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ABSTRACT

The Bell Jar: Commercial Interest Rates between Two Revolutions, 1688-1789*

This paper exploits arbitrage conditions for bills of exchange with different maturities to provide new evidence on commercial interest rates in Amsterdam, London, and Paris during the 18th century. The lesson that emerges is that commercial interest rates were very low in all three centres and did not differ much from one location to another. This suggests that a trans-national capital market resulting from the Commercial Revolution predated to the British 'Financial Revolution' of the 18th century.

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Le problème clef, c'est de savoir pour quelles raisons un secteur de la société d'hier, que je n'hésite pas à qualifier de capitaliste, a vécu en système clos, voire enkysté ; pourquoi il n'a pas pu essaimer facilement, conquérir la société entière.

Fernand Braudel, *Civilisation, économie et capitalisme*
Volume 2 : *Les Jeux de l'échange*

In our opening quotation, Fernand Braudel likens the development of early modern capitalism to a process occurring inside a “bell jar”: insulated from the rest of the economy and unable to expand to the whole society.¹ The key question for him was to understand why, although the main elements of modern capitalism were already present in the Commercial Revolution, it took so long (until the Industrial Revolution) for capitalism to “conquer” society, that is, to become the dominant organizational mode in the West.

Braudel’s puzzle has much relevance for modern development economists. Recently, Hernando de Soto suggested that the bell jar metaphor fairly characterizes today’s global financial system (de Soto 2000). During the past 25 years, he argues, many countries have formally opened up to global capital flows, but we still need to see that the extreme efficiency displayed by New York’s sophisticated financial markets fails to benefit the poor rural areas of Peru, Niger, or India, where credit markets are shallow and interest rates remain high. The implication is that capitalism may thrive in certain areas without inducing rapid progress in other areas.² This “Braudelian” puzzle is called by de Soto the “mystery of capital”.

Our paper revisits some critical aspects of the mystery of capital within the context of the 18th century. Our central theme is to provide a new interpretation of the logic of the historical development of financial markets. We argue that the benchmark money market of the early modern period was the commercial bill market, which had grown outside the reach of legislators and regulators. This market had a global scope because it was collateralized by commodities with an international circulation. The global trading network, in other words, turned out to provide the infrastructure of financial development for merchants fortunate to participate in it, regardless of their nationality. Since merchants could transfer funds as a counterpart to their shipping of commodities, capital was bound to be available at a cost that did not diverge much, on average, across markets that traded with one another. This in turn

¹ . By using the expression “bell jar” we follow the wording chosen by Braudel’s translator and recently popularized by de Soto, whose website displays a logo with a Wall—Street looking city enclosed in a bell jar and surrounded by deserts. As readers of French can notice, Braudel really referred to “*système clos*”, which could be translated as “secluded” or “self-centered”. He also writes “*enkysté*”, evoking the image of a (benign or malign) tumor that has limited interaction with the organism in which it is located.

² . See World Bank (2006: pp. 89 ff) for a discussion of the policy implications of this situation.

facilitated the extension of the trading system especially in places and for commodities that caused minimum disruption in the rest of the economy, since this minimized the regulatory backlash by temporal and religious authorities. Therefore, the contours of the bell jar coincided with the boundaries of world commerce, and the development of capitalism was confined to the realm of global trade, “unable to conquer the whole society”.

Another contribution of this paper is to construct new series for commercial interest rates in Amsterdam, London, and Paris. Systematic evidence on this is not available from contemporary sources. The absence is in large part attributable to regulations setting caps on interest rates, these deterred contemporaries from giving too much publicity to the business of lending, so interest rate data are not easy to come by. Here we estimate the interest-rate component of foreign exchange quotations by using the price of bills with different maturities.

Finally, the new statistical material presented here enables us to show that, although interest-rate levels were quite similar across markets, cyclical properties varied considerably, with more volatility in certain markets than in others (e.g., movements in Paris appear to have been dominated by seasonal variations). This suggests that the precise operation of the different credit markets located inside the global system is significant in its own right, a conclusion that calls for a detailed study of the microstructure of local and international credit relations.

The remainder of the paper is organized as follows. Section I discusses contemporary views on how much interest rates differed across countries and why. Section II focuses on prime commercial lending and explains why clean series for interest rates are rare in primary sources. Section III develops a simple model of the bell jar and builds on it an arbitrage formula that can be used to retrieve “shadow” interest rates concealed in exchange rate quotations. Section IV discusses our finding in relation to national and international monetary architecture. Section V compares our results with other domestic interest-rate series, yield on government debt and private returns on land. Section VI offers conclusions and directions for future research.

I. Why do interest rates differ?

In this section we review 17th- and 18th-century conceptions on interest rates. As Dickson (1968) reckons, economists in these centuries were obsessed with international interest-rate comparisons, in which they found much significance.

A. Child, interest rates, and prosperity

Edward Hatton writes that “the rate of interest is the sum given for the use of 100 *l.* for one year, and it is in some places more, in others less” (1699: p. 137), and the reasons *why* they were in some places more and in others less intrigued contemporary observers. This is because they perceived that deviations in the price of money bore some relation to respective national economic performances. Prosperity (or, in the language of the time, “riches”) was thought to be found where interest rates were lowest. Amsterdam was the archetype of cheap money and sheer wealth occurring jointly. He who mastered the mystery of capital would also achieve economic success.

Thus causality was found to run from cheap money to prosperity: in the language of the first proponent of this view, Josiah Child, low interest rates were the “*causa causans* (the causing cause) of all other riches of [the Dutch]” (Child 1668). “The abatement of the interest”, Child claimed, “is the cause of the prosperity and riches of any nation”, and to drive home his point Child’s statement was typed in case upper letters. The capital market, he concluded, was the philosopher’s stone of development.

Gathering empirical evidence, he further argued that his law of an inverse relation between the level of interest rates and riches did never “fail in any particular instance”: In France, where the rates were at 7%, the “Gentry lives in good conditions” but “Peazants [*sic*] are little better than slaves”. In Italy, where rates stood at 3%, “people are rich, full of trade [and] well attired”. The result held in Christendom and also “under the Turks Dominions, East-India, and America” (Child 1668).

Child’s approach anticipated the work of North and Weingast (1989) on the relation between Britain’s development and its “Financial Revolution” in the late 17th century. Child’s way of looking at economic progress became a veritable genre in the period that followed.³ For instance, the anonymous author of a pamphlet against high interest rates, writing probably in 1695, argued that, “as it is evident in those Countries viz. in Holland and Italy where Money is at 3%, trade flourishes, but in Spain, and other places where the interest of Money is at 10 and 12%, the people are poor, and have but little trade”.⁴ One French economist of the

³ . North and Weingast (1989) argue that the Glorious Revolution of 1688 caused a profound reorganization of the institutional design of Britain’s government, evidence of which is available in the sharp improvement of borrowing terms after 1688.

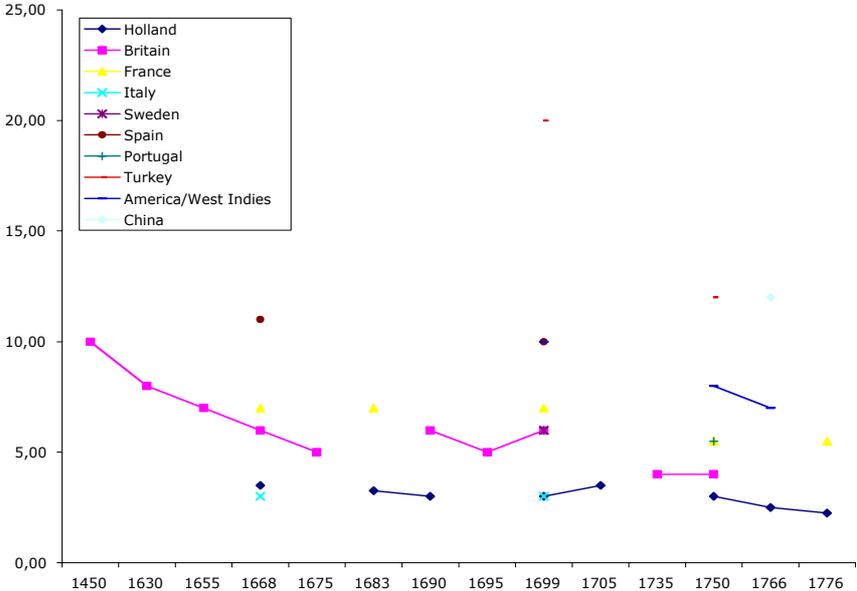
⁴ . *An Answer to a paper entitled Reasons against reducing interest to four percent*, in *Miscellaneous papers on banking*, London (1695—1750). British Library (8223e7).

mid-18th century mentions that it is “a widespread opinion nowadays that the interest on money has an influence on agriculture and commerce” (Buchet 1757: p. 3).⁵

Because numerous books compared “national interest rates”, it is possible to assemble a table summarizing the information available from secondary sources. This table is reported in the Appendix (Table A.1), and the data are depicted in Figure 1. The chart displays a downward trend. This decline, which admittedly began much earlier, is emphasized by Cipolla (1952), and more recently, Clark (2005). Clark argues that “the magnitude of this decline is little appreciated, its cause is a mystery, and its connection to the shift to an economic system with persistent advance is unknown” (Clark 2005: p.1).

Contemporaries were for their part mostly intrigued by the cross sectional properties of the data. As in Figure 1, they found that Holland and -perhaps more surprisingly, in view of recent literature on the topic- Italy were rich countries with low interest rates.⁶ Other European nations, such as Britain and France, were found within an interval of about 200 basis points above the two leaders, and Britain’s spread declines gradually. On the other hand, non-European countries were reported as having much higher rates: China, Turkey, and even such areas of European settlement as the West Indies and the British colonies of North America.

Figure 1. Summary of interest rates, 1450—1889



Source: See Table A.1 in the Appendix.

⁵ . “C’est une opinion aujourd’hui généralement reçue, que l’intérêt de l’Argent a une influence sur l’Agriculture et sur le Commerce. Cette opinion admise, il serait superflu d’examiner s’il est important de connoître les causes qui en déterminent le Taux; l’utilité de cette recherche est évidente”.

⁶ . On Italy’s financial lead, see Fratianni and Spinelli (2006).

B. Credit, constitutions, and commitments

We have suggested that there is a similarity between contemporary views on the relations between capital markets and development and the ideas developed more recently by North and Weingast (1989). The parallel is not a superficial one: when they turned to the causes determining the level of interest rates, 18th-century economists also emphasized institutional and political factors. For instance, one popular explanation of interest-rate differentials was variations in constitutions and commitments. Buchet is a characteristic example, and so “modern” is his rhetoric that it seems best to quote him extensively:

This difference [between “national” interest rates] takes its origin in *political and civil constitutions*. If a government can, at will, destroy its obligations whatever its resources and revenues, it will always be riskier to transact with that government, than with another one. *From where it follows that a Monarchy borrows at a higher rate than a Republic*. In the latter, we have individuals transacting with themselves, as members of a society they govern. They do not think of these loans as bearing any further risks than the other loans that are in their hands, and the influence that the various bodies of the state have in most of these governments give to contracts with their general, a degree of trust that the people of a Monarchy never enjoys. If any material proof of this proposition was needed, we would easily find such a state which, while more indebted and with less wealth than others, nonetheless borrows at lower rates.⁷

Buchet was obviously speaking of Britain and his view was not isolated, as described in Dickson’s classic book. In effect, Dickson identifies this conventional line of thought as the “confidence argument” (a close approximation of what economists call now credibility).⁸ It had many other proponents, such as Massie, who argued: “It is Government, and not nature, which makes Men thus differ from each other” (1750: p. 57). Temple emphasized the importance of “safety” for economic development, which could not “grow or thrive” without a “trust in the government, from an Opinion in its strength, wisdom, and justice”. Finally, this trust must be grounded “upon the constitutions and order of a state” (Temple 1673: p. 190). John Law, who motivated his 1715 project for a French government bank by the need to

⁷ . “Cette différence [entre les taux d’intérêts «nationaux»] prend sa source dans les constitutions politiques et civiles. Si le Gouvernement peut anéantir, quand il le voudra, ses engagements quelles (sic) que soient ses forces et ses revenus, les risques seront toujours plus grands dans ses conventions que dans celles d’un autre Etat. De-là vient qu’un Gouvernement Monarchique emprunte à un taux plus haut qu’un gouvernement Républicain. Dans ces Etats ce sont des hommes qui contractent avec eux-mêmes comme membres d’une Société qu’ils forment et qu’ils gouvernent ; ils ne voyent aucuns risques dans ces prêts qui ne soient communs aux biens qui restent dans leurs mains, et l’influence qu’ont dans dans la plûpart de ces Gouvernements tous les ordres de l’Etat donne dans ces conventions au général du peuple une confiance que n’ont Presque jamais au même degré les peuples dans les Monarchies; s’il falloit un exemple pour appuyer cette opinion, on trouveroit aisément un de ces Etats qui quoique plus obéré, et avec moins de richesses que quelques autres, emprunte encore à un Taux plus bas” (Buchet 1757: p. 20; emphasis in original).

⁸ . Dickson (1967: p. 475).

secure lower interest rates, felt compelled to address, if in the instance to reject, the “*conventional* objection that a government bank would not work [in France], because of the country’s political regime and the lack of control on the power of its sovereign”.⁹ And at the end of the century, Mirabeau summarized this thinking with his usual talent: “A constitution: behold the basis of all economics, of all resources, of all confidence, of all power”.¹⁰

Of course, the argument came in various packages. One variant emphasized the rule of law. Because governments had a responsibility to promote a sound judicial system, the quality of government institutions reverberated on the condition of private credit (see LaPorta et al. 1997, 1998 for a modern counterpart to this argument, which finds its origins in Akerlof 1970). Lacking commercial and bankruptcy laws, as well as judges and a police to enforce them, contracts would be plagued with moral hazard and the credit market would disappear. The case was made by Adam Smith (1776), among many others:

A defect in the law may sometimes raise the rate of interest considerably above what the condition of the country, as to wealth and poverty, would require. *When the law does not enforce the performance of contracts, it puts all borrowers nearly upon the same footing with bankrupts or persons of doubtful credit in better regulated economies. The uncertainty of recovering his money makes the lender exact the same usurious interest which is usually required from bankrupts.* Among the barbarous nations who over-run the western provinces of the Roman Empire, the performance of contracts was left for many ages to the faith of the contracting parties. The courts of justice of their kings seldom intermeddled in it. The high rate of interest which took place in those ancient times may perhaps be partly accounted for from this cause. (1776: part I, p. ix; emphasis added).

Another variant emphasized what today’s credit agencies refer to as “transfer risks”. Poor government credit reverberates on private credit because bad governments are likely to expropriate private agents in order to pay off their debts.¹¹ This view, John Law emphasized, had its origin in medieval conceptions of private ownership, whereby individual agents could not really own assets but only use them as long as the king was gracious enough to let them do so.¹² As a result, governments with poor reputation dragged with them the entire scale of credit toward bankruptcy. As Clavière, a Swiss refugee and financier in Paris, argued “Lack of public faith would spread general distrust among individuals, because the government can just as well rip off an individual to whom it owes nothing, as it can renege its pledge to those

⁹ . Emphasis added; quoted in Faure (1977: p.56). Law’s *Mémoire* is published in his *Œuvres complètes*, edited by Harsin (1934).

¹⁰ . Mirabeau (1788: p. 70), quoted in Lockett (1992: p. 173): “Une constitution: voilà donc la base de toute économie, de toute ressource, de toute confiance, de toute puissance”.

¹¹ . Compare Moody’s Investor Service (2001): “Revised Country Ceiling Policy”, June.

¹² . See Faure (1977: p. 55).

he is indebted to”.¹³ For how could the law punish private bankruptcies, this same law that has not punished but authorized the general bankruptcy” of the government?¹⁴

II. The challenges of direct evidence

The parallel between contemporary views on credit and modern “Northian” theories, which the previous section established, is as striking as it is intriguing: 17th- and 18th-century economists perceived and analyzed their world in pretty much the same way as today’s influential economic historians do. On the one hand, this may tell us about the sophistication of contemporary understanding; on the other hand, it may suggest the incompleteness of our current beliefs. Should we trust 18th-century observers? As Braudel would probably have argued, contemporaries perceive only imperfectly the world in which they live.

A. Searching for the risk-free rate

The evidence on which contemporaries based their assessment is not airtight. The interest rates reported by Child and included in Figure 1 used information from his “acquaintance[s] that had knowledge of foreign [sic] countries”. We have no idea how Child proceeded or how reliable his acquaintances were. Moreover, there are obviously many interest rates, especially in an underdeveloped economy with huge transaction costs and numerous informational asymmetries.

The issue is illustrated by a fascinating passage of Condillac’s *Le Commerce et le gouvernement* in which he discusses the situation of “*revendeuses des Halles*”, who lived on walking a stock of fresh fish across Paris. They purchased their bundle from the bulk market, the *Halles*, with money borrowed in a way similar to today’s “payday loans” (i.e., the loan was repaid as money rolled in from selling out the stock). The interest was “*cinq sols d’intérêt par semaine pour un écu de trois livres*”, enabling Condillac to compute an “exorbitant” interest of 430% per year (Condillac 1776: pp. 147—8). Condillac argued that such an interest rate must have reflected the market power of the lender and thus is certainly not informative of the “genuine” cost of capital, which he suggested be found in leading commercial centers. The same would hold of the interest rate at which, say, today’s sellers of Biri leaves (a kind of tobacco) in Kolkata’s streets secure their capital. There again, the “interest rate” would fail to convey any information on “Indian” interest rates.¹⁵

¹³ . Quoted in Bouchary (1939). “Le manque de foi de la part des gouvernements répandrait une défiance générale entre les individus, car l’Etat peut aussi bien dépouiller l’individu à qui il ne doit rien qu’il peut manquer à sa promesse envers ceux dont il s’est rendu débiteur”.

¹⁴ . Brissot (1787), as quoted by Luckett (1992: p. 196).

¹⁵ . We prefer using this notion rather than the modern concept of “risk free rate”, although such a notion was known to contemporaries, as revealed by Massie’s sophisticate discussion of “Praemia of Risque” (1750). Massie distinguished between sovereign rates, private commercial rates, and the interest rate at which the East

The matter is further complicated by the existence of usury regulations. The numbers by Hatton (1699; 1716) and included in Table A.1 seem to have referred to legal ceilings, not to actual interest rates.¹⁶ A debate exists as to whether legal rates were effective or not. Temin and Voth (2004) argue that regulations were binding. They show that the records of Hoare's bank reveal an almost perfect compliance to ruling usury rates circa 1714, when the legal rate was reduced.

However, as historians are fond of emphasizing, nobody prevented contracting parties from setting the recorded price for the amount of capital to be repaid at a level that would incorporate an adjustment of the official interest rate (see e.g. Lockett 1992). Suppose I lend 100£ at 7%. Rather than recording this as a 100£ one-year loan at 7%, I can record a 102£ loan at 5%, thus formally complying with the regulation yet securing the 7% interest I want. Borrowers would certainly not complain, since the alternative was to be turned down. Moreover, once they had agreed to the deal, documents only recorded a lawful interest rate and a capital they had agreed they owed.¹⁷ Ricardo's conclusion was that "little dependence for information, then, can be placed on that which is the fixed and legal rate of interest, when we find it may differ so considerably from the market rate" (Ricardo 1821, chap. XXI).¹⁸

B. Benchmarks

In this paper we argue that the best way to measure the opportunity cost of capital (the "benchmark" interest rate) during the period that saw the deepening of the Commercial

India Company secured fund: "Part of the Praemium which lenders receive under the name of interest, is, in all cases where there is Danger of losing, a Praemium of Risque, and not of Use; and there being a very great Risque of losing, where borrowers have, by their extravagance, spent one half of what was lent to them, a considerable part of the praemium paid for money by such borrowers is certainly a premium of indemnity and not of Use; and to call it interest, is as improper as it would be to call that praemium interest which a Merchant gives an Insurer to have his ship or Merchandize insured against the dangers of the Sea or Enemies: so that what is disguised under the Name of high interest, is in fact no such Thing, but a Praemium of Use and Risque joined together, which may just as well be called high Insurance as high Interest, for it is as much the one as the other" (1750: pp. 20ff). Similarly, William Temple dwelled on the differences between "country risk" and "sovereign risk", referred to as "private" and "publick safety" (1763).

¹⁶ . Indeed, Hatton (1699) gave 6% as the interest rate in Britain, this was the usury rate prevailing at the time. This number is revised to 5% in the next edition (Hatton 1716), following the 1714 abatement of the usury ceiling to 5%.

¹⁷ . Lockett (1992): "There probably never was a time in European history when usury laws actually prevented lenders from charging interest, but it should be clear from the foregoing that the formal compliance with these laws shaped the form and function of credit instruments by forcing business people to disguise interest payments as something else Short term credit at interest was disguised as credit without interest by the simple trick of including the interest payment with the principal. Peter purchases from Paul, on credit, a quantity of merchandise priced at 100£, for which he writes out a promise to pay Paul in six months the amount of 102£ 10s. Who is to say that the latter figure was not actually the cash price? Certainly the note itself contains no indication that interest has been charged".

¹⁸ .As Ricardo went on: "Adam Smith informs us, that from the 37th of Henry VIII to 21st of James I, 10 per cent continued to be the legal rate of interest. Soon after the Restoration, it was reduced to 6 per cent, and by the 12th of Anne, to 5 per cent. He thinks the legal rate followed, and did not precede the market rate of interest. Before the American war, Government borrowed at 3 per cent., and the people of credit in the capital, and in many other parts of the kingdom at 3 1/2, 4 and 4 1/2 per cent" (1821: chap. XXI).

Revolution and the onset of the Industrial Revolution is to look at short-term commercial rates: the rates at which credit would be extended to a merchant banker of high standing by his correspondents in other cities.

This benchmark is analytically distinct from, though not necessarily inconsistent with, the approach by Clark (1996), who calculates private interest rates in Great Britain using the return on land and on rent charges. It is, however, in contrast with the emphasis on sovereign bond prices in North and Weingast (1989) and more recently in Sussman and Yafeh (2006).¹⁹ Our benchmark is recommended by a number of contemporary observers of the capital market. According to the British economist Massie (1750), the “risk free rate” was provided by the rate at which “a reputable Merchant or Tradesman [can borrow money] upon his bond or note”. He took such an interest rate as the “standards for determining the rates of interest upon real and personal Securities” and recommended using this interest rate to compute the risk premium paid by other borrowers.²⁰ As already argued, Condillac concurred that a reliable measure of the cost of capital would be interest rates in leading commercial centers, “because money, in trading centers, has one price, just like corn has a price in markets ... and money is sold there just like any other commodity”.²¹

One further reason for using merchant bankers’ interest rates is their long noted ability to escape usury regulations altogether. According to de Roover (1953), bills of exchange (i.e., promises to pay a certain amount in a given place and at a later date) were the instruments of choice whereby promoters of the commercial revolution managed to escape usury ceilings. Unlike other financial instruments, such as France’s *billets à ordre*, which had a local circulation and thus subject to regulation, bills of exchange incorporated a convenient spatial dimension.²² The price they charged on bills of exchange, the bankers emphasized, was motivated by the risks and efforts associated with overcoming the obstacles of foreign settlement.²³ Consequently, foreign exchange bills were an ideal place to hide a loan, and the exchange rate an ideal place to hide an interest rate.

The problem may be stated as follows. Suppose that legislation prevents interest rates from rising above a certain ceiling, which would constitute “usury”. This obviously puts a severe

¹⁹ . We return to this point in the last section of the paper.

²⁰ . His conclusion was that “we need only subtract from the Rates paid by other People the Rates paid by the Gentleman, Merchant, or Tradesman, and the remainder will be Praemia of Risque” (p. 21).

²¹ . “Parce que l’argent dans les places de commerce a un prix courant, comme le bled en a un dans les marchés. On traite publiquement, ou du moins on ne se cache point ; et on vend son argent comme on vendroit toute autre marchandise” (Condillac 1776: p. 148).

²² . On “*billets à ordre*”, see e.g. Fuleman (1739: pp. 8—9).

²³ . Formal legislation incorporated this principle, which was kept in force all over Europe until the early 19th century. De Roover (1953: p. 45) gives Napoléon’s *Code de Commerce* as a late example.

constraint on the growth of formal credit markets: instead of charging higher interest rates when market conditions deteriorate, agents face a choice of either cheating or rationing.²⁴ However, suppose that bankers are entitled to buy and sell bills of exchange payable in foreign centers, and assume again that there is a sudden need to push interest rate above the usury ceiling. In this case, whereas domestic bankers cannot legally lend at the new interest rate, foreign bankers can buy bills on that center at a low price, in effect incorporating the unlawful interest rate. If one has a correspondent in each market, one can then arrange swaps that formally are exchange operations but really are credit operations. For legislators, it is hard to argue that bill prices in foreign centers are low because local interest rates are high, since lending does not exist in the first place or, if it does exist formally, it exists at a price that meets regulations. Moreover, even Church regulators had always been kinder with inter merchant credit, in which they saw agreements between consenting adults (Kerridge 2002). But the fact remains that a low price for bills is the same as a high interest rate (see Munro 2001 for a recent statement).

A statement of this mechanism is provided in an early discussion by Malynes (1601). In effect, Malynes (a Huguenot) saw global finance as a social “canker”, or cancer, given its ability to circumvent legislations. As he explained, there are regulations on interest rates but not on exchange rates, so that a foreign investment (the purchase of a foreign bill) can produce a bigger interest rate than domestic credit, which British regulations of the time limited to 10%:

The difference betwixt those that deliver their money at interest or by exchange, in regard of usurie, consisteth onely in the name, for they have both an intention of gaine upon money, and do beare an adventure for the losse of their monies, where as the one is certaine to have no more but ten upon the hundredth at the most, and the other doth expect at least 15. or 20. upon the hundredth, in regard whereof he is contended to stand in adventure to lose sometimes (and that seldome) by exchanges, but still the intention remaineth, which should be the surest guide of conscience to take away false or counterfeit pretences.

By the end of the 18th century, financial innovation had reached such a level of perfection that bankers could rely on a vast array of credit instruments based on derivatives of bills of exchange. These are described in the various editions of the *Negociator's magazine*, a leading

²⁴ . The point was first made by Montesquieu's *Lettres Persanes* (1721). His critique was formally directed against Muslim's sharia but was really targeted the Christian religion. The point is discussed again by Adam Smith in the passage referred to earlier, where we likens interest prohibition to a failure of the rule of law: “When the law prohibits interest altogether, it does not prevent it. Many people must borrow, and nobody will lend without such a consideration for the use of their money as is suitable, not only to what can be made by the use of it, to the difficulty and danger of evading the law. The high rate of interest among all Mahometan nations is accounted for by Mr. Montesquieu; not from their poverty, but partly from this, and partly from the difficulty of recovering the money” (1776, part I, p.ix).

financial textbook of the time (Hayes 1777). After a concise presentation of plain vanilla bills of exchange (called “real exchange”), the book gets into a long list of hot ways to use “dry exchange” meant to circumvent regulations and thus perform “usury” -that is, lend locally rather than internationally to yield a return that did not consider usury constraints.

These operations were typically over-the-counter transactions between consenting adults who were “feigning an exchange” (de Roover 1944). For instance, a banker in city A agreed to buy a first foreign bill payable in city B and use the proceeds to purchase at the maturity of that bill a second “return” bill payable in city A, thereby creating what was essentially a local loan. Hayes indicates that such an operation could be either covered or uncovered depending on whether bankers had agreed in advance on the price of the return bill.²⁵ If the operation was covered then it was bound by arbitrage to yield the same return as a local loan, had such a contract existed. If finance theory is a guide, the price of bills of exchange must have incorporated an implicit interest rate equal to the interest rate that would have been charged every time this could be done in the open, as was the case when interest rates were low or toward the late 18th century, as tolerance for credit became increasingly (see Carrière et al. 1976: p. 32).

In summary, exchange bills were “off shore” financial instruments that could be combined in many creative ways to replicate missing instruments. This was well recognized by the economists of the time such as Condillac, who argued that “legislators condemn lending on interest, and they allow it. ... For, they do not object to exchange bills and they do object to lending on interest. ... Are lending and borrowing anything else than an exchange transaction?”.²⁶ Condillac’s assessment resounds as the late 18th century’s pragmatic answer to Malynes’s earlier moral concerns. Through the agency of bills of exchange, credit had become a fact of life.

C. The case of the missing commercial rate

We therefore set out to collect data on the interest rate at which merchant bankers involved in long-distance trade would borrow or lend money. This is more easily said than done. As far as we know, whichever financial center we are looking at, there are no recorded series of “money market” rates for the period before the French Revolution in effect; such series generally start in the second half of the 19th century. Direct evidence on commercial interest rates is exceedingly difficult to come by. This seems to conflict with the earlier indication that

²⁵ . He states: “In dry exchange, sometimes the Sum to be repaid for the Sum received is fixed, determined, or certain, and sometimes uncertain or accidental” (Hayes 1777: p. 3).

²⁶ . “Les législateurs condamnent le prêt à intérêt et ils le tolèrent En effet, ils ne blâment pas le change et ils blâment le prêt à intérêt. . . . Le prêt et l’emprunt sont-ils autre chose qu’un change?” (1776: p. 141).

contemporaries seemed to know what they were talking about when they mentioned “national interest rates”.

Why did interest rates leave so few systematic traces? Part of the reason is that, 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 they consisted predominantly of over-the-counter transactions. A precise notion of the “general interest rate”, meaning probably the typical conditions that the best houses 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 observers. The other side of the coin is that, because of usury regulations, the “local” interest rate that a banker would extend to its correspondent could not really be made public, since when it was too high it was not supposed to exist at all. Thus, although observers had a precise notion of what interest rates were and meant in time and space, those rates are quite elusive when one tries to catch them.²⁷

This context sheds light on how we should deal with the variety of sources that are nonetheless available. One type of source is the interest rates at which banks of issue would discount bills when they did. Since these banks could have commercial activities, such rates must have been related to the price at which other institutions engaged in lending activity. On the other hand, banks of issue were typically not merchant banks and hence were subject to public scrutiny. As a result, the indications they provide are a bit off the mark and probably not much better than legal rates. Another possible source is indicated in contemporary reports, reflecting what observers felt was “the” relevant rate at a given time in a given commercial community (i.e., financial center). Provided such reports come from relevant persons –that is, genuine operators who knew with some precision the rate at which they could finance a given trade from a given center- they must be trustworthy. This encourages using archives in order to be as close as possible to where the business of merchant banking was taking place, as opposed to relying on a patchwork of comments in the secondary literature. Ideally, one would want to find systematic information on bilateral drawing conventions between correspondents, since they would state the interest rate at which business would be conducted even as the private nature of these documents helped them eschew legislation. However, sheer luck is involved, and the cost of collecting information can become prohibitive. Finally,

²⁷ . Reflecting on this paradox, Lüthy (1959) wondered how contemporary authors could be so sure when they mentioned, say, that discount rates “stood in France at 6%” when “the actual business of local discounting had not come to age” (“D’après les auteurs économistes du temps -mais où prennent-ils cette assurance puisque l’escompte des lettres de change n’est pas encore entré dans les usages? - le taux d’escompte courant en France est de 6%”). Lüthy (1999 [1959]: p. 435).

archives are not a magic bullet. Beyond the problem of the significance of the material they contain, we want to make sure that we focus on really top signatures, not on “average” merchant, or industrialist, of good standing.²⁸ The intersection of this limited group with the small number of available bank archives may be tiny.

Thus, interest-rate collectors have tended to rely on eclectics, as illustrated by Homer and Sylla’s pioneering work (see Homer and Sylla 2005 for the most recent edition). These authors provide some numbers for the markets on which this paper focuses. For Amsterdam, they follow a British parliamentary report suggesting an interval of between 2% to 3% for the period 1735—1738 (Clapham 1944 vol. I, p. 93; quoted in Homer and Sylla 2005: p. 176). This is below the range (of 3% to 3.5%) that Pierre de la Court, writer of several financial handbooks, indicated for “commercial interest” in 1671.²⁹ Jong-Keesing (1939) studied the crisis of 1763 from bankers’ archives and found (unsurprisingly) somewhat higher rates (between 4% and 6%). As far as we know, there are no continuous series for the Bank of Amsterdam, although it reportedly started to discount bills in the 18th century (Vilar 1978). Eagly and Smith (1976) mistakenly refer to a series in Posthumus (1946) as an “interest rate” series while it is really the agio of the Bank of Amsterdam.³⁰ More frequent references to market rates in Amsterdam are available toward the later part of the century, and it is likely that a series could be put together with some additional effort. The article by Wilson (1939) refers to a work by Van Dillen (ca. 1930 p. 3633), which contains additional evidence.³¹

To our knowledge, no source documents short-term commercial interest rates in London. Homer and Sylla rely on Clapham (1944), who gives some rates for the Bank of England that correspond to bills drawn within Britain and from abroad. They argue that this rate was “usually at or near the legal maximum” (Homer and Sylla 2005: p. 163). This would suggest that this rate fails to reflect the genuine cost of borrowed capital.³² We are not aware of studies documenting interbank discount rates during the period under study.

²⁸ . For instance, Etienne (1994: p. 183) discusses the case of credit lines that the bank Lowenberg & Leclerc extended to the champagne maker Ponsardin et fils (predecessor of today’s Veuve Clicquot) at 6%—7% in the early 19th century. This is substantially higher than the prime banker interest-rate quotes we find for the same date. Ponsardin might have been a first-class house, but the credit in question is more like an industrial credit with default risk included.

²⁹ . Saugrain (1896: p. 108) who reportedly follows books by Aulnis de Bourrouil and d’Avenel.

³⁰ . The “agio” was the market swap rate between current coins and deposit balances at the Bank of Amsterdam. For a recent discussion see Quinn and Roberds (2006).

³¹ . “The permanent stimulus to foreign investment was the low rate of interest in Holland. In the seventeenth century it had fallen from 6 1/2 to 3 1/2 and in the eighteenth century it was 3 to 2 1/2 per cent”. Wilson (1939: p. 122). We referred to Van Dillen (1925), which does not contain more information but does use to original sources: rates for “commercial loans” that the Bank of Amsterdam made to some private merchants.

³² . Note, however, that “usury” (i.e., the maximum legal interest rate) was at 5% after 1714 and that the Bank of England rate was at 4% during most of the century.

Evidence for France is even more patchy. Homer and Sylla rely extensively on a late 19th-century dissertation by Saugrain (1896). Saugrain indicated rates for France in the early 18th century ranging between 4% and 10%, but he stated that rates did not exceed 6% after 1776.³³ Direct evidence from bankers' correspondence supports slightly lower rates. Squarzoni (1976) quotes reports in the late 1720s giving 6% as the “norm” in Lyons, though “scarcity” may have caused interest rates to rise as high as 9%.³⁴ Sources quoted by Lüthy (1959) also suggested that, from mid century onward, interest rates in France might have been lower: close to 4% on average.³⁵ Sources for the late 18th century mentioned Paris interest rates of about 4%—4.5% in 1790³⁶ as well as foreign drawing arrangements on Paris at 5% in 1789.³⁷

A rare discovery is that of Luckett (1992) who found that, for about fifteen years (1746—1759), *Les Affiches*, a French commercial newspaper that appeared twice weekly, reported indications on interest rates on bills of exchange (*lettre de change*) and for financial bills (*billet de finance*)—that is, secured and unsecured bankers drafts.³⁸ According to this source, the interest rate for bills of exchange remained at 6% from 1746 (when the *Affiches* started being published) to April 1749, was then reported at 5% until September 1758, and then returned to 6%. Luckett expresses reservations about these quotations, which fail to display the “kind of volatility one would expect from a financial market”, and concludes that the rates reported may have represented a “kind of norm” (1992: p.31). In any case, the series lapses in 1759, and we can only speculate on the reasons for this.

³³ . “En réalité, c’est entre 4 et 5% qu’il faut évaluer le taux de l’intérêt au XVIIIème siècle ... L’escompte ne dépassait pas 6%” (Saugrain 1896: p. 107).

³⁴ . “La puissante maison Sellon confirme ce point de vue en indiquant à nouveau le taux de 6% l’an comme norme à Lyon pour les négociants et banquiers de premier rang. ... Lyon, Sellon père et fils, 6 Novembre 1729... 1 1/2 % qui est le cours d’un seul paiement pour les gens solides comme vous et nous. (6% l’an)”. (Squarzoni 1976: p. 283). On high rates: “Lyon, Melchior Philibert, 8 avril 1729, notre dit paiement s’est terminé sans aucun dérangement quoique l’argent soit ici fort rare, lequel a valu jusqu’à 2 1/2 % [i.e., 9% per year]”. (Squarzoni 1976: p.284).

³⁵ . Lüthy cited Isaac Mallet, a “retired banker” in Geneva who lent at 4%. But Geneva is not France. He also mention a French institution, the *Caisse d’Escompte* (created 23 March 1776) that “peut escompter tout papier commercial sans aucune clause de précaution relative à la qualité de ce papier ou de ses signatures ; mais son taux d’escompte ne pourra jamais dépasser 4% par an ” (Lüthy 1999 [1959]: p. 434). However, the *Caisse* was somewhat specific and thus may not be representative.

³⁶ . Letter to Froust and Guinebaud in Nantes. (Antonetti 1963: p. 146).

³⁷ . Arrangement between banker Greffuhle Montz et Cie in Paris and Courtiau Echenique Sanchez in Amsterdam. (Antonetti 1963: p. 146).

³⁸ . By “secured” we refer to bills of exchange that were the counterpart of a commercial transaction; “unsecured” bills were not. The *Affiches* also gave interest rates and promissory notes (*billets à ordre*), but in view of our discussion the bills of exchange are to be preferred.

III. Shadow interest rates

A. *The bell jar: A model*

To spell out our argument, we consider the following thought experiment. Imagine a world made of n trading centers. This world is similar to that described by Condillac: there are strict controls on domestic credit but no controls on capital movements. Merchant bankers can buy and sell foreign exchange bills, which are promises to pay a certain amount of money in a certain foreign trading center at a certain time, say two months in the future. For simplicity, we make the extreme hypothesis that domestic regulations are fully enforced so that there is no market for domestic credit and, as a result, no such thing as a “local” interest rate (an interest rate at which local bankers would lend money to one another). This is an exaggeration, but it is one that will show our point in the clearest light. Suppose now that there are no transaction costs and, to make things even simpler, that all markets use the same currency, so that there is no exchange risk. This last assumption is made only for convenience and will be amended at a later stage of the analysis.

Suppose we now let merchant bankers trade their bills of exchange all over the world. Specifically, they lend to one another, swapping international positions. In equilibrium, this determines a uniform “world” interest rate, say r . This is because otherwise –that is, if the rate at which bankers agree to swap their positions differs from unity- arbitrage is feasible. This also determines the price at which foreign exchange bills trade in each market. Let’s call this price the “foreign exchange”. If the world interest rate r is expressed in percentage per annum, then the price of country j ’s two-month bills in market i (i.e., the price that bankers in market i are prepared to pay in order to purchase one unit of “universal” currency to be paid in market j within two months) is

$$a_{ij} = \frac{1}{1 + r/6} \quad (1)$$

since two months is one sixth of a year.

This shows that merchants need not quote the interest rate r but only the exchange rate a_{ij} . The crucial point to understand is that, despite the lack of a domestic money market, there does exist a global capital market and a global interest rate, thanks to the availability of a global foreign exchange market with time contracts. This global interest rate, however, is a “shadow” interest rate in that it is not recorded in any periodical or price current. It exists only implicitly in the price at which bankers are prepared to swap domestic balances against foreign time deposits. In this world, there will be a peculiar form of financial development; indeed, an efficient global market for credit will thrive, despite the lack of domestic markets.

Obviously, if there were local markets for credit, these markets would have to clear at the same price as implied by equilibrium in the global money market (as will be discussed later), so that local interest rates should be identical to global ones. But the point is that such local markets need not exist. Consequently, the existence of local markets is not a precondition for the development of a global money market. Even in the absence of well-developed local markets, a global market can thrive. This is the essence of the bell jar.

In fact, our model captures the notion that financial development is a process that proceeded “top-down” –that is, from the making of a global market to the emergence of local ones. The Commercial Revolution, by creating a network of correspondent bankers working along trade relations, fostered the development of a global credit market that could prosper quite apart from the rest of the economy and that must therefore have preceded local development, explaining why local interest rates are hard to come by: the only thing that existed was the global concept of the opportunity cost of lending real resources.

Two slight complications of the framework, designed to make it more realistic, will help to show this point even more vividly. First, exchange rates can vary. Merchant bankers buying bills denominated in specific currencies must to adjust the world interest rate according to their expectations of future exchange rate changes. The result is n potentially different local interest rates whose prices incorporate compensation for expected appreciation or depreciation with respect to the virtual global currency standard. Depreciating currencies will have higher interest rates, appreciating currencies lower ones. Second, there are transaction costs. These entail a lower price (higher interest rates) for bills of exchange that are payable in trading centers characterized by greater frictions. In practice, since transaction costs are likely to be determined by bilateral characteristics (such as the greater or smaller number of correspondents that trading center i has in market j), there are $n-1$ different local shadow interest rates for each individual centre. Obviously, arbitrage ensures that the $n-1$ shadow interest rates for market j differ little from one another, since, with zero transaction costs they should be all identical. But the point is that the modern notion of a national interest rate just doesn't exist as such, for this economy we have only bilateral relations.

Our empirical approach builds on this insight. Specifically, we consider the following arbitrage, which is a generalization of (1). There are two bills of exchange of different maturities traded in a given market (i) and payable in a certain foreign centre (j). Denoting by a_{ij} the number of units of currency i that bankers give to get one unit of currency j in country j in n months and x_{ij} the number of units of currency i that bankers give to obtain one unit of

currency j in country j on the spot, we have r_j^i as the shadow interest rate in center j “according” to centre i :

$$r_j^i = \frac{12}{n} \cdot \left(\frac{x_{ij}}{a_{ij}} - 1 \right). \quad (2)$$

To be precise, r_j^i is the marginal interest rate in center j as given by center i . “Marginal” must here be understood in the following sense. Suppose that in market i , where bills on j are being traded, there is a number of bankers who have various drawing arrangements with their correspondents in market j . Banker A can lend and borrow from his correspondent at 4%, Banker B at 5%, Banker C at 5.5%, and so forth. Suppose now that the exchange rate on two-month bills payable in j falls to a price such that the shadow interest rate in j is 4.5%. Banker A will find it profitable to buy such bills and transfer the funds to center j , thus raising the price of bills on j up to the level where arbitrage is no longer feasible; hence the implicit interest rate on j , according to prices in i , will return to 4%. Consequently, *the shadow interest rate reveals the opportunity cost of a draft on j by the most competitive merchant banker in center i .*

In practice, of course, things must have been dramatically more complex than our abstract example suggests. When one drew a bill on a foreign center, one could never be entirely sure of the conditions there. The correspondent might have changed his terms or, worse still, might have gone bust. There was thus an inevitable element of chance in the exercise. Such is the meaning of the series we are about to uncover: they reflect a given market’s perceptions of the conditions in another foreign market. This is certainly not the same thing as knowing the actual interest rate in that center (when such an interest rate existed and was quoted), and we have argued this was not the case. But in the 18th-century context, that was all there was.

B. Methodology

In the literature, arbitrage relations between exchange rates and interest rates have been used in two main ways. Some studies have sought to derive the missing term of the equation: to compute implicit interest rates from knowledge of the price of spot and time exchange bills as just explained or, more often, to compute an exchange-rate series from knowledge of the price of time bills and interest rates. A seldom-noted feature of such computations is that they have precedents in actual arbitrage by merchant bankers. From the 16th century up to the mid-20th century, exchange rates were recorded by quoting the price of a notional contract, typically represented by an n -months bill payable in a given foreign place. One, two, and

three months were frequent benchmarks.³⁹ However, comparisons required putting all exchange rates on the same time footing—that is, transforming the various time quotations to a common maturity. An illustration of this is found in Tate’s discussion of “arbitrations of exchanges”, where he explains how, given an interest rate, “sight” rates can be computed from knowledge of the price of time bill:

The two places of operation should be taken at a long date as 3 months, and then discounted ... according to the rate charged by the two houses of business To show how to apply this discount properly, we will take the rates at the following example ...:

London on Paris at 3 months is quoted Fr. 25 55 Cents

Paris on London at 3 months – Fr. 25 10 Cents

The discount for 3 months is there stated to be taken at 1 per Cent or 25 Cents (the interest is here reckoned at 4 per Cent per Annum), which is taken from the London rate, and added to the Paris rate to make them Short or Cash rates; rendering the one Frs. 25 30 Cents and the others Frs. 25 35 Cents.

The interest is taken from the London rate, because if I send the Bill to Paris, and get it discounted there, the Interest will be deducted; but it is added to the Paris rate, because, if at Paris I want a bill upon London at sight, I shall have more French money to pay for it, than I should have to Pay for a Bill at three months.⁴⁰

Similar computations first appeared in the work of economic historians with Davis and Hughes’s construction of a “true” dollar—sterling spot exchange rate series for 1803—1895 (Davis and Hughes 1960). However, Davis and Hughes discount the price of sterling time bills they found in Trotter bank’s archive using the interest in New York. They argue: “Had Trotter not purchased time-bills of exchange, he could have invested in American earning assets.”⁴¹ According to Perkins (1975, 1978), this approach is inadequate. Time bills on London traded in New York should be discounted using the London rate because, by arbitrage, a London time bill in New York is equivalent to a transfer of funds to London (at the current exchange rate) and a subsequent deposit at the London interest rate. This approach is now conventional and, in effect, consistent with both economic logic and contemporaries’

³⁹ . Reference to future payments has misled a number of authors, who have referred to these quotations as “forward exchange rates”. For instance, Juhl, Wiles, and Weidenmier (2004) argue that they introduce a “new weekly database for spot and *forward* US—UK exchange rates”. However, these authors really refer to time bills of exchange. This is inadequate because a forward exchange contract implies no current down payment whereas quotations for time bills of exchange recorded outright purchases, implying full payment. Obstfeld and Taylor (2003) refer to the exercises they perform with time bills as “*Covered Interest Parity [CIP] tests*” (a language that is also used by Juhl et al. 2004). Since CIP is a condition on the pricing of forward markets, these authors must think of time bills as genuine forward instruments. For details on the emergence of forward exchange markets in the 19th century, see Flandreau and Komlos (2006).

⁴⁰ . Tate (1834: p. 89—90); see also Tate (1819).

⁴¹ . They continue in a footnote: “Trotter was, in fact, granting credit to Americans, and thus the bill prices reflect an interest payment. Moreover, *since credit was being granted in the American market, the discount on the bills was the American rate. This is true regardless of what Trotter’s British correspondents did with the remitted bills -whether they were held until the British importer paid them at maturity, or had them discounted in Britain*” (Davis and Hughes 1960: p. 53, emphasis added).

recommendations. Officer (1996: p. 61, 295) provides the general formula for converting the price of time bills into a spot foreign exchange quotation when both the local interest rate r_j and the n -month exchange rate a_{ij} are known:

$$x_{ij}^* = a_{ij} \cdot \left(1 + r_j \cdot \frac{n}{12} \right). \quad (3)$$

Another group of studies that have relied on interest-rate—exchange-rate arbitrage have been concerned with matters of market integration. Exclusively focused on the “first era of financial globalization”, these studies examine the differential between shadow interest rates and actual local interest rates (Calomiris and Hubbard 1996; Obstfeld and Taylor 1998, 2003; Flandreau and Rivi re 1999, Juhl et al. 2006). As argued here, efficiency requires that local interest rates and shadow interest rates, *when they both exist*, be identical to one another. Formally, these studies have considered the spread between actual and implicit interest rates. Under efficiency, this spread should be zero:

$$r_j^i - r_j = 0. \quad (4)$$

Flandreau and Rivi re (1999) explore the theoretical foundations for this relation. They show that the shadow interest rate is actually an *upper bound* for the actual domestic interest rate. Specifically, shadow rates are kept within a fluctuation band. The lower bound is the actual interest rate, and the upper bound is the lower band augmented by a factor related to transaction costs. The key intuition is that agents incur a transaction cost when they move capital from one market to the other: Although bills can readily be cashed in their domestic market, buying them in a foreign exchange market and then repatriating them for purposes of arbitrage entails a number of expenses, which may be denoted by c . As a result, the shadow interest rate is always above the actual interest rate. Formally:⁴²

$$r_j \leq r_j^i \leq r_j + \frac{12}{n} \cdot c. \quad (5)$$

Focusing on the shadow Paris shadow interest rates and the Paris actual open market interest rates derived from London sources during 1900—1914, Flandreau and Rivi re show that (5) performs very well empirically, implying no hindrances to credit and foreign exchange operations during that period.⁴³ Finally, as our Appendix shows, the existence of transaction costs implies that local market conditions do have an effect on the shadow interest

⁴². See Flandreau and Rivi re (1999) for details.

⁴³. Flandreau and Rivi re’s claim that the shadow interest rate is, in the context of 19th-century arbitrage, an upper bound for the actual interest rate is also illustrated in graphs provided by Calomiris and Hubbard (1996: Figures 7.1 and 7.2) for the U.S. dollar. The evidence in Obstfeld and Taylor (2003: p. 153) is similar to that in Calomiris and Hubbard (1996).

rate. This can be understood as follows. Suppose that the domestic interest rate rises. Investors thus sell some foreign assets and switch to domestic ones. The result is a decline in the price of foreign time bills and hence an increase in the computed shadow interest rate. But because there are transaction costs, this may not affect actual interest rates abroad. One should thus expect that, though shadow interest rates are primarily driven by foreign ones, an effect of domestic credit conditions is nonetheless perceivable on the margin.

C. Out-of-sample performance

In the rest of the paper, we apply the methodology detailed previously and compute implicit (or, in the language of the time, “arbitrated”) interest rates from the exchange rates of the *schelling vlaamsch* Banco of Amsterdam, the British pound sterling, and the French *écu* (of three livres tournois) during the 18th century. This follows the lead of Schubert (1989), who computes point wise 18th-century shadow interest rates for Amsterdam and Paris,⁴⁴ and Luckett (1992), who constructs a series of monthly average French shadow interest rates from exchange rates in London during 1740—1789. See also Table 1.

Our goal is to provide more systematic evidence by considering a greater number of countries and longer time periods. We also want to give a more explicit interpretation of the output of such exercises. In particular, it is important to emphasize the difference between the significance of the shadow interest rates derived in the context of the 18th century, on the one hand, and of those obtained for the late 19th century, on the other hand. Unlike the case for the period after the Industrial Revolution, when genuine domestic money markets existed, shadow interest rates computed for the 18th century and earlier are not an upper-bound estimate for a local interest rate that we just happen to have trouble finding. As we have argued, depending on the place and time we focus on, it may well be that such “local markets” did not exist or that the operation of such markets was subject to a number of restrictions tantamount to local transaction costs: these markets lay outside the bell jar.

⁴⁴. Specifically, Schubert (1989) computes average nested interest rates in bills in London on Amsterdam and Paris for periods between 4 and 15 years and then applies a uniform 4.3% to various series to derive spot exchange rates. The 4.3% is “in the range of interest rates observed in typical long bills in London on Amsterdam” (p. 3).

Table 1. Exchange market—money market arbitrage operations: survey

| | Authors | Country pair/Period | Output |
|--|------------------------------------|---|---|
| Arbitrated exchange rate or interest rate | | | |
| Shadow exchange rate | Davis and Hughes (1960) | New York/London (1803—1895) | Shadow spot exchange rate dollar/sterling |
| | Perkins (1978) | New York/London (1835—1900) | Shadow spot exchange rate dollar/sterling |
| | Schubert (1989) | London/Amsterdam/Paris/Hamburg/Lisbon (1731—1795) | Shadow cross rates Amsterdam on Hamburg, Paris, Lisbon through London; London on Hamburg, Paris, Lisbon through Amsterdam |
| Shadow interest rate | Perkins (1978) | New York/London (1835—1900) | Shadow interest rate in London from New York |
| | Eagly and Smith (1976) | London/Amsterdam (1731—1789) | In effect: shadow interest rate in Amsterdam from London* |
| | Schubert (1989) | London/Paris/Amsterdam (1731—1795) | Shadow interest rates in Amsterdam and in Paris from London |
| | Luckett (1992) | London/Paris (1740—1789) | Shadow interest rate in Paris |
| | Boyer-Xambeu et al. (1995) | London/Paris and Paris/London (1795—1873) | Shadow interest rate in London and Paris |
| | Boyer-Xambeu et al. (2001) | London/Paris (1833—1873) | Shadow interest in Paris from London and in London from Paris |
| Onshore/offshore spreads | | | |
| Compute interest spread | Calomiris and Hubbard (1996) | New York on London: shadow London minus London (1889—1909) | |
| | Obstfeld and Taylor (1998) | New York on London: shadow London minus London (1870—1914) | |
| | Flandreau and Rivière (1999) | London on Paris: shadow Paris, and interest arbitrage band for shadow Paris (1900—1914) | |
| | Boyer-Xambeu, et al. (2001) | London on Paris: shadow Paris minus Paris; and Paris on London: shadow London minus London rates (1833—1873) | |
| | Obstfeld and Taylor (2003) | New-York on London: shadow London minus London rate (1870—1880); London on Berlin: shadow Berlin minus Berlin (1877—1914) | |
| | Juhl, Miles, and Weidenmier (2006) | New-York on London: shadow London minus London (1880-1913) | |

Source: see text.

* Eagly and Smith argue that they are computing a London rate, but they actually calculate the Amsterdam interest rate because they use the price of bills on Amsterdam traded in London.

A more apt metaphor would thus be to liken the shadow interest rate to the interest rate on money balances denominated in a given currency in an offshore market, such as the Eurodollar market that developed in London in the 1950s following the tightening of credit conditions in New York and the existence of a binding regulation on dollar interest rates –the infamous Q-regulation (see Schenk 1998). In other words, what we are really computing is, in a world of credit controls, the interest rate on “Euro-écus” and “Euro-schellings” in London as well as the interest rate on “Euro-pounds” in Amsterdam. If we are to end up with an anachronism then we think that the euro-currency metaphor is a good approximation, for it squares nicely with the notion of our “shadow” interest rates being the price that would clear the supply and demand of credit in a cosmopolitan “Republic of Merchants”.

IV. New results, new insights

Previous research by Larry Neal and others has demonstrated the value of courses of exchange as reliable sources of information for quantitative financial historians. Consequently, we content ourselves here with briefly surveying the sources and move swiftly to the estimation techniques and results.

A. *Minutiae*

We have relied on the London *Course of Exchange* and the Amsterdam *Koers de Koopmanschappen*. The *Course of the Exchange* is from the collections of the University of London Library and British Museum and the *Lloyd's List*.⁴⁵ Our database is more complete than similar ones used in literature.⁴⁶ The *Course* provides the implicit interest rate in Amsterdam and Paris since these two are the only cities for which two-month and sight maturities are recorded.⁴⁷ We have collected the first quotation of each month; because exchange was quoted twice a week (Tuesday and Friday), the first quotation of the month means the 1st, 2nd, 3rd or 4th of each month.⁴⁸ For each date, a range of exchange rates is

⁴⁵ The course of the exchange (1698—1810). University of London Library Collection and British Museum Collection; British Library (St. Pancras). *Lloyd's List* (1741—1826), reprinted in 1969 by Gregg International Publishers Ltd; of Farnborough, England.

⁴⁶ Mc. Cusker (1978) and, the most quoted secondary source, Schneider, Schwarzer, and Schnelzer, (1993). Our London database is missing only one entry: that corresponding to 2 February 1778, when there was no quotation for Amsterdam. Double quotation for Amsterdam started in November 1720 and for Paris in February 1740. Data stopped between 1793 and 1802 for Paris and between 1795 and 1802 for Amsterdam. Our calculations run only through 1789 in order to avoid the high distortion in data caused by French Revolution.

⁴⁷ Neal (1990): pp. 20—43) compiles a full explanation of stock price lists in London and Amsterdam during 18th century. Mc. Cusker and Gravesteijn (1979) provide a description of exchange-rate source locations.

⁴⁸ London adopted the Gregorian calendar on 14 September 1752 (3 September in Julian calendar). The *Course of Exchange* was first published on Tuesday, 1 September 1752 (Julian calendar) and Friday, 15 September 1752 (Gregorian calendar; 4 September 1752 in Julian calendar). We have converted Julian to Gregorian calendar from 1720 to 1752 to maintain the homogeneity in data collection.

provided (lowest/highest). Given our claim that the shadow interest rate reflects the conditions of the most competitive banker, it is natural to focus on the best exchange rate (highest number of domestic unit per foreign unit).

The data collected for Amsterdam is similar to that collected by others.⁴⁹ As far as we know, the only European location where it can be read is the EHB in Amsterdam, which holds a series of photocopies from original materials held in Jakarta and Copenhagen, apparently made upon the initiative of N. W. Posthumus after WWII.⁵⁰ The original copies of *Prijscouranten-Koers van de Koopmanschappen* are located in *Copenhagen Rijksarchief* for 1708—1734 and in *Wordt Arsip Nasional Jakarta* for 1734—1789.⁵¹ The *Koers* provides two different maturities on London and Paris, starting fairly early on.⁵² Yet because most of the data for the first quarter of the 18th century is missing, we have started our calculations in 1734 for London. Data limitations for Paris encouraged us to leave it aside at this stage, although we return to it later on. Entries for alternative maturities on London are always identified. Sight is identified as “*op zigt*”, long bills as “*op uso van 2 M. Dato*”. As before, there again we focused on the best exchange rate.

Table 2. Time horizon for “long” and “short” bills

| | “Long” | | “Short” |
|---------------------------------------|----------------------------|---------------|------------------------|
| | Maturity | Days of grace | Maturity |
| In London on Amsterdam ^(a) | 2 months and/or 2.5 months | 6 | 3 ^(d) |
| In London on Paris ^(b) | 2 months | 10 | 4 + 1 day’s date bills |
| In Amsterdam on London ^(c) | 2 months | 3 | 3 ^(d) |

Sources: (a) Hayes (1724: pp. 261—265; Hayes (1777: pp. 11, 260—265; (b) Hayes (1724: p. 261); Markham (1739: p. 236); Hewitt (1740: p. 25); (c) Hayes (1724: p. 261); Markham (1739: p. 236); Hewitt (1740: p. 25); Hayes (1777: p. 266); (d) *Le Guide d’Amsterdam* (Anonymous 1701: p. 45) indicates “Les lettres partent deux fois par semaine, savoir les mardis et vendredis à neuf heures du soir, et doivent arriver les lundis et vendredis lorsque le vent est bon”.

⁴⁹ . See Schneider et al. (1993).

⁵⁰ . Despite Schubert’s statement on Dutch sources, we were not able to find formal new data in the *Utrechtse Courant*, *Haarlemsche Courant* or *Rotterdamsche Courant* for completing the missing entries. Those newspapers do not provide data before 1745 (*Utrechtse Courant*). Moreover, double quotations are not systematically reported. When they actually appear (circa 1765—1790), they are usually redundant with those found in the EHB.

⁵¹ . Except for years 1757, 1759, and 1783; when no *Prijscouranten* has been kept; Posthumus (1946).

⁵² . According to the *Prijscouranten*, not only Paris and London but also Rouen and Hamburg started to be quoted with either one or two “usances” from 1634 on. According to Lespagnol (1997), although the Third Anglo-Dutch War (1672—1674) did not create major commercial disruptions, the following period of conflict between England and France (1688—1697) had major consequences on international trade (see Clark 1923 regarding). This may explain the discontinuation of double quotation in Amsterdam on several other centers (except for quotations on London, which suffered a break around 1690). Another interesting feature of the primary source is that it is also about that time that we observe a shift, for short maturities, from “usance” to “sight”.

Previous research about the topic considers sight as spot and derives the implicit interest rate by straight application of formula (2).⁵³ However, it should be noted that sight is *not* spot because there is a time delay between the purchase of a “sight” bill and when it is cashed, since there is the actual delay in (say) crossing the Channel (as one late 18th-century banker does in the opening pages of Dickens’s *Tale of Two Cities*). Similarly, for long bills, one must reckon with the grace period between the day the bill is presented and the day it is paid. Thus, the long exchange rate $a_{ij}[n_l]$ and the short exchange rate $a_{ij}[n_s]$, can be rewritten in terms of an imaginary spot exchange rate x_{ij} as

$$a_{ij}[n_l] = x_{ij} / (1 + r_j^i \cdot \frac{n_l}{365}) \quad (6)$$

$$a_{ij}[n_s] = x_{ij} / (1 + r_j^i \cdot \frac{n_s}{365}) \quad (7)$$

Substituting for x_{ij} gives the arbitrage condition that we have used to derive shadow interest rates (details for sources are shown in Table 2)⁵⁴

$$r_j^i = \frac{(a_{ij}[n_s] - a_{ij}[n_l]) \cdot 365}{(a_{ij}[n_l] \cdot n_l - a_{ij}[n_s] \cdot n_s)} \quad (8)$$

B. Individual interest-rate series

Figures 2—4 depict the results from implementing equation (8) on the data described previously. Figure 2 presents the shadow interest rate for London as per Amsterdam; Figure 3, the shadow interest rate for Amsterdam as per London; and Figure 4, the shadow interest rate for Paris as per London. We have also reported on the charts (whenever this was feasible and meaningful) evidence on the short-term “commercial” interest rates discussed in Section II. Moreover, we also provide overlapping bars representing the financial crises summarized in Table 3. To work out this table we relied on Kindleberger (1989), Neal (1990), Lockett (1992, 1996), and the sources these authors refer to.⁵⁵

Combining direct evidence on interest rates and crises with evidence reconstructed from foreign exchange data demonstrates the consistency between the quantitative and systematic

⁵³ See Eagly and Smith (1976: p. 201) and Schubert (1989: p. 4) for 18th- century data, though these papers do not show the interest-rate graphs and/or data. See also Boyer-Xambeu et al. (2001: p. 2) for the 19th- century calculations.

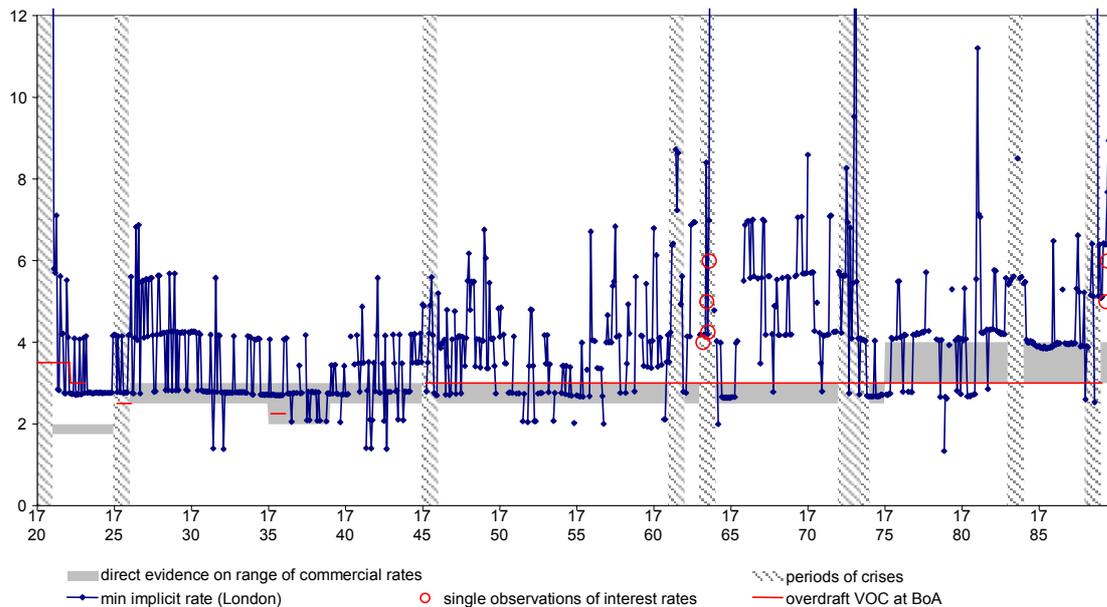
⁵⁴ The most used book about exchange rate in 18th-century London is Hayes (1719—1777). See also Marius (1655), Bringhurst (1682), Hewitt (1740—1755), de Sequeira (1798), Dickinson (1819), and Tate (1834—1836).

⁵⁵ . We have relied on the sources indicated by Lockett (1992) and (1996) rather than on Lockett’s own chronology of financial crises. The reason is that Lockett provides a chronology of financial crises that is suggested by the evidence of spikes in the arbitrated interest rate series he computes. Consequently, it would have been tautological to invoke his chronology as evidence in favor of our interest-rate data.

(but indirect) information that we have gathered here and the direct historical information derived from independent information on interest-rate ranges.

First, our estimates of the shadow interest rate in the three financial centers are quite obviously in line with direct evidence. This suggests that a more intensive search for interest rates in primary sources could lead further insights, especially for those centers that did not benefit from double quotation abroad so that a shadow interest rate cannot be computed. An implication of this is that commercial credit was sufficiently developed and efficient for there was to be little difference between the average interest rate (as indicated by contemporaries) and marginal ones (as measured by the shadow interest rate). This is supporting evidence of a central claim in this paper.⁵⁶

Figure 2. Amsterdam shadow interest rate, from London course of exchange



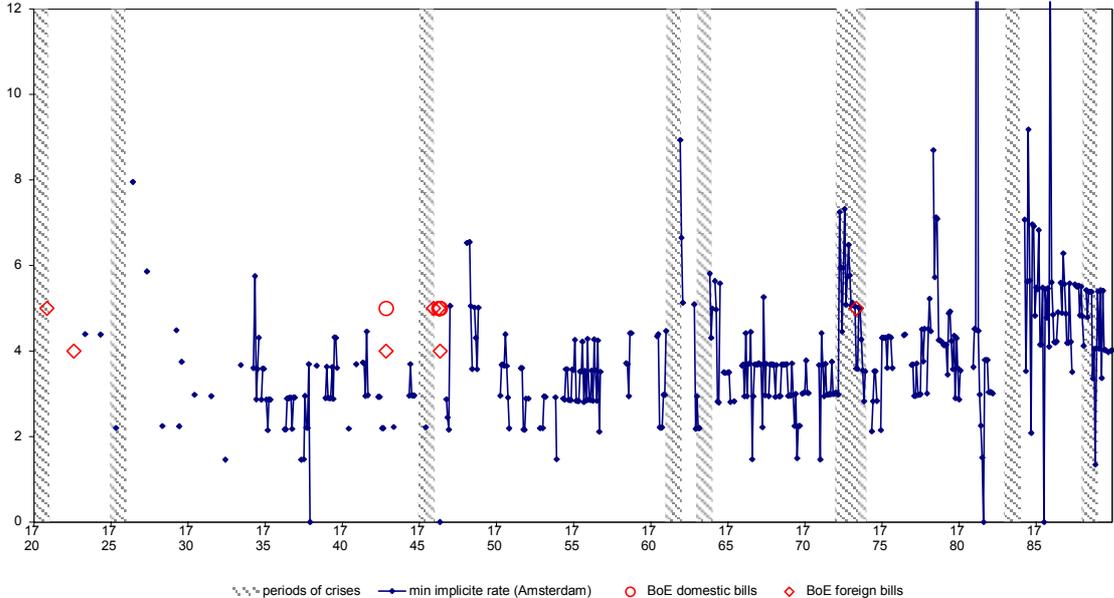
Sources: Shadow interest rates: see text. Range of commercial rates: 1720—1789, Homer and Sylla (2005); 1720—1725, Ehrenberg (1928); 1726—1734, Wilson (1939) and McCulloch (1851); 1735—38 Clapham (1944); 1738—1774, Wilson (1939) and McCulloch (1851), 1775—1789, Ehrenberg (1928). Direct observations: 1763, Jong-Keesing (1939); 1789, Antonetti (1963). Overdraft rates: Van Dillen (1925).

A second implication is that, as can be seen, there is a fairly tight connection between these two kinds of evidence, suggesting that their messages are mutually reinforcing. As already emphasized by Luckett (1992), monetary crises were accompanied by high interest rates. Moreover, although many crises were idiosyncratic, some had an impact on several interest

⁵⁶ . Incidentally, note the strong similarity between the implicit interest rate we compute for Paris during the mid-18th century and the one reported in the *Petites affiches*. Luckett discards the evidence in *Petites affiches* on the grounds that the rates do not move much where financial series should fluctuate a lot. The rate reported in *Petites affiches* might not have moved much, but neither does our Paris shadow interest rate.

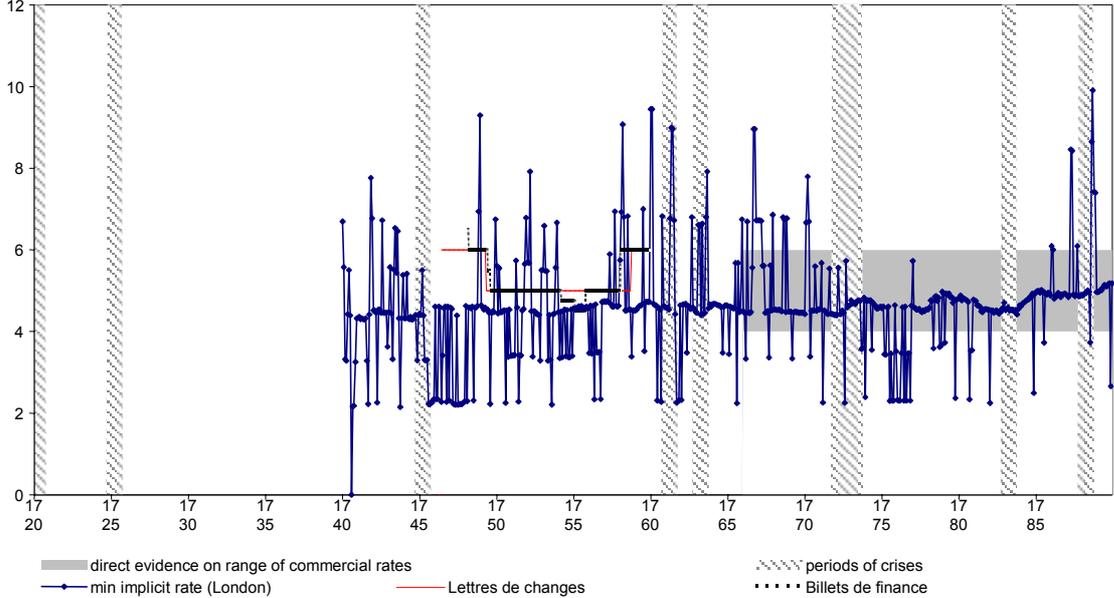
rates at once, a finding that accords with our hypothesis of a European-wide but closely knit, fabric of merchant bankers shifting capital from one centre to another. This is especially clear for Amsterdam and London, which tend to exhibit co-movements in periods of crises.

Figure 3. London shadow interest rate, from Amsterdam course of exchange



Sources: Shadow interest rates: see text. Bank of England rates: Clapham (1944).

Figure 4. Paris shadow interest rate, from London course of exchange



Sources: Shadow interest rates: see text. Range of commercial rates: Homer and Sylla (2005), from Saugrain (1896). Interest rate on *lettres de change* and *billets de finance* from data in Luckett (1992), following *Petites affiches*.

Table 3. List of financial crises, 1700—1789

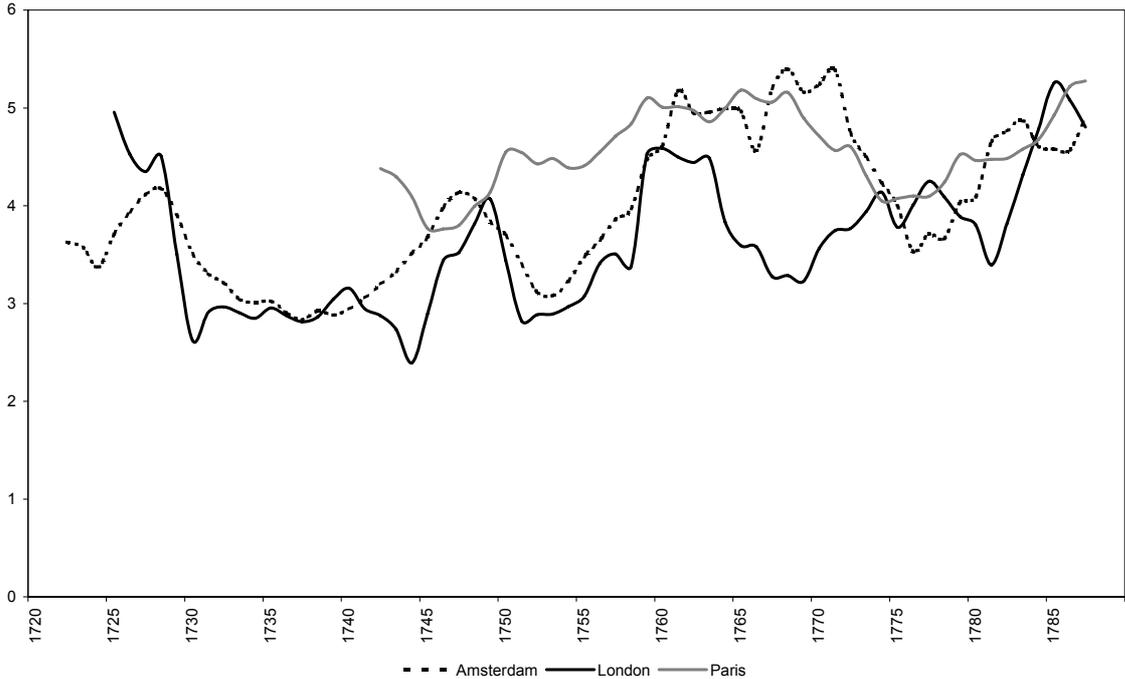
| Crises | Source | Centers affected | Motive |
|-----------|---|---|--|
| 1708—1710 | Neal (1990: p. 46, 134) Lüthy (1959: vol 1, p. 226) | London (1708—1710) Paris (1709 only) | Need for government finance in the War of the Spanish Succession (1702—13) Plague, famine, and fall of leading banking houses having lent to the king |
| 1715 | Lüthy (1959: vol 1, pp. 256—257) | Paris | Standstill on French government debt |
| 1720 | Kindleberger (1989), Neal (1990) | London, Paris | South Sea, Mississippi |
| 1725 | Marion (1914: pp. 124—129) | Paris | Final liquidation of the Law system and devaluation of the <i>livre tournois</i> |
| 1745 | Neal (1990: p. 169), from Ashton (1959) | London | Jacobite rebellion in Scotland; war of the Austrian succession (1740—8) with heavy influence on Amsterdam |
| 1761 | Neal (1990: p. 170), from Ashton (1959) | Panic confined to London | Unknown |
| 1763 | Kindleberger (1989) Lockett, (1992: p. 134) | Amsterdam, Hamburg, then London and Paris | End of the Seven Years war, Failure of De Neuvilles, |
| 1772—73 | Neal (1990, p. 170); Kindleberger (1989). | Scotland, then London and Amsterdam | Unknown |
| 1783 | Bigo (1927: p. 76—94) Bouchary (1937: p. 43) Lockett (1992) | Paris | Run on <i>Caisse d'escompte</i> , end of American War |
| 1788 | Lockett (1992) | Paris | Partial default on French debt |

We now take a look at the long-run behavior of the three commercial interest-rate series thus computed. This is done in Figure 5, which depicts 5-year moving averages. As can be seen, differentials between the series remain small throughout the century, especially for the Amsterdam—London pair. Throughout most of the century, 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 countries are not large and actually disappear toward the end of the century. Note also that the ranking emphasized by contemporary authors and summarized in Figure 1 (whereby Amsterdam rates were lowest, followed by British and French rates in that order) gives way to an alternative one where London catches up very early on and leads the pack thereafter.

In any case discrepancies are dwarfed by common secular trends: specifically, a general tendency for the price of money to rise over time. This finding is interesting in view of many previous historical accounts, which have focused on individual countries and have therefore portrayed these evolutions as essentially idiosyncratic. An illustration of this is the work of

Luckett (1992) and Hoffman, Postel-Vinay, and Rosenthal (2000), who have emphasized “French” factors to account for rising interest rates in Paris before the French Revolution. Although making sense of these common trends is still a long shot (an obvious candidate explanation is the mounting international political tensions that followed the U.S. independence), the evidence reported here suggests that we should be dealing with late 18th-century monetary tensions as European-wide phenomena.⁵⁷

Figure 5. Commercial rates, 5-year moving averages



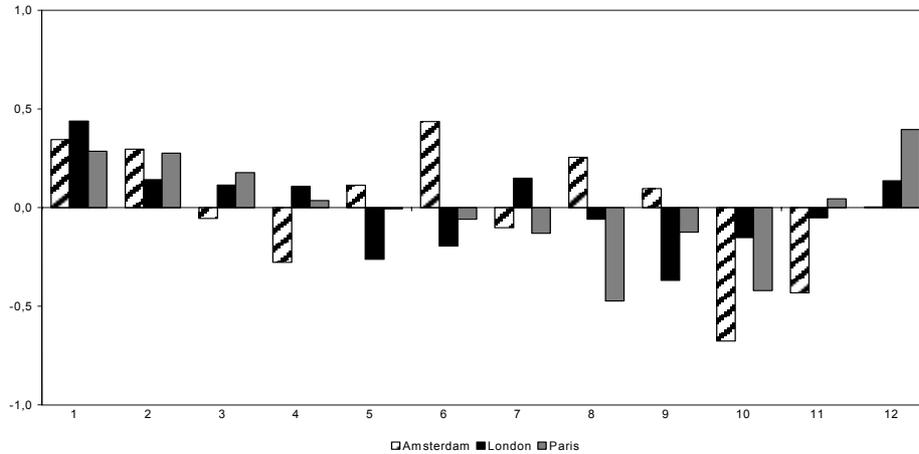
Source: See text.

C. Cycles and seasonality

The data also exhibit cyclical patterns. A glimpse at Figures 2—4 shows that Paris is relatively stable while London is less so and Amsterdam displays much variation. Some authors (e.g. Hoffman et al. 2000) have argued that these flat interest rates bear no connection with the state of the economy. But computing monthly average spreads suggests a more nuanced characterization. As illustrated in Figures 6 and 7, Paris rates –although stable in the long run- exhibited a highly seasonal pattern of fluctuations until 1770. This is also true of London rates. Amsterdam rates, by contrast, appear to have been less influenced by seasonality.

⁵⁷ . A rare exception emphasizing the international character of tensions in international credit markets of the 1780s is Bouchary (1937).

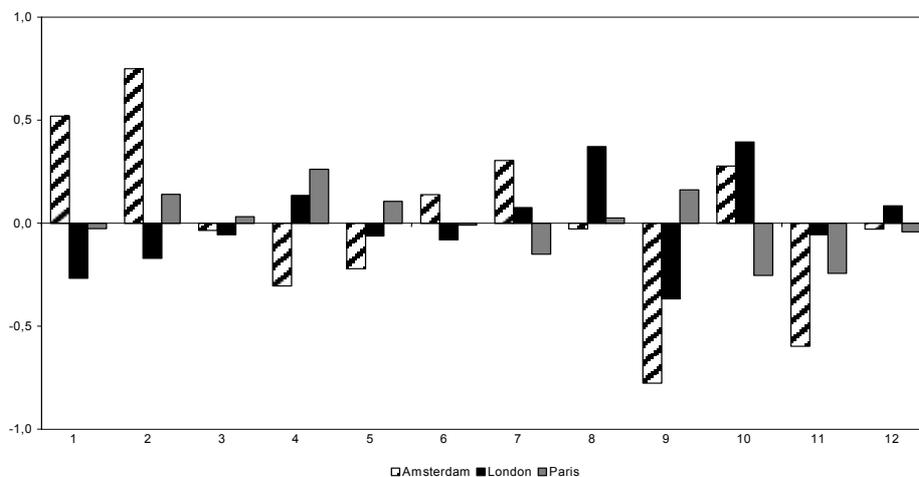
Figure 6. Seasonality in interest rates, 1740—1770



Source: Authors computations (see text). Months are numbered 1—12 (January—December). Data is beginning of month for Paris and Amsterdam mid-month for London, so “8” denotes early August for Paris and Amsterdam but mid August for London.

Given the predominant role of agriculture in France, we cannot rule out that money markets were influenced by crops and thus bore at least some connection with the state of the economy. Other economic factors may have contributed to cyclical behavior. Carrière et al. (1976, p. 87) report substantial effects of the arrival of Spanish galleons in Cadiz in late winter on European exchange rates. To the extent that the arrival of fleets exhibited seasonality, they might have contributed to the cyclical behavior of interest rates. Changes in the patterns of arrival of bullion might also have triggered changes in the patterns of seasonality.

Figure 7. Seasonality in interest rates, 1770—1789



Source: Authors computations (see text). Months are numbered 1—12 (January—December). Data is beginning of month for Paris and Amsterdam mid-month for London, so “8” denotes early August for Paris and Amsterdam but mid August for London.

An intriguing feature of the data, however, is that this pattern disappears toward the latter part of the century. After 1770 we find essentially no seasonality for both Paris and London, with Amsterdam becoming by contrast more cyclical. This takes place precisely when the integration of money markets -as measured by average shadow interest rates- was highest. One explanation could be that certain markets managed to use other markets as lenders of last resort, thus transmitting to them their business cycle.

D. Bilateral connections and the structure of the global money market

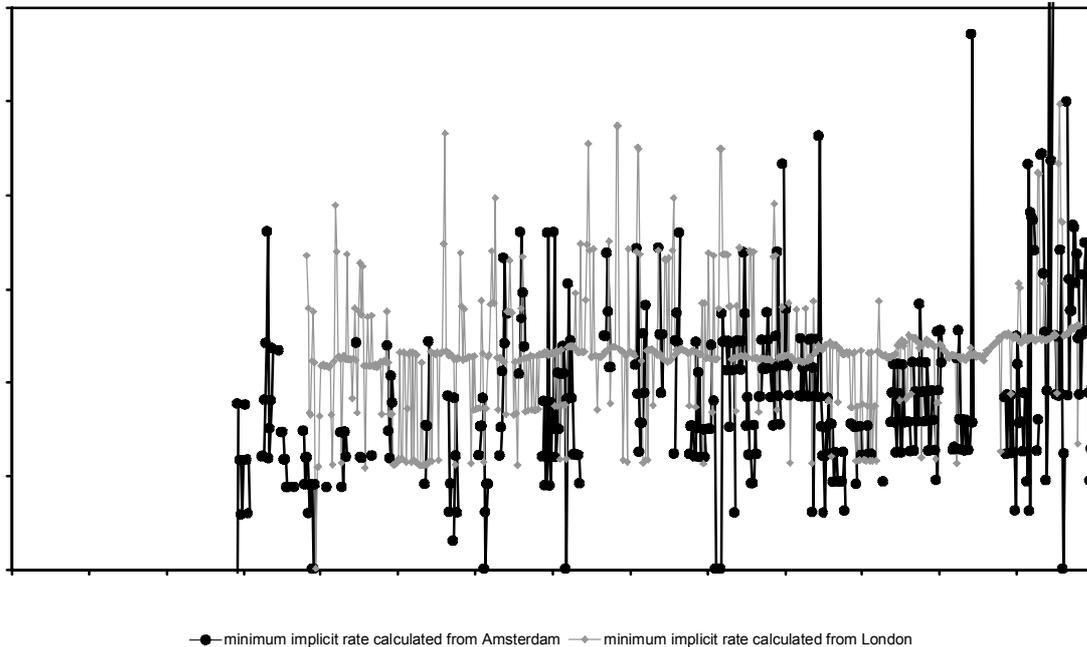
To conclude this section we take a look at the association between shadow interest rates in one financial center as measured from two other financial centers. Given our sources, this can only be done for Paris, since this is the only market for which both the London and Amsterdam courses of exchange report two maturities. Paris as from London has already been discussed (see Figure 4): now we want to compare it with Paris as from Amsterdam.

This exercise requires some qualification. First, data from London is beginning of month while data from Amsterdam is mid-month, so that there is no time coincidence between the two series. Second, and more importantly, the data on Paris in the Amsterdam course of exchange lacks regularity and consistency. There are many missing observations and many occurrences only when one maturity is quoted. It is not entirely clear whether this is a problem with the source or whether this pattern reflects some fundamental aspect of the underlying transactions. To support the latter interpretation we have anecdotal evidence that, whereas Amsterdam seems to have been an important source of capital for Parisian bankers, the converse was not true: Paris was more an occasional source of capital.⁵⁸ Therefore, Paris bills in Amsterdam may have lacked liquidity there, and their price must have behaved in a somewhat erratic way.

In any event, the result from our exercise is depicted on Figure 8, which reveals little connection between the two series. Since the Paris shadow interest rate, as priced in London, is consistent with direct evidence on reported average Paris conditions and is also obviously derived from quotation of a liquid instrument, it must be that the “abnormal” series is that constructed from the Amsterdam course of exchange. Subject to the foregoing qualification, this suggests that, within a general tendency toward market integration, a distinct hierarchy was nonetheless observed, with the more popular financial routes being those that were the most liquid, efficient, and thus informative.

⁵⁸ See Condillac (1776). Condillac, obviously briefed by a banker of the time, goes into minute details while explaining how the resources of modern finance enabled bankers in France to take advantage of lower interest rates in Amsterdam when there was a profit to do so. That Paris rate were, on average, higher than Amsterdam ones suggests that the opposite must have been less frequent.

Figure 8. Paris shadow interest rate, from London and Amsterdam



This leads us to recognize the existence of a complex web of issues pertaining to the microstructures of the global market for commercial credit. To get things close to the ground, consider the following anecdote, taken from Antonetti (1963: p. 146). In the late 1780s, the banking house Greffuhle, Montz & Cie of Paris made a convention with the Courtiau, Echenique, Sanchez & Cie bank of Amsterdam, arranging for drawing conventions on each other. Paris would charge 5% and Amsterdam 4%; this was said to be in connection with the “usually lower” rate in Amsterdam. In July 1789, when the cost of money rose suddenly in Amsterdam to an “extraordinary level” of about 5%—6%, Courtiau Echenique, Sanchez & Cie reneged on its promise to Greffuhle and started charging 5% for a remittance. Greffuhle immediately complained, arguing that conditions had changed in Paris, too (this was eight days before the storming of the Bastille!): If they were to go by the current rate in Paris then they should be entitled to charge 9%, 10%, or even 12%.

The episode raises many theoretical questions. First, the form of the drawing convention between the two firms should be explained. Why did firms engage in fixed-interest rate drawing arrangements as opposed to state-contingent contracts? Second, the unilateral reneging on the contract makes the matter even more puzzling. It is very probable that a firm that did this would seriously compromise its relations with its correspondents. Hence, under what circumstances could reneging be optimal? Addressing these questions is important. The

shadow interest rates we constructed reflect the arrangement agreed upon between local banks and their “marginal” correspondent. Their observed behavior thus bears a direct relation to underlying market organization. Exploring international money market microstructures should therefore feature prominently on the economic historian to-do list.

V. The bell jar: Inside and outside

This paper would not be complete if we didn’t compare our results with other domestic interest-rate series. In what follows, we combine the London and Paris shadow interest rates with yield on government debt and private returns on land. The yield on British government debt is derived from the price of British Consols, which we collected in *The course of exchange*, the series for France is the background series for Velde and Weir (1992), which was kindly communicated by François Velde.⁵⁹ Returns on land are taken from Clark (2005), who computed a rent charges series for Britain and reports some values for France.

The result (Figure 9 and 10 for Britain and France, respectively) is revealing. Consider government bonds first. As seen, yields on British consols overlap nicely with London commercial rates measured in Amsterdam. This means that the reorganization of Britain’s government following the Glorious Revolution essentially established its credit on the same footing as the best commercial signatures in Amsterdam when they borrowed sterling from their London counterparts. The standard way of looking at things is to argue that the improvement in the reputation of Britain triggered a decline of all interest rates and paved the way for the subsequent development of that country. Yet if Figure 9 tells anything, it is that commercial and sovereign credit behaved alike; thus it is not clear what drove what.

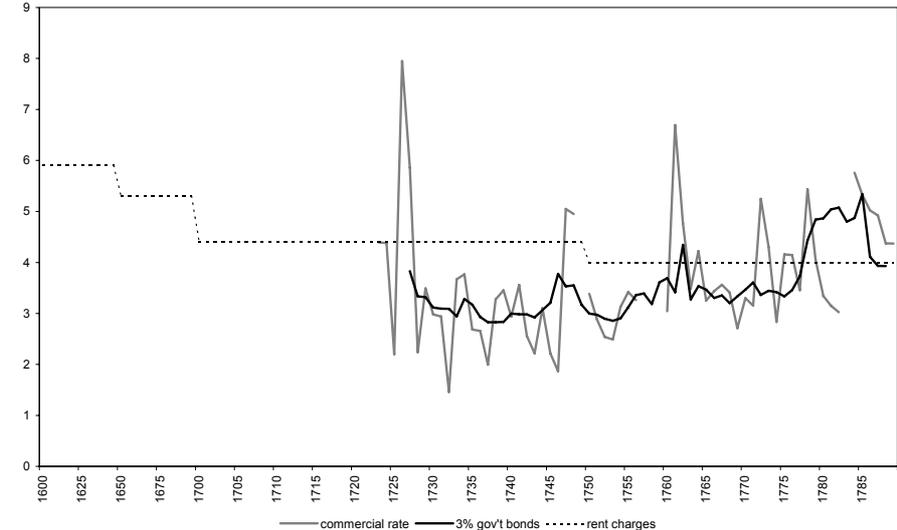
Figure 10, for its part, shows that the notion of a sovereign ceiling does not apply to the 18th-century capital market. During most of the period, French government yields are significantly above commercial rates, implying that commercial credit can thrive even in an economy with a delinquent government. This casts doubts on the costs-of-transfer risks and institutional moral hazard in the Ancien Regime economy. In France, for instance, we see that the benchmark interest rate was provided by corporate credit. By the same token, improvement in the government’s credibility cannot in itself radically change the prospects for development. To capture this notion, we might describe the financial system of the 18th century as displaying a “corporate ceiling” rather than the “sovereign ceiling” that obtains today.

⁵⁹ . See Velde and Weir (1992) for details.

Another interesting comparison is with the returns on land. Given that we are now comparing two forms of private credit (commercial credit and land credit), one should expect consistency within both countries. Merchant bankers did invest part of their gains in land and real estate, so that returns on property should equalize with returns from commercial investments. Such is indeed what we observe, and in a particularly striking manner for France. This is again consistent with our notion of a corporate ceiling.

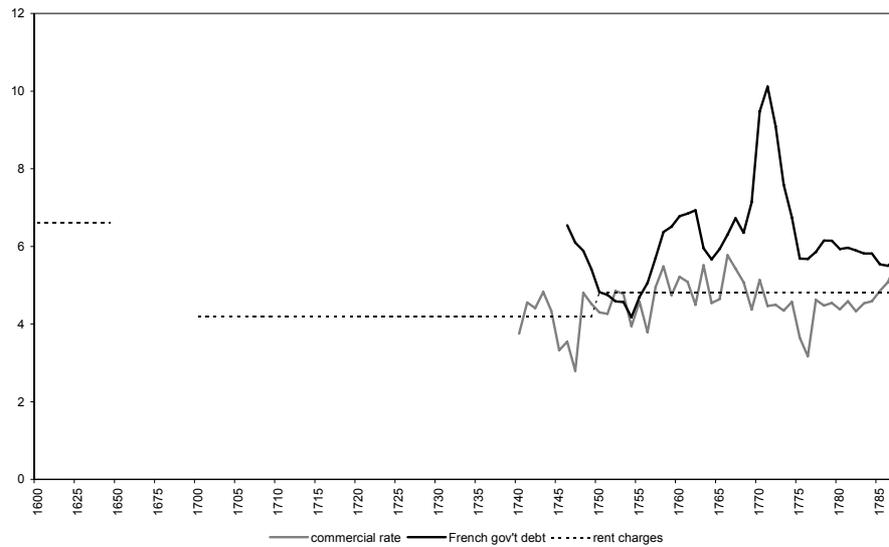
In conclusion, we suggest that the views developed in this paper have the potential to explain the long-run decline of interest rates in the late medieval and early modern periods, although verifying this should be the topic of future research. To the extent that merchant bankers connected with one another across Europe and achieved significant financial progress throughout the period by managing to reduce transaction and information costs by a variety of technological improvements, one should expect a decline in the return they required from extending commercial credit. By the same token, one should observe a reflection of this decline in the equilibrium return of all other assets in which these bankers invested. It may therefore be that the financial progress brought about by the Commercial Revolution goes a long way toward explaining the puzzle of declining land return identified by Clark (1996). Those sectors that were fortunate enough to attract the interest of merchants thus became an inclusive part of the bell jar. The rest were locked out.

Figure 9. Britain: Various interest rates



Sources: Authors calculations; Clark (2005).

Figure 10. France: Various interest rates



Sources: Authors' calculations for Paris commercial interest rates; Clark (2005) for rent charges; Velde and Weir (1992) for yield on government debt. Hoffman et al. (2000) indicate essentially stable interest rates on notarial credit, citing an interval of 4%—5% for 1720, but do not provide a time series.

VI. Conclusions

Owing to the fragmentary nature of the data, the evidence in this paper must remain incomplete. But a number of important findings emerge. The first is a fairly radical hypothesis: We have pleaded here for a thorough reassessment of the mechanics of financial development, which would have little to do with revolutions in constitutions or commitments. This is contrary to the hypothesis put forward by neoinstitutional economic historians. Their view, we think, is rooted in the modern notion of sovereign ceiling (government bonds are essentially risk-free assets, enjoying the highest grade and trading at the highest price compared to corporate securities). If one believes in the sovereign ceiling argument, then one is naturally led to treat transformations fostering the credibility of the sovereign as critical. For they are bound to have ripple effects on economic development, with the improvement in the quality of the sovereign percolating the economy at large through the reduction of all interest rates that must follow the reduction in government rates. From this perspective, the political transformations that took place in 1688 and after have been assumed to be epoch making, since they had the potential to lead to a considerable increase in the credibility of the British government. This familiar narrative places much emphasis on national differences, government quality, and interstate competition.

The alternative that emerges from our discussion is the following. Long before the British government reformed itself to take advantage of the possibilities of the capital market, a deep transformation of this capital market had already taken place. Commercial interest rates were

very low quite early, but better still, they were so for all merchants all over Europe. In effect, the low interest rates at which the British government managed to secure capital during the 18th century, after its reorganization of 1688, were identical to the cost at which British merchant bankers lent money to their continental counterparts – in Amsterdam for instance, as we found.

If one were to exaggerate a little bit (but only a little bit), one would argue that there is nothing exciting about the British government catching up on the credit of continental bankers. That the Glorious Revolution forced the introduction of a heavy dose of business like manners in government is consistent with our insight that, in the late 17th century, “benchmark” rates were provided by commercial credit so that there was no sovereign ceiling. To state things as clearly as possible, we are arguing here is that, in the early modern period, there was no sovereign ceiling but instead a corporate one. The history of finance in the 18th-century and afterwards would be that of the delayed catch-up by governments on commercial best practice. Or, to put it in still another way, it is a story of how governments reformed themselves to become included in a “bell jar” that pre-dated their reform toward parliamentary control.

This way of looking at things advises against writing about early modern financial development from a narrowly national perspective, since the transformation that occurred in finance long before 1688 was international or more rigorously, European. In any case, it was closely related to the making and reinforcement of a global community of merchants that was transnational by logic, multicultural by nature, and diffuse by necessity. In this context, the key questions would be to understand why and how –despite inept governments that went bankrupt, relished predation, or imposed all kinds of counterproductive regulations- finance found ways to develop, prosper, and integrate internationally long before the late 18th century. We are aware that this assumption is quite provocative given that scholars write about the “first” era of financial globalization in the late 19th century.

However, that financial development was in essence an international phenomenon does not mean that financial geography was a *tabula rasa* -a flat table. This was our second main theme. While we found that interest rates did not differ much between the markets under study (Amsterdam, London, and Paris), we also noted that there were persistent differences in average rates, suggesting different degrees of liquidity. Similarly, we reported that, quite early in the century, London –the capital of what was by then the world’s leading commercial power– tended to register the lowest commercial interest rates available anywhere. We also found evidence that some financial routes may have been one-way streets: The peculiar

behavior of Paris shadow interest rates inferred from the Amsterdam course of exchange suggests a limited use of Paris credit by Amsterdam bankers, but by contrast there is anecdotal evidence of Paris bankers relying on Amsterdam. The conclusion, therefore, is that within global finance there were capitals, hubs, highways, secondary routes, and a direction of circulation. There was certainly change, over time, as well.

Finally, at the intersection of these two issues –the high degree of international financial sophistication within the community of merchant bankers prevailing already in the early 18th century, and the chasm that existed between this community and a large variety of economic agents (both public and private) who lived outside the bell jar in abject underdevelopment – lies the key problem facing 18th-century thinkers of policy making. For them, much as for Hernando de Soto today, the question was not how to develop finance, since finance had already developed, but rather how to develop the rest of the economy to match the levels achieved inside the bell jar. Contemporaries thus struggled with the question of how to break open the jar of European financial capitalism so that it would pour its riches over the rest of the economy. Perhaps unsurprisingly, they were naturally led to look for lessons in the way merchant bankers had dealt with the matter and, in so doing, put the final stone on a building that had been started much earlier and whose completion may have indeed opened the way for the subsequent material revolution. As Condillac concluded a key chapter of *Le commerce et le gouvernement*: “Si l’art de mettre en valeur les terres avoit fait les mêmes progrès que l’art de mettre l’argent en valeur, nos laboureurs ne seroient pas aussi misérables qu’ils le sont.”⁶⁰

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⁶⁰ . Condillac (1776: chapter 17): “If the art of exploiting land had progressed as much as the art of exploiting money, our peasants would not be as miserable as they are.”

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Appendix 1. Evidence on interest rates from secondary sources

Table A.1. Interest rates in the early modern period

| Date | Source | Holland | Britain | France | Italy | Spain | Portugal | Turkey | America | China |
|-----------|----------------|------------|---------|--------|-------|--------|----------|--------|---------|-------|
| 1444—1460 | Massie 1750 | | 10% | | | | | | | |
| 1630 | Child 1668 | | 8% | | | | | | | |
| 1646—1665 | Massie 1750 | | 7% | | | | | | | |
| 1668 | Child 1668 | 3%; war 4% | 6% | 7% | <3% | 10—12% | | | | |
| 1666—1685 | Massie 1750 | | 5% | | | | | | | |
| 1683 | Petty 1690 | 3—3.5% | | 7% | | | | | | |
| 1690 | Barbon 1690 | 3% | 6% | | | | | | | |
| 1699 [?] | Hatton 1699 | 3% | 6% | 7% | 3% | 10% | | 20% | 10% | |
| 1686—1705 | Massie 1750 | | 5% | | | | | | | |
| 1705 | Law 1705 | 3—4% | | | | | | | | |
| 1716 | Hatton 1716 | 3% | 5% | 7% | 3% | 10% | | 20% | 10% | |
| 1729—1748 | Massie 1750 | | 4% | | | | | | | |
| 1750 | Massie 1750 | 3% | 4% | 5—6% | | | 5—6% | 12% | 7—9% | |
| 1766 | Smith 1776 | 2—3% | | | | | | “high” | 6—8% | 12% |
| 1776 | Condillac 1776 | 2—2.5% | | 5—6% | | | | | | |

Sources: Barbon (1690: p. 80), Child (1668: passim), Condillac (1776: p. 135), Hatton (1699, 1716), Law (1705: chap. 2), Massie (1750: pp. 44, 51), Petty (1690: chap. I), Smith (1776: I, p. ix). Note that subsequent editions of Hatton (1727, 1734, 1754, 1766, 1794) do not update the data –except for Britain’s data (which was probably adjusted for change in regulations; see text).

Appendix 2. Incidence on local rates on shadow foreign interest rates: 19th century evidence.

Table A.2 reports the results from simple regressions of the shadow Paris interest rate (computed from the London course of exchange) on the actual Paris interest rate (franc) and the London interest rate (sterling). As the table shows, there is a modest influence of local money market conditions on shadow interest rates, but the predominant driver is the actual interest rate. In the late 19th-century world of small transaction costs, the limited extent of the local money effect is understandable. We can surmise that this factor was more substantial for earlier periods.

Table A.2. Regression output (1900:01—1914:06, least squares)

| Dependent variable | Explanatory variable | | | | DW | Adj. R^2 | n -obs. |
|--------------------|--------------------------|--------------------------|--------------------------|----------------------------|----------|------------|-----------|
| | r_P | r_L | $Constant$ | | | | |
| r_P^L | 0.879956** (34.67501) | 0.056569** (3.257247) | 0.488423** (9.574705) | | 1.840358 | 0.940589 | 174 |
| Δr_P^L | Δr_P | Δr_L | $Constant$ | $Error\ correction$ | | | |
| Δr_P^L | 0.830261** (19.52174) | 0.043893 (1.489809) | -0.000578 (-0.035164) | -- | 2.990289 | 0.711300 | 173 |
| Δr_P^L | 0.904045** (27.17838) | 0.022615 (0.998388) | 0.306791** (10.00012) | -0.836597** (-10.98731) | 2.051867 | 0.830599 | 173 |

Note: Error correction factor is one-period lagged difference between franc rate in London and Paris open market rate, or $r_P^L(-1) - r_P(-1)$.