1808

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Abstract

Economic historians have used GDP and its backwards projections to quantify economic growth and the process of early globalisation from year 1 CE to the present day. This has generated a lively debate concerning which methodologies are the most accurate for quantitative history and which data are most reliable. In addition, whilst an overwhelming amount of scholarship has emerged on the supply side, the demand side and family economic changes have been less popular in economic history. In this article, I present a concrete case study to analyse consumer behaviour: the circulation of Chinese goods in western Mediterranean markets during the eighteenth century. In so doing, I test the "trickle-down" theory with new archival data using GECEM Project Database, and apply the OLS and SNA to measure the social distribution of these goods through trade networks' intermediation. The main result is that the agency of middle social groups—mainly merchants—was changing consumers' behaviour in western Mediterranean markets, and not local oligarchies and nobility as the "trickle-down" theory has conventionally assessed.

Keywords Global (Economic) History · "Trickle-down" theory · GECEM Project Database · China-Europe · Consumer behaviour · Social network analysis

JEL Classification B3 · B4 · N3 · O1

1 Introduction

Recent scholarship in global economic history is beginning to evaluate microhistory and global history, questioning whether it is pertinent to unite both narratives for the sake of answering questions and developing case studies within a *longue durée*

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perspective (de Vries 2019; Trivellato 2015; Sawyer 2015; Levi 1991). Whereas from the late 1970s and throughout the 1980s there was a fruitful development in microhistory, whereby many historians focused predominantly on local and national histories, with the collapse of the Soviet Union in the early 1990s, and the dawn of a more globalised world following the end of the Cold War, global history gained more practitioners. The objective was to decentralize the traditional divide between the West and East, abandoning western (Eurocentric and/or Anglocentric) exceptionalism and putting the focus on Asia, and other geographies or peripheral areas of the Americas, Africa, Near and Middle East that had been previously relegated to a secondary position within scholarship and only studied under the dominance of the European empires such as Britain, France, and Spain (Subrahmanyam 2017; Berg 2004).

This article introduces a case study in order to analyse the circulation of Asian (Chinese) goods—mainly textiles such as silks and porcelains—and the formation of trade networks in western Mediterranean regions. The economic axis in southern France and Spain concentrated in the port cities of Marseille and Cartagena; these stood out as the main trade nodes connecting Marseille with inner areas of France for the distribution of Chinese silks through the riverbank of the Rhône and Loire, and Cartagena as the main Mediterranean port of the Spanish crown in the eighteenth century connecting with areas of Almeria, Granada, Malaga, Cadiz and Seville. The main question is whether the "trickle-down" theory—which explains a rise in consumption through the role of the upper social classes (i.e. aristocracy, nobility) whose patterns of consumption are emulated by middle-lower social groups (i.e. merchants, retailers, artisans, professionals)—occurred in this instance. This theory, advanced in the early 1980s by Neil McKendrick during the so-called Reaganomics period of the Reagan administration, advocated for a "trickle-down" or boost in consumption as well as developing free-market economies (Niskanen 1988; Aghion and Bolton 1997).

Taking western Mediterranean markets, and southern Spanish local economies (i.e. Cartagena, Murcia, Cadiz and Seville) as a case study, here the "trickle-down" theory is challenged, demonstrating that the boost in consumption in the above-mentioned areas during the eighteenth century was not due to the action of the nobility or local aristocracy, but instead to the role played by merchants as mediators in fostering the demand for overseas goods, mainly textiles and manufactures such as silks and clothing from China (Brewer 2010). This generated a dependence on foreign supply as local Spanish centres of textile production were not able to absorb local demand. Thus, the reduction of scales to analyse local markets and consumer behaviour in eighteenth-century western Europe allows me to methodologically conjugate micro and macro history perspectives with new empirical data such as probate inventories and trade records through a new multi-relational database to properly quantify consumption by clustering data in social groups and time spans.

Thus, the case study presented in this research is empirically addressed by observing the degree of intermediation of merchants. It applies the social network analysis (SNA) to interpret how merchant alliances affected the global circulation of Chinese goods (mainly silks and porcelains), and how this ultimately changed consumer behaviour in social strata, thus testing the "trickle-down" theory. For this purpose,

using a balanced and representative sample of large data and registers from GECEM Project Database,[1] I have clustered data to reconstruct the merchant networks (small, medium, and big trade companies) that operated in western Mediterranean markets (Marseille-Cartagena-Seville) and typologies of Chinese silks and porcelains that were introduced in families of diverse social status and level of wealth.

I have used an SNA approach clustering typologies of goods and applying key algorithms such as Fruchterman–Reingold, Geolayout and Yifan Hu's proportional algorithm, to accurately analyse the traders' intermediation, circulation of goods, and the distribution in the local markets of south Spain. In addition, an ordinary least squares (OLS) approach has been used to estimate how the goods introduced by merchants' networks affected both household consumption and wealth accumulation in families, mainly those belonging to oligarchy and merchants with different level of incomes. McKendrick affirmed that the "trickle-down" takes place in societies with lower degrees of socio-economic inequality. To see whether this occurs in my case study, I have applied the Gini index to the sample of merchants and oligarchs, which enables me to observe unequal income distribution and wealth-heightened elasticity of demand in middle social groups, and whether this happened in a similar manner to upper social groups. The percentual quantification of the stock of goods in both merchants and oligarchs' families statistically estimates the volume of goods accumulated, and allows us to perceive the degree of goods that were circulating from top to bottom, or vice versa, in the social hierarchy. Using this approach, we can determine whether the "trickle-down" occurred. Thus, the paper is structured as follows: (1) general framework of discussions in global (economic) history on consumption and "trickle-down" theory; (2) data sample and GECEM database; (3) methods to clustering data; (4) conclusions.

2 Debates in Global Economic History: consumption, the "trickle-down" theory, and its early applications

Traditionally, modern economic growth and the modernisation of traditional societies have been studied by historians using macro aggregates such as gross domestic product (GDP) and the transformations in the supply side. Accordingly, the study of the demand side, and of the shifts in family wealth and incomes as micro-economic indicators to analyse changes in lifestyles (along with, as a consequence, the emergence of a modern middle-level consumer class), has been treated only marginally in recent studies.

Such approaches have also represented the main focus of debate in endless discussions about the means and methods that historians—mainly early modern historians—use to quantify long-term economic development, economic inequalities, consumption and comparisons between China and Europe (Deng and O'Brien 2016). The validity of GDP as a macro aggregate—and its backward projection to year 1

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[1] GECEM Project Database is authored by Perez-Garcia and Diaz-Ordoñez (2021). GECEM Project Database version 2021. The Database is published in Open Access: www.gecemdatabase.eu/index.html. www.gecemdatabase.eu.

CE to study long-term growth and locate the great divergence between western and eastern economies in the early nineteenth century using questionable data for the Kuznetsian paradigm—has been proven a doomed endeavour (Deng and O'Brien 2016; Broadberry et al. 2018; Maddison 2007; Kuznets 1966).

However, in recent decades economic historians have paid attention to the origins of modern "mass consumption" societies and the early origins of the globalisation in which markets became progressively integrated and commodities from distant territories were consumed (Riello 2019; Perez-Garcia 2020a, b). Thus, the main point of debate has been to locate the period of transition in which traditional or pre-industrial societies changed their patterns of consumption, and middle and lower social groups acquired goods orientated to better lifestyles, changing both market supply and consumer behaviour.

The "economic boom" of western societies in the second half of the twentieth century, and the new political momentum and outreach of globalisation in the dawn of the collapse of the Soviet Union, propelled economic history scholarship to study the birth of modern consumer societies, industrial development, and changes in purchasing power parity (PPP) (McKendrick 1982; Rostow 1971). Influenced by the economic context of the period, scholarship at the end of the 1980s and early 1990s sought the birth and origin of modern consumer societies in western and eastern territories. However, this Eurocentric perspective, focusing on the exceptionalism of the British empire and its colonies, prevailed in studies related to modern economic growth and industrialisation (Vries 2015).

Case studies on consumption which examine modern economic growth through the analytical approaches and premises of global history have not been as popular in the historiography as those by economic historians and economists using backward extrapolations of GDP per capita (Broadberry et al. 2018). The prime geographical unit of analysis has been always central economies, mainly the British world as the dominant area of the first industrialisation. Thus, revisionist studies on consumption aim to analyse the global movement of items such as porcelains, silks, or other Asian goods and its influence on the technological, socio-economic, and political transformation of European territories (Perez-Garcia et al. 2022; Riello 2019; Batchelor 2006; Clunas 1999).

Some scholarship challenged such Eurocentric (British) perspectives, taking into account different geographic units across the West and East and thereby placing diverse socio-economic, cultural, and political realities into a more global context. The California School challenged the strong Eurocentrism comparing the economic growth and path of modernisation between Europe and China (Perez-Garcia 2014; Gunder 1998; Pomeranz 2000).

The socio-economic and cultural interactions in Eurasia and the transcontinental networks of people and goods are the key elements in current revisionist studies of consumer societies. Case studies such as the global circulation of objects (silks, porcelains, tea) or the formation of trade networks in East Asia are renewing this historiographical trend searching for connectivities between the West and East (Perez-Garcia and de Sousa 2018).

Changes in consumer behaviour and fashions should be examined through world network systems by which overseas goods were introduced, as well as financial structures and credits behind the transactions. The case study that I present in this

article is a good instance of the connections between the business networks and consumers linking western Mediterranean ports such as the axis Marseille (south France) and Cartagena-Cadiz-Seville (south Spain) for the introduction of Chinese goods.

Thus, a global scale approach, which includes intercontinental trade networks, allows for a more accurate analysis of the socio-economic and cultural transfers that were occurring in the second half of the eighteenth century (de Sousa 2018; Oka 2018; Gipouloux 2011). Such a perspective, which focuses simultaneously on a micro-analysis scale to study the economic impact of the acquisition of new goods in households with different levels of wealth, as well as the financial system that allowed the rapid introduction of such goods using both probate inventories and merchant letters as main historical sources, provides more valuable economic indicators than backwards projections of GDP per capita to measure changes in consumption and its correlation with economic growth. This can be observed in the following case study, which demonstrates the circulation of Chinese goods in western Mediterranean markets and changes over time in patterns of consumption that were prompted by merchant networks did not follow a trend from top to bottom in the social hierarchy as the "trickle-down" theory affirms. This historical approach, which combines both micro–macro scales [*jeux d'èchelles*], has hardly been implemented by recent historiography due to the British exceptionalism that continues to dominate studies on consumption, industrialisation, and economic growth in Europe (de Vries 2019; O'Brien 2006; Brewer 2003; Revel 1996).

McKendrick's (1982) work paid close attention to the emergence of a "consumer revolution" in England in the second half of the eighteenth century. This line of research merely stresses the supply side as a driver of economic growth by which urban areas of north-western Europe such as London, Paris, or Amsterdam were the main centres of production of new goods, changing consumer behaviour. Shifts in patterns of consumption were provoked by social agents and consumers, and not by the market and institutions as recent scholarship has defended (Allen 2017; Rosenthal and Wong 2016).

The "trickle-down" theory was linked to the new consumer revolution that occurred when a relatively large group within society, mainly elites, augmented the volumes of new commodities that they did not previously possess. These goods progressively reached and poured down to all social classes from top to bottom and were spread in local, national and international markets.

> There was a consumer boom in England in the eighteenth century. In the third quarter of the century that boom reached revolutionary proportions…
> For the consumer revolution was the necessary analogue to the industrial revolution, the necessary convulsion on the demand side of the equation to match the convulsion on the supply side (McKendrick 1982).

According to this theory, a consumer revolution takes places in open societies when there is a growing middle class with lower degrees of socio-economic inequalities in which wealth is widely distributed (McKendrick 1982). The consumption of certain goods such as clothing, household ornaments, or textiles for personal hygiene such as napkins, towels, table linens, or bedroom clothing is a good indicator of

socio-cultural changes and alteration of family economies through the acquisition of new fashions and tastes. The acquisition of such new items prompted an emulation of patterns of consumption from top to bottom in the social hierarchy. This provoked a socio-cultural phenomenon of emulation in which lower and middle classes tend to reproduce the lifestyle of the upper classes. European courts, as well as coffee or tea rooms, meeting halls, and walk and entertainment areas, were the main physical scenarios where social emulation took place, and where the eighteenth-century European bourgeoisie expanded.

New socio-cultural models and practices emerged from the social distinction implied in the consumption of new items, lifestyle changes, and references to aristocracy and elites. An early application of the "trickle-down" theory might be found in the texts of a group of Spanish Enlightenment thinkers who were in favour of the production of new luxury goods on domestic soil. This was in line with the mercantilist policies of the seventeenth century. Some Enlightenment intellectuals such as Sempere y Guarinos believed that the production of luxury goods and reductions in the volume of imports could stimulate national revenues and consumption. It was believed that by providing even more wealth to the wealthy, the middle class would receive some of this wealth themselves, which would ultimately stimulate consumption:

> …vanity, fostered by luxury, should be considered a lesser evil to prevent a greater one, which would be the cessation of work and industry, and with it the ruin of the state, public amusements, snacks, and saloon balls and many other amusements... who is able to calculate the costs derived from this trade? (Sempere y Guarinos 1788).[2]

The acquisition of luxury goods was changing cultural habits as the social groups' desire towards the consumption of these items was rapidly growing. As well as intellectual speeches such as those by Sempere y Guarinos, the acquisition of superfluous goods and conspicuous consumption by the aristocracy and elites had, as its main symbolic and "immaterial meaning", the preservation of a distinction between social groups. Certain commodities such as Chinese silks and textiles with exotic materials, colours, and adornments, which were exclusive to the aristocracy, progressively came into the possession of the middle social groups, as we can observe from probate inventories (Perez-Garcia 2013).

For instance, through observing the clothing of Isabel de Farnesio, Philip V's second wife, it can be proved that such varieties of costume, material, colour, and textile were also appearing in middle-social class wardrobes. By examining the possessions of the upper social classes, in this case that of royalty, and comparing them with those of the lower classes, it might be said that the "trickle-down" and top–bottom emulation process took place in eighteenth-century Spain.

Hangings of China, property of the King Philip V's Queen Dowager:

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[2] The original text was written in Spanish. Herein I present the English translation for a better understanding of the reader.

A hanging from China, with bouquets, flowers and birds, lined in white taffeta, trimmed with gold bangs, the ceiling is composed, imperial, bedspread, bedhead, seven "cenejas", three skirting boards, four curtains, two clamps and two finishings. Twenty-eight curtains of the aforementioned will with birds and flowers, for doors and windows, trimmed with gold bangs, lined in white taffeta, and two of them are twice made... Sixty-two hanging cloths of several lined cloths on white canvas from China... A drapery of yellow twill printed with flowers from China, composed of nine cloths. Lined in Dutch linen of the same color and has thirty-six legs...[3]

This text represents the vanity and fashion crazes of the eighteenth-century Spanish court and aristocracy to consume exotic goods from distant territories, such as China, and how such taste permeated to wider society. Some studies have proven the validity of concepts such as emulation, luxury, and "trickle-down" in analysing how lower groups might acquire goods emulating the lifestyles of the upper classes (Berg, 1991, 2004; Berg and Eger 2003). Fairchilds (1994) mentions "a lower class prosperous enough to own a few luxuries and eager to follow the latest vagaries of fashion," and by observing the desired goods, such as those mentioned in McKendrick's work (1982), "populuxe goods were desired as symbols of an aristocratic lifestyle."

Catholic European regions issued interventionist decrees, prohibitions, and restrictions on international trade to foster national industries and national consumption (Berg and Eger 2003). Such mercantilist measures of import-substitution aimed to maintain economic protectionism and improve the outdated manufacture centres:

By decree of April 6 of this year [1734] I hereby revalidate others of October 25, 1717, June 20, 1718, and June 4, 1728, in which the introduction of sugar, cocoa, and sweets of Marañón from the Kingdom of Portugal, and silk and textiles and fabrics from China, and other parts of Asia, as well as cottons and painted canvases, whether made in Asia, or in Africa, or imitated, or counterfeit in Europe, is forbidden into these kingdoms…[4]

The passage above shows the prohibition of the introduction of silks and textiles from China, the same goods that king Philip V's queen dowager owned as her main luxury possessions, as indicated in the previous text. The purpose of such restrictions had both social and economic connotations. On the one hand, the measures aimed to maintain the social division of classes, and, on the other, state trade revenues were designed to stimulate consumption. This is evident in an exchange of letters in 1788 between don José Moñino y Redondo, count of Floridablanca and the countess of Montijo, Maria Francisca de Sales Portocarrero, secretary of the "Junta de Damas de Honor y Mérito" [Board of Ladies of Honour and Merit], concerning

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[3] The original text was written in Spanish. Herein I present the English translation for a better understanding of the reader. Colección Documental del Museo de Tarrasa (hereafter CDMT), ref. CA 93.

[4] CDMT, Royal Decree Banning the Entry of Silk and Textiles from China, Madrid, 1734.

an anonymous political and economic essay on ladies' luxury and a plan for a national female dress, apparently written by a lady at court:

> …introduced in the social order of a Monarchy, but that which arises naturally from the virtues and gifts of the soul and the body and, deriving from this nature, the adornment of dress, and finally, also deriving from this nature, the difference between classes… The desire then to impose the wearing of a garment with which the unlimited freedom for satisfying the first inclination, or whim, is removed, and compensated for with a distinction of class…[5]

The "trickle-down" theory, the emulation of upper social groups (aristocracy, nobility) and the circulation of new habits of consumption from top to bottom in the social hierarchy, has been largely discussed by later studies in which the upper classes were not the focal point. Thus, the concept of emulation was contested by alternative studies that believe that modern consumer societies did not necessary emerge from the emulation of lifestyles of the upper classes (Perez-Garcia 2013; Weatherill 1988; Vickery 1994). Wide attention has been paid to the nobility and aristocracy, but merchants should be the social agents to be closely analysed in order to observe which social groups stimulated changes in consumer behaviour. At the end of the eighteenth century, Protestant European merchants, mainly from Britain and the Netherlands, endeavoured to leave behind their bourgeois origins and be assimilated into the nobility by purchasing noble titles with the profits from their businesses.

3 Testing the "trickle-down" theory: GECEM Database and data clustering

In this section, I provide further details regarding the methodology I have used, applying a multi-relational database (GECEM Project Database) through Intentionally-Linked Entities (ILE) to visualise the unlimited number of roles played by entities—either merchants or commodities—in a relational model (Kantabutra et al. 2010). The community of Mediterranean traders who settled in south France (Marseille) and those of the Spanish Mediterranean coast, who mainly settled in the areas of Barcelona, Valencia, Alicante, Murcia, Cartagena, Cadiz, and Seville, played a crucial role in the introduction of Asian goods. The case of Chinese goods (silks and porcelains) is presented as the main example. Thus, the social network analysis (SNA) is modelled through social actors (merchants) and goods from long-distance places making Mediterranean regions the focal point of such global encounters between people and goods.

Based on an analysis of the consumption of Chinese goods, and the introduction of goods meant not to cover basic necessities in social groups with different level of wealth, this paper aims to answer the following questions: (1) Did the "trickle-down" occur in western Mediterranean economies? (2) Who were the main

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[5] CDMT, Colección Viñas, ref. CA, 241.

social agents that provoked changes in consumption? (3) Were those social agents the nobility and aristocracy, as McKendrick mentioned in his formulation of the "trickle-down" theory, or middle-class groups and the new rich bourgeoisie composed mainly of merchants?

The database used as my main methodological tool comprises the structure of the so-called Relational Database Management System (RDBMS) and not a Document-Oriented Database (DOB) (Perez-Garcia et al. 2022). The RDBMS structure allows cross-referring sources through Structured Query Language (SQL) by which we can maintain the original language of the historical source and accommodate it to the computer coding language system. The DOB is more focused on the document itself and not on the information relevant to our research question and hypothesis drawn from the primary sources.

For the GECEM Project Database, a relational RDBMS structure such as MySQL Community Edition was chosen along with the application of the software GENO-PRO and GEPHI for clustering the genealogies of social actors. ILE have been created in this database for the analysis of the circulation of goods in the social hierarchy as well as the social groups which fostered the introduction of such goods.

Through the data and RDBMS model structure of GECEM Database, McKendrick's assumption can be tested. This theory establishes that a consumer revolution and the "trickle-down" occurs when there is a growing middle class with lower degree of socio-economic inequality in which wealth is evenly and widely distributed. Consequently, the household's demand and consumption for goods, not to cover basic necessities, rises in the middle-lower classes, and this leads to improvements in standards of living and lifestyles. To test whether a "trickle-down" effect occurs, and the degree of changes in consumer behaviour in local markets of early modern southern Spain, I have applied quantitative tools and SNA to observe changes in consumer behaviour, inequalities in income and wealth distribution, and the structure and degree of intermediation of merchant networks as main agents who increased local demand for overseas goods. Firstly, I have run the Gini index for the group of merchants and oligarchs (mainly local aristocracy and titled nobility) to observe income and wealth inequality. If there is low degree in such inequality, then we find symptoms or indicators of the "trickle-down" theory. Secondly, to prove whether the household's demand increases, and to compare the frequencies of volumes between oligarchs and merchants to see whether goods were circulating from top to bottom (or vice versa) in the social hierarchy, I have run an OLS model. This represents a valid approach to estimating changes and choices in households' demand by measuring through probate inventories as the main source of the stock of goods and wealth in families with different income levels. Finally, the SNA has been used as a main strategy through the Fruchterman–Reingold, Geolayout, and Yifan Hu proportional algorithm applying a two-mode network (actor-by-actor, and good-by-good) to compare the network metrics (degree of intermediation and clustering) and graphic representation in which the main determinants are the accumulation and circulation of wealth and goods through merchants' transactions in local markets (mainly Seville, Murcia, and Cartagena) of southern Spain.

To make feasible these statistics and econometric models, through GECEM Database I have arranged a sample of 1,000 probate inventories which list nearly 40,000

Table 1 Socio-professional groups of the sample of probate inventories in south Spain, 1730–1808

	% probate inventories (1730–69)	% probate invento-ries (1770–1808)
Local oligarchy	12.59	12.32
Merchants	11.85	12.32
Landowners	17.04	16.67
Master Artisans	8.15	7.97
Professionals	2.96	2.90
Artisans	19.26	18.84
Yeomen	28.15	28.99
Total	100.0	100.00

Sample of 1000 probate inventories. Source: author's own elaboration. Archivo Histórico Provincial de Murcia (hereafter AHPM), Archivo Histórico Provincial de Sevilla (hereafter AHPS), protocols

entries of goods. The chronology of the sample ranges from 1730 to 1769, and from 1770 to 1808. The first period covers a span of years of relatively stable socio-economic and political context in the Mediterranean after the War of the Spanish Succession (1701–1715) and the Great Plague of Marseille at the start of the 1720s, and the second period covers the years of political turmoil with the interference of Great Britain and France in Spanish markets, the Free Trade Act, the French revolution, and the Napoleonic wars.

The geography of the sample covers the areas of the kingdom of Murcia, in southern Spain, and the area of Cartagena, the main Mediterranean port of the crown of Castile in the eighteenth century which was connected with the port of Marseille as a centre of distribution of East Asian goods in eighteenth-century Mediterranean Europe (Carrière 1973). In addition, the sample covers the city of Seville, in which French traders operating in the port of Cartagena were the mediators connecting the local markets of Marseille and Seville for the introduction of Chinese goods (silks and porcelains).

This sample of probate inventories ranges across a wide and diverse variety of socio-professional categories. In this particular case, it is important to emphasise the complexity of the social structure and hierarchy of early modern European societies. My strategy for grouping the social categories of the sample has been to follow Kriedte et al. (1996) model, which consists of scrutinising the social structures of the *Ancien Regime* societies using instruments to classify social groups, and being aware of the strong division and hierarchies within those same social groups. Hence, I have divided the sample's social groups into the following segments of socio-professional categories to minimise the bias regarding their representativeness (Table 1). This strategic classification avoids the problems of arbitrary randomness that historians sometimes incur by accumulating a large amount of sample and data making, thereby making it impossible to run comparisons.

Within this social representation, potential biases are minimised when estimating frequencies in household demand and the circulation of goods—whether from top to bottom—in social hierarchy and wealth distribution. In addition, in this sample I

have subtracted the grouping of oligarchs and merchants to see which group has the main degree of intermediation in changing consumer behaviour in southern Spanish local markets. The group of oligarchs encompasses diverse subcategories that might also be defined as local elites such as titled nobility, local positions in the council [city hall] such as *regidores* or *jurados*, ecclesiastic positions in the cathedral, or military positions. Classifying the social group of merchants is even more complex as it ranges from wholesalers to retailers or peddlers, and from traders with a high volume of business in local and overseas markets to small and medium companies with modest revenues, but which undoubtedly play a vital role in the distribution of goods in local communities. It is important to mention that artisans, peasants, or even local elites could also fulfil the role of merchants, making the merchant group quite an open-ended social category.

Through the application of GECEM Database, a selective search of concrete products such as Chinese silks, textiles and porcelains (or import-substitutions) can be carried out with ease. A search of a wide typology of Chinese textiles such as bed-clothing (mattresses, headboards, blankets, and covers) and certain goods such as trimmings, clothing, and clothing adornments such as handkerchiefs give us some clues about changes in consumption. Observing and comparing the clusters concerning which social groups have higher volumes of consumption of these goods might also give us some insights as to whether the "trickle-down" was prompted by the high social groups or the middle groups: the so-called new business rich elite. Thus, I have studied the data to analyse the consumption per capita, choosing wealth and textile consumption as the main variables, as can be observed in the OLS model. The typologies of the good categories such as textiles (mainly those made of Chinese silks), porcelains, and beverages such as tea, coffee and chocolate help to estimate the standard of life and lifestyles. Per capita consumption in families (the average of the family size in the sample is between six and nine family members per household) with middle and upper volumes of wealth increases in the period from 1730 to 1808. The stock of consumer durables which has been measured in the sample of probate inventories and the consumer price index (CPI) that I have elaborated from the prices of a wide variety of goods of family expenditures (mainly in the categories of textiles, beverages, and porcelains) are weighted averages that allow us to observe shifts in consumer choices in families with high and middle volumes of wealth.

Changes in the demand side should be understood through the effect of relative prices upon purchasing power and, therefore, how this process prompted shifts regarding consumer durables, household expenditures per capita, and wealth accumulation. Dismissing Gilboy's conventional assumption that high level of incomes entails a growing demand, there is a sociological factor determining consumer choices in which a relevant share of incomes is spent to satisfy necessities associated with leisure time and luxury goods, or goods that were not meant to cover basic necessities. This ultimately shapes standards of life. Such changes in lifestyles and consumer durables are the necessary precedent to set societies and families into a well-being economy. As can be observed in Table 2 of the sample of probate inventories, the wealth accumulated by families of different incomes were growing in the middle tiers, mainly in groups of wealth from 10,000 *reales* to 50,000 *reales* per

Table 2 Groups of wealth in south Spain, 1730–1808

	% probate inventories (1730–69)	% probate invento-ries (1770–1808)
Non-evaluated	25.19	9.42
0 > 10,000	25.93	20.29
10,000 > 50,000	25.93	31.16
50,000 > 100,000	7.41	16.67
> 100,000	15.56	22.46
Total	100.00	100.00

Units in *reales*. Sample of 1000 probate inventories. Source: author's own elaboration. AHPM and AHPS, protocols
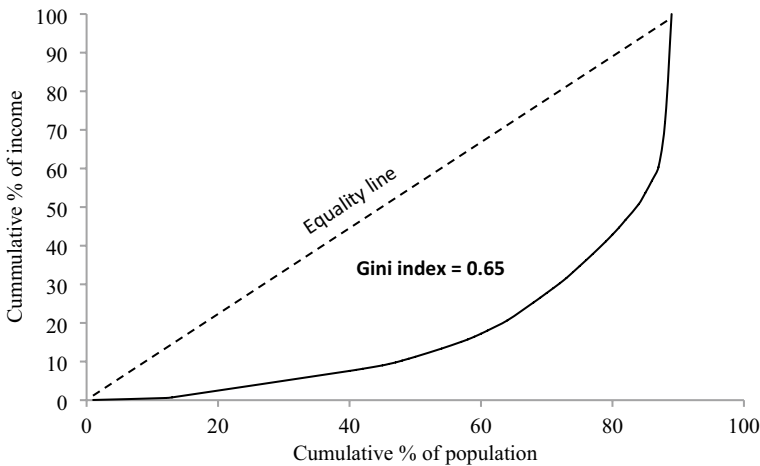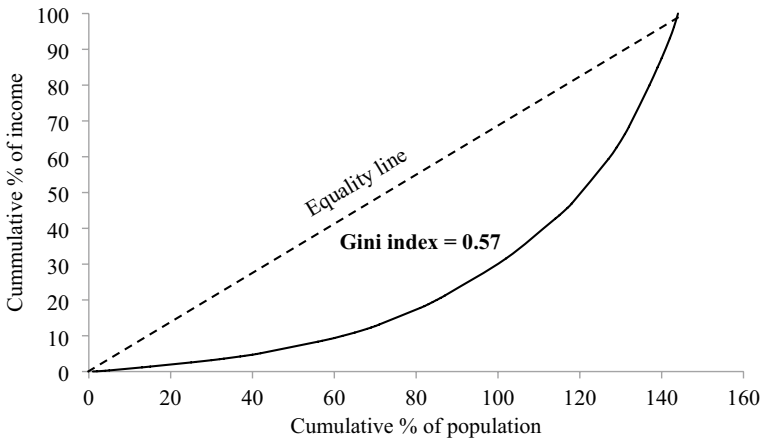

Fig. 1 Lorenz curve and Gini index for local oligarchy's incomes. Source: author's own elaboration. AHPM, protocols. Income unit in *reales*

annum in which the upper percentual averages grows from 25.93% to 31.16% in the second half of the eighteenth century. This indicates that a growing middle class with sufficient rents and wealth was being consolidated, with the groups of merchants becoming the main pillar of this new middle class.

$$I_G = \frac{\sum_{i=1}^{n-1}(p_i - q_i)}{\sum_{i=1}^{n-1} p_i}$$

The representation of the Lorenz curve is defined for all p in the interval [0,1] to estimate inequalities in the distribution of incomes by occupational and social categories (Figs. 1 and 2). The calculation of the Gini coefficient is realised through the cumulative sum p as the sum of incomes of each socio-professional category and the population (number of individuals) with different levels of income. Here q is the

Fig. 2 Lorenz curve and Gini index for merchant's incomes. Source: author's own elaboration. AHPM, protocols. Income unit in *reales*

percentual calculation of cumulative frequencies of income for each occupational and social category (Gastwirth 1972).

The Gini index has been calculated to estimate inequalities in the distribution of incomes in the main occupational sectors of this research. The aim is to test the "trickle-down" theory and observe whether there are lower income inequalities in the group of oligarchy which is the target group to assess whether the "trickle-down" effect took place. Or, on the contrary, weather there are lower income inequalities in the groups of merchants mainly composed by the middle classes that were moving upward in the social hierarchy through their wealth accumulation in business transactions (Figs. 1 and 2).

The percentual distribution of wealth, as we can see in Table 2, is higher in middle groups with rents between 10,000 *reales* to 50,000 *reales* per annum, which indicates that, in the second half of the eighteenth century, the higher proportion of revenues in local communities and urban areas came from trade. By plotting the Gini index to measure the degree of inequality of income distribution in the group of oligarchs and merchants, we can observe in Figs. 1 and 2, in the representation of the Gini index through the Lorenz curve, that inequality is smaller in the group of merchants. Both indexes are slightly similar: 0.57 for the group of merchants, and 0.65 for the groups of oligarchs. Although they show high inequality, for extremely hierarchical, complex and inequal pre-industrial societies of early modern Europe, a coefficient approaching 0.5 indicates a smooth reduction of inequalities, which confirms the table of percentual groups of wealth in which the middle classes were growing. At first glance, this might corroborate the existence of lower degrees of socio-economic inequality and a growing middle class. This could be a symptom of the "trickle-down" effect; however, whilst this does not occur in the upper classes (nobility, aristocracy, oligarchy), as McKendrick mentions, it does feature in the group of merchants as the main group in the middle class which was fostering demand in upper and middle-lower social groups.
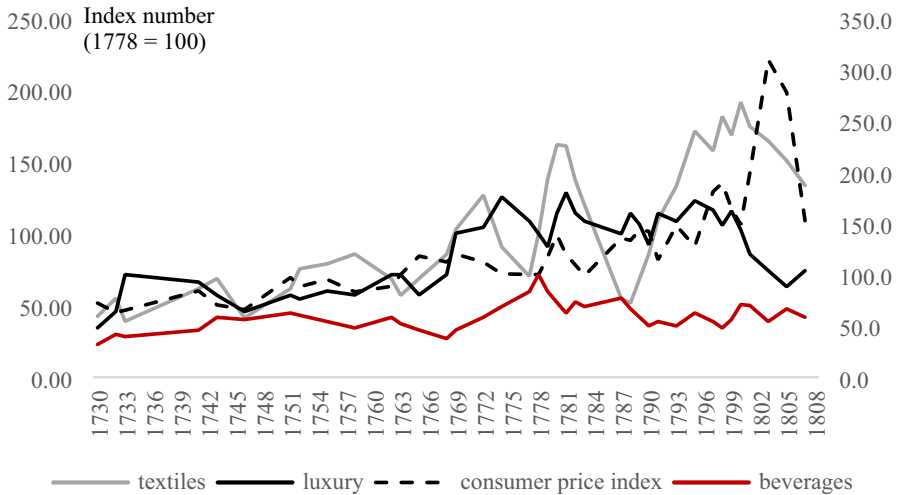
Fig. 3 Consumer price index vs. per capita stock of goods in southern Spain, 1730–1808. Source: author's own elaboration. AHPM and AHPS, protocols. Price and stock unit in *reales*

In Fig. 3, I have constructed the CPI as average of the prices that encompass goods of consumer expenditure per capita of the stock of families with the levels of wealth mentioned in Table 2. These goods include wide typologies of textiles (clothing made of Chinese silks), beverage items (tea, coffee, and chocolate), and luxuries (Chinese porcelains, mirrors, clocks, glassware, and household furniture) as items which improved lifestyles and created a consumer elite. Conventional scholarship has simplified the CPI to one good, normally bread grains, as a more significant consumable in families' expenditures (Allen 2001; de Vries 1993; Reher and Ballesteros 1993). However, here in Fig. 3, I have followed Phelps Brown and Hopkins' (1981) construction of "basket consumables" using textiles and household furniture as the main components and significant indicators of new consumer choices leading to comfort and leisure time. Such patterns of consumption were slowly developing a new middle class and global consumerism, since many of these items came from overseas markets through merchant intermediation. There was a smooth tendency of rising prices during the eighteenth century and sharp fluctuations in the last third of the eighteenth century, which coincided with the political turmoil of that period.

The year 1778 has been used as an index year because it was during this time that the Spanish monarch Charles III issued the Free Trade Act between Spain and its colonies. Instead of correcting the endemic problem of contraband and fixing the fluctuation and speculation of prices, this act had the opposite effect since it did not avoid hikes of CIP and the constant price rises during the period of the French revolution until the Napoleonic wars. The per capita stock of textiles was higher on average due to the growing demand for these goods; however, in the period mentioned, the stock suffered sharp fluctuations (see Fig. 3). At a lower level, the stock of beverage items and luxuries was equally varied, but to a lesser extent as these goods were purchased by social groups with upper-middle levels of wealth. Figure 4
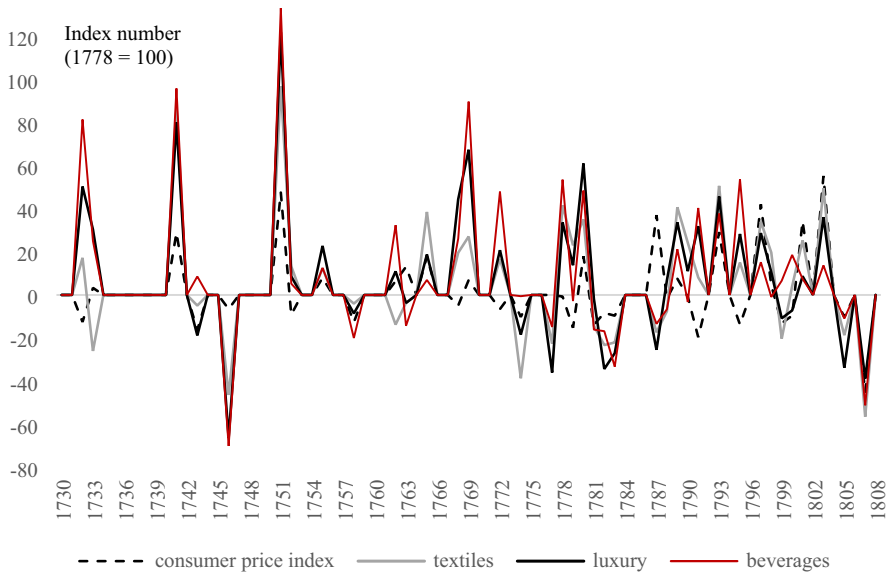
Fig. 4 Growth rate of consumer price index vs. per capita stock of goods in southern Spain, 1730–1808. Source: author's own elaboration. AHPM and AHPS, protocols. Price and stock unit in *reales*

computes the average rate of CPI and the flow of household stock per capita. This is because the permanent aim to regulate trade and overseas consumption by the Spanish Bourbon monarchs, mainly through the Free Trade Act, did not eradicate smuggling activities, fluctuation of prices and speculation. The growing demand for overseas goods, mainly silks and porcelains from China, remained constant through the intermediation of local traders and non-official transactions.

Thus, it is possible to test the "trickle-down" theory through the analysis of the consumption of specific goods such as silks and porcelains from China, and therefore to ascertain whether a social emulation occurred from the top to the bottom in the social hierarchy of a traditional society such as Mediterranean Spain. McKendrick's thesis is, therefore, challenged since the circulation and introduction of these goods in middle-lower social groups was prompted by the mediation of traders as agents who ultimately fostered the acquisition of new fashions and tastes. In the model presented in my research, merchants are defined as "vicarious consumers" (see Fig. 5 and Table 3).

Presenting the new model of the "vicarious consumption" theory for the period from 1730 to 1808, we can observe that merchants—for an economy dependent on foreign trade, since local production seemingly failed to absorb local demand for Asian (Chinese and Indian) textiles and clothing—were the main socio-economic agents as mediators in stimulating the demand and creating new needs in social groups, and, therefore, changing consumer behaviour (Perez-Garcia 2019; Veblen 1934). This model challenges and presents the "trickle-down" theory as invalid because local oligarchs and elites were not the main agents in changing and creating a new demand in the lower-middle classes.

Fig. 5 "Trickle-down" theory vs. "Vicarious consumption" theory. Source: author's own elaboration

Table 3 Testing the "trickle-down" theory through consumption by merchants of Chinese and luxury goods in southern Spain, 1730–1808

	Porcelains (%)	Mirrors (%)	Clothing made of "indiennes" (%)	Goods from China (silks) (%)	Chinaware (%)
1730–1769					
Merchants	20.00	60.00	46.66	0.00	0.00
Other social groups	4.27	27.35	23.07	**3.41**	**1.70**
Total	6.06	31.06	25.75	11.76	5.88
1770/1808					
Merchants	0.00	72.22	55.55	5.55	0.00
Other social groups	**4.27**	38.46	**60.68**	**10.25**	**8.54**
Total	3.70	42,96	66.66	9.62	7.40

Source: Sample of 1000 probate inventories. Source: AHPM and AHPS, protocols

Figures in bold represent the higher frequency of consumption of social groups in comparison to merchants'

This can be observed in Tables 3 and 4, wherein, through a consistent sample of probate inventories, a comparison has been made between oligarchs and merchants by measuring over time the frequencies of the stock of Chinese goods (i.e. clothing and silks), textiles from India (*indiennes* as a fashionable cotton fabric of the eighteenth-century), Chinese porcelains, and other luxury goods such as mirrors.

We can observe that frequencies in consumption (see Tables 3 and 4) are evenly distributed during the eighteenth century, when merchant groups

Table 4 Testing the "trickle-down" theory through consumption by local oligarchs of Chinese and luxury goods in southern Spain, 1730–1808

	Porcelains (%)	Mirrors (%)	Clothing made of "indiennes" (%)	Goods from China (silks) (%)	Chinaware (%)
1730/1769					
Local Oligarchs	0.00	37.50	37.50	27.27	9.09
Other social groups	6.89	30.17	24.13	0.86	0.86
Total	6.06	31.06	25.75	11.76	5.88
1770/1808					
Local Oligarchs	6.25	50.00	75.00	43.75	37.50
Other social groups	3.36	42.01	57.98	5.04	3.36
Total	3.70	42.96	66.66	9.62	7.40

Sample of 1000 probate inventories. Source: AHPM and AHPS, protocols

(peddlers, retailers, and wholesalers) had higher frequencies in consumption of the aforementioned goods than local oligarchs. In the second half of the eighteenth century, there is a smooth decline in the frequency of merchants purchasing overseas goods as this was the period in which mercantilist decrees forbade the introduction of Asian goods into Spain, as well as the political conflicts and wars with Britain such as the War of Jenkins' Ear or *guerra del asiento* (1739–1748) for the control of the *asiento* (merchants' licenses to monopolise trade routes). Although the British failed in occupying Cartagena de Indias in the Caribbean, they succeeded in seizing Portobello and making a trade blockage of Manila in the Philippines that later prompted the British invasion of Manila from 1762 to 1764. In addition, the War of the Austrian Succession provoked naval battles such as the Cabo Sicié, and the trade blockage by the British of strategic western Mediterranean ports such as Cartagena and Genoa, which affected the trade between Marseille and Spanish ports, decreased trade exchanges and ships' arrivals in Marseille, Cartagena, and Cadiz. This political turmoil affected the supply side, fostering illegal trade and contraband, but the demand for overseas goods remained at similar levels to the first half of the eighteenth century.

Despite some symptoms that might indicate a degree of "trickle-down" effect from top social tiers such as oligarchs and local nobility, merchant groups and networks were the main agents in the intermediation to introducing new goods and increasing the demand in local markets. To test the social factor that determines which social class fostered consumption—whether the top social groups (oligarchy) or the middle ones (merchants)—and, therefore, whether or not McKendrick's "trickle-down" theory is present, I have run a regression analysis model to analyse changes in consumer's choices. Data from probate inventories are the main source in this model to measure the effect of the "basket of consumables" that includes textiles, beverage and luxury items, and wealth accumulation in shifts in patterns of consumption.

To determine the set of variables using the overall consumption output through the "basket of consumables" and wealth as main dependent variables, applying an OLS method allows us to estimate *t*-statistic and standards of error by a white method, robust for heteroscedasticity (Deaton 1994). This method mainly determines consumer's choices and the positive or negative correlation among the consumer durables chosen. Within the development of this econometric model, it is relevant to acknowledge the possible presence of heterocedasticity due to the presence of potential bias in the sample and its representativeness. This is a common issue when analysing data for early modern economies. Thus, it is reasonable to find high variance or dispersion in social groups with different levels of wealth, as it is the case of our sample, and such variance appears when plotting household expenditures in several categories of goods. In econometric terms, this means high dispersion of the residuals due to the value of the set of variables.

Heterocedasticity maintains unbiased properties and consistency of OLS indicators, having a degree of efficiency in our model when the sample is balanced and robust, and, therefore, keeping the interval confidence when using statistical *t* and *F*. Thus, to reduce heteroscedasticity of the econometric model in the set of variables, I have utilised a trans-logarithmic function (Berndt and Christensen 1973; Deaton and Muellbauer 1980), applying a second order Taylor's series around the point $ln\, x = 0$, obtaining:

$$\ln X \approx B_0 \sum_{i=1}^{M} (\frac{\partial \ln X}{\partial \ln a_i}) \ln a_i + \frac{1}{2} \sum_{i=1}^{M} \sum_{j=1}^{M} \left(\frac{\partial^2 \ln X}{\partial \ln a_i \ln a_j} \right) \ln a_i \ln a_j$$

In the point of the expansion of the series, the derivatives are calculated and identified through quotients using asymmetry of *a* as partial derivatives. Therefore, *f(x)* is expressed as follows:

$$\ln X = B_0 + B_1 \ln a_1 + \cdots + B_M \ln a_M + \partial_{11} \left(\frac{1}{2} \ln^2 a_1 \right) + \partial_{12} \ln \partial_1 \ln \partial_2$$
$$+ \rho_{22} \left(\frac{1}{2} \ln^2 a_2 \right) + \cdots + \partial_{MM} (\frac{1}{2} \ln^2 a_m)$$

The aim of this model is to determine how the purchase of a wide array of goods established in our "basket of consumables" affects wealth and consumer behaviour. The set of variables in this model such as family size, wealth, gender, occupation, and being a merchant or an oligarch proves whether or not the "trickle-down" effect occurs in a pre-industrial economy. Despite the overwhelming literature on economic models during the birth of consumer societies, industrious revolution, market integration, and so on, there is still a gap in scholarship to prove this statistically with primary data from early modern sources. This helps us to analyse and observe consumer behaviour in the long run as the main indicator of the prosperity of middle social groups, which is the main indicator of a robust and sustainable economy and welfare state. Applying to this equation the degree of consumption of the "basket of consumables", as shown above, gives the indication of wealth and prosperity of families belonging to any socio-professional category through the intermediation

Table 5 Summary of key variables and parameters to test the "trickle-down theory"

Choice variables		Parameters	
hc	Household consumption	*ud*	Urban development
b	Beverage goods	*g*	Gender
l	Luxury goods	*as*	Agrarian sector
t	Textile goods	*mg*	Merchant group
p	Prices		
w	Wealth		

Source: author's own elaboration

and agency of merchants. For instance, grouping textile goods of different typologies and qualities, including beverages (coffee, tea, chocolate) as well as household goods not to cover basic necessities but as luxury items, proves changes and improvements in the lifestyles and living standards of families (Table 5). The equation of the econometric model can be expressed as follows:

$$\text{Ln}(hc) = A_0 + A_1 \text{Ln}b + A_2 \text{Ln}l + A_3 \text{Ln}t + A_4 \text{Ln}p$$
$$+ A_5 \text{Ln}w + A_6 ud + A_7 g + A_8 as + A_9 mg + \varepsilon_t$$

The aim of this model, applying OLS, is to observe consumers' choices through the stock of textiles in households with different level of wealth, as well as its effect on the expenditure of other categories of goods such as beverages or luxuries. The coefficients in Tables 6 and 7 show a high influence of merchants in households' expenditures for textiles, as well as a positive correlation in the consumption of textiles and the other categories of goods, as shown in Table 8. There is a positive correlation, predominantly in groups of a middle level of wealth, of per capita expenditure for these goods. This argument challenges the conventional belief that groups with high levels of wealth (oligarchs, in the case of the current sample) entail an increase in consumption and, therefore, a "trickle-down" effect from top to bottom in the social hierarchy (Shammas 1990; Jones 1980). Findings in the sample of this research and the testing of this model prove the contrary, as the merchant groups are those exerting a positive effect in changing consumer habits of other social groups through the introduction of goods that led to comfort and leisure time. This tendency towards the acquisition of better lifestyles through merchants' agency is proved in the R^2 coefficients. Figures are not as high as one could expect, were we dealing with datasheets of modern or postmodern economies, but for an early modern economy the positive variation is sufficient to demonstrate that there exists a positive correlation in all estimations, as demonstrated by the regression statistics and the analysis of variance. Therefore, there is a positive effect on the stock of textiles and wealth variations through the expenditure of the "basket of consumables" in middle social groups (see Table 7). The positive indices correlation in Table 8 allows us to affirm that there was an elastic demand for the three categories of goods (luxury, beverages, and textile items) for which family members rapidly found substitutions when certain commodities of item-types did not satisfy their needs.

Table 6 OLS estimates of household consumption in south Spain, 1730–1808. Dependent variable in logarithmic. *Textile prices in 'reales'

$Ln(t) = A_0 + A_1 Lnb + A_2 Lnl + A_3 Lnw + A_4 Lnp + A_5 ud + A_6 g + A_7 as + A_8 mg + \epsilon_t$

Regression statistics

Multiple R	0.6576
R square	0.4325
Adjusted R square	0.3809
Standard error of estimate	1.1049
Observations	1000

Analysis of variance

	Freedom degree	Square sum	Square average	F-statistics	F critic value
Regression	6.0000	61.3964	10.2327	8.3825	0.0000
Residual	66.0000	80.5680	1.2207		
Total	72.0000	141.9643			

	Coefficient	Standard error	T-statistic	Probability	Inferior 95%	Superior 95%	Inferior 95.0%	Superior 95.0%
Interception	2.2609	1.2598	1.7946	0.0773	−0.2544	4.7762	−0.2544	4.7762
Wealth	0.1823	0.1275	1.4291	0.1577	−0.0724	0.4369	−0.0724	0.4369
Luxury goods prices	0.2206	0.0932	2.3660	0.0209	0.0345	0.4068	0.0345	0.4068
Beverage good prices	0.0705	0.0791	0.8908	0.3763	−0.0875	0.2285	−0.0875	0.2285
SECTOR	−0.2182	0.3378	−0.6459	0.5206	−0.8926	0.4562	−0.8926	0.4562
URBAN	0.2908	0.3479	0.8359	0.4062	−0.4038	0.9855	−0.4038	0.9855
GENDER	−0.5235	0.2965	−1.7656	0.0821	−1.1155	0.0685	−1.1155	0.0685

Table 7 OLS estimates of household wealth in south Spain, 1730–1808. Dependent variable in logarithmic. *Families' wealth accumulation in *'reales'*

$Ln(w) = A_0 + A_1 Lnb + A_2 Lnl + A_3 Lnt + A_4 Lnp + A_5 ud + A_6 g + A_7 as + A_8 mg + \varepsilon_t$

Regression statistics

Multiple R	0.7447
R square	0.5546
Adjusted R square	0.5014
Standard error	1.6033
Observations	1000

Analysis of variance

	df	SS	MS	F	Significance F
Regression	8	2.4528E+12	2.68E+11	10.43121	2.32169E−09
Residual	67	1.7224E+12	2.57E+10		
Total	75	3.86769E+12			

	Coefficients	Standard error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95,0%	Upper 95,0%
Intercept	−39,078.8100	67,613.4750	−0.5779	0.5652	−174,035.8711	95,878.2510	−174,035.871	95,878.2510
Textile	139.9623	25.1140	5.5730	4.82E−07	89.8344	190.0901	89.8344	190.0901
Luxury	25.0170	8.5494	2.9261	0.0046	7.9522	42.0819	7.9522	42.0819
Beverages	−6.8610	24.1933	−0.2835	0.7775	−55.1511	41.4289	−55.1511	41.4289
GEN	77,655.3831	41,871.0871	1.8546	0.0680	−5919.6566	161,230.423	−5919.6566	161,230.423
FAMILY	7657.5981	7072.4660	1.0827	0.2828	−6459.1030	21,774.2994	−6459.1030	21,774.2994
SECTOR	−71,736.6322	49,681.1033	−1.4439	0.1534	−170,900.5295	27,427.2650	−170,900.529	27,427.2650
MERCHANT	22,503.479	61,084.6036	0.3683	0.7137	−99,421.9002	144,428.8582	−99,421.9002	144,428.8582
URB	4959.4030	48,222.9847	0.1028	0.9183	−91,294.0772	101,212.8834	−91,294.0773	101,212.8834

Table 8 Correlation estimates of household consumption in south Spain, 1730–1808

	Textile	Luxury	Beverages	SECTOR	URB	Wealth	NOB	GEN	FAM-ILY
Textile	1.0000								
Luxury	0.3662	1.0000							
Beverages	0.2500	0.5642	1.0000						
SECTOR	−0.2177	−0.2111	−0.2496	1.0000					
URB	0.1916	0.2104	0.1672	−0.5383	1.0000				
Wealth	0.2883	0.4542	0.3020	−0.2426	0.2463	1.0000			
MER-CHANT	0.2881	0.4819	0.6468	−0.3508	0.1997	0.2563	1.0000		
GEN	0.0583	−0.1526	−0.0946	0.0591	−0.0415	0.1736	−0.0262	1.0000	
FAMILY	0.0347	0.0446	0.0423	0.0527	−0.0825	0.0979	−0.0705	−0.0357	1.0000

The oligarchs' and nobility's consumer behaviour prompted emulation among their equals, individuals and groups that belonged to the same social class, but not in the middle lower classes. If we follow McKendrick's theory, we can instead present a "trickle-up" model since some goods, such as clothing and household furniture that became popular with ordinary people, were emulated by the upper classes. This is the case of merchants who fostered new needs for the upper classes, introducing overseas commodities in high volumes. The typology of the goods introduced generated constant changes in demand, and the family and business strategies that the group of French merchants (who dominated this market) articulated through arranged marriages ultimately consolidated the foreign dependency from external suppliers and agents in the Spanish economy.

4 Trade networks and Chinese goods between southern Spain and Marseille: network distribution and estimates

GECEM Project Database currently accounts for approximately 40,000 registers of global goods that were circulating among European, American and east Asian (mainly China) markets, whereby nearly 30,000 social actors (merchant groups) were participating in those transactions as mediators introducing consumer durables such as textiles (Chinese silks), luxuries (porcelains) and beverages items (tea, coffee, chocolate). Such merchant intermediation and agency changed consumer behaviour at the local level. For this case study, I have taken a sample from GECEM Database to observe, in the parishes of the urban area of the city of Seville, the degree of consumption of Chinese goods (mainly silks and porcelains) applying the SNA.

The construction of the network rests upon the ties of social actors and merchants who belonged to big, medium, and small companies that were operating in the area of the western Mediterranean market connecting Marseille, Cartagena and Seville. These trade networks and business alliances were mainly introducing goods from China in local markets of the western Mediterranean region. I

have built another network wherein the typologies of goods (Chinese silks and porcelains) constitute the main nodes. The clusters and partitions of this two-mode network are defined by the size of the nodes, centrality, and intermediation between business groups and clusters of goods (representing consumers' choices) within a micro-level approach through the geo-localisation of consumer durables. The relational composition of the actors-by-actors network is based on the origin, partners, weight of the transactions in terms of value and volume of goods, kinship and non-kinship ties. The relational structure of the good-by-goods network is based on location, origin of goods, volume of goods and value, typology and frequency of stock accumulation.

For the period chosen in this research and for the specific localities of the city of Seville, Murcia and Marseille, the sample accounts are those with circa 500 actors (nodes) and circa 1,000 links (edges). The weight of the links in the actor-by-actor network is associated with the value of the transactions (expressed in *reales*) that connected local markets of Marseille, Cartagena, and Seville. In addition, the weight of the links of the goods-by-goods network is associated with the frequency and volume of goods accumulated in the parishes of the city of Seville. To analyse the intermediation and agency of the trade networks, I have created node attributes on the size of the company as big, medium, or small. Thus, through hierarchical clustering and partitions of the network, we can observe the degree of betweenness/intermediation, centrality and closeness between the types of companies and partnerships. I have created node attributes on the typologies of goods such as textiles (mainly silks), porcelains, furniture, as well as their origin and geo-localisation in the parishes of the city of Seville. The SNA analytical tools (Gribaudi 2000) help to develop the main hypothesis on the mediation of traders as "vicarious" agents. This is accomplished through fostering changes in patterns of consumption and circulation of goods that did not follow a "trickle-down" effect, which proves that local oligarchy and nobility were not the main agents in changing consumers' habits.

As the main strategy for the analysis of the network, a spring layout method through the Fruchterman–Reingold algorithm has been applied to observe the graphic distribution of the network through the relevant node attributes partition and the repulsive and attractive forces between networks (Fruchterman and Reingold 1991). This enables us, for the case of the analysis of traders, to obtain the degree of intermediation in business transactions to introduced Chinese goods. The Geolayout algorithm has been applied to the goods-to-goods network to observe the distribution and frequencies of Chinese goods by consumers of the urban area of Seville, which has been projected in the eighteenth-century map of the city through the accurate longitude and longitude coordinates. In addition, the Yifan Hu proportional algorithm has been also applied to the goods-to-goods network to observe the graphic representation of the goods through clusters of typologies, origin and specific items for silk, porcelain, and luxuries (household furniture). This algorithm uses a proportional displacement of the main nodes and clusters of the network, mainly for forced-directed algorithms, which helps to restructure and reduce the complexity of networks such as the one presented in this study (Hu 2005).
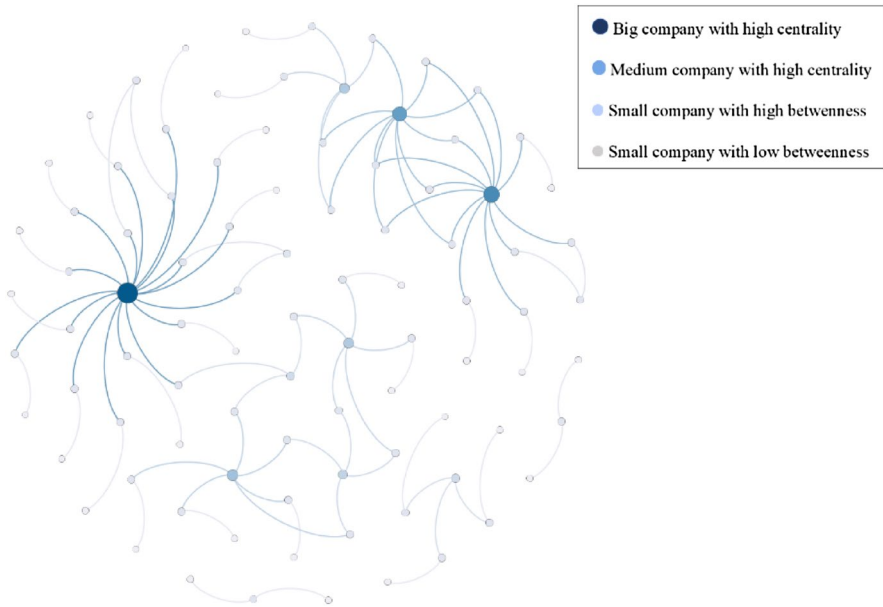
Fig. 6 Western Mediterranean trade network of Marseille-Seville market, 1740–1780. Source: GECEM Project Database www.gecemdatabase.eu. AHPM and AHPS, protocols; Archive de la Chambre de Commerce de Marseille (hereafter ACCM), Statistique, Serie I; Arquivo Historico de Macau (AHM), Leal Senado

Table 9 Metrics of the network applying Fruchterman–Reingold algorithm	Western Mediterranean market (Marseille-Seville)	
	# actors' size (nodes)	91
	# links' size (edges)	100
	# weighted-in-degree	17.0
	# weighted-out-degree	2.0
	# weighted degree	17.0
	# eccentricity	4.0
	# closeness centrality	0.66
	#harmonic closeness centrality	0.46
	# betweenness	0.26
	# authority distribution	0.13
	# modularity	0.72
	# probability (page rank)	0.85
	# average path length	4.24

The spring layout Fruchterman–Reingold algorithm method for the representation of the western Mediterranean market, which connects the international trade hubs Marseille-Seville through the port city of Cartagena in southern Spain, allows

us to observe the distribution and connection of big, medium, and small companies that were interconnected with a high degree of intermediation (betweenness). As can be observed in Fig. 6, there is a high degree of betweenness among nodes that connect big, medium, and small trade companies, which links the clusters of traders operating in Marseille, Cartagena (as places of medium and small companies) and the urban area of Seville as end market. In the clusters, graphically represented, in the Fruchterman–Reingold algorithm, there is a fairly high degree of centrality, as shown by the metrics in Table 9. The betweenness as measure of centrality in Fig. 6 shows the shortest path of intermediation between trade companies, for the small ones have a high degree of intermediation as the key actors, exerting a major responsibility in the financial achievements and smooth transactions of the network. The value of eccentricity (nodes/traders in a peripheral location in the network), centrality (main traders), and betweenness (traders acting as mediators or brokers) is calculated based on the measure of the stress. The calculation is expressed as follows:

$$C_B(n_i) = \sum\nolimits_{uw} (\sigma_{uw}(n_i)/\sigma_{uw})$$

where C_B is the centrality/betweenness of a n_i, node/actor in the network, the $\sigma_{uw}(n_i)$ is the number of paths that cross through n_i, and σ_{uw} is the total number of shortest paths through node u to node w.

The degree of the node [$d_i (n_i)$] expresses its frequency of connections, being its range from 0 to d-1, where d is $\sum$ of nodes in a network. The metrics of Table 9 show a fairly high weighted-in-degree of the nodes [$d_i (n_i)$], which is the frequency of a node that is adjacent to n_i (i.e. the small and medium companies that intermediate with the main actors, the biggest nodes of the network). This demonstrates that the degree of intermediation of the network—and, therefore, the profit and revenue accumulated through business transactions and introduction of overseas goods in southern Spain local markets—is sustained by small and medium companies.

The weighted-out-degree of a node [$d_i (n_i)$] in the network is the number of nodes that are adjacent to the main actors. The low weighted-out-degree is explained by the low degree of intermediation of the main actors, as it is the small and medium companies that feature higher degrees of intermediation. The relatively high degree of closeness centrality [normalised from 0 to1], 0.66, indicates the attraction and frequency of links from small and medium nodes (merchants) to the main companies in the network. This is a good indicator to demonstrate that the "trickle-down" theory—and, therefore, boosting the degree of consumption of goods from China's markets—is not explained by the action of local nobility and oligarchy, nor even by wealthy merchants which at some point underwent an upward social mobility (when buying a noble title or obtaining a position in the political elite), but is instead due to the intermediation and "vicarious" agency of small and medium businessmen.

To give names to the social actors and trade companies that participated in this network, the Roux Frères Trade House stands out as main actor (represented in the big-sized nodes of the network in Fig. 6) in coalition with small and medium trade groups that settled in southern Spain in the urban and rural areas of Murcia, Cartagena and Seville. The Roux company was considered one of the most important French companies undertaking business in Mediterranean Europe in the eighteenth
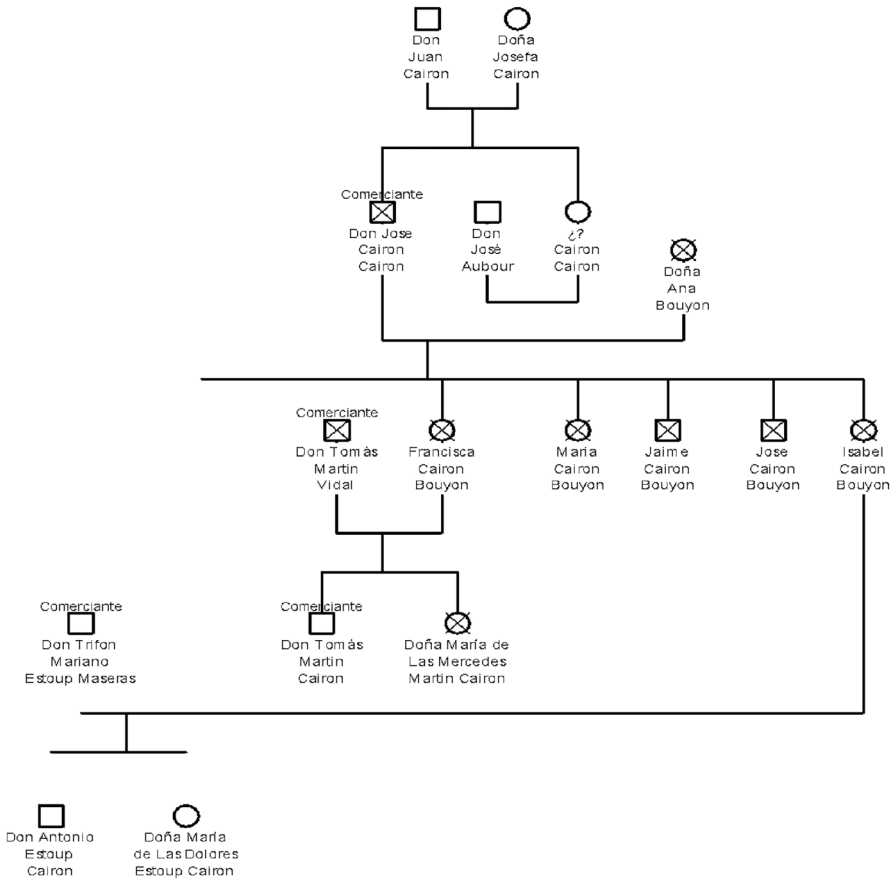
Fig. 7 Marriage alliances within the French merchant family Cayron-Bouyon, seventeenth–eighteenth century. Source: AHPM, protocols; and Archivo Municipal de Lorca (hereafter AML), merchant letters

century and first half of the nineteenth century. This trade house was created around 1728, acquiring an important influence in the commercial transaction regions of Europe, mainly Mediterranean markets such as southern Spain (for this case study), Europe, Asia and the Americas. The main figure of this company was Pierre-Honore Roux, who was born in 1695 and died in 1774.[6]

Partnership and trust were rooted in economic exchanges between family groups working in the trade sector. This caused the consolidation of trade networks (Figs. 6 and 7) united by ties based on family and non-family relations, *paisanaje* [belonging to the nationality or region], *vecindad* [individuals living in the same neighbourhood], and kinship among foreign traders, mainly foreign merchants from southern France, who had settled in Cartagena and the kingdom of Murcia (Figs. 8, 9, 10).

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[6] ACCM, L. IX, Fonds Roux.
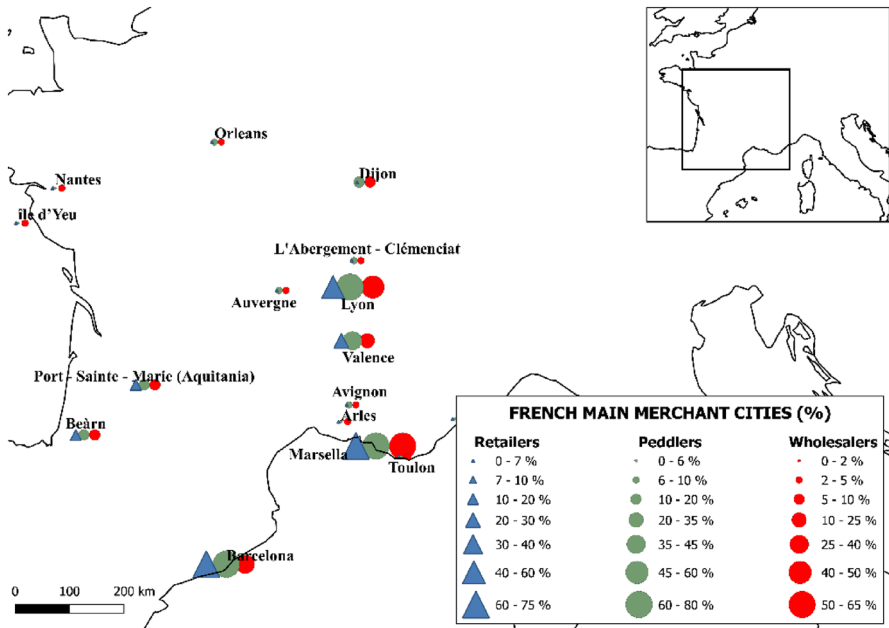
Fig. 8 Network of French trade cities connected with Mediterranean Spain, 1730–1808. Source: Author's own elaboration, using GECEM Project Database and Software QGIS v3.12. Base map from Natural Earth raster

In this way, a certain economic prosperity took place in this area mainly due to the absence of war and the stimulus prompted by foreign trade.

Thus, southern Spain and the neighbouring areas of the kingdom of Murcia were dynamised due to Cartagena's geostrategic location and the construction in the port of Cartagena—also known as the Arsenal of Cartagena—in the second half of the eighteenth century. This fostered trade relations with other European areas, as well as with Atlantic, Mediterranean and Asian markets. Such economic development, prompted by the growing population and foreign trade houses (mainly of French origins) which had settled in the area, provided a stimulus for the consumption of overseas goods, creating new needs in consumers' habits.

Due to its location, Cartagena played the role of a Mediterranean centre of redistribution of goods and commercial exchange. The natural port—an exceptional non-artificial Spanish port—had excellent infrastructure and access for the stopover of ships that were in transit between Mediterranean and Atlantic markets. The docks of the port of Cartagena represented a daily bazaar offering its visitors all manner of manufactured and luxury goods. In this way, *trajineros* [small merchants], *carreteros* [roadmen], peddlers and retailers from Cartagena (represented in the small and medium size of the nodes in Fig. 6) connected inner areas of Spain such as La Mancha (Albacete, Chinchilla), Madrid, inner areas of the kingdom of Murcia (Lorca, Caravaca, Moratalla) or down to southern areas of Spain in Granada (Huéscar, Puebla de don Fadrique, Vera, Almanzora valley, Baza), and Mojácar, Almería, Málaga and Motril via maritime routes to Sanlúcar de Barrameda, Cadiz and
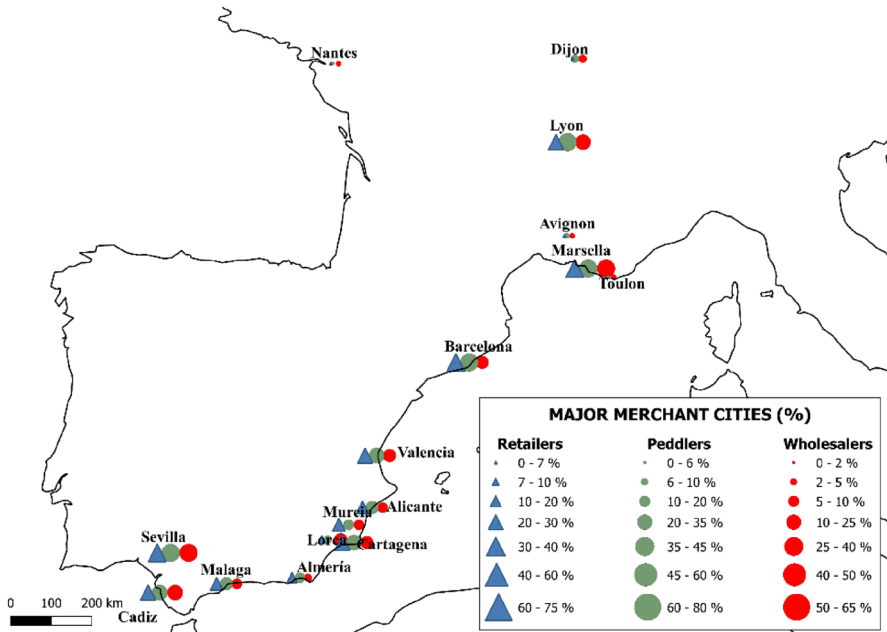
Fig. 9 Mediterranean Spain connected with the axis Marseille-Dijon, 1730–1808. Source: Author's own elaboration, using GECEM Project Database and Software QGIS v3.12. Base map from Natural Earth raster

Seville (Figs. 9, 10). These areas benefited from the purchase of products introduced in Cartagena which acted as a crossroad connecting southern and northern Spain. French traders that settled in this region interacted with the local network of retailers and textile merchants and artisans of the city of Murcia during the eighteenth century (Tables 10 and 11).

An excellent example is the case of Pedro Luis Bridon and his wife María Barbara Devan Andrés from the island of *Lleu* [*île d'Yeu*], close to the city of Nantes, who had settled in Murcia, close to Cartagena. Together, they founded a small family company dedicated to the textile commerce. A merchant letter from this company mentions the following:

> María Barbara Deván Andrés resident to the present in the city of Murcia as transient person interested in the commerce of clothing, *quincalla* (trinket) and other goods that she brings with her to be sold in the cities, villages and places of the Kingdom of Spain and other places of her interest, in company of her son Juan Bautista Bridon …[7]

These small companies, mainly established in Cadiz, Seville, Cartagena and Murcia, were intermediaries of the main trade houses of France such as the Roux Frères

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[7] AHPM, 2522, pp. 98–99.
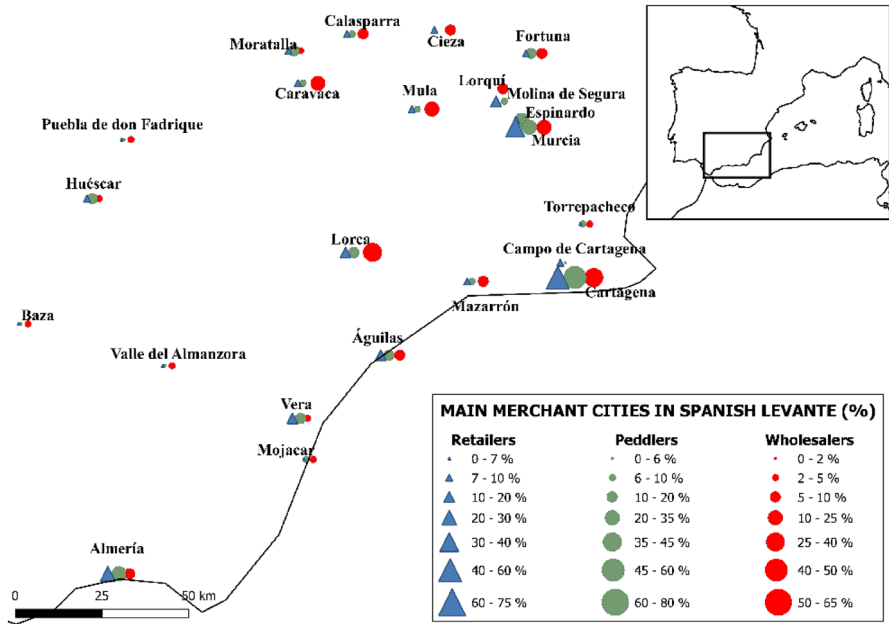
Fig. 10 Southern Mediterranean Spain connected with Marseille, 1730–1808. Source: Author's own elaboration, using GECEM Project Database and Software QGIS v3.12. Base map from Natural Earth raster

Trade House of Marseille. Many of these small merchant companies alternated trade activities with artisan work. Among the more relevant social actors that have been identified as undertaking these activities are the Bicaix, Davide, Champeli, Aubour, Bouyon, Pirraimun, Estrabo, Cayron, Bremon, Churguet, Orleac, Cayluz and Hourtane companies, among others that worked in the textile sector and originated in Marseille and the southern regions of France (see Tables 10 and 11). The alliances by the merchant families Cayron-Aubour and Cayron-Bouyon (see Figs. 7 and 11) present an outstanding example of French communities that settled in southern Spain in the eighteenth century, mainly from Marseille and other southern France localities from Provence (Arles, Avignon, Toulon), and the Pyrenees (Beàrn, Oloron), among others (Fig. 7).

Household clothing, dresses, and ornaments made of silk, cotton, or high-quality wool were acquired by the merchants of Marseille from the Levant regions such as Constantinople and Salonica and Near East areas such as Aleppo (through the interaction of Armenians). Moreover, Chinese silks, obtained from Suzhou or Nanjing, were exported to Marseille via Pacific and Indian routes through the partnership of European companies such as the Swedish Grill company, established in Macao and Canton (Perez-Garcia 2020a, b).

Regarding wools from Near East regions, in the years 1736 and 1737 the Roux company, through Pierre-Honore and Jean Baptiste Roux, brought 456 bales of wool

Table 10 French traders settled in the Kingdom of Murcia, eighteenth century

Name	Place of origin	Work sector
don Joseph Cayron	*Venze* (Vence) in Provence-Alpes-Côte d'Azur region	Textile merchant
Pedro Bremon	Marseille	Textile merchant
Jaime Champeli Pirraimun	Born Clemensa, Bishopric of *Tula* (Tulle) in Aquitaine	Textile merchant
Antonio Churguet Churguet	Born in the region of Auvergne	Textile merchant
Juan de Orleac (brother-in-law of Juan Calyluz)	Marseille	Boilermaker master and textile company owner with Juan Cayluz
Juan Cayluz (brother-in-law of Juan de Orleac)	Marseille	Boilermaker master and textile company owner with Juan de Orleac
don Juan Francisco Estrabó Camon	Bearn	Textile merchant (he founded a textile company with don Juan Ysnel)
don Bernardo Hourtane	Oloron Sainte-Marie, Aquitania	Textile merchant

Source: AHPM, protocols

Table 11 Textile merchants in the city of Murcia, eighteenth century

Name	Place of origin	Work sector
Doña Nicolasa Ballesteros	Murcia	Shopkeeper and textile merchant
Francisca Barzelon Alama	Murcia	Textile merchant
Maria de Gracia Casaus	Murcia	Shopkeeper and textile merchant
Nicolas Estop Fadeville	Murcia	Silk merchant and spice seller
Doña Antonia Fernandez de Cordova Parielo	Murcia	Textile merchant
Don Vicente Galiana	Murcia	Merchant
Doña Felicia Garcia Rodenas	Murcia	Textile merchant and hardware artisan
Manuel Maria	Murcia	Weaver artisan and merchant
Doña Fulgencia Melgares	Murcia	Textile merchant
Antonio Ruiz Merino	Murcia	Textile merchant

Source: AHPM, protocols, and Marquis of Ensenada's Cadastre for the population of Murcia, *Hacienda*, L. 3845

from Constantinople, 1,166 from Smyrna, and 1,605 from Salonica.[8] Semi-elaborated materials, many of these were embroidered, printed and finished in southern French textile centres of the Rhône region such as Dijon, Lyon, Valence and Loire areas such Puy-en-Veley, Orleans or Nantes (Figs. 8, 9). The geostrategic and advantageous location of these textile centres, close to the banks of the Rhône and Loire rivers, granted access to the port of Marseille for the supply of semi-elaborated and elaborated textiles that derived from Asia.

Local textile workshops and manufacturers in Spanish localities such as Valencia, Murcia, Granada and Seville could not compete with these high-quality textiles and elaborated clothing such as hats, handkerchiefs, vests, dresses, passementerie (trimmings, laces, and handkerchiefs) and embroideries. The search for import-substitutions failed in local Spanish workshops, and the demand for foreign textiles and manufactures increased throughout the eighteenth century (Perez-Garcia 2011a, b). Thus, there is a positive correlation between the rising trade activities in Marseille with Asian markets and the demand for clothing made of silk of diverse typologies in southern Spanish localities such as Valencia, Murcia, Cartagena and Seville (see Fig. 12).

In Fig. 13, the nodes of the network have been clustered through the georeferenced location of consumers of Chinese silk in Seville, applying a Barnes-Hut algorithm (Barnes and Hut 1986). This algorithm, and the georeferenced representation of the parishes of Seville as end market of Chinese silks and porcelains that were redistributed from Marseille to Seville via the port of Cartagena, allow us to visualize the high demand of these goods in the local market of Seville. The clustering Yifan Hu proportional algorithm (Fig. 14a and b) illustrates the complexity of silk and porcelain typologies and items (i.e. clothing, household furniture) whose supply

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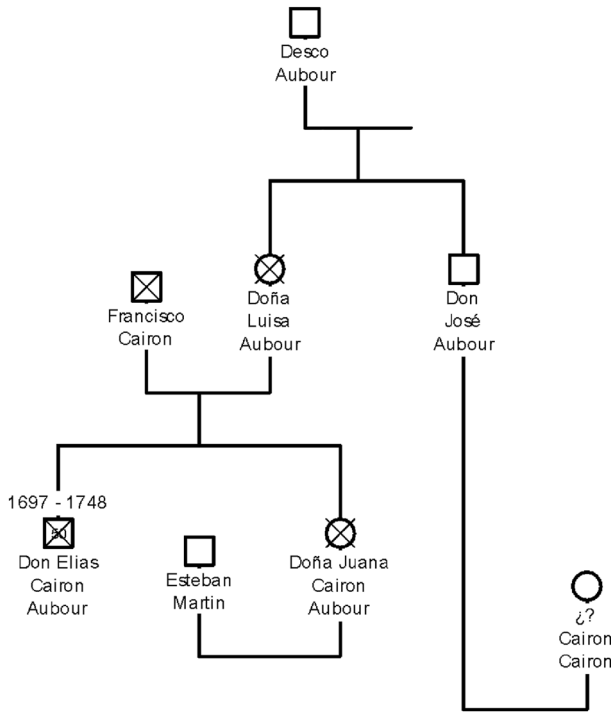
[8] ACCM, H, 151, laines (1687–1796).

Fig. 11 Marriage alliances within the French merchant family Cayron-Aubour, seventeenth–eighteenth century. Source: AHPM, protocols; and AML, merchant letters
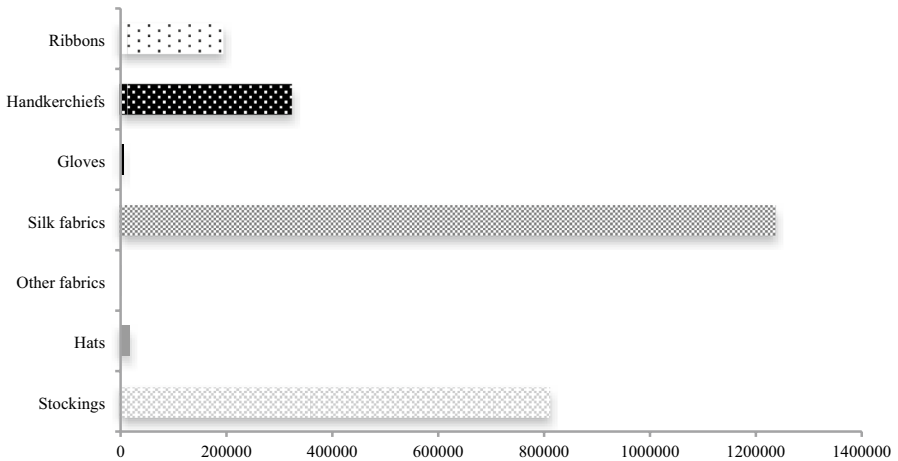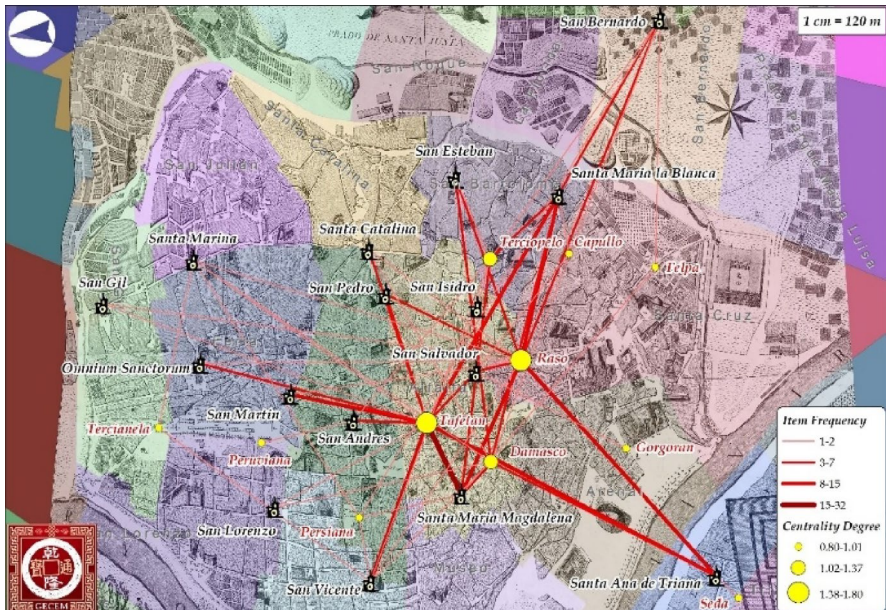

Fig. 12 Exports of clothing made of silks from Marseille to Spanish Mediterranean ports, 1720–1780. Source: author's own elaboration. ACCM, Statistique, Serie I. Units in pounds

Fig. 13 Network clustering by parish of Chinese silk typologies in Seville, 1727–1750. Source: Author's own elaboration, using GECEM Project Database and Software QGIS v3.12. Basemap: Pablo de Olavide, "Plano topográfico de la MNYMI, ciudad de Sevilla", 1771

was absorbed by the local demand of urban families—mostly those with a middle level of wealth. These goods-to-goods networks, graphically represented through forced-directed algorithms such as the Barnes-Hut algorithm (Fig. 13) and Yifan Hu proportional algorithm, combines a multilevel approach to reduce dispersion and repulsive force calculation to represent the vertices and adjacent edges (links) of the clusters and partitions with lower degrees of closeness and betweenness. Nearly 500 actors and 1,000 edges (links) are represented through the Yifan Hu proportional algorithm (Fig. 14a and b) in which the degree of centrality of Chinese goods, silk and porcelains is 0.69 and 0.62 (see Table 12a and b). This proves the high importance of items made from these materials and origins, as seen in the complex typologies.

The growing demand for these textile products and fabrications was not brought about due to the emulation of social patterns from the upper classes to the middle-lower classes. McKendrick's "trickle-down" pattern is not taking place in southern Spanish local economies. Instead, it was a consequence of traders' activities as they introduced these goods in southern France and Spain for self-consumption, but also for market distribution through the partnership between wholesalers and big trade houses such as the Roux Frères and small trade networks of retailers, peddlers, and itinerant merchants. These merchant trade networks and overseas goods exchanges brought about the progressive introduction of new fashions and tastes. Textiles to dress the body and household were popularised among the middle classes, who were

Fig. 14 (**a**) Typologies of
porcelain and clothing made
of silk in the city of Seville,
1700–1750 (**b**) Typologies of
porcelain and clothing made of
silk in the city of Seville, 1700–
1750. Source: author's own
elaboration. AHPS, protocols

Table 12 Metrics of the network applying the Yifan Hu proportional algorithm

(a) Chinese goods market in Seville	
# actors' size (nodes)	253
# links' size (edges)	637
# weighted-in-degree	69
# weighted-out-degree	46
# weighted degree	96
# eccentricity	2.0
# closeness centrality	0.69
# harmonic closeness centrality	0.78
# betweenness	0.4
# authority distribution	0.22
# modularity	3.0
# probability (page rank)	1.5
# average path length	1.18
(b) Chinese silk market in Seville	
# actors' size (nodes)	70
# links' size (edges)	90
# weighted-in-degree	32
# weighted-out-degree	22
# weighted degree	36
# eccentricity	2.0
# closeness centrality	0.62
# harmonic closeness centrality	0.69
# betweenness	0.6
# authority distribution	0.17
# modularity	4.0
# probability (page rank)	0.4
# average path length	1.18

the major consumers of these goods leading to comfort and the acquisition of better lifestyles.

Thus, the consumption of fashionable Asian textile materials such as silks, cottons and wools was not due to a process of emulation from the aristocracy and nobility down to other social groups, as McKendrick claims. The role played by merchants' networks was the crucial factor in the introduction of these fashions and tastes, since their main objective was to supply social groups with different levels of incomes with a wide variety of goods. Merchants acted as the nexus, as mediators, with different social groups that changed patterns of consumption. Therefore, merchants can be defined as "vicarious consumers" changing patterns of consumption by introducing new cultural habits. They created new needs in individuals and society in general, leading to a new type of consumer.

5 Conclusions

The main objective of this article has been to present a new case study within the framework of the new global economic perspective and its use of micro history analysis. The focus is on western Mediterranean localities such as Marseille, Cartagena and Seville, involving meta-narratives of global history on how the global circulation of overseas goods (for this research, the case of Chinese goods) affected local markets and changed patterns of consumption of social groups with different levels of wealth. McKendrick's "trickle-down" theory was tested, therefore, by clustering data on consumption and comparing frequencies of consumption of Asian goods in the group of merchants and local oligarchies of southern Spain during the eighteenth century.

Changes in consumer behaviour were not prompted by the upper classes; however, some symptoms of a "trickle-down" effect during this period may perhaps be due to conspicuous consumption by upper social groups. Some Spanish Enlightenment thinkers, such as Sempere y Guarinos, believed that their consumer behaviour may have a positive effect on the consumption of middle and lower groups. This was promoted through incentives in Spanish local industries to find substitutes for the highly demanded Chinese silks or Indian cottons, and through the banning of foreign textiles.

In conclusion, a paradox—which we might define as "the economic interventionism paradox"—emerges, whereby Spanish ministers in the second half of the eighteenth century lifted the bans for the introduction of Asian textiles. This process promoted free trade since such prohibitions had driven increases in the levels of contraband, thereby decreasing the revenues of the royal treasury. Yet, on the other hand, the stiff mercantilist and protectionist measures persisted. Early modern Spain's "Reaganomics" was not successful in pouring wealth to middle-lower social groups because Spanish ministers failed in stimulating and improving the national textile industries with technological innovation. This made the textile sector extremely dependent on foreign trade and on the action of French trade networks from Marseille down to Cadiz-Seville.

The need and desire for original and fine Asian textiles was fostered by foreign merchants (mainly French, who connected Marseille with southern Spanish ports) who acted as mediators; "vicarious consumers" stimulating demand in social groups. This has been proven as quantifiable in global economic history by using probate inventories from southern Spanish areas, as well as trade records from Marseille. Using GECEM Project Database and applying the OLS and SNA as main methodological tools seems more reliable that using GDP, which does not work well when measuring economic growth in early modern economies. The measure of consumption and trade activities from a local basis through data of local archives is a reliable indicator when analysing economic growth, real wealth of social groups, and consumption in the early modern period. The reduction of scales using this data from a microhistory perspective provides more solid answers to big questions on a global scale as to how the circulation of Chinese goods affected, in the long-run, western Mediterranean economies at the dawn of the European industrial revolution.

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