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Monetary geography before the Industrial Revolution

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In this article, we study Europe's monetary geography on the eve of the Industrial Revolution. Our unit of analysis is the city and we explore inter-city linkages. Important findings include a considerable degree of integration and multilateralism with monetary centres having already emerged as vehicles for international settlements, before the Industrial Revolution.

Keywords: international monetary system, networks, agglomeration, multilateralism
JEL Classifications: F33, F36, N10, N23

Introduction

The making of modern monetary and financial geography is not very well understood because we lack systematic data. Accordingly, this paper, mostly empirical, is an attempt to map the monetary geography of the period just before the Industrial Revolution, circa 1750. We know that the Industrial Revolution was accompanied by substantial transformation in international trade and finance. Taking a detailed look at the spatial circuits of international finance during that period is both important and to a very large extent, novel.

Although this is not the primary goal of this article, but rather a long-term objective of our project, we speculate that such research is likely to shed some light on current and older debates on the drivers of monetary geography. We identify three interdisciplinary approaches to the matter. The first emphasises the process through which states have gradually 'nationalized' monetary space. National money, it suggests, has been constructed by states and this construction was fairly delayed. For instance, some political scientists have emphasised that the making of national money is a recent phenomenon (Cohen, 1998; Helleiner, 2002), echoing the findings of earlier economic historians (Bloch, 1954; Braudel, 1979) who claimed that during the early modern period, there were much less

national discontinuities than would be displayed later. Braudel (1979) also stated that structuring of economic space along political lines did not occur until the aftermath of the Industrial Revolution. The process would have only taken place long after the emergence of nation states (conventionally associated with the Peace of Westphalia of 1648) and was linked with 19th-century transformations such as the creation of intra-national par clearing arrangements, central banking, and the expansion of branch banking (James, 1976, 1998). De Roover (1968) writes that early modern Europe's money markets were integrated and Europe's monetary geography was seamless owing to the existence of 'bills of exchange', which were traded widely. The bill of exchange developed towards the end of the medieval period and although it was also subjected to some national (State) and supra-national (Church) regulations, its qualities were heavily influenced by provisions that were decided at the sub-national (City) level, through regulatory arrangements in which merchants were able to prevail.[1] These underpinnings would have contributed to unify European money markets by facilitating international arbitrage.[2]

An alternative approach is provided by economic geography. An economic geography perspective on early modern money and finance would emphasise location, transaction costs, agglomeration economies, and positive or negative externalities (see, e.g. Crafts and Venables, 2003, for a survey that does not deal with money however). Such a perspective has been dominating the language used in earlier work on international currencies (Kindleberger, 1967), although empirical work has remained limited in this area. Flandreau and Jobst (2005, 2009) provide material bearing upon these issues, albeit for a later period. We know from the work of historians (Lesger, 2005) that agglomeration forces were important factors in shaping the contours of the early modern international financial system but we certainly lack systematic evidence.

Finally, apart from these perspectives, new institutional economic history emphasises the constitutional underpinnings of monetary and financial development. The British 'Financial Revolution', it is argued, was achieved by increasing the credibility of British fiscal and monetary institutions. This is said to have boosted the demand for domestic government bonds and banknotes, i.e. for state-produced and bank-produced financial instruments (North and Weingast, 1989). On the other hand, more recent work has emphasised that on this account alone, highly credible free cities offered a good (and possibly superior) alternative, akin to modern offshore centres (Stasavage, 2007). One interesting issue is whether parliaments and constitutions created more value than agglomeration economies. To put the argument differently, the question is whether large centres did permit higher degrees of government predation without entirely losing their competitive edge. On this account, Flandreau et al. (2009) show that delinquent government institutions in France did not prevent its money market from achieving low private commercial interest rate and international financial integration.

These remarks suggest that a careful study of the 18th-century international monetary order may be rewarding. Accordingly, this paper looks at early modern monetary geography without addressing the previous issues, but providing instead material that is relevant to these issues. We do this with two complementary methodological innovations. First, we focus on foreign exchange relations. The phrase 'foreign exchange' refers to financial instruments known as bills of exchange that were payable in one city and traded in another one. Thus, we focus on the extent to which 'local' currencies circulated 'abroad', i.e. 'in other cities'. The 'currencies' dealt with in this paper therefore are privately issued bills of exchange whose issuing entities were city-based private banks subjected to city or state regulations. These bills stated the amount of currency or local settlement instrument that would have to be paid at maturity. We depart from earlier approaches by focusing on trans-national features. We explore the monetary geography of Europe, circa 1750, by collecting and exploiting material on connections among cities, viewed as centres. Our unit of analysis is the individual city, seen as a node in a network of monetary and financial linkages. Financial centres could be free cities, or in unitary states, national capitals or secondary cities.

In other words we study the extent of currency competition in the mid-18th century by tracing the reach of alternative city-produced currencies. This approach enables us to construct a systematic map of inter-city monetary relations that is straightforwardly amenable to modern network analysis techniques. This is the second innovation we make. By exploiting these techniques, we are able to study the contours of international and intra-national foreign exchange market linkages in Europe and make a number of inferences on early modern European monetary geography. They are expected not only to provide a set of preliminary answers on important subjects but also to give motivation, interest and impetus for future research using similar material, collected in likewise fashion.

Our objective is thus mostly descriptive. We find that a huge city network of bills of exchange existed in Europe. It seems that the bill of exchange was indeed essential to the economic life of early modern Europe. A wide literature on early modern economic history has already provided anecdotal evidence on the widespread use of bills of exchange, but this paper is first in detailing the networks used. Beyond that, the paper makes two contributions. First, it produces an encompassing ranking of international centres. Not only can we locate the relative importance of Amsterdam, Hamburg, London or Paris but also we will be able to document Italian, Spanish, Swiss or German centres (keeping in minds that these words are understood as designating geographical abstractions, not political entities). Second, it identifies a number of geographical patterns. For instance, we uncover the existence of a trans-European 'crescent' of dense financial linkages which previews geographer Brunet's 'Blue Banana', the Western European, curved corridor that today holds one of the world's highest concentration of people, money and industry. That the geography of Europe's financial system in the mid-18th century anticipates on later trends suggests that attention on financial factors in economic development is adequate but that the exclusive focus on the London-centred British Financial Revolution—at one end of the banana—is not.

The rest of the article is organised as follows. The next section discusses the significance of the material we have used and is followed by a section that describes how the data were collected. The paper then discusses the results from applying network analysis techniques to the dataset thus constructed. It ends with conclusions.

Mapping money: the significance of foreign exchange quotations

Tilly (1990, 5) persuasively argued that during the early modern period, ''individual countries such as Germany, Russia and Spain, simply did not exist as coherent entities… Arguments that begin with the distinctive, enduring characteristics of 'Germany' or 'Russia' misrepresent the troubled, contingent history of European states''. This is true of many facets of economic life during that time, but money provides a particularly vivid illustration. On the face of it, it would seem that bills payable in different cities but within the same country, because they were subjected to the same authority (say the monarch), would be perfect substitutes for one another. But this was not: *écus* in Paris were not *écus* in, say, Marseilles. While the same instrument (specie) could be given in settlement of debt in both places, transferring that instrument between the two centres entailed a variety of costs (shipping, insurance and delay) and as a result, specie could trade at a different price in two centres within the same country, so that inter-city 'arbitrated parity' (or the ratio of the price of specie in two centres within the same jurisdiction) was not exactly one: there was, in other words an inter-city balance of payments. As a result, bills between two cities of the same kingdom or republic did not trade at one for one, but rather, at a discount or premium depending on supply and demand—a premium or discount that was itself limited by arbitrage costs (shipping, coining and melting charges), very much as would be the case later for gold points on which so much has been written.[3]

On top of this, individual centres had idiosyncratic habits and regulations regarding how bills would be cashed, paid or 'protested' (the action through which a drawee would refuse to accept and pay upon presentation of the bill). Centres also

differed according to risk. The *quality* of credit was heterogeneous across centres. Various centres specialised in different businesses so collaterals were different and this could matter in periods of crises (a centre heavily involved in, say timber, would be at risk if timber prices plummeted). And there were differences in the way local courts handled bankruptcy (Sarvary 1675, Phoonsen 1715). Therefore, there was no substantive difference between intranational (or domestic) and international (or foreign) exchange rates. This conclusion is critical: it implies that the relevant unit of analysis for documenting monetary/financial relations was not the country or nation, but the city, which could either be a sovereign (as in the case of city-states) or subsovereign (as in the case of cities within states) entity. Thus, the European monetary system was not an international, but an inter-city system.

To see this under the crudest light, consider now the following advertisement that was posted in Lorient, a French port, in October 1771.[4] It announced an auction of commodities coming from China and Mauritius. The notice did specify carefully the cities whose bills would be acceptable instruments for payment. It stated a number of *Villes et Places du Royaume* (Cities and Centres of the Kingdom [of France]): Lorient, Paris, Nantes and Lyons (although there were limitations on the use of instruments issued by this last city). The advertisement also recognised London, Amsterdam and Hamburg as additional acceptable issuing centres. And thus, not only were not all 'French' instruments acceptable means of payments (bills on Marseilles, for instance, are not included) but also some foreign instruments were. We cannot think of a better illustration that monetary space and political space, as earlier writers have already suggested, did not overlap with one another. That said, the forces of geography seem to be at work. Nantes is just a few hundred miles down Lorient on the Atlantic, while Marseilles is on the Mediterranean.

In what follows, we construct a map of inter-city financial relations. The 18th-century international financial foreign exchange network has left prints, and it is those prints that we collect and piece together. In each and every financial centre of some importance, merchant-bankers had organised a system for swapping around the balances they held in other centres. Because of the importance of information on the price at which such operations cleared, they ended up being recorded and circulated through various supports, generically known as 'courants' or 'courses of exchanges'. We have thus relied on this material, which we gathered from both 'primary' sources (hand-written foreign exchange lists in merchant-bankers, correspondence or printed 'currents') and 'secondary' sources, such as contemporary merchant-bankers' handbooks. To some extent, therefore, we proceed as archaeologists who try to infer the shape of buildings from exploring the remains of their foundations.

Take a look, for instance, at a hand-written note on the Course of Exchange in Marseilles, a spare set

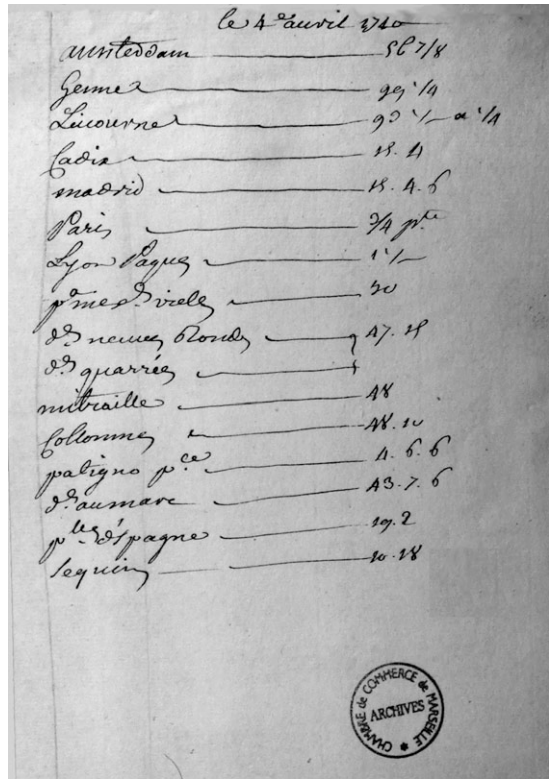


Figure 1. *The Course of Exchange in Marseilles, 4 April 1740. Source:* Archive CCM., L. IX, Fonds Roux, liasse 1030, 1032.

of copies of which is kept in the *Chambre de Commerce de Marseille* (hereafter CCM) (Figure 1). This one is dated 4 April 1740.[5] It lists as centres those whose bills are traded in Marseilles (and in this order): Amsterdam (Dutch Republic), Genoa (Free City), Leghorn (French for Leghorn is Livourne, Livorno in Italian—in the Duchy of Tuscany), Cadiz (Kingdom of Spain), Madrid (Kingdom of Spain), Paris (Kingdom of France) and Lyon's fair (Kingdom of France). Below are indications of bullion prices. We note that the French cities are somehow sorted out from the list (they feature on the bottom). Similarly the two Spanish centres are regrouped. Also, Amsterdam appears as header, a common feature in many bulletins—but it generally comes first by alphabetical order too. In this table, all cities do bear a mention of an exchange rate quote, although we have seen cases, and discuss later situations, where centres are listed but no quotation is provided.

The relevant element here is that certain centres are listed but not others. To understand why, the straightest route is to begin with the way merchant-bankers ('bankers' for short in what follows) conducted their business.[6] They had extensive business relationships covering a wide array of cities, and one or several connections in each city. These business relations were put to work when bankers sought to buy, sell, finance commodity transactions or secure credit either using goods as collateral or in any other fashion that the parties agreed upon. Correspondents and correspondence were also kept when there were no other motives but the sheer need to remain posted, to know about the market outlook or get information on third parties. This meant having many connections and writing lots of letters and clerks did it all day. An illustration of the breadth of the networks of individual banks is provided by the *liste des correspondants* register kept by the House of Roux in Marseilles. This source displays about 1900 correspondents covering the period 1728–1843, of which 1250 were in France. Historians studying given merchant banks have often constructed interesting maps that revealed a wide geographical reach for individual banks' networks.[7]

Thus, any banker in any city could and did secure credit from, or extended it to, a vast list of bankers located in other centres. In practice, however, when deciding where they should secure credit from, bankers had to take into account costing, in which interest rates, informational asymmetries and most probably the quality of local institutions as well as economic factors such as expected future exchange rates and liquidity must have mattered a lot if we are to believe the insights from economics and the traces correspondences have left.

Consider costing. De Roover (1968) reported 15th-century anecdotal evidence of its incidence on borrowing. According to him when interest rates were high in Barcelona, bankers whose letters are kept in the Datini firm archive recommended *la rimessa ma non la tratta*, i.e. to not borrow from Barcelona but try to lend there (De Roover, 1968, 48–49). Flandreau and Jobst (2009) found the same logic still at work in the late 19th century, with bankers considerably less likely to draw on centres with permanently high real interest rates. Consider now liquidity. We think of a banker in Marseilles seeking to finance a given operation. A given city (say Amsterdam) will be an attractive source of funding if Marseilles has extensive financial and commercial relations with that centre, for our banker is likely to find someone willing to buy the bill. In case he is suddenly faced with a need for cash, selling the Amsterdam bill may work better than selling a bill on say, Saint Petersburg, which had limited merchant relations with Marseilles. The probability to find a ready buyer knowledgeable in Saint Petersburg bills is low. As a result, other things being equal, bills on Amsterdam in Marseilles might develop a market while bills on Saint Petersburg might not, so that we would expect to find evidence in Marseilles of a market for Amsterdam's bills, but not for Saint Petersburg's. That does not mean that bankers in Marseilles could not draw on Saint Petersburg, but rather that they would not.

In the end we are likely to observe the development of liquid, well-organised foreign exchange markets where not only commercial and financial intercourse is intense but also other bankers have

already established connections, as occurs in agglomeration economies. And this is the critical idea on which our archaeology of the late modern European monetary system rests. One important element to keep in mind, however, is that there is no one for one correspondence between underlying trade flows and the exchange rate links that we identify. As indicated, a given market is used because it provides benefits to the merchants. These benefits may arise because drawing on that centre is the simplest way to pay a local exporter, but more often other elements will be factored in, since in principle any centre could be used provided that its instruments are understood and held by many other agents—recall that the Lorient commodity sales discussed above recognised bills on Amsterdam and London.

Half a century ago, these questions gave rise to a controversy between Wilson (1949, 1951) and Heckscher (1950). The debate dealt with the structure of Europe's monetary geography during the period 1650–1750. This controversy focused on the degree of 'multilateralism' (i.e. international integration) that prevailed in international settlements during the 17th and 18th centuries. Wilson saw the world of Josiah Child plagued with rampant international liquidity problems: They created cash constraints that forced merchants to settle international balances in a purely bilateral way, leading them to hoard gold and silver as these would be the only instruments available if bilateral trade flows did not offset one another. According to Wilson, such would have been the predominant pattern in Baltic trade, vindicating the mercantilist prejudice in favour of holding bullion. Heckscher (1950) vehemently countered that multilateralism was already a fact of life around 1650 and even more so over time with bills of exchange on Amsterdam serving as a settlement medium, a claim that was reiterated more recently by Kindleberger (1993) and Lesger (2005).

As argued some time ago by Sperling (1962), looking at exchange quotations is thus a natural way to actually measure the degree of multilateralism that prevailed in the international monetary system of the time. The world imagined by Wilson is one where exchange relations are mostly bilateral with pairs of cities quoting one another. That of Heckscher and Kindleberger assumes the existence of readily available international instruments of settlement traded in all markets, such as bills on Amsterdam, along with more parochial ones. We provide evidence on this.

Data collection

Suppose now that we are able to retrieve the same kind of material we have for Marseilles, but for all possible commercial towns. We can then stack the corresponding information in a matrix whose lines register exchange currents (that of Amsterdam, that of Bologna, that of Cadiz and so on), and whose columns would display the same list of cities. We would then fill a given line by writing ones or zeros depending on whether bills on the city in a given column are traded or not in the foreign exchange market corresponding to the given line. In the previous example the Marseilles line would have ones for Amsterdam, Cadiz, Genoa, Leghorn, Lyons, Madrid and Paris, and zeros for the rest. From a mathematical point of view the result is a network matrix. Previous research on social networks has shown that such matrices are amenable to quantitative analysis techniques. We shall exploit these instruments to identify the monetary and financial contours of early modern Europe.

Sources and methodology

Our primary material is information on local foreign exchange markets. We relied on a variety of sources, part of which being printed or semi-printed while others were hand-written. As part of bankers correspondence, most recent local quotes were scribbled at the bottom of their letters. An example is shown in Figure 2. Sometimes a separate sheet of paper was appended to business letters, as is the case of the Marseilles bulletin shown earlier (Figure 1).

The diffusion of foreign exchange information was expensive. One may easily guess the amount of work that this required when many correspondents were involved, especially given that letters

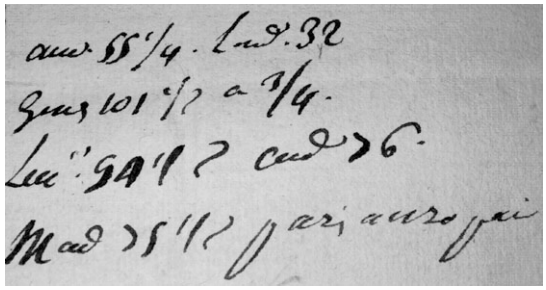


Figure 2. *Exchange rate quotations in Lyons from correspondence.*
Source: Correspondence from Lyon, 6 February 1742 (CCM., L. IX, Fonds Roux-lettre de Sellon et Cie, liasse 353) text: (*Amsterdam 55 1/4; Londres 32; Gênes 101 1/2 à 3/4; Livourne 94 1/2; Cadix 76; Madrid 75 1/2; Paris au pair*).

had to be completed before the mail would leave. Perhaps as an answer to this problem, labour-saving semi-printed forms emerged. The printed part recorded the instruments that were traded in the market (in the instance bills payable in a given city), and the clerks had only to scribble the quotes of the day. An illustration is shown in the Venice list of 28 January 1757 (Figure 3). While we admire the etching of the *Rialto*, we also observe that certain centres exhibit no quotations at all (e.g. Lecce, an Italian city in Apulia).

A transition product towards full-fledged journalism was completely printed forms that certain brokers circulated, such as the *Cours van coopmanschappen tot Amsterdam*. These forms were usually produced by brokers who signed the document. Bankers could then append this material to their correspondence. The final stage of the evolution was the emergence of a press explicitly concerned with providing economic and financial information.[8] Foreign exchange quotes was obviously only one product but it must have been an important one for it could generally be found in most journals. There was a variety of such 'journals'. The Commercial press, primarily concerned with reporting prices of merchandises also collected information regarding exchange rates. A Financial press gave exchange rates along with quotations of other instruments such as bullion, shares and debentures. Some local specialised newspapers provided

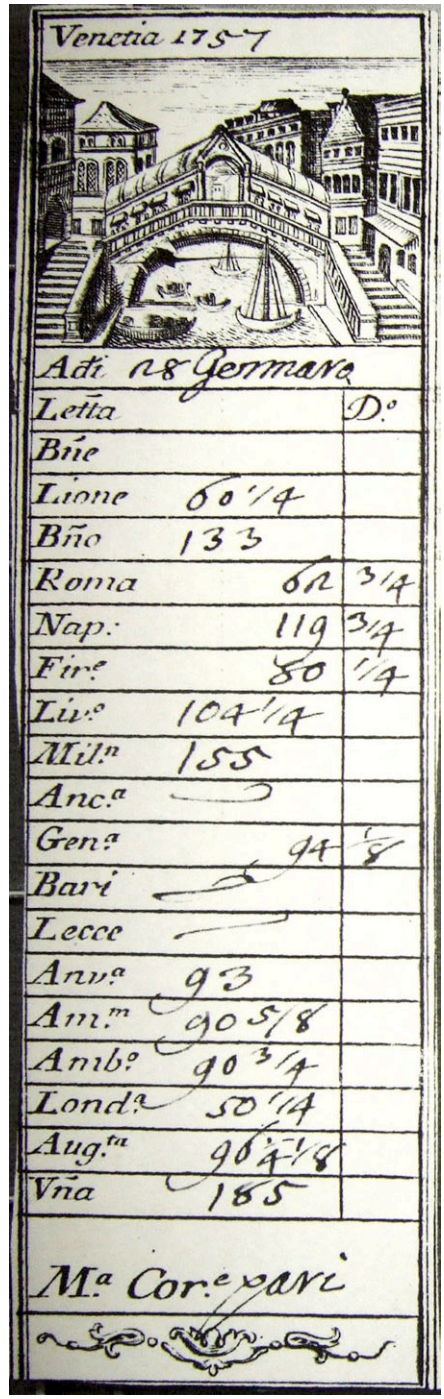
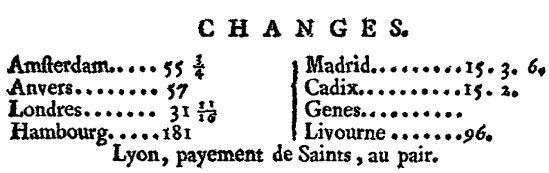


Figure 3. *The Course of Exchange in Venice, 28 January 1757.*
Source: NEHA BC 472 VEN.4.01.

commercial, financial, maritime and other economic data together. Such was the case, for instance, of the *Haerlemse Courant* for Amsterdam or the *Petites Affiches* for Paris from which Figure 4 is taken (it shows the Course of Exchange in Paris in 1751).

Our aim here being to construct the broadest possible dataset, we have used, on top of known printed bulletins, a number of archival sources that are rich in such material. One famous repository of foreign exchange bulletins is the Nederlandsch Economisch-Historisch Archief (NEHA), Amsterdam, and it has been used extensively by previous writers.[9] However, more bulletins for more places were found in the Archives of the Chambre de Commerce de Marseille (Fonds Roux), the Stadsarchief Amsterdam (Archief Brants) and the Archives Départementales de la Gironde (several bankers and merchants). We also used, for contemporary publications, the Koninklijke Bibliotheek Den Haag, the Commerzbibliothek Handelskammer Hamburg, the British Library and the Bibliothèque nationale de France.

Cities for which we could find no evidence had to be documented with other sources. For this, we used the first and second edition (1751–1752 and 1756) of Giraudeau's highly regarded handbook.[10] A merchant from Geneva, Giraudeau intended to provide accurate and systematic information on local currencies, weight, measures and trading techniques. A full section of the book was concerned with local foreign exchange markets. The cities he documented were arranged by alphabetical order. His methodology seems to have been similar to ours. He pooled local information to come up with an informed description of what was going on 'in general' in a given centre.[11]


CHANGES.

Amsterdam..... 55 ¼ | Madrid.....15. 3. 6.
Anvers..... 57 | Cadix.....15. 2.
Londres..... 31 11/16 | Genes.....
Hambourg.....181 | Livourne.....96.

Lyon, payement de Saints, au pair.

Figure 4. *The Course of Exchange in Paris, 31 December 1751.*
Source: Bibliothèque nationale de France, Petites Affiches, MFICHE V-28255-28299.

The availability of overlapping evidence (two sources or more for one centre) enables to double check the quality of sources and to better understand their intrinsic logic. In principle, we should like to establish a hierarchy among sources. McCusker and Gravejstijn (1991, 28) emphasised the significance of the breakdown between lists set up by individual merchant-bankers, and the published price currents. However, depending on circumstances, either hand-written or printed sources may be deemed superior. Neither 'printed' nor 'hand-written' can be taken as equivalent of 'reliable'. The superiority of the hand-written lists is their greater availability when nothing else does exist as in the case of the smaller centres, or those which, despite their being large and important, were operated by bankers who did not disclose systematic information, apparently preferring opacity, as seems to have been the case in Lyons (Giraudeau, 1756, 137). On the other hand, such lists may have involved a selection bias, as bankers in a hurry may have selected only those centres, which they knew to be relevant to their correspondents. The semi-printed or printed listings have perhaps a more official and transparent character. They were typically the product of 'fixing' arrangements by some local intermediary or intermediaries. In all cases, however, to the extent that sources sought to establish some standard of reliability (vis-à-vis correspondents who were also customers or providers), they were compelled to be faithful. We think that the inclusion of given lists must have reflected the bankers' confidence in the information they reported being accurate: Their reputation was at stake. Looking at the archive of bankers that operated during long time periods and had therefore a name and reputation to protect may be a reasonable way to go.

In general we have observed a great consistency between alternative sources.[12] But there are cases where the coverage of the various sources varied wildly. One example of this is Genoa, for which we have a hand-written source that gives four centres when the semi-printed form adds 11 centres. In practice we have thus proceeded as follows. We began by using correspondence in archives. When several sources were identified, we developed two measures. The narrow one takes the intersection of

the sources (cities that appear in all sources for a given city). The broad one takes the reunion of the various sources. Second, there is an issue regarding whether we should focus on the listing or quoting of given centres. In practice, however, differences are not so large. We favour quotation over listing, because quotation does reflect actual transactions, while listing may just capture inertia (as in the case of pre-printed forms). We also believe that focusing on the reunion rather than intersection of competing sources is better, as it is the surest way to avoid selection biases. In what follows results are provided for the 'reunion-quoted' dataset, unless stated otherwise. Results for other datasets are nonetheless similar. Finally, the material we collected covers a 20-year period centred around 1750. While this was motivated by availability (sources typically exist for a few months or years only and it would be illusory to attempt documenting the whole of Europe while focusing on, say one year only), it is our experience that listings and quotations evolved slowly and the chosen period does provide a reasonable basis for cross-section.

Geographical scope

Our aim here is not to construct a sample but to identify the contours of a population. The guiding principle therefore was to start from our archival material and see where it would get us. Published sources and bankers' correspondence enabled us to identify a number of cities for which information on local foreign exchange markets was then sought. Lists, courants, letters and their likes were used. When this did not work, we turned to the local press and finally, as said, used Giraudeau as the lender of last resort.[13]

This simple methodology produced a population of cities that has two characteristics. First it is heavily European. We have no American city, no Asian city, no African city and only two cities in the Middle East (Ottoman Empire). This European bias is not the product of an arbitrary decision but the outcome of our investigation. Starting from European sources, we were not directed to non-European centres. Starting from non-European sources, we were brought back to Europe.[14] It is thus legitimate to focus on the European system, the hub of the global financial system.

Consider the non-colonised territories in the Middle East, Asia and Africa. We know that there existed commercial links between Europe and the entrepôt cities and foreign trade enclaves in the Ottoman Empire (the so-called *Echelles du Levant*[15]). The same held for Asia and Africa. Transactions were carried by a mix of European intermediaries but also trading peoples (Greeks, Syrians and Jews in the Levant and Near East and Parsees and the Gujarati in India). These participated to the European trading system, but what about the financial system?

Our careful examination of a vast correspondence that did provide evidence of trade with these areas yielded scant traces of financial linkages from Europe to the Middle East, Asia or Africa. The only exceptions are Smyrna and Constantinople. We found Smyrna's exchange rate quotations for 1760 added in handwriting to a printed price current bulletin for this centre.[16] It showed Amsterdam, Constantinople, Leghorn and Marseilles. The presence of Constantinople leads us to include it in our population of cities. This is consistent with Ambrose (1931) who found evidence of English traders in 1756 drawing bills on Constantinople and that Constantinople acted as a reserve centre for Smyrna, Scanderoon (Alexandretta) and Aleppo.[17] However, bills on Constantinople were decidedly *not* quoted in London (an indication of illiquidity of such bills). For our part, we find no trace of quotations in Constantinople until much later, in the 1790s. When this occurred, only European centres were listed.[18]

Similarly, European foreign exchange lists never took us to the shores of European colonies in the Americas, in Asia or in Africa.[19] McCusker (1978) reports evidence suggesting that exchange relations when they existed went from the colony to its European metropolis. For instance, circa 1750, he writes that there were London bills traded in Philadelphia, although apparently no official or printed quote was available. According to our own investigations, it is only after 1790 that the *Federal Gazette*, published

in Philadelphia, recorded foreign exchanges (for London, Amsterdam and 'France').[20]

Our second striking finding concerns Britain. While every country typically displays several centres that are quoted by other cities in the same political entity or abroad, our inquiry never came across financial centres other than London in either England or Scotland (the two kingdoms had been united in 1707). This fact was earlier emphasised by McCusker (1978).[21] To be sure, we have checked many sources. We checked several English newspapers (in the Burnley Collection, online at the British Library) and could not find other courses of exchange than that of London. We also checked correspondence from English cities in two repositories and they never reported exchange rates, except those of London.[22] Exploration of these letters enabled us to understand the reason for a pattern that, in view of other practices, may seem anomalous. In fact, various English cities relied on London as an intermediary for both national and international settlements. One typical illustration of what was going on is a Guernesey merchant who receives in London cash from Saint Malo and uses London to pay a Bordeaux merchant.[23] The implication is that bankers in England had an account in London and used it along with the international payment facilities provided by London to settle with other cities in Britain and the Continent (see Kent 1973).

Regarding Scotland, we also checked newspapers and many correspondence.[24] There again, sources suggest that international relations were managed through London. However, unlike what was the case for England, there are many references in second-hand sources to the existence of an exchange rate on London. Hamilton (1953, 350) declares that ''it is significant that all the contemporary [i.e. circa 1762] references to exchange rates [in Scotland] refer to London''. Anonymous (1958) states that exchange rates between Edinburgh and London are available in the Courts Minutes of the Royal Bank of Scotland (RBS). This source (30–31) describes the system run by the Royal Bank of Scotland as a sterling exchange standard, with the RBS holding balances at the Bank of England as a way to 'govern' the exchange rate.[25] As for Glasgow, Glen (1824) provides similar indications (albeit for a later period).[26] Therefore, we conclude that Scottish centres were probably quoting London but did *not* quote centres other than London. London, as happened for English places, monopolised much of Scotland's external relations.[27] For simplicity, we have excluded Scotland from the matrix, but including it as quoting London would not change the results of the analysis. This is because cities that branch exclusively with one centre and are not quoted by anybody else belong to a 'degenerate' (technically speaking) category that can be safely removed from the global analysis.

Monetary geography in the mid-18th century: a network analysis

General outlook of the network

Our investigation enabled us to identify a population of 78 centres of which 64 could be documented. About 40% of the total number of centres are covered through quotations in newspapers and/or commercial or financial bulletins and/or letters collected in a number of places. About 20% are documented through quotations found in letters only.[28] A further 20% is detailed using Giraudeau. For the remaining balance (14 centres or less than 20% of the population) we could not find any primary or secondary source.

The result is depicted in Figure 5. It shows the location of the 78 cities and helps delineate centres for which we do have information (dots) and those for which we do not (circles). As can be seen, our coverage is broad and we believe that as far as Europe is concerned, it is more or less exhaustive. The undocumented cities tend to be the more obscure ones: in the language of networks, it is the less 'popular' members of the tribe that are underrepresented. Locations are evenly scattered all over Europe with outreaches on the fringes of The Orient (Constantinople and Smyrna), although we note a strikingly white area in the map East of the line Vienna–Breslau–Riga–Petersburg. Cities are either part of bigger political constructs and subjected to the power of a ruler, such as Paris, or essentially sovereign entities, such as Hamburg or Genoa. A

Figure 5. *European financial centres circa 1750.*
Source: Authors' database.

high proportion of the cities (close to one half) are ports. There are typically several markets per country. England stands out as the one large political entity with only one exchange centre.

In what follows, we provide a characterisation of the European financial system in the mid-18th century by relying on network analysis techniques. Links between cities are directional. To capture this we have projected the information from the network in a number of figures. Figure 6 shows the ranking of cities according to the number of quotes they received differentiating according to the listed versus quoted criterion discussed earlier. As seen, Amsterdam was quoted almost everywhere (54 out of 64 possible markets, or 84%), implying that multilateral settlement using Amsterdam as a clearing centre was definitely feasible by the mid-18th century as Heckscher (1950) argued. Of course, exclusion of English centres dwarfs the importance of London, but this is an acceptable procedure from the vantage point of international predominance.

Another feature is the dominance of North-Western European financial centres (Amsterdam, London, Paris and Hamburg) along with the

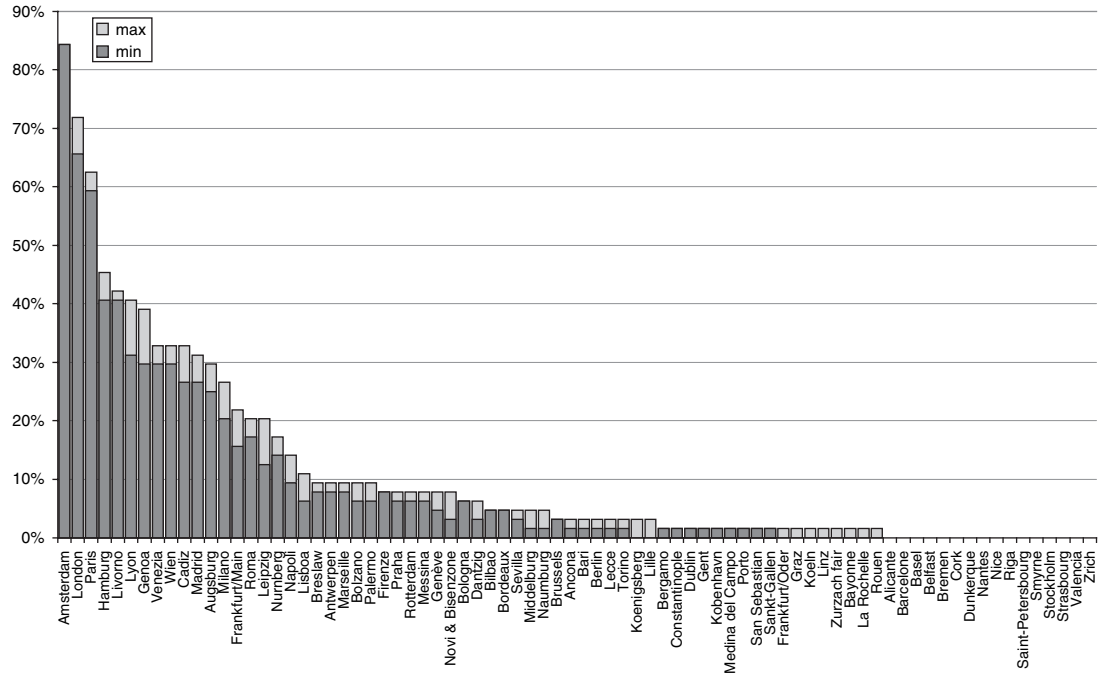


Figure 6. *Monetary popularity in the mid-18th century.*
Source: Authors' computations. Min and max over four networks: listed/quoted of which we took intersection/reunion.

continued relevance of cities in the Southern/Mediterranean area. Leghorn and Genoa are indisputably the two leading financial centres of this later zone. The data thus both confirm and qualify traditional accounts of a 17th-century shift in European economic geography from a Mediterranean-centred system to a North-Western area revolving around Amsterdam. We see that the relative decline of Genoa and Leghorn is perceptible in the 18th century, but they had hardly retreated into complete obscurity.

The map shown in Figure 7 collects all the links that do exist and registers the relevance of the various centres by showing, as a shaded circle, the number of links that a particular market does receive (this latter element is essentially proportional to the size of the bars in Figure 6). It thus reflects the agglomeration of monetary links. As can be seen, the European system was a dense web with a number of identifiable hubs. We note the area of intense financial linkages that goes from Amsterdam-London-Paris-Hamburg and shrinks as it heads towards Italy. This area overlaps with Brunet's Blue Banana area of modern economic prosperity. Other more isolated centres are Vienna on the East and Madrid and Cadiz on the South-West.

Network statistics

We now take a look at network statistics. Since it is always hard to tell how large is large and how close is close, we report in Table 1 the same statistics, but for the 19th-century international monetary network in Flandreau and Jobst (2005). Consider first the density of the network. This is the ratio of the number of links that are active to the total number of possible links. For instance, in a three-cities world, there can be at most six links (every city quotes every city). If there is no link at all, the density is zero. We see that the 18th-century system was highly concentrated: Only between 11% and 13% of the set of total possible links were active. This degree of concentration is comparable to what was obtained for the later, country-based, network

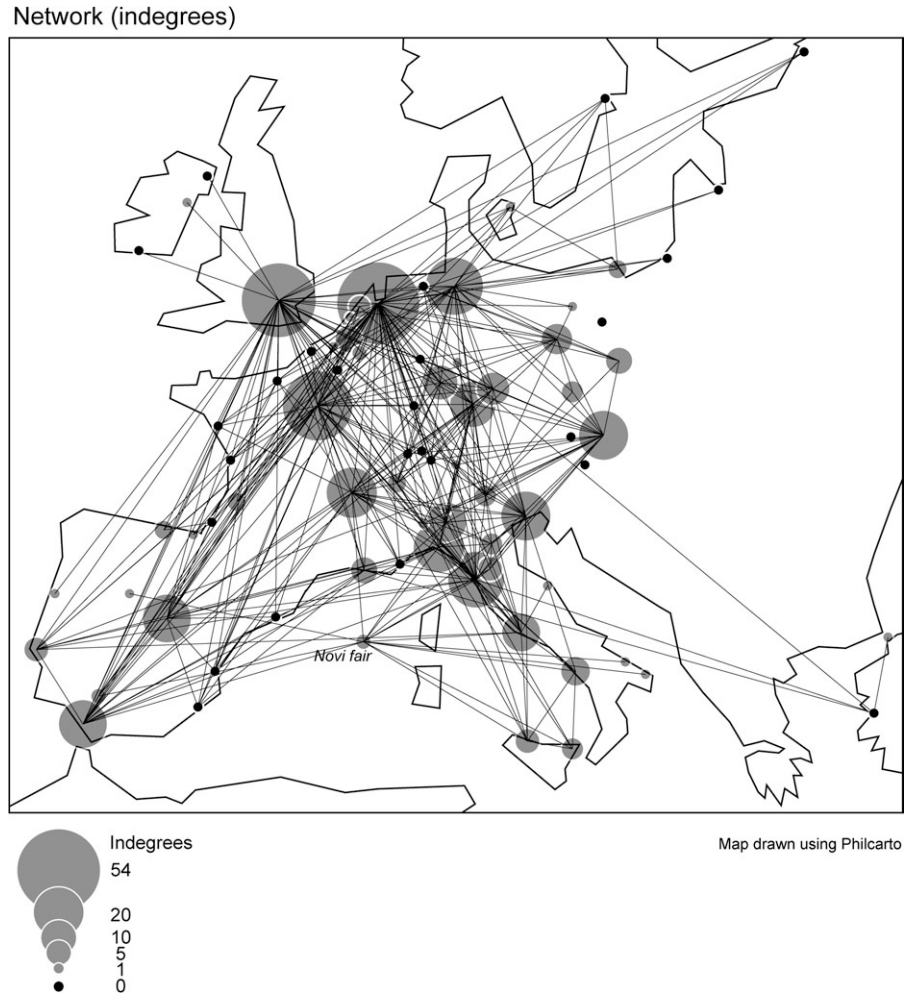


Figure 7. *Monetary agglomeration in the mid-18th century. Source:* Authors' database.

of the late 19th century. We think this is a striking result, as it shows the already critical importance of finance (multilateral) as opposed to trade (bilateral).

We then compare the distribution of links (symmetrical or (1,1), asymmetrical or (0,1) and non-existent or (0,0)) with what would obtain under a random drawing. This comparison does serve to outline the tendency of the network to be symmetrical or instead asymmetrical. As seen, for the 18th-century network, we get a higher proportion of symmetrical links (1,1) and a lower proportion of asymmetrical ones ((0,1) or (1,0)) than would obtain under a random draw. We shall see later that it does reflect the existence of an intermediary layer of regional centres that were linked with one another.

We finally compute the average distance between two centres (i.e. the average number of non-directional links one has to travel to reach any city from any other one). The connectivity of the network was very substantial. The average distance between two cities was 1.87 (listed) and 1.9 (quoted), which is smaller than two meaning that in general, financial centres were reached from anywhere either directly or through a third market.

Table 1. *Structural properties of the network: mid-18th century and late 19th century compared*

	Mid-18th century (circa 1750)		Late 19th century (quoted)		
	Listed	Quoted	1890	1900	1910
1. Density	0.13	0.11	0.10	0.11	0.13
2. Pairs in % (if random %)					
(0,0)	80.3 (75.7)	82.2 (78.5)	84.3 (81.4)	82.7 (79.2)	79.6 (75.1)
(1,0) or (0,1)	13.4 (22.6)	12.8 (20.2)	11.7 (17.7)	12.5 (19.6)	14.1 (23.1)
(1,1)	6.3 (1.7)	5.0 (1.3)	3.9 (1.0)	4.7 (1.2)	6.3 (1.8)
3. Distance	1.88	1.90	1.84	1.83	1.80

Notes: Data for 1890–1910 are from Flandreau and Jobst (2005).
Source: Mid-18th century: see text. Authors' computations based on reunion of sources.
Numbers in brackets indicate proportions under a random draw.

About 18% of links between cities were direct, 75% had to pass through an intermediary centre, only 7% needed two intermediaries. This reinforces the notion of an encompassing multilateral settlement system with Amsterdam, London, Paris, Hamburg, Genoa and a number of secondary centres as connecting hubs.

Groupings: language, politics and centralisation

Cliques

Network analysis techniques provide various ways to organise groupings of individuals. 'Cliques' are groups of cities that symmetrically quote one another.[29] Table 2 lists the cliques by decreasing size.[30] Two interesting facts emerge. First, we come across high profile, leading centres cliques. The largest 5-to-4 city cliques may be seen as providing the backbone of the European settlement system. They predominantly comprise the main international centres: Amsterdam, London, Paris, Genoa, Leghorn, Madrid and Cadiz. As one goes down the table, however, we see the emergence of a number of regional cliques that have geographical and trading significance. Examples of this include not only the all-Italian five-cities clique (Genoa, Leghorn, Napoli, Roma and Venezia) and a large number of German-Austrian groups (e.g. Augsburg, Frankfurt-Am-Main, Nurenberg and Vienna) but also the three ports triangle (Amsterdam, London and Bilbao) or the trans-Alpine route (Venezia, Bolzano and Augsburg). Existence of these cliques explains the symmetry in the system discussed above.

Table 2. *Cliques in the network*

Size	Members of the clique				
5	Amsterdam	Genoa	Lisboa	Livorno	London
5	Amsterdam	Genoa	Livorno	London	Paris
5	Amsterdam	Genoa	Livorno	London	Venezia
5	Amsterdam	Cadiz	Livorno	London	Paris
5	Amsterdam	Cadiz	London	Madrid	Paris
5	Genoa	Livorno	Napoli	Roma	Venezia
4	Genoa	Livorno	Lyon	Paris	
4	Genoa	Livorno	Napoli	Palermo	
4	Augsburg	Livorno	Milano	Venezia	
4	Bologna	Firenze	Livorno	Roma	
4	Firenze	Livorno	Roma	Venezia	
4	Livorno	Messina	Napoli	Palermo	
4	Livorno	Milano	Roma	Venezia	
4	Amsterdam	Antwerpen	London	Paris	
4	Amsterdam	Bordeaux	Hamburg	London	
4	Amsterdam	Breslaw	Hamburg	Wien	
4	Augsburg	Frankfurt/Main	Nurnberg	Wien	
4	Augsburg	Frankfurt/Main	Leipzig	Wien	
4	Augsburg	Hamburg	Leipzig	Wien	
4	Augsburg	Hamburg	Nurnberg	Wien	
4	Augsburg	Hamburg	Venezia	Wien	
4	Amsterdam	Hamburg	Venezia	Wien	
4	Amsterdam	Hamburg	London	Venezia	
4	Amsterdam	Hamburg	London	Paris	
3	Genoa	Livorno	Marseille		
3	Livorno	Fairs	Palermo		
3	Amsterdam	Bilbao	London		
3	Augsburg	Bolzano	Venezia		

Source: Authors' computations.

Block modelling

Another, more sophisticated, way to approach the issue of grouping and monetary architecture is to adjust a 'block model' to the data (details are in the Appendix). Rather than merely focusing on symmetrical bilateral links, as cliques do, block models provide a summary picture of a given network based on the way individuals (in this case, cities) relate to one another. A group, in this logic, is a set of individuals who interact in similar ways with other groups and among themselves. The group is identified by marshalling two criteria known as 'Information' and 'Clarity'. Once the groups have been identified, the interesting part is to interpret the significance of the resulting groups.[31]

Applying this methodology we are able to identify two main breakdowns. They are documented in Tables 3 and 4. The first identifies two groups. One comprises international centres that tend to quote their likes but do not quote members of the other group. The other comprises local centres doing the reverse. They generally quote the seniors but do not quote each other. We note that this architecture is similar to the core–periphery pattern that Flandreau and Jobst (2005) obtained for the late 19th century. At a first level of generalisation, the core–periphery arrangement that would be characteristic of the 19th century is perceptible in the mid-18th century.

Finer characteristics of the mid-18th century system, however, emerge when we take a look at the other grouping with good statistical properties. It displays seven categories: first, the North Western 'capitals of capital' (Amsterdam, London and Paris), which we know were already tightly integrated with one another by the mid-18th century and enjoyed a high degree of liquidity[32]; second, Hamburg, hub for northern European trade and finance, in a category of its own; third, the Italian financial capitals (Genoa and Leghorn); fourth, the Franco-Spanish connection which played an important role during the 18th

Table 3. *List of countries in block model: two groups*

Number/name	Cities
Group 1: senior	Amsterdam, Augsburg, Cadiz, Genoa, Hamburg, Livorno, London, Lyon, Madrid, Milano, Paris, Roma, Venezia and Wien
Group 2: junior	Alicante, Antwerpen, Barcelone, Basel, Bayonne, Belfast, Bergamo, Berlin, Bilbao, Bologna, Bolzano, Bordeaux, Bremen, Breslaw, Cork, Dantzig, Dublin, Dunkerque, Firenze, Frankfurt/Main, Genève, Gent, Kobenhavn, Koeln, Koenigsberg, La Rochelle, Leipzig, Lille, Lisboa, Marseille, Messina, Nantes, Napoli, Nice, Novi and Bisenzone Fairs, Nurnberg, Palermo, Riga, Rotterdam, Rouen, Saint-Petersburg, San Sebastian, Sankt-Gallen, Sevilla, Smyrne, Stockholm Strasbourg, Torino, Valencia and Zürich

Source: Authors' computations from block model: see text.

Table 4. *List of countries in block model: seven groups*

Number/Name	Cities
Group 1: North-West	Amsterdam, London and Paris
Group 2: Hamburg	Hamburg
Group 3: Genoa–Livorno	Genoa and Livorno
Group 4: Franco-Spanish	Cadiz, Lyon, Madrid and Marseille
Group 5: Old continental centres	Augsburg, Frankfurt/Main, Leipzig, Milano, Nurnberg, Roma, Venezia and Wien
Group 6: Periphery-Mediterranean orientation	Basel, Bergamo, Bologna, Bolzano, Bremen, Firenze, Genève, Koeln, Lisboa, Messina, Napoli, Nice, Novi and Bisenzone Fairs, Palermo, Sankt-Gallen, Torino and Zürich
Group 7: Periphery-Atlantic orientation	Alicante, Antwerpen, Barcelone, Bayonne, Belfast, Berlin, Bilbao, Bordeaux, Breslaw, Cork, Dantzig, Dublin, Dunkerque, Gent, Kobenhavn, Koenigsberg, La Rochelle, Lille, Nantes, Riga, Rotterdam, Rouen, Saint-Petersburg, San Sebastian, Sevilla, Smyrne, Stockholm, Strasbourg and Valencia

Source: Authors' computations from block model: see text.

Table 5. *Probability that a city in a row-group quotes a city in a column-group*

in/on	North-West	Hamburg	Genoa–Leghorn	Franco-Spanish	Old continental	Mediterranean periphery	Atlantic periphery
North-West	100	100	100	58	13	4	16
Hamburg	100	–	0	25	63	6	10
Genoa–Leghorn	100	50	100	100	44	32	0
Franco-Spanish	100	0	75	58	0	0	0
Old continental	88	75	50	19	57	5	2
Mediterranean periphery	61	24	65	18	45	8	1
Atlantic periphery	67	45	5	21	0	0	1

Source: Authors' computations, see text.

century for channelling the American Treasure out of Spain (Cadiz, Madrid, Lyons and Marseilles); fifth, a group of very old financial centres located at the heart of the Holy Roman Empire trade routes (Augsburg, Frankfurt/Main, Leipzig, Nuremberg, Milan, Rome, Venice and Vienna); and finally, sixth and seventh, two peripheries with respective Mediterranean and Atlantic and atlantic orientations.

In block modelling, the rationale for constructing a group is positional. What makes individuals belong to a given category is the way they relate to one another in the same group and to members of the other groups. Navigating in Table 5 (which gives the probability that a city in a given group (in rows) quotes another city in another group (in columns)) helps understand the reason for the structure we uncover. To read Table 5, consider a city in the North-West group. The probability that it does quote a city in the Franco-Spanish group is 58%. We now see that the reason for putting Hamburg (a leading Northern Europe centre) in a category of its own is because of the specific way it related with certain parts of Europe such as with the 'Old continental' centres, which it quoted much more than the 'North-West' group (63% versus 13%). Conversely, Hamburg was much less quoted by the 'Mediterranean orientation Periphery' than the North-West group (24% versus 61%).

Another contrast is between the Genoa–Leghorn pair and the North-West group. As seen, the two Italian ports is the group that quotes most often the Mediterranean periphery and is most often quoted by it. They are also tightly coupled with the Franco-Spanish group, both on the sender and receiver side (100% and 75%, respectively).

An interesting group is the cohesive, continental network of traditional financial centres (Old continental), which has fairly homogenous links across the board, with less hierarchy across partners than what is observed for other junior groups: Members of the Old continental group quote one another in 57% of the cases, against say 1% for the Atlantic periphery and 8% for the Mediterranean one. An important feature is that it has balanced links with both Hamburg and Genoa–Leghorn and can thus be seen as a glue connecting Northern Europe with the Mediterranean. This Old continental group, which geographically and culturally stands in between the Mediterranean and the Atlantic, is pivotal. Beyond that, peripheries split in two sub-groups and the split does reflect the opposition between the traditional Mediterranean network and the modern Atlantic one that became dominant in the late 17th century. The wording 'Mediterranean' and 'Atlantic' is heuristic and for convenience only, and we are aware that Lisbon is geographically on the Atlantic. But its connections put it squarely with the old Mediterranean system, with links to Genoa–Leghorn, and to a lesser extent, the Old continental system.

Some tentative hypotheses

Some tentative implications of the evidence in this article can now be organised. On the view that the construction of national money followed the Industrial Revolution, we remark that it is true that we do

not report evidence of national groups in block modelling. A serious qualification concerns Britain, however, whose monetary integration was already so substantial by 1750 that we do not find evidence of 'market' relations through foreign exchange, intermediation via London already assuming the form of correspondent balances kept there and used for national and international payments. Thus, Britain stands as a prominent exception to the notion that nationalisation of money was a 19th-century transformation.

Second, on the Economic Geography and Economic History nexus, we remark that the evidence we have supports the view of powerful positive externalities, with leading centres securing and consolidating their role. It is remarkable that, while as far as trade is concerned, Britain had most probably surpassed Holland by 1750, Amsterdam's lead in bills of exchange was still intact, according to our numbers. Bills on Amsterdam were available in a number of places where bills on London had yet to take a foothold. The implication from this would be that, while trade provides the basis for the development of an active market for bills on a given centre, liquidity tends to take a momentum of its own, and with the help of strategic externalities supports a measure of persistence and deepening of earlier leadership. On this account, we note that the list of centres for which we were able to collect material does not represent the new industrial centres of the 18th century, but rather the older places that may have found in financial intermediation a specialisation and a way to survive.

Finally, on the view that credible institutions are a requisite for financial development, we cannot but emphasise the considerable exception that is suggested by the already crucial importance of Paris as an international centre. This is at odds with the traditional emphasis on the inadequacy of the constitutional underpinnings of France's political regime. Understanding better the underlying mechanisms and the reason why Paris-based commercial paper could prosper despite the financial difficulties of the French crown would go a long way towards providing us with a clearer view of the degree to which economic centralisation and the economies of scale it entails can substitute for 'sound' institutional infrastructure. We also speculate that such explorations will provide critical advances in our appraisal of the economics of mercantilism.

Conclusions

This paper has provided a study of the international monetary order in the mid-18th century. As we saw, the basic unit of analysis in monetary relations was not the country with a financial capital (as would be the case in the late 19th century), but the city with a foreign exchange market. Some of these cities were city-states and others were part of broader political areas—republics, kingdoms or empires.

The main finding that does emerge at the end of our foray is that the international monetary organisation of the mid-18th century can be described as a very developed web of inter-city linkages. These linkages provided for a unified fabric that reached all over Europe with a non-European marginal fringe on the Eastern part of the Mediterranean.

One important result is the degree of multilateralism that was achieved through the agency of bills of exchange. The evidence we report suggests that for close to 85% of the cities in this system, settlement of balances could always occur through Amsterdam, because Amsterdam bills were routinely purchased and sold on local markets. If this did not work, London, Paris, Hamburg, Genoa and others offered alternatives. And thus the system of the mid-1750s was very centralised unlike some descriptions of the 17th and 18th centuries, which suggest a period ruled by specie shipments and bilateral clearing of trade imbalances. At the same time, the picture we painted is not fitting well with some representations that have suggested an absolute predominance of Amsterdam. Amsterdam was the largest agglomeration but there were other ones too. We consider it more promising for future research to think of complementarity across financial capitals than to emphasise competition and crowding out of old centres by new ones.

Regarding the geography that does emerge from the analysis, we have found evidence of a two-parts system. One was the older Mediterranean system, now revolving around Genoa and Leghorn. The other was the newer 'Northern Atlantic' system with Amsterdam, London and Paris on top. Another

hub of the Northern Atlantic system was Hamburg. Contact between these two systems was guaranteed by the pivotal role of Amsterdam, London and Paris. It was also achieved through the agency of older European continental financial centres that had been the cradle of the Commercial Revolution, such as Augsburg, Frankfurt, Leipzig, Vienna, etc.

In the end history, geography, politics, institutions and economics interacted to produce the complex system that prevailed on the eve of the Industrial Revolution. While this article has provided a first pass as well as a list of insights on its architecture, we leave it at the door of future research to provide more systematic evidence bearing on the relative role of alternative explanations for the observed outlook. We conclude by predicting that unilateral causation is unlikely.

Endnotes

[1] In particular, merchants took over the implementation of the *Lex Mercatoria*, or merchant's law, arbitration and so on (see Beawes (1752)). Although national regulations on such things as bankruptcy procedures became more and more prevalent, they bore the print of merchant lobbies.

[2] Neal (1990) provides quantitative evidence supporting the role of the bill of exchange in bringing about European financial integration.

[3] Just as in the familiar analysis of 'gold points' that would prevail between countries under the gold standard of the 19th century, the premium or discount could not grow larger than the cost of shipping legal tender between the two cities.

[4] *Vente de Marchandises de la Chine et des Indes au Port de L'Orient*, CCM., L. IX, Fonds Roux, liasse 1037.

[5] CCM., L. IX, Fonds Roux, liasse 1030, 1032.

[6] A discussion of the meaning of such information in the context of the late 19th century is provided in Flandreau and Jobst (2005). We highlight here specific features that are relevant to the context of the 18th century.

[7] Carrière (1973) and Squarzoni (1976).

[8] McCusker and Gravejstijn (1991) argue that the 17th and 18th century represented the 'beginnings of financial journalism'.

[9] NEHA's collection contains originals bulletins, photos and facsimiles. This archival evidence was accumulated by its founder, Professor N. W. Posthumus (see Borsma and Van Genabeek (1991). McCusker and Gravejstijn (1991) call it the largest repository of archival evidence on foreign exchange bulletins. Schneider et al. (1992) have extracted from this collection several exchange rate series.

[10] On merchants' handbooks, see Hoock and Jeanin (1986). Sperling (1962, 451) relies on a similar methodology for his inspection of foreign exchange linkages of Amsterdam.

[11] As emphasised by McCusker and Gravejstijn (1991, 283) 'the context strongly suggests that he was working with a copy of the actual exchange current on his desk'.

[12] Exceptions are Nantes and Saint Petersburg, for which the bulletin and correspondence vary substantially. Otherwise typical discrepancies are more like the following: in the case of Lisbon, Giraudeau (1756, 192) reproduces a quotation for the very same date for which we happen to have an original listing (18 March 1755, NEHA BC 472 LIS.4.01). Comparing Giraudeau and the original source, we find that they overlap except for Rome and Vienna, which are listed (and quoted) in the original bulletin, but not in Giraudeau.

[13] For Ireland, for instance, information on the foreign exchange markets in Dublin, Cork and Belfast, of which Cullen (1968) say they existed, was collected from the *Belfast News-Letter* (1752–1754), *Dublín Gazette* (1739–1742) and *Esdall's News Letter* (1749–1754).

[14] We were also struck by the broad similarity in which European sources were organised, and we speculate that this may have reflected the broad homogeneity of the area.

[15] See Carrière (1973).

[16] CCM., L. IX, liasse 1036.

[17] See also Sperling (1962, 461).

[18] When this occurred, the cities that were quoted were Amsterdam, Marseilles, Leghorn, London, Vienna and Genoa. CCM., L. IX, liasse 720, 25 August 1797.

[19] This is in contrast with what happened for Dublin, a European colony of Britain, which is quoted in the London Course of Exchange.

[20] We are grateful to John James for looking up this information for us in the *Gazette*.

[21] For Bristol (288) he states 'no exchange current until 1775'. For Liverpool he notes the publication of a price current (not an exchange rate current) going bankrupt in the mid-1760s.

[22] Archives Départementales de la Gironde, Bordeaux: Guernesey, Newcastle, Tavistock, Bristol and London. Brants-Stadsarchief, Amsterdam: Birmingham, Cheshunt

in Hertfordshire, Dartmouth, Dover, Halifax, Hull, Leeds, Newcastle, Rochdale, Shropshire, Sheffield, Tiverton, Wakefield and London.

[23] Archives Départementales de la Gironde, Bordeaux 7 B 2066.

[24] We looked into the *Edinburgh Eighth-Day Magazine* (1779), the *Scots Magazine* (1761), *The Glasgow Courant* (1750–1751), *The Edinburgh Evening Courant* (1753), *Glasgow Journal* (1752–1754), *Dublin Journal* (1751–1752), *Williamson's Liverpool Advertiser* (1756–1758), *Aberdeen Journal* (1753–1757), *True British Courant* (1745–1753) and *Caledonian Mercury* (1751). We also checked correspondence for the following Scottish cities: Borrowstounness, Edinburgh and Glasgow in the Archief Brants-Stadsarchief in Amsterdam. There was no mention of exchange rates.

[25] Sterling is reported to have been usually at a premium and this premium, with sight bills quoted between 0.5% and 1% above par (Anonymous, 1958, 30–31). Nurkse (1944, 28–29) describes this system as a forerunner of the gold exchange standard: 'The gold exchange system was by no means invented in Genoa. It had been practised in many cases before 1914. One example commonly quoted is the arrangement by which the exchange between London and Edinburgh was regulated in the second half of the 18th century.'

[26] Glen (1824, 13): 'The Glasgow merchant having a deal of money to remit to his correspondents in London, […] purchases bills on London, for which he gives a premium above the money price, in proportion to the expense of remitting specie, and the scarcity of, or demand for, London paper in the market.'

[27] Stevenson (1764, 202) indicates that 'The price currents of the exchange of London, Amsterdam and Antwerp' are used to know the state of exchange rates 'through all Europe' (211–212).

[28] Fonds Roux in Chambre de Commerce de Marseille, Archief van de familie Brants in Stadsarchief Amsterdam and Fonds Des Négociants in Archives Départementales de la Gironde.

[29] Formally, a clique is a sub-matrix in the general network matrix that contains ones only.

[30] Of course, all cliques contain subsets of smaller cliques. They are not reported since only the biggest grouping matters.

[31] See Flandreau and Jobst (2005) for a discussion and earlier application.

[32] Neal (1990) and Flandreau et al. (2009).

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References

Ambrose, G. (1931) English Traders at Aleppo (1658–1756). *The Economic History Review*, **3**: 246–247.

Anonymous. (1958) The royal bank and the London-Edinburgh exchange rate in the eighteen century. *The Three Banks Review*, **38**: 27–36.

Beawes, W. (1752) *Lex maercatoria rediviva: or, The Merchant's Directory*. London: Published by the author.

Bloch, M. (1954) *Esquisse d'une histoire monétaire de l'Europe*. Paris: Armand Colin.

Boorsma, P. and van Genabeek, J. (1991) *Commercial and financial serial publications of the Netherlands Economic History Archives: commodity price currents, foreign exchange rate currents, stock exchange rate currents and auction lists: 1580–1870*. Amsterdam: NEHA.

Braudel, F. (1979) *Civilisation matérielle, économie et capitalisme (XVe–XVIIIe siècles)*. vol. 3 Paris: Armand Colin.

Carrière, C. (1973) *Négociants marseillais au XVIIIème siècle: Contribution à l'étude des économies maritimes*. Marseille: Presses de l'Université d'Aix en Provence.

Cohen, B. J. (1998) *The Geography of Money*, Ithaca: Cornell University Press.

Crafts, N. and Venables, A. J. (2003) Globalization in history: a geographical perspective. In M.D. Bordo, A.M. Taylor, and J.G. Williamson (eds) *Globalization in Historical Perspective*, pp. 323–369. Chicago: University of Chicago Press.

Cullen, L. M. (1968) *Anglo-Irish Trade, 1660–1800*. New York: Kelley.

De Roover, R. (1953) *L'Evolution de la Letter de Change, XIV^{e}-XVIII^{e} siècles*. Paris: Armand Colin.

Flandreau, M. and Jobst, C. (2005) The ties that divide: a network analysis of the international monetary system 1890–1910. *Journal of Economic History*, **65**: 977–1007.

Flandreau, M., Galimard, C., Jobst, C. and Nogués-Marco, P. (2009) ''The Bell Jar: Commerical Interest Rates between Two Revolutions, 1688–1789,''. In J. Atack and L. Neal (eds) *The Origins and Development of Financial Markets and Institutions. From the Seventeenth Century to the Present*, *Century to the present*, pp. 161–208. Cambridge: Cambridge University Press.

Giraudeau, P. (1751–1752) *Abrégé du cambiste, contenant la valeur des monnoies de change et les prix des changes des principales places de l'Europe*. Genève: Published by the Author.

Giraudeau, P. (1756) *La banque rendue facile aux principales places de l'Europe*. Genève: Published by the Author.

Glen, W. (1824) *Treatise on the Law of Bills of Exchange, Promissory Notes and Letters of Credit in Scotland*. Edinburgh: Printed for Oliver & Boyd, and Bell & Bradfute (Edinburgh); Smith & Son, and Robertson & Atkinson (Glasgow); and G. & W. B. Whittaker, and Charkers Hunter *(London)*. 2nd edition.

Hamilton, H. (1953) Scotland's balance of payments problem in 1762. *The Economic History Review,* New Series, **5**: 344–357.

Heckscher, E. F. (1950) Baltic trade and the mercantilists. *Economic History Review*, **3**: 219–228.

Helleiner, E. (2002) *The Making of National Money: Territorial Currencies in Historical Perspective*. Ithaca, NY: Cornell University Press.

Hoock, J. and Jeanin, P. (1986) Une enquête en cours, la bibliographie analytique des manuels et traités à l'usage des marchands, 1470–1820*, Histoire et Mesure*, **I/2**: 85–97.

James, J. (1976) The development of the National money market, 1893–1911. *Journal of Economic History*, **36**: 878–897.

James, J. (1998) Did the Fed's Founding Improve the Efficiency of the U.S. Payments System?—A Commentary. *Federal Reserve Bank of Saint Louis Review,* issue May: 143–150.

Kent, H. S. K. (1973) *War and Trade in Northern Seas. Anglo-Scandinavian Economic Relations in the Mid-Eighteenth Century*. Cambridge: Cambridge University Press.

Kindleberger, C. P. (1993) *A Financial History of Western Europe*. Oxford: Oxford University Press (2nd edn).

Kindleberger, C. P. (1967) *The Politics of International Money and World Language (Essays in International Finance No. 61)*. Princeton: Princeton University Press.

Lesger, C. (2005) *The Rise of the Amsterdam Market and Information Exchange: Merchants, Commercial Expansion and Change in the Spatial Economy of the Low Countries, c. 1550–1630*. Burlington, VT: Ashgate.

McCusker, J. J. (1978) *Money and Exchange in Europe and America, 1600–1775*. Tennessee: Kingsport Press, (reissued with corrections, 1992).

McCusker, J. J. and Gravejstijn, C. (1991) *The Beginnings of Commercial and Financial Journalism*. Amsterdam: NEHA.

Neal, L. (1990) *The Rise of Financial Capitalism: International Capital Markets in the Age of Reason*. Cambridge: Cambridge University Press.

North, D. and Weingast, B. (1989) Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century Britain, *Journal of Economic History*, 46(4): 803–832.

Nurkse, R. (1944) *International currency experience: Lessons of the inter-war period*. Princeton: League of Nations.

Phoonsen, J. (1715) *Les loix et les coutumes du change des principales places de l'Europe: livre contenant non seulement ce qu'on fait ordinairement, mais ce qu'un habile marchand doit observer, dans les difficultez qui se présentent sur toutes sortes de lettres de change,* translated by J. P. Ricard, Amsterdam: E. Roger.

Savary, J. (1675) *Le parfait negociant, ou Instruction générale pour ce qui regarde le commerce des marchandises de France & des pays étrangers*. Paris: L. Billaine.

Schneider, J., Schwarzer, O., Zellfelder, F. and Denzel, M. (1992) *Währungen der Welt VI: Geld und*

Währungen in Europa im 18. Jahrhundert. Stuttgart: Franz Steiner.
Sperling, J. (1962) The international payments mechanism in the seventeenth and eighteenth centuries. *The Economic History Review*, **14**: 3.
Squarzoni, R. (1976) *Mécanismes monétaires et bancaires du capitalisme commercial au XVIIIème siècle*. Unpublished dissertation University of Aix-en Provence.
Stasavage, D. (2007) Cities, constitutions, and sovereign borrowing in Europe, 1274–1785. *International Organization*, **61**: Summer 2007: 489–525.
Stevenson, W. (1764) *A Full and Practical Treatise upon Bills of Exchange*. Edinburgh: John Robertson.
Tilly, C. (1990) *Coercion, Capital and European States: AD 990–1992*. Malden, MA: Blackwell Publishers.
Wilson, C. (1949) Treasure and trade balances: the mercantilist problem. *The Economic History Review*, **2**: 152–161.
Wilson, C. (1951) Treasure and trade balances: further evidence. *The Economic History Review*, **4**: 231–242.

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Appendix

A. Datasets

In Table A1 we illustrate in the case of Amsterdam how the data set was constructed. As can be seen, there are three different sources.

Block modelling

Block modelling is a technique to identify groups of nodes in a network (groups of cities in our case) whose members are structurally equivalent, i.e. that relate to other nodes in the same manner. Intuitively, if two cities belong to the same class, cities i and j have the same ex ante probability to quote city k. Ex post, they may end up with different realised links with k. But on average they will quote k just as often. The idea is therefore to back up the network structure from the realised (*a posteriori*) observed links. In the end, block modelling identifies the structure that fits the data best.

Identification proceeds in two steps. First, the number of groups is taken exogenously. Membership of the cities in certain classes and the probabilities of ties between and within the groups of cities are determined in an iterative procedure that seeks to maximise the likelihood of the observed patterns. The procedure is then repeated for different numbers of groups. In a second step, the researcher determines the optimal number of groups. In doing so, he has to trade off detail (summarised in the 'Information' statistic, or Iy) against relevance (measured by the 'Clarity' statistic or Hx). Information and Clarity are maximised when their corresponding statistics are minimised. The intuition for why there should be two statistics rather than one is the following: just like the R^2 is improved in standard regressions by adding new explanatory variables, Information is always improved by adding new categories: there is therefore a need to adjust the amount of 'Information' provided by increasing categories with the amount of 'Clarity' this yields. However, unlike what happens in standard regression analysis, there does not exist at this stage any statistic to weigh Information against Clarity, so that output must be interpreted carefully.

Table A2 gives information and clarity for numbers of groups ranging from two to nine and the four definitions of the dataset (intersection listed, intersection quoted, reunion listed and reunion quoted). In the text, reunion quoted has been used as our preferred definition for the database. As can be seen below, alternative definitions do not lead to fundamentally different results.

For all datasets, gains in information level off after adding a seventh group (except intersection listed, where an eighth group improves information, but only marginally). In terms of clarity, there are two maxima. The first is for a low number of groups, typically two. This gives the senior/junior decomposition discussed in the text. Adding more groups worsens the interpretability of the resulting groups, before a new maximum is attained when seven (or eight) groups are used.

Table A1. *From sources to the database: Amsterdam*

	Source 1: full-printed commercial bulletin		Source 2: full-printed financial bulletin		Source 3: semi-printed financial bulletin		Databases generated			
	Listed?	Quoted?	Listed?	Quoted?	Listed?	Quoted?	Listed narrow	Quoted narrow	Listed broad	Quoted broad
Antwerpen	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Bayonne	Yes	No	No	No	Yes	No	0	0	1	0
Bilbao	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Bordeaux	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Breslaw	Yes	Yes	Yes	Yes	Yes	No	1	0	1	1
Brussels	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Cadiz	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Dantzig	Yes	Yes	No	No	Yes	No	0	0	1	1
Frankfurt/Main	Yes	No	No	No	Yes	No	0	0	1	0
Geneva	No	No	No	No	Yes	No	0	0	1	0
Genoa	Yes	Yes	Yes	Yes	Yes	No	1	0	1	1
Gent	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Hamburg	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Koenigsberg	Yes	No	No	No	Yes	No	0	0	1	0
La Rochelle	Yes	No	No	No	Yes	No	0	0	1	0
Leipzig	Yes	No	No	No	Yes	No	0	0	1	0
Lille	Yes	No	No	No	Yes	No	0	0	1	0
Lisboa	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Livorno	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
London	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Lyon	Yes	No	No	No	Yes	No	0	0	1	0
Madrid	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Middelburg	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Paris	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Rotterdam	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Rouen	Yes	No	No	No	Yes	No	0	0	1	0
Sevilla	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Venezia	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1
Wien	No	No	Yes	Yes	No	No	0	0	1	1
All others	No	No	No	No	No	No	0	0	0	0

Source: Source 1: Koers van de Koopmanschappen, 92 bulletins for 1740–1760 (19/09/1757 in the sample) NEHA BC 674 AMS.1.01 fol C and NEHA BC 674 6.1–6.5; source 2: course the change in Amsterdam into Haerlemse Courant, around 2000 bulletins for 1740–1760 (11/02/1756 in the sample), KB Micro C.37; source 3: Cours des Changes à Amsterdam, 650 bulletins for 1740–1760 (05/08/1751 in the sample), CCM., L. IX, liasse 1034, NEHA AMS.4.01, ADG 7 B 2172 and ADG 7 B 3026.

Table A2. *Block modelling statistics for the various datasets*

Dataset	intlist		intquo		reulist		reuquo	
Number of groups	Information	Clarity	Information	Clarity	Information	Clarity	Information	Clarity
2	0.507	0.008	0.469	0.064	0.514	0.007	0.474	0.054
3	0.466	0.057	0.434	0.029	0.482	0.043	0.439	0.056
4	0.423	0.079	0.396	0.166	0.429	0.049	0.398	0.080
5	0.406	0.076	0.376	0.088	0.414	0.056	0.381	0.094
6	0.387	0.059	0.365	0.088	0.402	0.077	0.369	0.056
7	0.374	0.055	0.360	0.069	0.380	0.047	0.363	0.050
8	0.366	0.037	0.360	0.068	0.378	0.051	0.363	0.050
9	0.366	0.037	0.358	0.068	0.375	0.059	0.362	0.048

Source: Authors' computations.