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Money Markets and Exchange Rates in Preindustrial Europe

Pilar Nogues-Marco

Contents

Abstract

This chapter focuses on money markets and exchange rates in preindustrial Europe. The foreign exchange market was mostly based on bills of exchange, the instrument used to transfer money, and provide credit between distant centers in preindustrial Europe. In this chapter, first I explain bill of exchange operations, money market integration, usury regulations and circumventions to hide the market interest rate, as well as the evolution of bills of exchange in history, focusing mainly on the most relevant features generalized during the first half of the seventeenth century: endorsement and the joint liability rule, which facilitated the full expansion of the foreign exchange market beyond personal networks. Then, I describe the European geography of money in the mid-eighteenth century, characterized by a very high degree of multilateralism with the triangle of Amsterdam, London, and Paris as the backbone of the European settlement system. Finally, I measure the cost of capital and relate it to liquidity. I show evidence of interest rates in the eighteenth century for Amsterdam, London, Paris, and Cadiz. While Amsterdam, London, and Paris presented low and similar

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interest rates, Cadiz had higher interest rates, mostly being double the cost of capital. These results seem to show a high inverse correlation between liquidity and interest rates, suggesting that the share in international trade of European centers might have been a powerful driver of international monetary leadership. While more empirical evidence and further research are needed, this approach opens the scope of the analysis beyond the national institutional explanation.

Keywords
Money market · Bills of exchange · Monetary geography · Usury regulations · Cost of capital

Introduction

This chapter focuses on money markets and exchange rates in preindustrial Europe. The foreign exchange market was mostly based on bills of exchange, the instrument used to transfer money, and provide credit between distant centers in preindustrial Europe. In section "Bills of Exchange: Transfer and Credit Instrument" I define bill of exchange operations in order to highlight the two functions of transfer and credit involved in bill of exchange transactions. The function of transfer strengthened trade relations because bills of exchange facilitated cashless payments, as I explain in the second section. The function of credit developed due to the hidden interest rate embedded in the exchange rate at maturity that circumvented usury regulations on credit, as I describe in the third section.

European money markets became connected by virtue of utilizing bills of exchange, which had been created for the purpose of transferring money between cities without having to ship specie. Section "European Money Market Integration" measures European money market integration in the eighteenth century. Because shipping precious metals was costly, the exchange rates normally fluctuated within the "specie point," that is, the ratio of the bullion market prices in two cities plus/minus the cost of shipping bullion. An efficient and integrated money market would suffer only few and nonpersistent "breaks" of the "specie points." In Medieval and Early Modern Europe, the well-functioning of the specie-point mechanism was conditioned by the foreign exchange policy, which distorted market integration. However, by the early eighteenth century, core countries had liberalized bullion movements, which permitted market integration. The measurement of the specie-point mechanism shows that London and Amsterdam money markets were highly integrated in the mid-eighteenth century. This result is consistent with our knowledge of London-Amsterdam securities market integration in the eighteenth century. Nevertheless, more research is needed to improve our knowledge on money market integration for a broader sample of European centers.

Section "Usury Regulation and Circunventions in Commercial Finance" explains how the credit function of bills of exchange developed due to the hidden interest rate embedded in the exchange rate at maturity since it circumvented usury regulations on credit. Usury regulation influenced the development of capital markets in the

Middle Ages and the Early Modern period by defining a ceiling on interest rates. To conceal usurious interest rates in local loans, the borrower sometimes acknowledged a debt larger than the sum actually received. Other times official documents just recorded the amount of capital to be repaid, so interest rates are unknown. As a consequence of usury regulations, local interest rates cannot be found, or, if they can be found, they are only a biased measure of the opportunity cost of capital. Bills of exchange, however, constitute the benchmark to calculate interest rates because this instrument circumvented usury regulations. Church doctrine accepted that the price charged on bills of exchange was motivated by the risks and efforts associated with overcoming the obstacles of the foreign settlement. In practice, the price of bills of exchange was determined by the geographical distance as well as by time, so the interest rate was hidden by the exchange rate at maturity.

Section "Bills of Exchange: Endorsement and the Joint-Liability Rule" focused on the most relevant features of bills of exchange generalized during the first half of the seventeenth century: endorsement and the joint liability rule. Endorsement made bills of exchange a common negotiable instrument because the joint liability provided high financial protection against nonpayment as all parties involved in a bill transaction (the payer, all the endorsers, and the drawer) had a joint liability for the payment. As a consequence, endorsement facilitated an expansion of commercial-financial activities beyond personal networks by supporting long-distance transactions which involved quasi-impersonal relations between parties. The emergence of a liquid European market for bills of exchange organized along lines defined by trading relations provided the infrastructure for financial development.

In section "The Geography of Money Before the Industrial Revolution," I describe the European geography of money in the mid-eighteenth century, characterized by a very high degree of multilateralism with the triangle of Amsterdam, London, and Paris as the backbone of the European settlement system. This result underlines the critical importance of multilateral commercial finance as opposed to bilateral trade relations in shaping foreign exchange transactions. More research is needed to map the geography of monetary relations before the eighteenth century in order to understand the dynamics of change in commercial finance geographical relations during the Early Modern period.

Finally, in section "Measuring the Cost of Capital in the Eighteenth Century Europe" I measure the cost of capital and relate it to liquidity. I show evidence of interest rates in the eighteenth century for Amsterdam, London, Paris, and Cadiz. While Amsterdam, London, and Paris presented low and similar interest rates, Cadiz had higher interest rates, mostly being double the cost of capital. These results seem to show a high inverse correlation between liquidity and interest rates, suggesting that the share in international trade of European centers might have been a powerful driver of international monetary leadership. While more empirical evidence and further research are needed, this approach opens the scope of the analysis beyond the national institutional explanation.

Bills of Exchange: Transfer and Credit Instrument

A bill of exchange was a letter by which one merchant ordered his correspondent in some other city to make a payment on his behalf to another merchant in that distant city. It was the European merchants' instrument of cashless payment and a means of providing credit between the Middle Ages and the twentieth century. Thus, the European money and financial market was historically built on the bill of exchange.

Figure 1 explains bill of exchange operations. Four persons participated in the transaction: two at the city where the bill was drawn and two at the city where it was payable. First, there was the drawee (deliverer, giver, remitter, or negotiator), the person who delivered the money to the drawer in exchange for the bill; second, the drawer (taker) who received the money by selling the bill to the drawee; third, the party who paid the money at the destination point by virtue of the bill drawn on him, commonly termed the payer (accepter); and fourth, the person to whom the bill was made payable at the destination point, called the payee (possessor or holder). Typically the payer and the drawer would keep accounts with each other and could offset the payment of the bill with claims from other transactions so that only small net amounts would have to be occasionally settled (Beawes 1773; De Roover 1953; Einzig 1962; Mueller 1997; Neal 1990; Nogues-Marco 2011; Jobst and Nogues-Marco 2013).

Suppose that an English agent needs to settle a debt in Amsterdam and he does not have his own correspondent there. This English agent (drawee) will buy a bill of exchange from a merchant in London who has a Dutch correspondent (drawer), paying out in local currency, sterling pounds (£). The bill is drawn in the foreign currency, *shellinge bank* (β) to be paid out in Amsterdam. The drawee will remit by post the bill to the payee in Amsterdam to settle his debt. The payee will show the bill to the payer for acceptance, and the payer will pay the bill to the payee at maturity. If the bill was not accepted or if the accepted bill was not paid, the payee would protest the bill and the drawer would be obliged for the payment of the bill plus the charges of protest, postage, commissions, and brokerage.

The exchange rate is defined by the ratio between the quantity of sterling pounds paid for the purchase of the bill in London and the quantity of *shellinge bank* paid in Amsterdam for the payment of the bill. The operation of exchange entails indeed two operations: the transfer of money from London to Amsterdam and the lending involved between the purchase of the bills in London and its payment in Amsterdam. Thus, the exchange rate at maturity is comprised of two components: a shadow spot exchange rate for the transfer and a shadow interest rate for the loan. This interest rate is determined by the interest rate at the destination point in accordance with the origin center. In our example (Fig. 1), it would be the interest rate in Amsterdam. To understand why, just think about the following arbitrage operation: A time bill in London on Amsterdam is equivalent to a spot transfer of funds from London to Amsterdam at the current exchange rate and a subsequent deposit of the *shellinge* thus obtained at the Amsterdam interest rate (Flandreau et al. 2009a).

In the next sections, we study the two functions of transfer and credit of bills of exchange. The function of transfer strengthened trade relations because bills of exchange facilitated cashless payments. The function of credit developed due to

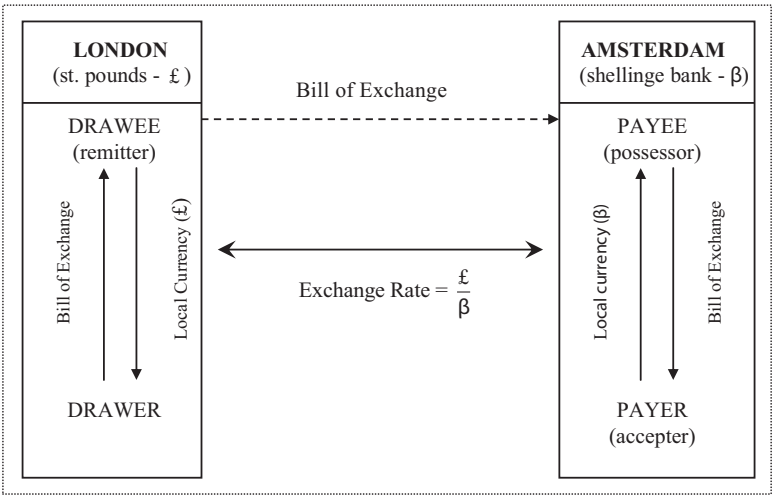

Fig. 1 The bill of exchange

the hidden interest rate embedded in the exchange rate at maturity that circumvented usury regulations on credit.

European Money Market Integration

European money markets became connected by virtue of utilizing bills of exchange, which had been created for the purpose of transferring money between cities without having to ship specie. Bills offered several advantages in relation to precious metals: First, shipping precious metals had a high risk of shipwreck, piracy, and/or brigandage. Second, bills avoided transportation costs of gold or silver, and finally, bills eliminated the cost of minting coins at the destination point, that is, cost associated with specie shipment except for those few coins that enjoyed international acceptance (Munro 1979: 172–173).

Because shipping precious metals was costly, the exchange rates normally fluctuated within the "specie point," that is, the ratio of the bullion market prices (gold or silver) in two cities plus/minus the cost of shipping bullion between the two cities (Morgenstern 1959; Officer 1996; Flandreau 2004; Nogues-Marco 2013). As a consequence, agents would prefer to transfer bills than specie, except when the exchange rates "broke" the "specie point" so it was more profitable to ship specie instead of bills. Suppose that an English agent needs to settle a debt in Amsterdam. Gold and silver, along with bills of exchange, may be used to settle international payments. Normally, the best way to settle the debt was to buy a bill of exchange in London on Amsterdam, provided enough such bills were available. But if bills were scarce, their price would rise. If the bill price increased above the level at which it

became preferable to send metal than bills as payment, the English debtor would buy gold or silver on the London market and ship it to Amsterdam.

The exchange rate must lie within the "specie points" to avoid metal shipments and, therefore, eliminate the risks and costs of transferring specie to cash payments. A well-functioning and integrated money market would suffer only few and non-persistent "breaks" of the "specie points."

In Medieval and Early Modern Europe, the well-functioning of the specie-point mechanism was conditioned by the foreign exchange policy, which included several measures that distorted market integration, such as bans or licenses on the export of bullion, fixed exchange rates for foreign coins, bans on unauthorized exchange transactions, taxes on foreign exchange transactions, debasements, official foreign exchange operations, etc. Governments were interested in influencing foreign exchange in order to achieve goals such as retaining or attracting bullion, preventing or reversing a rise in domestic prices resulting from a depreciation of the exchange rate, safeguarding the interests of national industries by stimulating exports or handicapping imports, keeping down or reducing the cost of government remittances abroad, or causing difficulties to hostile governments (Einzig 1962: 155–168).

The implementation of foreign exchange policies that distorted market integration decreased during the eighteenth century because the spirit of laissez-faire was gaining ground. Indeed, many of the foreign exchange policies used during the sixteenth and seventeenth centuries became obsolete in the early eighteenth century (Einzig 1962: 168). European countries liberalized bullion movements at the end of the seventeenth century, which permitted money market integration: Dutch law had allowed ingots and foreign coin exports since 1646. Dutch mint masters attempted to ban bullion exports, but mercantile circles in Amsterdam opposed them and prevailed in keeping bullion exports open. England's bullion trade was liberalized in 1663. At that time, bars and foreign coins could be exported, although this was not possible for English coins up to 1819 (Attman 1983: 27; Gillard 2004: 132; Viner 1955: 4; Munro 1979: 212). To the end of the eighteenth century, only Spain and Portugal, the empires that produced the vast majority of precious metals, maintained bullion export prohibitions (Pallavicino 1855: 8; Larruga 1787–1800: (3) 49–57; Nogues-Marco 2010).

Once bullion movements were free and money markets integrated, shipping bullion was only occasionally profitable, and bills of exchange were normally used for payments. Money market integration supported commercial exchanges between European centers because an efficient functioning of the "specie-point mechanism" facilitated the use of bills of exchange, so eliminated the transaction costs associated with the shipping of specie.

Measuring money market integration in the Early Modern period is complicated because systematic data on bullion prices are difficult to find in primary sources before the nineteenth century. Nevertheless, from the end of the seventeenth century, London registered prices on bullion in the financial press *The Course of the Exchange*. Additionally, Amsterdam bullion prices are available for the eighteenth century in the commercial bulletin *Kours van Koopmanschappen tot Amsterdam*. Using these

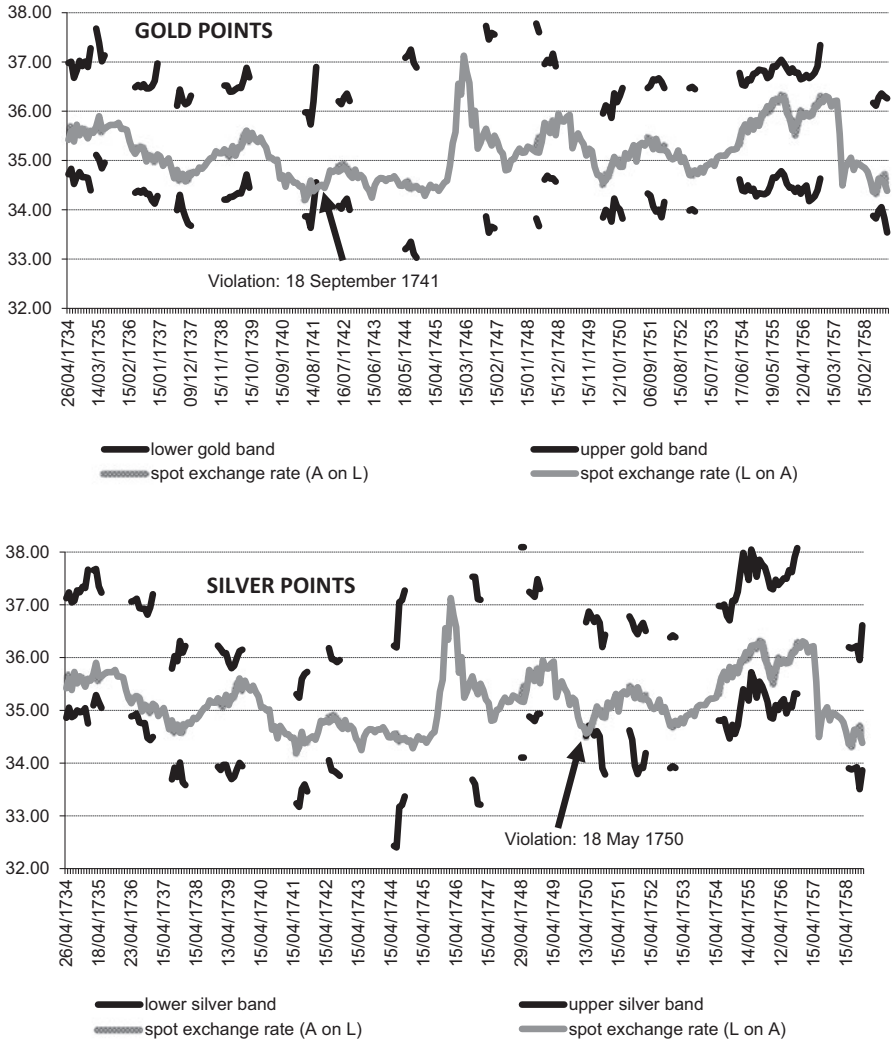

Fig. 2 Specie-point mechanism (1734–1758), London and Amsterdam, shellinge bank/sterling pound (monthly observations). (Source: Nogues-Marco 2013: 452–453)

data, Nogues-Marco (2013) measured money market integration between London and Amsterdam in the mid-eighteenth century. Figure 2 shows results.

Figure 2 demonstrates the highly integrated money market between London and Amsterdam in the mid-eighteenth century. These results are consistent with our knowledge of London and/or Amsterdam securities market integration in the eighteenth century (Neal 1990, 2000; Nogues-Marco and Vam Malle 2007; Koudijs 2011). While integration for the cases of London and/or Amsterdam is well known,

more research is needed to improve our knowledge on money market integration for other European centers.

Usury Regulation and Circumventions in Commercial Finance

Usury regulation influenced the development of capital markets. In the Middle Ages, usury was defined as a ban on lending money at interest, that is, anything beyond the principal of a loan was deemed usury (De Roover 1967: 258). According to Koyama (2010), usury regulation endured centuries because it created a barrier to entry that enabled secular rulers, the Church and a small number of merchant-bankers to earn monopolistic rents. This argument suggests that the prohibition restricted lending to a small group of merchants who were able to write contracts sufficiently complex to evade the Church's laws. The rents generated by the usury prohibition were appropriated by medieval rulers, elite merchant-bankers, and the Church.

To conceal usurious interest rates in local loans, the borrower acknowledged a debt larger than the sum actually received. Usury suits provide evidence of this practice. Two examples can be obtained from the *Archivio di Stato* (Pisa 1230): In the first suit, the borrower stated that the lender had forced him to appear in front of a notary and swear that he had borrowed £26 when in fact he had received but £20. In the second suit, the borrower claimed that he was forced to stipulate that he had received £7 in order to borrow only £4 (Blomquist 1971: 469). Many other cases illustrate that contemporaries used the same device to camouflage interests, that is, merchants recorded a price for the amount of capital to be repaid at a level that would incorporate a hidden interest rate. For example, local merchants of Prato used a parallel account to keep track of large loans with a full description of all the conditions: In 1385, the tailor Domenico di Jacopo recorded in his accounting books that he had received a loan of 70 florins, while the lender had given him a written receipt for a loan in the amount of 90 florins. Similarly, in 1333 in *Santa Maria dell'Impruneta*, a moneylender confessed in his will that he was owed 90 ½ florins and 37 *staia* of grain but had lent only 68 florins and no grain. In 1402, a wool manufacturer made a loan of 20 florins but had it notarized as 22 florins. In 1450, Francesco di Matteo Castellani signed an agreement in a banker's book to repay a loan of 110 florins when – according to his own accounts – he had in fact borrowed only 100 florins (Marshall 1999: 98–99).

Medieval usury regulation did not distinguish between money lent to poor people or to businessmen who intended to invest it in a profitable venture. Calvin (1509–1564) was the first who made such a distinction between business loans on which it was all right to take interest and distress loans which should be made free of charge (De Roover 1967: 258; Kerridge 2002: 30–34). For business loans, the ban was replaced in some countries by a legal maximum rate that prevented interest rates from raising this legal ceiling, which would constitute "usury." The legal ceiling declined in the long run, suggesting an improvement of efficiency in European capital markets. For example, in the case of England, Henri VIII defined the legal ceiling at 10% in 1545, but Edouard VI reintroduced the ban on lending at interest in

1552. Queen Elisabeth accepted again the ceiling at 10% in 1571 due to merchants' interests, despite the opposition of the scholastic doctors and the Church. The ceiling was reduced to 8% in 1624, 6% in 1661 and 5% in 1714 (Nelson 1949: 83; De Roover 1953: 125).

The practice of concealing interest rates remained until the end of the Old Regime as the consequence of the usury regulation. In France, while certain debt instruments and short-term loans among merchants permitted interest rates if they did not exceed the usury ceiling, the ban on interest rates for long-term loans endured until the French Revolution (Hoffman et al. 2000: 14). Luckett (1992: 29) explains that the annual yield of perpetual annuities was limited by law to 5% and, therefore, notarized acts of the sale of rentes thus invariably list the purchase price as exactly 20 times the coupon. According to him, historians have frequently accepted this evidence at face value, asserting that the long-term rate of interest was unusually stable under the Old Regime. But he considers that the formal purchase price of rentes found in notarized contracts was nothing but a legal fiction, an amount that the buyer pretended to pay and that the seller pretended to receive when they signed the act. Mercier (1782–1788: (2) 36) considered that "when [the notary] then writes 'currency counted and delivered', this is most often a fiction." Similarly, Hoffman et al. (2000: 15–16) explains the ways by which the Early Modern notaries hid the interest rates on loans. For instance, obligations (promissory notes) could not openly specify the payment of interest, but evidence shows that it was de facto paid. Suppose, for example, that Monsieur Martin lent 1000 livres to Baron du Pont for a year at 10% interest. The contract might hide the interest rates if it did not register the loan actually received but specified only the amount of repayment. In our example, the contract might stipulate that du Pont had to repay 1100 livres in a year's time. In the late eighteenth century, notaries developed payment schedules that joined interest payments and capital repayment in obligations. Suppose, for example, that Martin lent du Pont 1000 livres to be repaid in 5 equal annual installments at an interest rate of 10%. The notary might draw up a contract stating that du Pont had borrowed 1320 livres, which he would repay at the rate of 264 livres a year.

Therefore, the mechanism to hide interest rates remained similar from the Middle Ages to the end of the Old Regime. These mechanisms were mainly based on recording in the official documents only the amount of capital to be repaid. As a consequence of usury regulation, local interest rates cannot be found, or, if they can be found, they are only a biased measure of the opportunity cost of capital.

Bills of exchange, however, constitute the benchmark to calculate interest rates because this instrument circumvented usury regulations. Unlike other financial instruments, which had a local circulation and were thus subject to the regulation of interest rates, bills of exchange escaped usury ceilings because the price charged on bills of exchange was motivated, according to contemporary bankers, by the risks and efforts associated with overcoming the obstacles of foreign settlement. As we have seen, in practice, the price of bills was determined by the geographical distance as well as by time, so the interest rate was hidden by the exchange rate at maturity (Beawes 1773; De Roover 1967; Flandreau et al. 2009a; Malynes 1601).

Indeed, we can distinguish between "real exchanges," that is, the plain vanilla bills of exchange drawn to cash real mercantile transactions between distant cities, and "fictitious exchanges," which were credit instrument based on derivatives of bills of exchange used in Medieval and Early Modern Europe to lend locally to yield a return that did not consider usury constraints. One way of doing so was called "dry exchange" (*cambium siccum*) that worked as follows: merchant *A* went to local banker *B* in London to borrow money; banker *B* wanted to charge an usurious interest rate, so he gave the money to merchant *A* in exchange for a bill drawn by merchant *A* to an imaginary person settled in Amsterdam at *x* number of months, according to the maturity of the loan. When it reached maturity, the bill protested for nonpayment came from Amsterdam, so merchant *A* must repay to banker *B* in London for the money he had borrowed. An alternative way to lend locally at usurious interest rates was "exchange and reexchange" (*cambium et recambium*): merchant *A* went to local banker *B* in London to borrow money, and the banker B gave the money to the merchant *A* in exchange for a bill drawn by the merchant *A* payable in Amsterdam (exchange operation). When the bill was presented for payment at maturity in Amsterdam, the payer *C* (merchant's *A* agent there) settled the bill by sending a second bill in Amsterdam on London for payment to the banker *B*, the original lender in London (re-exchange operation). Using these two bills back to back, the first bill (exchange operation) created a local loan in London to be repaid in London when the second bill (reexchange operation) returned for payment. The operation was covered because participants had agreed in advance on the price of the return bill (fictitious exchange), so the operation was bound by arbitrage to yield the same market return as a local loan (Beawes 1773; De Roover 1944; Denzel 2010; Flandreau et al. 2009a; Hayes 1719–1777; Jobst and Nogues-Marco 2013; Neal 1990).

Bills of exchange became a safe and cheap financial instrument from late Medieval Europe, rather than simply a means of cashless payments because exchange transactions provided wealthy lenders with a way of making profit while circumventing the religious interest ban. Plain vanilla bills of exchange were used to arbitrate for profit by buying and selling bills in different European cities at different exchange rates. Additionally, fictitious exchange operations (such as dry exchange or exchange and reexchange) facilitated the use of bills of exchange as a legal financial instrument to hide market interest rates. Borrowers were willing to pay a premium, that is, the interest rate hidden in the exchange rates, to have access to capital. According to available empirical evidence, the volume of financial bills surpassed the volume of bills used for commercial purposes already in the fourteenth to fifteenth centuries. For instance, the ledger of the Covoni Family Company (Florence, 1336–1340) registered 443 exchange operations: 70 purely commercial remittances from Venice to Florence, covering liabilities incurred; 335 speculative remittances (159 from Florence to Venice, 179 from Venice to Florence); and 38 dry exchange contracts (Mueller 1997: 317–318).

The expansion of the financial use of bills of exchange in late Medieval Europe gave businessmen the incentive to establish organizations capable of spreading the use of bills of exchange from relatively small and personal networks to a broader

European semi-impersonal system. According to Rubin (2010), Italian bankers established interregional branches in all the major financial centers of Europe to take advantage of exchange rate differences and capital scarcity (thus implicitly lending at interest) while at the same time diversified portfolios to shield against risk. Calculations of the return of exchange and reexchange operations between Bruges, London, and Venice (c. 1437–1481) indicate rates ranging from 15.6% to 20.9% and rising as the length of the loan rose from 1 to 6 months (Neal 2015: 37).

The extension of the credit network achieved by the branching system allowed for semi-impersonal credit relations to arise because from the point of view of the headquarters in Italy, most financial activities were conducted with impersonal relations in Europe (Rubin 2010). In late fourteenth and fifteenth centuries, a dense network of bank branches and corresponding merchant-bankers linked the main European trade and finance centers. For instance, Datini (1335–1410) established a bank in Prato with branches in Florence, Pisa, Avignon, Barcelona, Valencia, and Palma de Mallorca. Although Datini's bank had no branch in Bruges, he was represented there by several correspondents (De Roover 1948a: 30, 55–56). Similarly, the Medici bank established in Florence (1397–1494) opened branches in many European centers, such as Ancona, Avignon, Basel, Bruges, Geneva, London, Pisa, Rome, and Venice (De Roover 1948b: 13–23, 1963: 67–69). Quasi-impersonal credit relations consolidated during the Early Modern period with the adoption of endorsement and the joint liability rule, as we are going to see in next section.

Bills of Exchange: Endorsement and the Joint Liability Rule

European trade and finance supported the emergence of a liquid market for bills of exchange, which was organized along lines defined by trading relations and provided the infrastructure of financial development. Endorsement facilitated the expansion of bills because it made them a common negotiable instrument from the early seventeenth century (Usher 1914; De Roover 1953). Endorsement means that the holder (endorser) could transfer the bill to another person (endorsee) by signing the back of the document. Endorsement implied a joint liability, that is, all parties involved in a bill transaction (the payer, all the endorsers, and the drawer) were legally responsible in solidum for the payment (joint liability rule).

The adoption of endorsement is difficult to trace. Usher (1914: 576) considered that the practice began in Italy in the second half of the sixteenth century and spread northward along the commercial routes. Lapeyre (1956: 296) and De Roover (1953: 101) claimed that endorsement already existed in sixteenth century, according to the empirical evidence obtained in *Archivo provincial de Valladolid* (Castilian bills of exchange endorsed in 1575) and *Archivio di stato di Firenze* (Italian bills of exchange already endorsed in 1519), although endorsement seems to have been only occasional in the sixteenth century. Evidence of bills of exchange endorsed in northwestern Europe dates from the late sixteenth century. The first bill of exchange discovered for Antwerp is from 1571, although endorsement was not generally

practiced in Antwerp until the first decades of the seventeenth century (Van der Wee 1963: (II) 349).

The legal origin of the joint liability rule that supported the expansion of endorsement is also difficult to trace. According to Van der Wee (1963: (II) 337–348, 1977: 325–329) and Puttevils (2015), bills of exchange adopted the Antwerp legal principle of assignment when they were introduced in the Antwerp market in the sixteenth century. From the Middle Ages, merchants in Antwerp had used the instrument "letter obligatory" (promissory note) to postpone payments: A merchant who underwrote one committed himself to paying a given sum within a given period. The medieval letter obligatory used quite frequently the clause "payable to bearer," although it did not facilitate their circulation from hand to hand because of the lack of legal guarantees in transferability. To be able to take a defaulting debtor to court, the bearer of a letter obligatory, even if it carried a bearer's clause, had first either to obtain an explicit authority from the original creditor – an authority which incidentally could be revoked at any time – or to have an official transfer by means of a formal cession. But in 1507, a judicial verdict in Antwerp granted the bearer of letter obligatory the same rights as the original creditor with regard to the prosecution of an insolvent debtor. This principle was confirmed by Imperial Edict for the whole of the Netherlands in 1537. Additionally, financial protection for the bearer improved: The courts had tended to regard all transfers of letters obligatory as cessions that relieved the transferring creditor of all responsibility. But this practice changed by 1532 when assignment of letter obligatory had become familiar practice. In 1541, an Imperial Edict recognized the principle of assignment for transferred letter obligatory, that is, the legal right of the bearer to assign the collection of the debt from the original signatory of the letter to the assigning debtor (i.e., the ceding creditor). This principle added a new important guarantee for the circulation from hand to hand of letter obligatory, as the assigning debtor was also bound until the payment had really been made. Once this principle had been recognized for the first transfer, it had logically to apply to the ensuing transfers as well, with the proviso however that only the last assigning debtor was held. When the use of bills of exchange expanded in Antwerp by influence of the more important firms of Southern German and Italian merchant-bankers, the clause "payable to bearer" was naturally introduced in bills of exchange, so the ordinance of 1541 recognized the principle of assignment covered both letter obligatory and bills of exchange. However, the increasing degree of anonymity created problems in terms of identifying who the latest assigned debtor was – because in letter obligatory only the original creditor and debtor were named in the document itself. As a consequence, endorsement emerged to identify the last debtor by the signature within the bill of exchange, and the liability was no longer limited to the latter but extended to all previous endorsers, that is, the principle of the joint liability rule (see also Hunt and Murray 1999: 212–213; Munro 1991).

The joint liability attached to endorsement played a major role in ameliorating fundamental information problems in long-distance trade and finance, so facilitated the expansion of the foreign exchange market beyond personal networks. Santarosa (2015) has empirically examined the role of the joint liability rule in reducing

asymmetric information in long-distance trade. First, negotiable bills of exchange contained a threat of adverse selection caused by the incentive of sellers to pass on the bills of riskier debtors. The joint liability rule diminished adverse selection because it made the drawer, all the endorsers, as well as the payer legally responsible for payment. Second, bills of exchange also included a standard moral hazard problem in agency relations between correspondents. On the one hand, the drawer had to deal with clearing risk, that is, the payer refusing to pay his bill. On the other hand, the payer had to deal with the risk of the drawer's account being overdrawn. The joint liability rule induced endorsers to participate in the enforcement of agency relationships because it encouraged endorsers to monitor the payers. An increase in the number of endorsers improved monitoring and thereby reduced the chance of default. As a consequence, the joint liability rule permitted bills of exchange to expand commercial-financial activities by supporting long-distance transactions which involved quasi-impersonal relations between parties.

The joint liability rule turned the bill of exchange into the most important instrument of transfer and short-term credit in the Early Modern period. The geography of the market for bills of exchange indicates the density of commercial finance transactions in Europe. The next section explains the geography of money before the industrial revolution.

The Geography of Money Before the Industrial Revolution

In a joint research, Flandreau et al. (2009b) mapped the geography of money in the mid-eighteenth century. We constructed a systematic map of European intercity monetary relations to study the contours of foreign exchange market linkages in Europe before the industrial revolution, whose main results are summarized in this section.

Why do we consider intercity monetary relations? The European monetary linkages in the Early Modern period were not international linkages but intercity linkages. The modern national monetary systems emerged in Europe in the nineteenth and first half of the twentieth centuries, as part of the process of nation-state building, through the establishment of national issuing banks and the development of branch-banking transfers (Helleiner 2003). Such changes consolidated national payment systems based on paper currencies circulating within national territories, which reduced the cost of moving money across domestic locations practically to zero. But before the process of money nationalization, money moved between cities – within the same country or between countries – according to the "specie-point mechanism," as we have seen in previous section. Therefore, the relevant unit of analysis for documenting monetary relations was not the country but the individual city, seen as a "node" in a "network" of inter-cities monetary linkages.

Why do we focus on Europe? The market for bills of exchange was restricted to Europe until the late eighteenth century. We documented the bills-of-exchange connections between nearly 80 cities in the mid-eighteenth century. A high proportion of those cities (close to one half) were ports. There were typically several

markets per country, except for the case of England that stands out as the one large political entity with only one exchange center in London. Locations were evenly scattered all over Europe with outreaches on the fringes of the Orient. There were no American, Asian, or African cities, while only two cities in the Ottoman Empire, Constantinople and Smyrna. This European bias is the result of a structural characteristic of the foreign exchange network: European sources did not direct to non-European centers, while non-European sources directed back to Europe. The global financial system of that period had a distinct European focus.

Why do we analyze the mid-eighteenth century? European intercity monetary linkages are measured by the existence (or not) of exchange rate quotations, that is, city *X* quotes city *Y*. Our primary sources are the traditional handwritten exchange rates reported in bankers' correspondence together with semi-printed and printed foreign exchange bulletins whose use expanded in the eighteenth century (McCusker and Gravesteijn 1991). The large sample avoids biased results. This research has provided us with the opportunity to identify Europe's monetary geography on the eve of the Industrial Revolution. However, more research is needed to map the geography of monetary relations before the eighteenth century in order to understand the dynamics of change in commercial finance geographical relations during the Early Modern period.

A crucial characteristic of foreign exchange bulletins – handwritten, semi-printed, or published bulletins – is that certain centers are quoted but not others. Flandreau et al. (2009b) argue that the existence or not of a price quotation gives a reasonably good indication for the liquidity of the underlying market because it reveals the existence of a sufficiently large demand and supply to warrant the posting of exchange rates.

We are likely to observe the development of liquid, well-organized foreign exchange markets, where not only commercial and financial intercourse is intense, but also other bankers have already established connections, as that which occurs in agglomeration economies. The existence or not of quotations gives a strong indication of liquid markets in international financial claims and the existence of financial linkages between financial centers. Therefore, collecting lists of foreign centers quoted allows sketching the geography of commercial finance.

Figure 3 shows the ranking of cities according to the number of quotes they received differentiating according to the listed versus quoted criterion. We identified a population of 78 centers. We found exchange rate bulletins for 64 of them. According to the available sample, Amsterdam was quoted almost everywhere (54 out of the 64 possible markets, or 84%), London was quoted in 46 markets (72%), and Paris was quoted in 39 markets (61%), implying that multilateral settlement using Amsterdam, London, or Paris as a clearing center was definitely feasible by the mid-eighteenth century. Another feature is the dominance of Northwestern European financial centers (Amsterdam, London, and Paris; and also Hamburg) along with the continued relevance of cities in the Southern/Mediterranean arena. Leghorn and Genoa (and also Venice) were the most relevant centers of the Mediterranean zone.

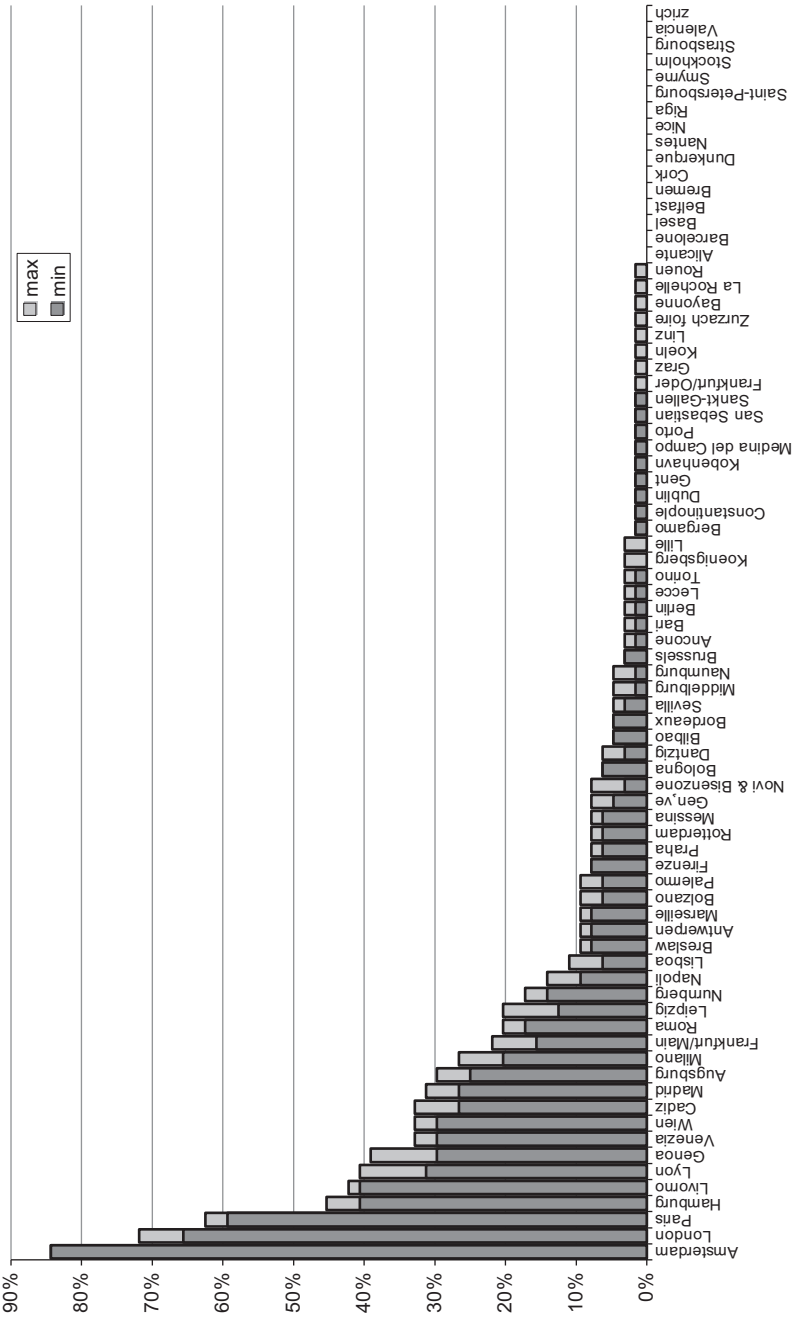

Fig. 3 Monetary popularity in the mid-eighteenth century. (Source: Flandreau et al. 2009b: 160). Min and max corresponds to the intersection/reunion of four networks created as the narrow/broad listed/quoted databases generated from several primary sources: printed commercial and/or financial bulletins, semi-printed and hand-written financial bulletins

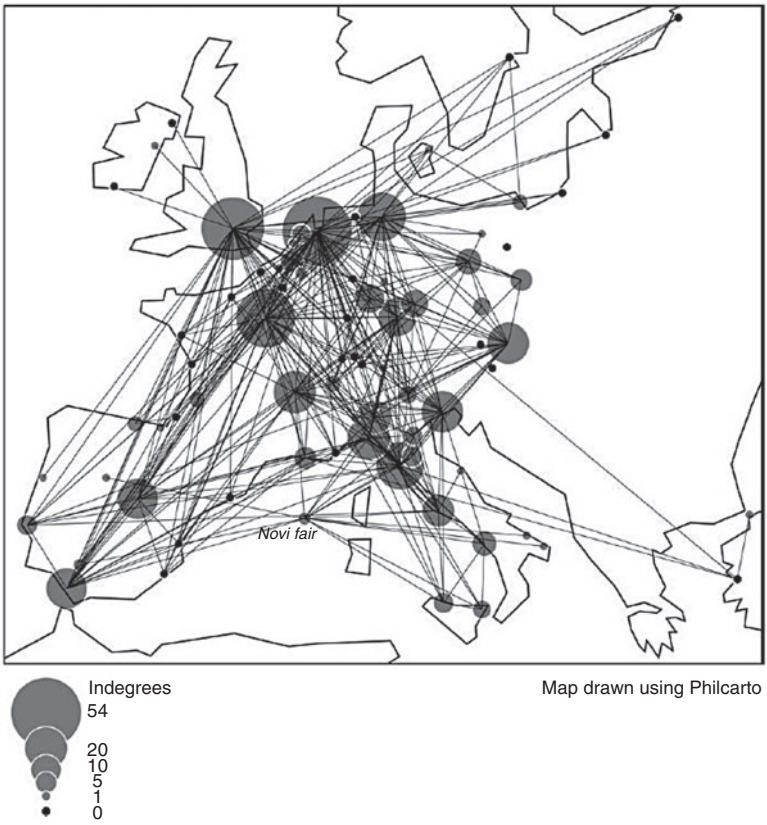

Fig. 4 Monetary agglomeration in the mid-eighteenth century. (Source: Flandreau et al. 2009b: 161)

Graphically, the information can be depicted in a map, where a line between two cities indicates the existence of a liquid market for mutual claims. These linkages are directed, i.e., they might go from center *A* to center *B* (*A* quotes *B*), from center *B* to center *A* (*B* quotes *A*), or both ways (*A* quotes *B* and *B* quotes *A*). The sum of all links gives the network. Figure 4 shows monetary agglomeration: It plots the number of links that a particular market received by the mid-eighteenth century. About 20% of links between cities were direct, 75% had to pass through an intermediary center, while only 7–8% had two intermediaries. This reinforces the notion of an encompassing multilateral settlement system with Amsterdam, London, Paris, and also Hamburg and Genoa as the main connecting hubs. Therefore, the European system was a dense web with an area of intense financial linkages that stretched over Amsterdam-London-Paris-Hamburg and shrunk as it headed toward Italy. This area overlaps with Brunet's current Blue Banana area of modern economic prosperity (Brunet 2002).

While the network appears dense, only a small share of between 11% and 13% of the total number of possible links is active. In fact, the eighteenth-century system

exhibited a high degree of concentration, comparable to what Flandreau and Jobst (2005) obtained for the later, country-based, network of the late nineteenth century. This result underlines the critical importance of *multilateral* commercial finance as opposed to *bilateral* trade relations in shaping foreign exchange transactions.

To sum up, the geography that emerges from the network analysis shows evidence of a two-part 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. Amsterdam was the leading clearing center for multilateral settlements and the entrepôt for commercial credit throughout Europe (Neal 2000: 121–122), but Dutch currency did not possess a natural monopoly that had crowded out the other international currencies. On contrary, the contact between North Atlantic and Mediterranean systems was guaranteed by the pivotal roles 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.

Measuring the Cost of Capital in the Eighteenth Century Europe

We have seen in previous sections that the bill of exchange was the instrument that sustained European commercial finance. International trade supported the making of a liquid international market for trade bills of exchange, which as a result tended to be organized along lines defined by trading relations. The global trading network turned out to provide the infrastructure of financial development. The eighteenth-century European money markets were integrated and Europe's monetary geography was seamless owing to the existence of bills of exchange, which were widely traded. In turn, the market for commercial bills was the benchmark money market of the eighteenth century, which had grown outside the reach of usury legislation, through regulatory arrangements in which merchants were able to prevail.

The commercial bills market was the benchmark money market of the eighteenth century, so the commercial interest rate was the benchmark interest rate. But systematic direct evidence on commercial interest rates in the eighteenth century is difficult to find. Whichever financial center we are looking at, there are no recorded series of "money market" rates for the eighteenth century. This is consistent with the fact that we are dealing with an over-the-counter market. In order for "one" price to be recorded and quoted, a formal centralized market must be organized. This requirement was not met by the credit markets of the time, since interest rates resulted from bilateral drawing arrangements that were in turn put to work as a lever for operating on the foreign exchange market. Formalization and centralization prevailed in the foreign exchange market, not in the money market. As a result, a precise notion of the "general interest rate," meaning probably the typical conditions that the best merchant-bankers in a center would extend to their correspondent in another center, must have existed as a kind of "mental average" in the mind of contemporary practitioners but was nowhere physically quoted.

Interest rate collectors have tended to be eclectic in their choice of sources, using mainly bankers' archives – although not exclusively – as illustrated by Homer and Sylla (2005). An indirect way in line with direct evidence to know the commercial interest rate for the eighteenth century is to estimate the shadow interest rate comprised in the bills of exchange. Suppose that we know the price for a foreign bill bought in a given market A and drawn on another market B where it matures at a certain future date (a_{AB}). Suppose next that we also know the price for a "similar" bill, bought in market A and payable in market B and involving the same risks and returns, but hypothetically maturing today – spot bill (x_{AB}). It is obvious that there is a relation between the price of the first and the second bill that involves the interest rate for the maturity period for a commercial loan in center B according to center A between today and the maturity period (r_B^A) (Officer 1996):

$$x_{AB} = a_{AB} \cdot \left(1 + r_B^A\right)(\text{currency } A/\text{currency } B) \tag{1}$$

Scholars have used variants of this formula to calculate the shadow interest rate. Perkins (1978) provided the interest rate in London from New York, 1835–1900. Schubert (1989) estimated the interest rate in Amsterdam and Paris from London, 1731–1795. Boyer-Xambeu et al. (2001) calculated the interest rate in Paris from London and in London from Paris, 1833–1873. Flandreau et al. (2009a) gave the interest rate in Amsterdam from London, in London from Amsterdam, and in Paris from London, 1720–1789. Nogues-Marco (2011) measured the interest rate in Cadiz from London, 1729–1788, and, finally, Edvinsson (2011) made the interest rate available in Stockholm, 1660–1685.

According to Flandreau et al. (2009a), it is possible to calculate the shadow interest rate for the main centers in the eighteenth century (Amsterdam, London and Paris) because these centers quoted bills of exchange at two maturities, sight and 2 months. For example, let us calculate the shadow interest rate in Amsterdam (denoted as A) according to London (denoted as L), supposing that we know the sight and 2 months exchange rate in London on Amsterdam. The long maturity exchange rate (a_{LA} [n_l days]) and the short maturity exchange rate (a_{LA} [n_s days]) can be rewritten according to Eq. (1) as:

$$a_{LA}[n_l] = x_{LA} / \left(1 + r_A^L \cdot \frac{n_l}{365}\right)(\text{sterling pound}/\text{schellingbank}) \tag{2}$$

$$a_{LA}[n_s] = x_{LA} / \left(1 + r_A^L \cdot \frac{n_s}{365}\right)(\text{sterling pound}/\text{schellingbank}). \tag{3}$$

Substituting for x_{LA} in the Eqs. 2 and 3 gives the arbitrage condition that derives shadow interest rates:

$$r_A^L = \frac{(a_{LA}\,[n_s] - a_{LA}\,[n_l]) \cdot 365}{(a_{LA}[n_l] \cdot n_l - a_{LA}\,[n_s] \cdot n_s)} \tag{4}$$

However, this methodology is limited to the centers whose exchange rates quoted at two maturities, which are mainly the core centers, such as Amsterdam, London, and Paris for the eighteenth century. We need to explore other methodologies for those noncore centers whose exchange rates quoted only at the longer maturity. Nogues-Marco (2011) proposed a method that derives an implicit spot exchange rate assuming that market participants had an idea of the interest rate that was used in correspondent markets. The intuition is the following: suppose that the interest rate in a given market B is known for bankers located in center A. Then it is possible to derive a "shadow" spot exchange rate in center A on center B, provided that A quotes B at certain maturity (Eq. 1). Assuming that the spot exchange rate in A on B is, by arbitrage, essentially identical to the spot exchange rate in B on A, it is possible to construct the interest rate in A if we know the exchange rate at maturity in center B on center A (Eq. 1).

In other words, suppose that people in market A can form an estimate of interest rate in center B from A, ($\hat{r}_B^A$). This estimate is indexed by A reflecting that it is a market A's opinion of the price of credit in market B. Of course, there can be as many such estimates as there are markets where people must form an opinion of credit conditions in market B. If agents are reasonable enough, we can assume that on average, they will guess things adequately so that:

$$\hat{r}_B^A = E\left(r_B^A | I_A\right) \tag{5}$$

This is the first assumption we make. The $E\left(r_B^A | I_A\right)$ operator indicates the expectation conditional upon the information available in market A, denoted as I_A. Plugging this value into Eq. (1) yields an estimate of the "shadow" spot exchange rate in market A on market B or

$$\tilde{x}_{AB} = E(x_{AB}|I_A) = x_{AB} \cdot \left(1 + \hat{r}_B^A\right) \tag{6}$$

Now suppose further that the "shadow" exchange rate of A on B is identically the shadow exchange rate of B on A so that we can write:

$$\tilde{x}_{AB} = \tilde{x}_{BA} \tag{7}$$

This is the second assumption we make. At one level it is a simple arbitrage condition. But in practice, since there are delays in information delivery and transaction costs, "cross" spot exchange rates, when they exist, are not necessarily the same and assuming that shadow cross spot exchange rates are identical is not

innocuous. A priori, we may surmise that the validity of this assumption is influenced by the degree of development of money markets, the efficiency of arbitrage and information technology, and the quality of expectations of what is happening in other markets. Nogues-Marco (2013: 467) notes that cross spot exchange rates between Amsterdam and London in mid-eighteenth century display only tiny differences.

Conditional on this assumption being a valid one, we can plug our estimates of the shadow price of a bill on A traded in B and combine it with the known price of a time bill on A traded in B to generate a measure of the interest rate in center A. It is the following:

$$\hat{r}_A^B = (\tilde{x}_{BA}/a_{BA}) - 1 \tag{8}$$

Figure 5 shows the long-run behavior of the three commercial interest rate series computed for Amsterdam (from London), London (from Amsterdam), and Paris (from London) according to Eq. 4 (Flandreau et al. 2009a) and the interest rate series in Cadiz (from London) according to Eq. 8 (Nogues-Marco 2011). Differentials between Amsterdam, London, and Paris remain small throughout, especially for the Amsterdam-London pair. Paris interest rates were slightly higher – say, between 4% and 5% when London and Amsterdam were between 3% and 4.5% – but the salient fact is that differences across core countries are not large and actually disappear toward the end of the century.

A different result appears for the case of Cadiz that shows high interest rates in comparison with core countries. While average interest rate for the whole period, 1720–1789, is 3.92% for Amsterdam, 3.8% for London, and 4.59% for Paris, it is 8.79% for the case of Cadiz. These results are consistent with the limited direct evidence that we have for the four centers. In the case of Amsterdam and Paris, we can compare our estimated interest rates with some empirical evidence on commercial rates, as well as VOC overdrafts at the Bank of Amsterdam for the case of Amsterdam. Similarly, we have some evidence of Bank of England's discount rate for the case of England (Flandreau et al. 2009a: 187–188). For the case of Cadiz, the discount rate in Cadiz was 8% in 1786, according the evidence available in the archive of the Bank of San Carlos (Tedde 1988: 131). In all cases, the direct evidence is consistent with our estimations.

These results challenge the view given by North and Weingast (1989) about the relevance of credible institutions as a requisite for financial development. It is well worth to note the 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 toward getting a clearer view of the degree to which agglomeration economies can substitute for "sound" institutional infrastructure.

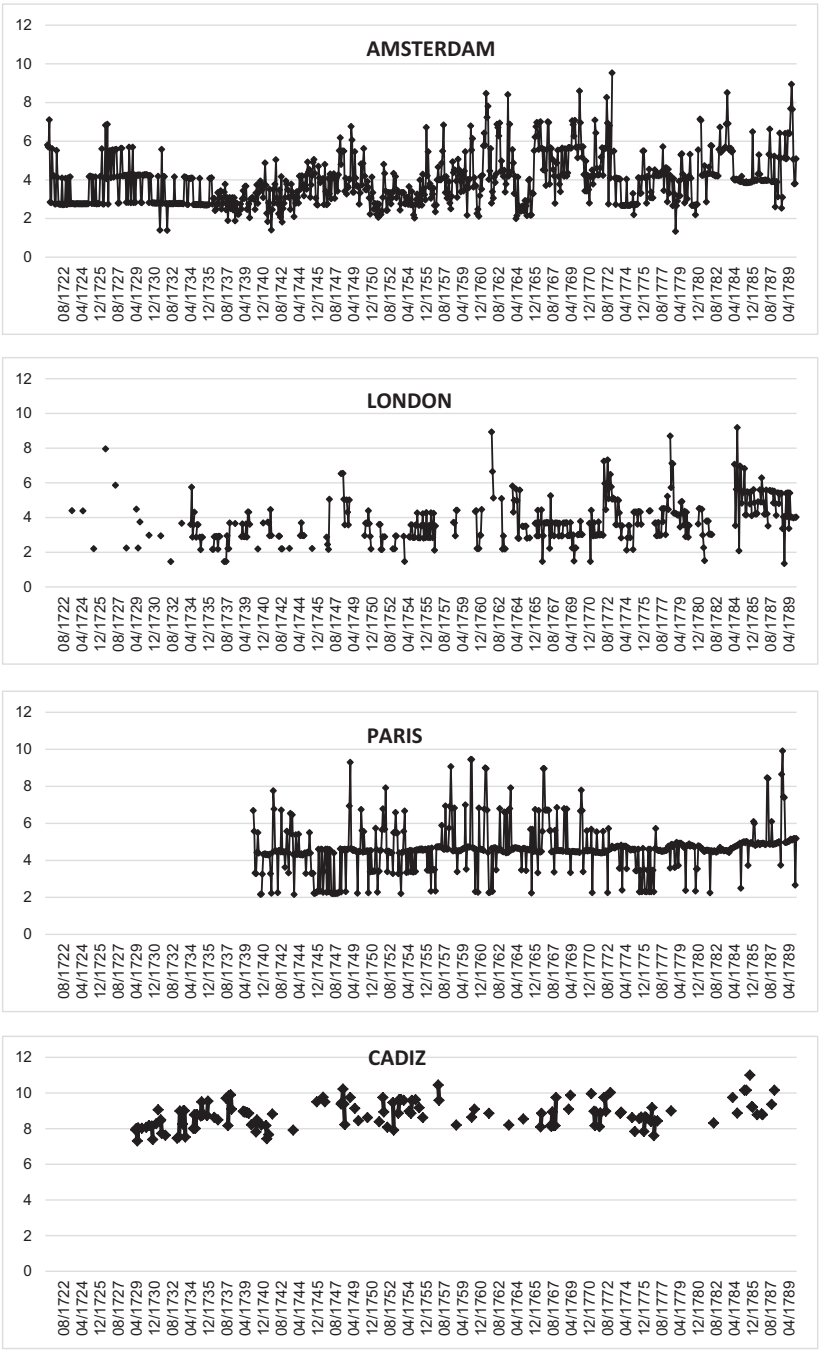

Fig. 5 Commercial annual interest rates (%), 1720–1789. (Source: Amsterdam, London and Paris in Flandreau et al. 2009a: 187–188. Cadiz in Nogues-Marco (2011: 65–92). Outliers have been removed)

Figure 4 in the previous section has shown monetary agglomeration in mid-eighteenth century. Amsterdam, London, and Paris were the most liquid centers at that time. According to Flandreau and Jobst (2009: 653) and Eichengreen et al. (2018: 101), the larger the number of foreign quotations a currency received, the lower its interest rates. That is, interest rates of leading currencies were lower because lots of agents were using them, so that their currencies were more likely to be quoted abroad and this further strengthened their leadership.

According to Kindleberger (1967), size is the main driver of currency leadership. Flandreau and Jobst (2009) tested the empirical determinants of international currency status in 1900 and found that size measured by the share in international trade is a powerful driver of international monetary leadership. While the drivers of international monetary leaderships in the Early Modern period have not been studied yet, size would also explain currency leadership in the eighteenth century. If we approach the share in international trade by the merchant fleet, England, France, and Holland had the highest shares of the European merchant fleet circa 1790 – being 26.15%, 21.62%, and 11.79%, respectively – while Spain had one of the lowest, being only the 4.43% (Romano 1962: 578). Size would explain leadership and low interest rates in core centers (Amsterdam, London and Paris), and high interest rates in secondary centers (Cadiz). While more empirical evidence and further research is needed, this approach opens the scope of the analysis beyond the national institutional explanation.

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