

# DISCUSSION PAPER SERIES

No. 7169

## MONETARY GEOGRAPHY BEFORE THE INDUSTRIAL REVOLUTION

Marc Flandreau, Christophe Galimard,  
Clemens Jobst and Pilar Noguès-Marco

*INTERNATIONAL MACROECONOMICS*



**C**entre for **E**conomic **P**olicy **R**esearch

[www.cepr.org](http://www.cepr.org)

Available online at:

[www.cepr.org/pubs/dps/DP7169.asp](http://www.cepr.org/pubs/dps/DP7169.asp)

# MONETARY GEOGRAPHY BEFORE THE INDUSTRIAL REVOLUTION

Marc Flandreau, The Graduate Institute, Geneva and CEPR  
Christophe Galimard, BNP Paribas, Paris  
Clemens Jobst, Austrian National Bank, Vienna  
Pilar Noguès-Marco, Institut d'Études Politiques de Paris

Discussion Paper No. 7169  
February 2009

Centre for Economic Policy Research  
53–56 Gt Sutton St, London EC1V 0DG, UK  
Tel: (44 20) 7183 8801, Fax: (44 20) 7183 8820  
Email: [cepr@cepr.org](mailto:cepr@cepr.org), Website: [www.cepr.org](http://www.cepr.org)

This Discussion Paper is issued under the auspices of the Centre's research programme in **INTERNATIONAL MACROECONOMICS**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as an educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Marc Flandreau, Christophe Galimard, Clemens Jobst and Pilar Noguès-Marco

CEPR Discussion Paper No. 7169

February 2009

## ABSTRACT

### Monetary Geography Before the Industrial Revolution

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 centers having already emerged as vehicles for international settlements, before the Industrial Revolution.

JEL Classification: F33 and N23

Keywords: history, international currency, international monetary system and network analysis

Marc Flandreau  
The Graduate Institute  
P.O.Box 136  
1211 Geneva 21  
SWITZERLAND

Email:  
[marc.flandreau@graduateinstitute.ch](mailto:marc.flandreau@graduateinstitute.ch)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=113661](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=113661)

Clemens Jobst  
Economic Analysis Division  
Oesterreichische Nationalbank  
Otto Wagner Platz 3  
POB 61 1011 Vienna  
AUSTRIA

Email: [Clemens.Jobst@oenb.at](mailto:Clemens.Jobst@oenb.at)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=162898](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=162898)

Christophe Galimard  
BNP-PARibas  
Inspection Générale  
5-7 rue Saint Fiacre  
75002 Paris  
FRANCE

Email:  
[christophe.galimard@bnpparibas.com](mailto:christophe.galimard@bnpparibas.com)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=165561](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=165561)

Pilar Noguès-Marco  
Institut d'Études Politiques de Paris  
11 rue de Grenelle, 4ème étage  
75007, Paris  
FRANCE

Email:  
[mariadelpilar.noguesmarco@science-s-po.org](mailto:mariadelpilar.noguesmarco@science-s-po.org)

For further Discussion Papers by this author see:  
[www.cepr.org/pubs/new-dps/dplist.asp?authorid=164223](http://www.cepr.org/pubs/new-dps/dplist.asp?authorid=164223)

Submitted 02 February 2009

Funding for this research was partly covered by funding from the Chaire de Finances Internationales, Institut d'Etudes Politiques, Paris. It also received support from a National Science Foundation grant, "International Currencies in Theory and History" SES-0550404 earned jointly by Barry Eichengreen and Marc Flandreau. Pilar Noguès-Marco thanks GLOBALEURONET and the European Sciences Foundation for an exchange grant with the Universität Zürich and the Graduate Institute of International and Development Studies in Geneva.

We are grateful for cooperation from archivists and librarians in the Nederlandsch Economisch- Historisch Archief, Amsterdam, the Koninklijke Bibliotheek Den Haag, the Stadsarchief Amsterdam, the Commerzbibliothek Handelskammer Hamburg, the British Library, the Bibliothèque nationale de France, Paris, the Chambre de Commerce de Marseille and the Archives Départementales de la Gironde.

We thank the editors of the *Journal of Regions, Economy and Society* for their interest and one referee for comments on an earlier draft. We are grateful to colleagues and friends Gopalan Balachandran, Harold James, Giovanni Federico, Raja Kali, Jordan Siegel, Barry Eichengreen, Patricia Flavin, John James, Richard Saville, and Nathan Sussman for comments and suggestions. This paper was presented in the ASSA meetings session on "Complex networks trade and Finance" in Chicago, (January 7, 2007), at the Graduate Institute for International Studies, Geneva (January 26, 2007), at the European University Institute, Fiesole (March 1, 2007), the London School of Economics Economic History Seminar (June 14, 2007), and the EABH conference, "Continental and Global Networks of Credit and Capital in Historical Perspective", Frankfurt (May 29, 2009). Responsibility for errors and misinterpretation remains ours.

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 with 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, emphasizes 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 emphasized that the making of national money is a recent phenomenon (Cohen 1998, Helleiner 2002), echoing the findings of earlier economic historians (Braudel 1979, Bloch 1946) 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 19<sup>th</sup> century transformations such as the creation of intra-national clearing arrangements, central banking, and the expansion of branch banking. De Roover (1968) writes that early modern Europe’s money markets were integrated and Europe’s monetary geography was seamless owing to the existence “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.<sup>2</sup> These underpinnings would have contributed to unify European money markets by facilitating international arbitrage.<sup>3</sup>

---

<sup>2</sup> In particular, merchants took over the implementation of the *Lex Mercatoria*, or merchant’s law, arbitration and so on. Although national regulations on such things as bankruptcy procedures became more and more prevalent they bore the print of merchant lobbies.

<sup>3</sup> . Neal (1991) provides quantitative evidence supporting the role of the bill of exchange in bringing about European financial integration.

An alternative approach is provided by economic geography. An economic geography perspective on early modern money and finance would emphasize 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 (2006) and (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 emphasize 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, that is, for state-produced and bank-produced financial instruments (North and Weingast 1989). On the other hand more recent work has emphasized that on this account alone, highly credible free cities offered a good (and possibly superior) alternative, akin to modern offshore centers (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 centers did permit higher degrees of government predation without entirely losing their competitive edge. On this account Flandreau et al. (2008) 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 18<sup>th</sup> 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 centers. Our unit of analysis is the individual city, seen as a node in a network of monetary and financial linkages. Financial centers 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 18<sup>th</sup> 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 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 centers. Not only can we locate the relative importance of Amsterdam, Hamburg, London or Paris, we also able document Italian, Spanish, Swiss, or German centers (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’s holds one of the world’s highest concentration of people, money, and industry. That the geography of Europe’s financial system in the mid-18<sup>th</sup> century anticipates on later trends suggests that attention on financial factors in economic development is adequate but that the exclusive focus on the London centered British Financial Revolution – at one end of the banana – is not.

The rest of the article is organized as follows. Section I discusses the significance of the material we have used. Section II describes how the data was collected. Section III discusses the results from applying network analysis techniques to the dataset thus constructed. We end with conclusions.

### **Section I. Mapping Money: The Significance of Foreign Exchange Quotations**

Tilly (1990, p. 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 centers entailed a variety of costs (shipping, insurance, delay) and as a result *specie* could trade at a different price in two centers within the same country, so that inter-city “arbitrated parity” (or the ratio of the price of *specie* in two centers within the same jurisdiction) was not exactly one: there was, in other words an intercity 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.<sup>4</sup>

On top of this, individual centers 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). Centers also differed according to risk. The *quality* of credit was heterogeneous across centers. Various centers specialized in different businesses so collaterals were different and this could matter in periods of crises (a center heavily involved in, say timber, would be at risk if timber prices plummeted). And there were differences in the way local courts handled bankruptcy. Therefore, there was no substantive difference between intra-national (or “domestic”) and

---

<sup>4</sup> . Just as in the familiar analysis of “gold points” that would prevail between countries under the gold standard of the 19<sup>th</sup> century, the premium or discount could not grow larger than the cost of shipping legal tender between the two cities.

inter-national (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 sub-sovereign (as in the case of cities within states), entity. Thus the European monetary system was not an inter-national, 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.<sup>5</sup> 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 Centers 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 recognized London, Amsterdam and Hamburg as additional acceptable issuing centers. And thus, not only weren’t all “French” instruments acceptable means of payments (bills on Marseilles, for instance, are not included), but 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 18<sup>th</sup> 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 center of some importance, merchant-bankers had organized a system for swapping around the balances they held in other centers. 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 this material, which we gathered from both “primary” sources (handwritten foreign exchange lists or printed “currents”) and “secondary” sources, such as contemporary merchant bankers’ handbooks. To some extent, therefore, we proceed as archeologists who try to infer the shape of buildings from exploring remains of its foundations.

---

<sup>5</sup> . *Vente de Marchandises de la Chine et des Indes au Port de L'Orient*, CCM, L, IX, Fonds Roux Liasse 1037.

Figure 1. The Course of Exchange in Marseilles, April 4, 1740

City	Exchange Rate
Amsterdam	86 3/4
Genoa	27 1/2
Livourne	22 1/2 - 1/4
Cadix	11 1/2
Madrid	11 1/2
Paris	24 p.
Lyon's fair	1 1/2
p. de la riviere	20
2e. de la riviere	17 1/2
3e. de la riviere	18
Colonne	18 1/2
p. de la riviere	18 1/2
3e. de la riviere	15 1/2
p. de la riviere	17 1/2
Leghorn	16 1/2

Source: Archive CCM, L, IX, Fonds Roux Liasse 1030, 1032.

Take a look, for instance, at a handwritten note on the Course of Exchange in Marseilles, a French port, a spare set of copies of which is kept in the *Chambre de Commerce de Marseille* (hereafter CCM). This one is dated April 4, 1740.<sup>6</sup> It does list as centers 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 centers are regrouped. Also, Amsterdam does appear 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 centers are listed but no quotation is provided.

The relevant element here is that certain centers 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)

<sup>6</sup> . CCM, L, IX, Fonds Roux, liasse 107-1032.

conducted their business.<sup>7</sup> 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 which the parties agreed upon. Correspondents and correspondence were also kept when there were no other motives but the sheer need to be kept 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 correspondents*” register kept by the House of Roux in Marseilles. This source displays about 1900 correspondents covering the period 1728-1843, of which 1250 in France. Historians studying given merchant banks have often constructed interesting maps that revealed a wide geographical reach for individual banks’ networks.<sup>8</sup>

Thus any banker in any city could and did secure credit from, or extended it to, a vast list of bankers located in other centers. 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) reports 15<sup>th</sup> century anecdotal evidence supporting the existence 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, p. 48-9). Flandreau and Jobst (2008) find the same logic still at work in the late 19<sup>th</sup> 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 center, 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

---

<sup>7</sup> . A discussion of the meaning of such information in the context of the late 19<sup>th</sup> century is provided in Flandreau and Jobst (2005). We highlight here specific features that are relevant to the context of the 18<sup>th</sup> century.

<sup>8</sup> . Carrière 1973, Squarzoni 1976.

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-organized foreign exchange markets where commercial and financial intercourse is intense, but also where other bankers have already established connections, as occurs in agglomeration economies. And this is the critical idea on which our archaeology of late modern European monetary system does rest. 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 does provide 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 recognized bills on Amsterdam and London.

Half a century ago, these questions gave rise to a controversy between Wilson (1949, 1951) and Hecksher (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 17<sup>th</sup> and 18<sup>th</sup> 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 this 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 favor of bullion. Hecksher (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 (1992) 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 Hecksher 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.

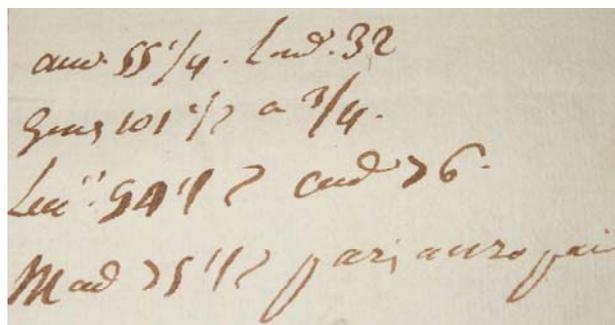
## Section II. Data Collection

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 zeroes depending on whether the city in a given column is traded or not in the foreign exchange market corresponding to the given line. In the previous example the Marseilles line (“vector”) would have ones for Amsterdam, Cadiz, Genoa, Leghorn, London, Lyons, Madrid and Paris, and zeroes for the rest. From a mathematical point of view the result is a network matrix. Previous research on social networks has shown that such “vectors” are amenable to quantitative analysis techniques. We shall exploit these instruments to identify the monetary and financial contours of early modern Europe.

### 1) 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 handwritten. As part of bankers correspondence, most recent local quotes were scribbled at the bottom of their letters. An example is shown in Figure 2 below. Sometimes a separate sheet of paper was appended to business letters, as is the case of the Marseilles bulletin shown earlier (Figure 1).

Figure 2. Exchange Rate Quotations in Lyons from Correspondence



Source: Correspondence from Lyon, February 6, 1742 (CCM L.IX Fond Roux-lettre de Sellon et Cie, liasse 353) (text :: “Amsterdam 55 1/4; Londres 32; Gènes 101 1/2 à 3/4; Livourne 94 1/2; Cadix 76; Madrid 75 1/2; Paris au pair”)

The diffusion of foreign exchange information was expensive. One may easily guess the amount of work that this involved when many correspondents were involved, especially given that letters had to be completed before the mail would leave. Perhaps as an answer to this problem, labor-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 January 28, 1757 (Figure 3). While we admire the etching of the *Rialto*, we also observe that certain centers exhibit no quotations at all (e.g. Lecce, an Italian city).

Figure 3. The Course of Exchange in Venice, January 28, 1757

Venetia 1757	
Adi. 28 Germana	
Letta	D.
Bne	
Lione	60 1/4
Bno	13 3
Roma	62 3/4
Nap.	119 3/4
Fir.	80 1/4
Liv.	104 1/4
Mil.	155
Anc.	—
Gen.	44 1/2
Bari	—
Lecce	—
Anv.	93
Am.	90 5/8
Amib.	90 3/4
Lond.	50 1/4
Aug.	96 1/2
Vna	185
Ms. Corcyari	

Source: NEHA BC 472 VEN.4.01.

A transition product towards full-fledged journalism were completely printed forms which 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.<sup>9</sup> Foreign exchange quotes was

<sup>9</sup> . John McCusker and Cora Gravesteijn (1991) argue that the 17<sup>th</sup> and 18<sup>th</sup> century represented the “beginnings of financial journalism”.

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”. Commercial bulletins, primarily concerned with reporting prices of merchandises also collected information regarding exchange rates. Finally, some financial bulletins gave exchange rates along with quotations of other instruments such as bullion, shares and debentures. Some local specialized newspapers provided 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.<sup>10</sup> 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.

Figure 4. The Course of Exchange Paris, December 31, 1751

**C H A N G E S .**

<b>Amsterdam.....</b>	<b>55 <math>\frac{3}{4}</math></b>	<b>Madrid.....</b>	<b>15. 3. 6.</b>
<b>Anvers.....</b>	<b>57</b>	<b>Cadix.....</b>	<b>15. 2.</b>
<b>Londres.....</b>	<b>31 <math>\frac{11}{16}</math></b>	<b>Genes.....</b>	
<b>Hambourg.....</b>	<b>181</b>	<b>Livourne.....</b>	<b>96.</b>
<b>Lyon, payement de Saints , au pair.</b>			

Source: *Petites Affiches*, BnF MFICHE V-28255-28299.

Cities for which we could find no press evidence or no separate bulletins needed to be supplemented with other sources. For this, we used the first and second edition (1751-52 & 1756) of

<sup>10</sup>. NEHA’s collection contains originals bulletins, photos and facsimiles or this archival evidence was accumulated by its founder, Professor N. W. Posthumus (see Borsma, P and Van Genabeek, J. 1991: Commercial and Financial serial publications of the NEHA, Amsterdam). McCusker and Gravesteijn (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.

Giraudeau's highly regarded handbook.<sup>11</sup> 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 center. Giraudeau proves indispensable for the centers for which nothing is recorded in primary sources.<sup>12</sup>

The availability of overlapping evidence (two sources or more for one center) 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 Gravesteijn (1991, p. 28) emphasize 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 centers, 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). On the other hand, such lists may have involved a selection bias, as bankers in a hurry may have selected only those centers, which they knew to be relevant to their correspondents. The semi-listed 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 faithful and accurate: Their reputation for reliability 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.

---

<sup>11</sup> . On merchants' handbooks, see Hooek and Jeanin (1986). Sperling (1962: p. 451) relies on a similar methodology for his inspection of foreign exchange linkages of Amsterdam.

<sup>12</sup> . As emphasized by McCusker and Gravesteijn (1991: p. 283) "the context strongly suggests that he was working with a copy of the actual exchange current on his desk".

In general we have observed a great consistency between alternative sources.<sup>13</sup> But there are cases where the coverage of the various sources varied wildly. One example of this is Genoa, for which we have a handwritten source that gives 4 centers when the semi-printed form adds 11 centers. In practice we have thus proceeded as follows. We used correspondence in archives to identify typical source(s). When several sources were identified we developed two measures. The narrow one takes the intersection of the various bulletins (cities that appear in all bulletins for a given city). The broad one takes the reunion of the various bulletins.<sup>14</sup> Second, there is an issue regarding whether we should focus on the listing or quoting of given centers. In practices however, differences are not so large. We favor quotations over listing, because quotations do 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 dataset are similar. Finally, the material we collected covers a ten year period centered around 1750. While this was motivated by availability (bulletin 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 so that a ten year periods provides a reasonable basis for cross-section.

## 2) *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. Standard sources and bankers’ correspondence enabled us to track a number of cities for which information on local foreign exchange markets was then actively sought. Lists, courants, letters and their likes were then used with one or several lists of foreign currencies being established for each single market circa

---

<sup>13</sup> 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, p. 192) reproduces a quotation for the very same date for which we happen have an original listing (March 18, 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 Giraudeau’s original bulletin, but not in correspondence.

<sup>14</sup> . Finally, if no primary foreign exchange market source is available, we turned to Giraudeau. See appendix for details.

1750. When this did not work we turned to the local press and finally, as said, used Giraudeau as the lender of last resort.<sup>15</sup>

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 centers. Starting from non-European sources, we were brought back to Europe.<sup>16</sup> It is thus legitimate to focus on the European system of that period, the hub of the global financial system.

Consider the non-colonized 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*"<sup>17</sup>). The same held for Asia and Africa. Transactions were carried by a mix of European intermediaries but although trading peoples (Greeks Syrians and Jews in the Levant and Near East, Parsees and the Gujrati 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.<sup>18</sup> 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 Abrose (1931) who finds evidence of English traders in 1756 drawing bills on Constantinople and that Constantinople acted as a reserve center for Smyrna, Scanderoon (Alexandretta) and Aleppo.<sup>19</sup> 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<sup>20</sup>

---

<sup>15</sup> 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), Dublin Gazette (1739-1742), and Esdall's News Letter (1749-1754).

<sup>16</sup> . We were also struck by the broad similarity in which European sources were organized, and we speculate that this may have reflected the broad homogeneity of the area.

<sup>17</sup> . See Carrière, 1973.

<sup>18</sup> CCM. L.IX, liasse 1036.

<sup>19</sup> . See also Sperling (1962, p. 461).

<sup>20</sup> When this occurred the cities that were quoted were Amsterdam, Marseilles, Leghorn, London, Vienna, and Venice CCM. L.IX, liasses 704-707, 709, 711, 716-720.

Similarly, European foreign exchange lists never took us to the shores of European colonies in the Americas, in Asia or in Africa.<sup>21</sup> McCusker (1977) 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 is only after 1790 that the *Federal Gazette*, published in Philadelphia, recorded foreign exchanges (for London, Amsterdam, and “France”).<sup>22</sup>

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 emphasized by McCusker (1978).<sup>23</sup> To be sure, we have checked many sources. We checked several English newspapers (in Burney Collection, on-line at the British Library) and could not find other course 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.<sup>24</sup> 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.<sup>25</sup> 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 manage their account with other cities in Britain and the Continent.

Regarding Scotland, we also checked newspapers and much correspondence.<sup>26</sup> There again, sources suggest that international relations were managed through London. However unlike what was

---

<sup>21</sup> . This is in contrast with what happened for Dublin, a European colony of Britain which is quoted in the London Course of Exchange.

<sup>22</sup> . We are grateful to John James for looking up this information for us in the Gazette.

<sup>23</sup> . For Bristol (p. 288) he states that “no exchange current until 1775”. For Liverpool he notes the publication of a price current (not an exchange rate current) going bankrupt in mid 1760s

<sup>24</sup> 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..

<sup>25</sup> Archives Départementales de la Gironde, Bordeaux 7 B 2066.

<sup>26</sup> . 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), Caledonian Mercury (1751). We also checked correspondence for the following Scottish cities: Borrowstounness, Edinburgh, and Glasgow in the Archief Brants-Stadsarchief in Amsterdam. There were no mention of exchange rates.

the case for England, there are many references in second hand sources to the existence of an exchange rate on London. Hamilton (1953 p. 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. This source (p. 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.<sup>27</sup> As for Glasgow, Glen (1823) provides similar indications (albeit for a later period).<sup>28</sup> Therefore we conclude that Scottish centres were probably quoting London but did *not* quote other centers than London. London, as happened for English places, monopolized much of Scotland’s external relations.<sup>29</sup> 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.

### **Section III. Monetary Geography in the mid 18<sup>th</sup> century: A Network Analysis**

#### *1) 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 centers are covered through quotations in newspapers and/or commercial or financial bulletins and/or letters collected in a number of places.<sup>30</sup> About 20% are documented through quotations found in letters only.<sup>31</sup> A further 20% is detailed using Giraudeau. For the remaining balance (14 centres or less than 20 per cent of the population) we couldn’t find any primary or secondary source.

---

<sup>27</sup> Sterling is reported to have been usually at a premium and this premium, with sight bills quoted between .5 and 1 percent above par (Anonymous 1958, p. 30-31). Nurkse (1944, p. 28-9) 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 practiced 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 18<sup>th</sup> century”.

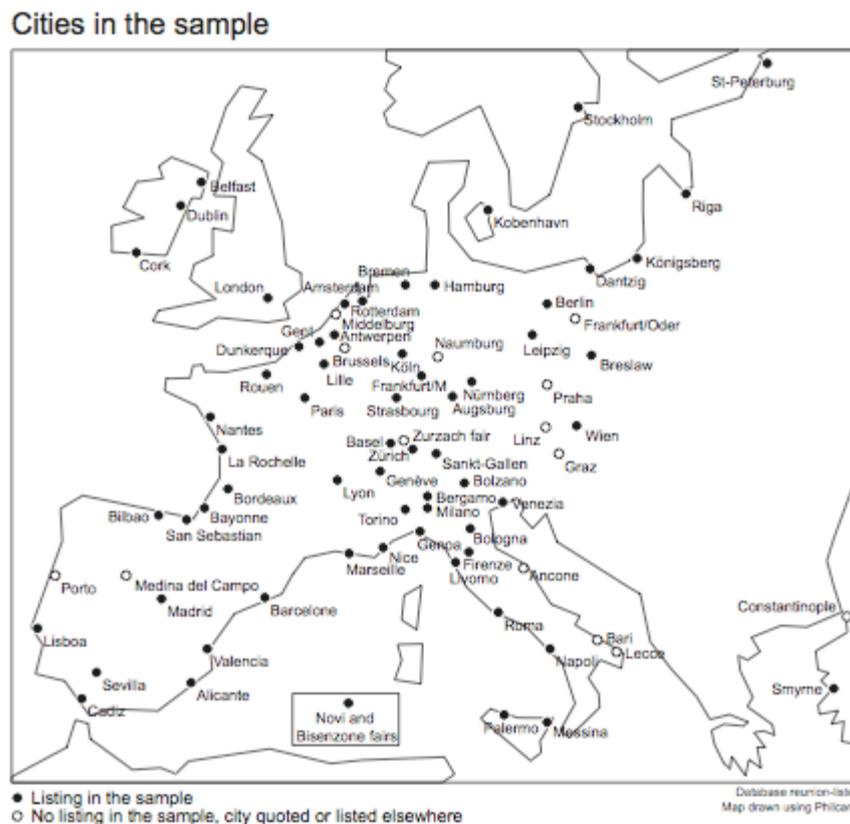
<sup>28</sup> . Glen (1823, p. 13) : “The Glasgow merchant having a deal of money to remit to his correspondents in London, and few there to draw upon, purchases bills on London, for which he gives a premium above the money price, in proportion to the expense of remitting specie, and the scarcity of, or demand for, London paper in the market”.

<sup>29</sup> . Stevenson (1764) p. 202, indicate that the. “The price currents of the exchange of London, Amsterdam and Antwerp” are used to know the state of exchange rates “through all Europe” p. 211-12.

<sup>30</sup> . Nederlandsch Economisch-Historisch Archief, Chambre de Commerce de Marseille, Commerzbibliothek Handelskammer Hamburg, British Library, Bibliothèque nationale de France, Koninklijke Bibliotheek Den Haag, Archives Départementales de la Gironde

<sup>31</sup> .Fond 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.

Figure 5. European Financial Centers Circa 1750



The result is depicted in Figure 5. It shows the location of the 78 cities and helps delineate centers for which we do have information (dots) and those for which we don't (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 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 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 center.



Figure 7. Monetary Agglomeration in the mid-18<sup>th</sup> century



Source: Authors' database

The map shown in Figure 7 collects all the links that do exist and registers the relevance of the various centers 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 triangle of intense financial linkages that goes from Amsterdam-London-Paris-Hamburg and shrinks as it heads towards Italy. This triangle overlaps with Brunet's Blue Banana area of modern economic prosperity. Other more isolated centers are Vienna on the East and Madrid and Cadiz on the South-West.

## 2) 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 19<sup>th</sup> 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 6 links (every city quotes every city). If there is no link at all, the density is zero. We see that the 18<sup>th</sup> 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 of the late 19<sup>th</sup> 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)), or 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 18<sup>th</sup> 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 centers that were linked with senior ones and with one another.

We finally compute the average distance between two centers (i.e. the average number of non directional links one has to travel to reach any city from any other one). As can be seen, 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 centers were reached from anywhere either directly or through a third market. About 20% of links between cities were direct, 75% had to pass through an intermediary centre, only 7-8% needed two intermediaries. This reinforces the notion of an encompassing multilateral settlement system with Amsterdam, London, Paris, Hamburg, Genoa and a number of secondary centers as connecting hubs.

### 3) Groupings: Language, Politics and Centralization.

#### a- "Cliques"

Network analysis techniques provide various ways to organize groupings of individuals. "Cliques" are groups of cities that symmetrically quote one another.<sup>32</sup> Table 2 lists the cliques by decreasing

---

<sup>32</sup> . Formally, a clique is a sub-matrix in the general network matrix that contains ones only.

size.<sup>33</sup> Two interesting facts emerge. First, we come across high profile, leading centers cliques. The largest 5-to-4 country cliques may be seen as providing the backbone of the European settlement system. They predominantly comprise the main regional and international centers: Amsterdam, London, Paris, Genoa, Leghorn, Madrid, 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 the all-Italian five cities clique (Genoa, Leghorn, Napoli, Roma, Venezia), a large number of German-Austrian groups (e.g. Augsburg, Frankfurt-Am-Main, Nuremberg, Vienna), but also the three ports triangle (Amsterdam, London, Bilbao), or the trans-Alpine route (Venezia, Bolzano, Augsburg). Existence of these cliques explain the symmetry in the system discussed above.

*b- "Block modeling"*

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.<sup>34</sup>

Applying this methodology we are able to identify two main breakdowns. They are documented in Table 3 and 4. The first identifies two groups. One comprises senior centers that tend to quote their likes but do not quote members of the other group. The other comprises junior centers 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 19<sup>th</sup> century. At a first level of generalization, the core-periphery arrangement that would be characteristic of the 19<sup>th</sup> century is perceptible in the mid-18<sup>th</sup> century.

Finer characteristics of the mid-18<sup>th</sup> century system, however, emerge when we take a look at the other grouping with good statistical properties. The 7 categories identifies the following groups are: First, the "capitals of capital" (Amsterdam, London, and Paris), which we know were already tightly

---

<sup>33</sup> . Of course, all cliques contain subsets of smaller cliques. They are not reported since only the biggest grouping does matter.

<sup>34</sup> . See Flandreau and Jobst 2005 for a discussion and earlier application.

integrated with one another by the mid-18<sup>th</sup> century and enjoyed a high degree of liquidity;<sup>35</sup> Second, Hamburg, hub for northern European trade and finance, is 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 18<sup>th</sup> century for channeling the American Treasure out of Spain (Cadiz, Madrid, Lyon, Marseille). Fifth, a group of very old financial centers located at the heart of the Holy Roman Empire trade routes (Augsburg, Frankfurt/Main, Leipzig, Nuremberg, Milan, Roma Venice, Vienna). And finally, sixth and seventh, two lists of centers of lesser importance (peripheries) with a respective Atlantic or Mediterranean orientations.

In block-modeling, 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 lines) quotes another city in another group (in column)) thus helps understand the reason for the structure we uncover. To understand how to read Table 5, consider for instance 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 center) in a category of its own is because of the specific way it related with certain part of Europe such as with the “Old continental” centers, which it quoted much more than the “North-West” group comprising Amsterdam, London and Paris (63% vs. 25%). Conversely, Hamburg was much less quoted by the “Mediterranean Periphery” than the “North-West” group (24% vs. 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 centers (“Old continental”), which has a wide array of 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

---

<sup>35</sup> . Neal 1991, Flandreau, et al. 2008.

“Old continental” group, which geographically and culturally stands in between the Mediterranean 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 17<sup>th</sup> 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.

*c- Some tentative hypotheses*

Some tentative implications of the evidence in this article can now be organized. 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 modeling. 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 nationalization of money was a 19<sup>th</sup> 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 centers 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 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, and their liquidity, was also dominating. The implication from this would be that, while trade provides the basis for the development of an active market for bills on a given center, liquidity tends to take a momentum of its own, and with the help of strategic externalities support a measure of persistence and deepening of earlier leadership. On this account, we note that the list of centers for which we were able to collect material does not represent the new industrial centers of the 18<sup>th</sup> century, but rather the older places that may have found in financial intermediation a specialization and a way to survive.

Finally, on the view that credible institutions are a requisite for financial development, we cannot but emphasize the considerable exception that is suggested by the already crucial importance of Paris

as an international center. 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 centralization 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-18<sup>th</sup> 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 19<sup>th</sup> 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 organization of the mid-18<sup>th</sup> 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 per cent 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 centralized unlike some descriptions of the 17<sup>th</sup> and 18<sup>th</sup> 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 emphasize competition and crowding out of old centers 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 centers 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.

## References

- Anonymous, 1958, “The Royal Bank and the London-Edinburgh Exchange Rate in the Eighteenth Century”, *The Three Banks Review*, June, n. 38, pp. 27-36.
- Beawes, W. (1752): *Lex maercatoria rediviva: or, The merchant's directory*. Published by the author, London.
- Braudel, Fernand, 1979, *Civilisation matérielle, économie et capitalisme (XVe-XVIIIe siècles)*, Paris, Armand Colin, 3 volumes, 1979.
- Carrière, C., 1973, *Négociants marseillais au XVIIIème siècle: Contribution à l'étude des économies maritimes*, Marseille: Presses de l'Université d'Aix en Provence.
- Crafts, Nicholas and Venables, Anthony, J., 2003, *Globalization in History: A Geographical Perspective*, in M. D. Bordo, A. M. Taylor and J. G. Williamson, *Globalization in historical perspective*, p. 323-69, Chicago : University of Chicago Press.
- Crooke, George, 1778, *The Merchant, Tradesman and farmer's Director : Containing the rules prescribed by all the Acts of Parliament, from the ninth of William the Third to the nineteenth year of his present Majesty's reign for drawing, endorsing, accepting, noting, and protesting foreign and inland bills of exchange, etc*
- Cullen, L. M. 1968, *Anglo-Irish Trade 1660-1800*.
- Flandreau, M. and C. Jobst, 2005, “The ties that divide: a network analysis of the international monetary system 1890-1910”, *Journal of Economic History*.
- Flandreau, M. and C. Jobst, 2009, “The empirics of international currencies: network externalities, history and persistence”, *The Economic Journal*, 119 (April), 1–22.
- Flandreau, M. C. Galimard, C. Jobst, P. Nogues Marco, 2008, “The Bell Jar: Commercial Interest Rates Between Two Revolutions”, in J. Atack and L. Neal *Essays in Financial History*, Cambridge University Press.
- Flynn, D. O., A. Giráldez, R. von Glahn (eds), 2003, *Global connections and monetary history, 1470-1800*, Aldershot : Ashgate.
- 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*, author Publisher, Genève
- Giraudeau, P., 1756, *La banque rendue facile aux principales places de l'Europe*, Geneva.
- Glen, William, 1824, *Treatise on the law of bills of exchange, promissory notes and Letters of Credit in Scotland*, Second edition.
- Hamilton, H. (1953): “Scotland's Balance of Payments problem in 1762”, *The Economic History Review*, New Series, vol. 5, n. 3, pp. 344-357
- Hayek, F. A. von (1976). *Denationalization of Money, The Argument Refined*, (2nd ed., London: Institute of Economic Affairs, 1990).
- Hecksher, Eli. F. 1950, “Baltic trade and the Mercantilists”, *Economic History Review*, 3, 2, pp. 219-28.

Helleiner, E., 2002, *The making of national money: territorial currencies in historical perspective*, Cornell University Press.

Hook, J. and P. Jeanin, 1988, "Une enquête en cours: La bibliographie analytique des manuels et traits à l'usage des marchands", Vol. I, N° 2.

James J., 1976, "The development of the National Money Market, 1893-1911", *Journal of Economic History* 36, 4, pp. 878-97.

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*, p. 143-150.

Kent, H. S. K., 1973, *War and trade in Northern Seas. Anglo-Scandinavian economic relations in the mid-eighteenth century*, Cambridge University Press.

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

Krugman, Paul, 1993, "Lessons of Massachusetts for EMU", in F. Giavazzi and F. Torres, *The Transition to Economic and Monetary Union in Europe*, NY, CUP, pp. 241-61.

Lesger, Clé, 2006, *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*, Kingsport Press, Tennessee (reissued with corrections, 1992)

McCusker, J. J., and C. Gravejstijn, 1991, *The beginnings of commercial and financial journalism*, NEHA-SERIES III.

McNamara, K., 2004, "Making money: political development, the greenback and the Euro", mimeo, Washington University.

Osiander, A. "Sovereignty, International Relations, and the Westphalian Myth", *International Organization*, Vol. 55 Issue 2 (Spring 2001) pp.251-287

Ricard, J.P. 1715, *Les loix et les coutumes du change des principales places de l'Europe*, J. Phoonsen: Amsterdam.

Roover, R. de, *L'évolution de la letter de change*,

Samuelsson, 1955, "International payments and credit movements by Swedish Merchant-Houses, 1730-1815 », *Scandinavian Economic History review*, 3, N° 1.

Savary, J., 1675, *Le parfait négociant*. Paris.

Schneider, J. O. Schwarzer, F. Zellfelder and M. Denzel, 1992, *Währungen der Welt VI: Geld und Währungen in Europa im 18. Jahrhundert*, Franz Steiner Verlag Stuttgart.

Sperling, J. 1962, "The international Payments Mechanism in the Seventeenth and Eighteenth Centuries", *Economic History Review*, 14, 3.

Squarzoni, R., 1976, *Mécanismes monétaires et bancaires du capitalisme commercial au XVIII<sup>ème</sup> siècle*, Unpublished dissertation University of Aix-en Provence.

Stasavage, David, 2007, "Cities, Constitutions, and Sovereign Borrowing in Europe, 1274 – 1785", *International Organization* 61, Summer 2007, pp+ 489–525

Stevenson, W., (1764) *A full and practical treatise upon bills of exchange*, Edinburgh: John Robertson.

Wilson, Charles, 1949, "Treasure and Trade Balances: The Mercantilist Problem", *The Economic History Review*, 2, 2, pp. 152-161.

Wilson, Charles, 1951, "Treasure and Trade Balances: Further Evidence", *The Economic History Review*, 4, 2, pp. 231-42.

**Table 1. Structural Properties of the Network:  
mid-18<sup>th</sup> century and late 19<sup>th</sup> century compared**

	<i>Mid 18th century (circa 1750)</i>		<i>Late 19th century (quoted)</i>		
	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

Source: mid-18<sup>th</sup> century: see text. Authors computations based on reunion of sources.  
Data for 1890-1910 is from Flandreau and Jobst 2005.

**Table 2. Cliques in the Network**

<i>Size</i>	<i>Members of the Clique</i>				
5	Amsterdam	Genoa	Lisboa	Leghorn	London
5	Amsterdam	Genoa	Leghorn	London	Paris
5	Amsterdam	Genoa	Leghorn	London	Venezia
5	Amsterdam	Cadiz	Leghorn	London	Paris
5	Amsterdam	Cadiz	London	Madrid	Paris
5	Genoa	Leghorn	Napoli	Roma	Venezia
4	Genoa	Leghorn	Lyon	Paris	
4	Genoa	Leghorn	Napoli	Palermo	
4	Augsburg	Leghorn	Milano	Venezia	
4	Bologna	Firenze	Leghorn	Roma	
4	Firenze	Leghorn	Roma	Venezia	
4	Leghorn	Messina	Napoli	Palermo	
4	Leghorn	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	Leghorn	Marseille		
3	Leghorn	Fairs	Palermo		
3	Amsterdam	Bilbao	London		
3	Augsburg	Bolzano	Venezia		

Source: Authors' computations

**Table 3. List of countries in Blockmodel: 2 groups**

<i>Number/Name</i>	<i>Cities</i>
Group 1: Senior	Amsterdam, Augsburg, Cadiz, Genoa, Hamburg, Leghorn, London, Lyon, Madrid, Milano, Paris, Roma, Venezia, 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 & Bisenzone Fairs, Nurnberg, Palermo, Riga, Rotterdam, Rouen, Saint-Petersbourg, San Sebastian, Sankt-Gallen, Sevilla, Smyrne, Stockholm Strasbourg, Torino, Valencia, Zürich

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

**Table 4. List of countries in Blockmodel: 7 groups**

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

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

**Table 5. Probability that a city in a line-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.

## Appendix:

### A) Datasets

In Table A.1 we illustrate in the case of Amsterdam how the dataset was constructed. As can be seen there are three different sources.

Table A.1. 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
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
Leghorn	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	No	No	No	Yes	No	0	0	1	0
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: Sources: 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 1034, NEHA AMS.4.01, ADG 7 B 2172 and ADG 7 B 3026.

### B) Blockmodelling

Block-modeling 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 realized 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 realized (a posteriori) observed links. In the end, block-modeling 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 maximize 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 (summarized in the "Information" statistic, or  $I_y$ ) against relevance (measured by the "Clarity" statistic or  $H_x$ ). Information and Clarity are maximized when their corresponding statistics are minimized. 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 by 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.

Appendix table A.2 below gives information and clarity for numbers of groups ranging from two to nine and the four definitions of the data set (intersection listed, intersection quoted, reunion listed, reunion quoted). In the text, reunion quoted has been used as our preferred definition for the data base. As can be seen below, alternative definitions do not lead to fundamentally different results.

For all data sets, gains in information level off after adding a seventh group (except intersection listed, where an 8th 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 7 (or 8) groups are used.

## A.2. Blockmodelling statistics for the various datasets.

data set	intlist		intquo		reulist		reuquo	
# 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