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

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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.  


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. 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, and 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

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1 The authors are grateful to the British Library and the archivists from the Nederlandsch Economisch-Historisch Archief for facilitating access to sources. Availability of the Goldsmith-Kress online library, “The Making of the Modern Economy” (MOME) through a free trial access proved critical. We thank Thomas M. Luckett for sending his unpublished dissertation and François Velde for sharing data on French government bonds with us. The comments of Jeremy Atack, Charlie Calomiris, Guillaume Daudin, Larry Neal, Camila Vann Malle, and conference participants are gratefully acknowledged.

2 “The key problem is to find out why that sector of society of the past, which I would not hesitate to call capitalist, should have lived as if in a bell jar, cut off from the rest: why was it not able to expand and conquer the whole society?”

3 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.
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fairly characterizes today's global financial system. During the past twenty-five years, he argues, many countries have formally opened up to global capital flows, but we still need to see the extreme efficiency displayed by New York's sophisticated financial markets 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. This "Braudelian" puzzle is called by de Soto the "mystery of capital."

This chapter revisits some critical aspects of this mystery of capital within the context of the eighteenth 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 bills 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 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 limited the regulatory backlash by temporal and religious authorities. Therefore, the contours of the bell jar coincided with the boundaries of world shipping, and the development of capitalism was confined to the realm of global commerce, "unable to conquer the whole society."

Another contribution of this chapter is to construct new series of commercial interest rates in Amsterdam, London, and Paris. Systematic evidence on these is not available from contemporary sources. This absence is in large part attributable to regulations that set caps on interest rates and deterred contemporaries from giving too much publicity to the business of lending. We measure the opportunity cost of lending by recovering the interest-rate component of foreign exchange quotations.

Finally, the new statistical material presented here shows that, although interest-rate levels were quite similar across markets, suggesting deeper integration, cyclical properties varied considerably, with more volatility in certain markets than in others (for instance, movements in Paris appear to have been dominated by seasonal variations). This means that the precise operation of the different credit markets located inside the global system is significant in its own right and calls for more research on markets microstructures.

The remainder of the chapter is organized as follows. The first section discusses contemporary views on how much interest rates differed across countries and why. The second section focuses on prime commercial lending and explains why clean series for interest rates are rare in primary sources. The third section develops a simple model of the bell jar and builds on it an arbitrage formula to retrieve "shadow" interest rates from exchange rate quotations. The fourth section discusses our findings in relation to national and international monetary architecture. The fifth section compares our results with other domestic interest-rate series, yield on government debt, and private returns on land. The last section offers conclusions and directions for future research.

I. Why do interest rates differ?

A. Josiah Child, interest rates, and prosperity

While it is hard to find consistent interest rate series, P.G.M. Dickson (1967) reckons that economists, policy makers and merchants of the seventeenth and eighteenth centuries were actually obsessed with international interest-rate comparison. 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," and the reasons why they were in some places more and in others less intrigued 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 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 prowess.

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]. "The abatement of the interest", Child claimed, "is the cause of the prosperity and riches of any nation," and to drive home his

4 de Soto, The Mystery.
7 Child, Brief Observations.
point Child's statement was typed in upper case 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 percent, the "Gentry lives in good conditions" but "Peasants are little better than slaves." In Italy, where rates stood at 3 percent, "people are rich, full of trade [and] well attired." The result held in Christendom but also "under the Turk Dominions, East-India, and America." 98

Child's approach anticipated Douglass North and Barry Weingast's celebrated paper on the relation between Britain's development and its "Financial Revolution" in the late seventeenth century. 9 Child's way of looking at economic progress became a genre in the period that followed. 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 percent, trade flourishes, but in Spain, and other places where the interest of Money is at 10 and 12 percent, the people are poor, and have but little trade." 100

One French economist of the mid-eighteenth century mentions that it is "a widespread opinion nowadays that the interest on money has an influence on agriculture and commerce." 11

Using the numerous books that compared "national" interest rates, we constructed Figure 6.1 (Table 6A.1 in the Appendix gives background data and sources). The chart captures the well-known downward trend in interest rates already emphasized by Carlo Maria Cipolla (1952). Gregory Clark (2005) argues that "the magnitude of this decline [of interest rates] is little appreciated, its cause is a mystery, and its connection to the shift to an economic system with persistent advance is unknown." 112

Contemporaries for their part were mostly intrigued by the cross-sectional properties of the data. They found that Holland and – perhaps more surprisingly, in view of recent literature on the topic – Italy, were rich countries with low interest rates. 13 Other European nations, such as Britain and France, were found within an interval of about 200 basis points above the two leaders. Britain's spread relative to Holland and Italy declines gradually. On the other hand, non-European countries had much higher rates: China, Turkey, and even such areas of European settlement as the West Indies and the British colonies of North America.

B. Constitutions, commitments and credit

We have suggested that there is a similarity between contemporary views on the relations between capital markets and development and the ideas articulated 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, eighteenth 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 his rhetoric strikingly "modern."

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

8 Child, Brief Observations.
9 North and Weingast, "Constitutions," 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.
11 Buchet, Causes de la dévétité, p. 3 "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 est admise, il serait superflu d'examiner si il est important de connaître les causes qui en déterminent le taux; l'utilité de cette recherche est évidente."
12 Clark, "Interest Rate," p. 1.
13 On Italy's financial lead, see Fratianni and Spinelli, "Did Genoa?"
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 gives 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.\textsuperscript{14}

Buchet was obviously speaking of Britain and his view was not isolated. Dickson identifies this conventional line of thought as the “confidence argument” (a close approximation of what economists call now credibility).\textsuperscript{15} It had many other proponents, such as Joseph Massie, who argued: “It is Government, and not nature, which makes Men thus differ from each other.”\textsuperscript{16} W. 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.”\textsuperscript{17} John Law, who motivated his 1715 project for a French government bank by the need to 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.”\textsuperscript{18} And at the end of the century, Mirabeau summarized: “A constitution: behold the basis of all economics, of all resources, of all confidence, of all power.”\textsuperscript{19}

\textsuperscript{14} “Cette différence [entre les taux d’intérêts (nationaux)] prend sa source dans les constitutions et civils. Si le Gouvernement peut anéantir, quand il le voudra, ses engagements quelles que soient ses forces et ses revenus, les risques seront tous 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 voient aucuns risques dans ces prés qui ne soient communs aux biens qui restent dans leurs mains, et l’influence qu’ont dans la plupart de ces Gouvernements tous les ordres de l’Etat donné dans ces conventions au général du peuple une confiance que n’ont Presque jamais au même degré les peuples dans les Monarchies; s’il fallait un exemple pour appuyer cette opinion, on trouverait aisément un de ces Etats qui quoiqu’un peu plus obéré, et avec moins de richesses que quelques autres, emprunte encore à un Taux plus bas” (Buchet, Causes de la diversité, p. 20; emphasis in original).

\textsuperscript{15} Dickson, Financial Revolution, p. 475.

\textsuperscript{16} Massie, An Essay on the Governing Causes, p. 57.

\textsuperscript{17} Temple, Observations, p. 190.

\textsuperscript{18} Emphasis added; quoted in Faure, Banqueroute, p. 56. Law’s Mémoire is published in Harshin, ed., Œuvres complètes.

\textsuperscript{19} Mirabeau, Suite, p. 70; quoted in Luckett, Cédos, p. 173: “Une constitution: voilà donc la base de toute économie, de toute ressource, de toute confiance, de toute puissance.”

Of course, the argument came in various packages. One 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.\textsuperscript{20} 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.\textsuperscript{21} The case was also made by Adam Smith, 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.\textsuperscript{22}

A variant emphasized what today’s credit agencies refer to as “transfer risks.” Poor government credit spills over on private credit because bad governments are likely to expropriate private agents in order to pay off their debts.\textsuperscript{23} 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.\textsuperscript{24} 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 he is indebted to.”\textsuperscript{25} For how could the law punish private bankruptcies, this same law that has not punished but authorized the general bankruptcy of the government?\textsuperscript{26}

\textsuperscript{20} An anticipation of La Porte et al. “Legal determinants” and “Laws and finance.”

\textsuperscript{21} An anticipation of Akerlof, “Lemons”.

\textsuperscript{22} Smith, An Inquiry, Book I, Chapter ix, p. 133, emphasis added.

\textsuperscript{23} Compare Moody’s Investor Service, Revised Country Ceiling Policy.

\textsuperscript{24} See Faure, Banqueroute, p. 55.

\textsuperscript{25} Quoted in Bouchary, Manieurs. “Le manque de foi de la part des gouvernements repandrait une defance generale entre les individus, car l’Etat peut aussi bien depouiller l’individu a qui il ne doit rien qu’il peut manquer a sa promesse envers ceux dont il s’est rendu debiteur.”

\textsuperscript{26} Brisot, Banqueroute, as quoted by Luckett, Cédos, p. 196.
II. Challenges of direct evidence

The parallel between contemporary views on credit and modern theories, which the previous section established, is as striking as it is intriguing: seventeenth and eighteenth century economists perceived and analyzed their world in pretty much the same way as today’s influential economic historians. On the one hand, this may tell us about the sophistication of contemporary understandings; on the other hand, it may suggest the incompleteness of our current beliefs. Should we trust eighteenth century observers? As Braudel would probably have argued, contemporaries perceive only imperfectly the world in which they live, and we cannot rule out that we too are erring on the wrong side.

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 6.1 used information from his “acquaintance[s] that had knowledge of foreign 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 Abbé de Condillac’s *Le commerce et le gouvernement* in which he discusses the situation of “revendueuses 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 percent per year.27 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 wholesale credit 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.28

27 Condillac, *Commerce*, pp. 147–8
28 We prefer using this notion rather than the modern concept of “risk free rate,” although it was known to contemporaries, as revealed by Massie’s sophisticated discussion of “Præmia of Risque.” Massie distinguished between sovereign rates, private commercial rates, and the interest rate at which the East India Company secured funds: “Part of the

The matter is further complicated by the existence of usury regulations. The numbers by Hatton (1699, 1716) and included in Table A.6.1 seem to have referred to legal ceilings, not to actual interest rates.29 A debate exists as to whether legal rates were effective or not. Peter Temin and Joachim Voth (2004) argue they were. They show that the records of Hoare’s bank reveal a perfect compliance to ruling usury rates circa 1714, when the legal rate was reduced. This may be too perfect to be true. Historians long emphasized that a current practice was to record a price for the amount of capital to be repaid at a level that would incorporate an adjustment of the official interest rate30 so that records would look fine. I lend 100£ at 7 percent, but rather than recording this as such, I can record a 102£ loan at 5 percent. 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.31 David Ricardo’s own 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.”32

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 it 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,” Essay, pp. 20–2. Similarly, Temple, *Observations*, dwelt on the differences between “country risk” and “sovereign risk,” referred to as “private” and “public safety.”

29 Indeed, Hatton, *The Merchant’s Magazine*, gave 6 percent as the interest rate in Britain. This was the usual rate prevailing at the time. This number is revised to 5 percent in the next edition (1716), following the 1714 abatement of the usury ceiling to 5 percent.
30 See e.g., Luckett, *Crédit.*
31 Luckett, *Crédit.* “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.”
32 As Ricardo wrote 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
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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. Therefore, 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 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. 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, as emphasized by Eric Kerridge, even church regulators had always been kinder with inter-merchant credit, in which they saw agreements between consenting adults. But the fact remains that a low price for bills is the same as a high interest rate.

A statement of this mechanism is provided in an early discussion by Gerard de Malyne (1601, p. 120). In effect, Mayne (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

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37 Formal legislation incorporated this principle, which was kept in force all over Europe until the early nineteenth century. De Roover, L’евolution, p. 45, gives Napoléon’s Code de Commerce as a late example.
38 The point was first made by Montesquieu’s Lettres Persanes. His critique was formally directed against Muslim’s sharia but really targeted Christianity. Adam Smith discusses this point in the passage referred to earlier, and where he 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.” Smith, Inquiry, Book I, Chapter IX, p. 133.
39 Kerridge, Usury, passim. 
40 See Munro, “Origins,” for a recent statement.
foreign bill) can produce a bigger interest rate than domestic credit, which British regulations of the time limited to 10 percent:

The difference betwixt those that deliver their money at interest or by exchange, in regard of usurie, consisteth only 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 contented 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 eighteenth 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 financial textbook of the time. 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 agents who were “feigning an exchange.” 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. If the operation was covered then it was bound by arbitration 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 eighteenth century, as tolerance for credit increased.

In summary, exchange bills were “off shore” financial products 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?” Condillac’s assessment resounds as the late eighteenth century’s pragmatic answer to Malynes’s earlier moral concerns. Through the agency of bills of exchange, credit had become a fact of life.

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. Direct evidence on commercial interest rates is exceedingly difficult to come by. Whichever financial center we are looking at, there are no recorded series of “money market” rates for the period before the French Revolution. Rather, such series generally start around the second half of the nineteenth century. This seems to conflict with the earlier indication that contemporaries knew what they were talking about when they mentioned “national interest rates” but it is consistent with the fact that we are dealing with an over-the-counter market. In order for “one” price to be recorded and quoted, a formal centralized market must be organized. This requirement was not met by the credit markets of the time, since interest rates resulted from bilateral drawing arrangements that were in turn put to work as a lever for operating on the foreign exchange market. Formalization and centralization prevailed in the foreign exchange market, not in the money market. As a result, a precise notion of the “general interest rate,” meaning probably the typical conditions that the best 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 practitioners but was nowhere to be quoted. Yet the “local” interest rate that a banker would extend to his 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.

41 Hayes, *Negociator Magazine*. 42 de Roover, “What is Dry Exchange?” 43 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,” *Negociator Magazine*, p. 3. 44 Carrière et al., *Banque et capitalisme*, p. 32.

45 “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?” *Commerce*, p. 141.

46 Reflecting on this paradox, Lüthy, *Banque protestante*, p. 435 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 prêter-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%”).
These considerations shed light on the significance of the alternative sources that are nonetheless available. One is the interest rates at which banks of issue would discount bills when they did. Since these banks had 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 occasional reports in contemporary commercial letters, 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 (i.e., genuine operators) 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, archives are not a magic bullet. Sheer luck is involved, and the cost of collecting information can become prohibitive. Beyond the problem of the significance of the material they contain, we want to make sure that we focus on really top signatures, i.e., "risk free", not an "average" merchant, or industrialist of good standing. The intersection of these constraints with what little material is available may be zero.

Thus, interest-rate collectors have tended to be eclectic in their choice of sources, as illustrated by Sidney Homer and Richard Sylla's pioneering work. 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 percent to 3 percent for the period 1735-1738. This is below the range (of 3 percent to 3.5 percent) that Pierre de la Court, writer of several financial handbooks, indicated for "commercial interest" in 1671. Elisabeth de Jong-Keesing (1939) studied the crisis of 1763 from bankers' archives and found (unsurprisingly) somewhat higher rates (between 4 percent and 6 percent). As far as we know, there are no continuous series for the Bank of Amsterdam, although it reportedly started to discount bills in the eighteenth century. R.V. Eagly and V.K. Smith (1976) mistakenly refer to a series in N.W. Posthumus (1946) as an "interest rate" series while it is really the agio of the Bank of Amsterdam. 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 C.H. Wilson (1939) refers to the work by J.G. Van Dillen (ca. 1930, p. 3633), which contains additional evidence.

To our knowledge, no source documents short-term commercial interest rates in London. Homer and Sylla rely on Clapham (1944), who gave 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 the rate fails to reflect the genuine cost of borrowed capital. We are not aware of studies documenting interbank discount rates during the period under study.

Evidence for France is even more patchy. Homer and Sylla rely extensively on a late nineteenth century dissertation by G. Saugrain (1896). Saugrain indicated rates for France in the early eighteenth century ranging between 4 percent and 10 percent, but he stated that rates did not exceed 6 percent after 1776.55 Direct evidence from bankers' correspondence supports slightly lower rates. René Squarzoni quotes reports in the late 1720s giving 6 percent as the "norm" in Lyons, though "scarcity" may have caused interest rates to rise as high as 9 percent. Sources quoted by Herbert Lüthy (1959) also suggested

51 Vilar, *Or et monnaie*.
52 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 Roberts, "Economic Explanation."
53 "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, "Economic Decline," p. 122. We referred to Van Dillen, "Bromen," 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.
54 Note, however, that "usury" (i.e., the maximum legal interest rate) was at 5 percent after 1714 and that the Bank of England rate was at 4 percent during most of the century.
55 "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, *Baisse*, p. 107.
56 Squarzoni, *Mécanismes*, p. 283. "La puissante maison Selion confirme ce point de vue en indiquant a nouveau le taux de 6% l'an comme norme à Lyon pour les négociants et banquiers de premier rang. . . . Lyon, Selion père et fils, 6 Novembre 1729 . . . 1 1/2 %"
that, from mid century onward, interest rates in France might have been lower: close to 4 percent on average. Sources for the late eighteenth century mentioned Paris interest rates of about 4-4.5 percent in 1790 as well as foreign drawing arrangements on Paris at 5 percent in 1789. A rare discovery is that of Thomas 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. According to this source, the interest rate for bills of exchange remained at 6 percent from 1746 (when the Affiches started being published) to April 1749, was then reported at 5 percent until September 1758, and then returned to 6 percent. 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.” In any case, the series lapses in 1759, and we can only speculate on the reasons for this.

III. Shadow interest rates

A. The bell jar: a model

Consider the following thought experiment. The world is made of n trading centers. As in Condillac (1776), 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. To simplify, regulations prevent the emergence of a market for domestic credit so that there is no such thing as a “local” interest rate (an interest rate at which local bankers would lend money to one another). Suppose as well that there are no transaction costs and that all markets use the same currency, so that there is no exchange risk. This convenient assumption will be amended at a later stage.

Now, we let merchant bankers trade their bills of exchange all over the world. In equilibrium, this determines a uniform “world” interest rate, say r. This is because if the rate at which bankers agree to swap their positions differs from unity, then arbitrage is feasible. This also determines the price at which foreign exchange bills trade in each market. Let’s call this price the “exchange rate,” or $a_{ij}$. It is the price bankers in market i are prepared to pay in order to purchase one unit of “universal” currency to be paid in market j within, say, two months. If the world interest rate r is expressed in percentage per annum and the maturity of the bill is two-months (one-sixth of a year)

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

This shows that merchants need not quote the interest rate r but only the exchange rate. 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 trade domestic balances against foreign time deposits. This world displays a peculiar form of financial development; 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. This is the essence of the bell jar. Globalization may precede national development.

62 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
Two slight complications are now introduced to make our framework more realistic. First, exchange rates can vary. Merchant bankers buying bills denominated in specific currencies must adjust the world interest rate according to their expectations of future exchange rate changes. The result is k 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 k − 1 different local shadow interest rates for each individual centre. Obviously, arbitrage ensures that the k − 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. In this economy, we have only “bilateral” interest rates, i.e., interest rates in city j as seen from i.

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 center (j). Denoting by $a_j$ the number of units of currency $i$ that bankers give to get one unit of currency $j$ in country $j$ in $n$ months and $a_i$ 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 $r_j^*$ as the shadow interest rate in center $j$ “according” to center $i$:  

$$r_j^* = \frac{12}{n} \left( \frac{a_j}{a_i} - 1 \right)$$

(2)

To be precise, $r_j^*$ is the marginal interest rate in center $j$ as given by center $i$. “Marginal” means the following: suppose that in market $i$, where bills on $j$ are being traded, there is a number of bankers who have 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 concept of the opportunity cost of lending real resources.

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various drawing arrangements with their correspondents in market $j$. Banker A can lend and borrow from his correspondent at 4 percent, Banker B at 5 percent, Banker C at 5.5 percent, 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 percent. Only banker A will find it profitable to buy such bills. 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. When one drew a bill on a foreign center, one could never be entirely sure of the conditions there. The correspondent might have changed terms or even gone bust. There was thus an inevitable element of chance. Therefore, the series we are about to uncover reflects a given market’s perceptions of the conditions in another foreign market at a given time. This is certainly not the same thing as knowing the actual interest rate in that center, if such an interest rate existed at all. But we must emphasize that in the eighteenth century, that’s 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 a spot exchange-rate series from knowledge of the price of time bills and interest rates. Foreign exchange quotations recorded the price of “notional” contracts, typically a one, two, or three-month bill payable in a given foreign place. However, comparisons require putting all exchange rates on the same time.

63 Reference to future payments has misled a number of authors, who have referred to these quotations as “forward exchange rates.” For instance, Juhl et al., “Covered Interest Arbitrage,” 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, “Globalization,” 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., “Covered Interest Arbitrage.” Since CIP is a condition on the pricing of forward markets, these authors must think of time bills as genuine forward instruments.
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Another group of studies has been concerned with matters of market integration. 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:

\[ r_f - r = 0 \]  

Marc Flandreau and Chantal Rivière explore the theoretical foundations for this relation. They show that the actual interest rate is a lower bound for the shadow interest rate. Specifically, shadow rates are kept within a fluctuation band. The upper bound is the actual interest rate augmented by a factor related to arbitrage costs. The key intuition is that agents incur a transaction cost when they move capital from one market to another. 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 expenses \( c \). As a result, the shadow interest rate is always above the actual interest rate:

\[ r_f \leq r \leq r + \frac{12 \cdot c}{n} \]  

Focusing on the Paris shadow interest rates and the Paris actual open market interest rates derived from London sources during 1900–1914, Flandreau and Rivière show that (5) performs very well empirically, suggesting no hindrances to credit and foreign exchange operations during that period.

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64 An illustration of this is found in William 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. Tate, Modern Cambist, pp. 59–60. “The two places of operation should be taken at a long date as three 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 35 Cents. Paris on London at 3 months - Fr. 25 10 Cents. The discount for 3 months is 0.25 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.” See also Tate, Foreign Exchange.


66 See Flandreau and Rivière, “Grande Retransformation” for details.

67 Flandreau and Rivière’s claim that the shadow interest rate is, in the context of nineteenth century arbitrage, an upper bound for the actual interest rate is also illustrated in graphs provided by Calomiris and Hubbard, “International Adjustment” (Figures 7.1 and 7.2) for the US dollar. In addition, our Appendix shows that the existence of transaction costs implies that local market conditions do have an effect on the shadow interest 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.
Table 6.1. Exchange market money market arbitrage operations: survey

<table>
<thead>
<tr>
<th>Authors</th>
<th>Country pair/period</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbitrated exchange rate or interest rate</td>
<td>New York/London (1803–1895)</td>
<td>Shadow spot exchange rate dollar/sterling</td>
</tr>
<tr>
<td>Shadow exchange rate</td>
<td>New York/London (1835–1900)</td>
<td>Shadow spot exchange rate dollar/sterling</td>
</tr>
<tr>
<td>Shadow interest rate</td>
<td>London/Amsterdam (1731–1789)</td>
<td>In effect: shadow interest rate in Amsterdam from London</td>
</tr>
<tr>
<td>Eagly and Smith (1976)</td>
<td>London/Amsterdam (1731–1795)</td>
<td>Shadow interest rates in Amsterdam and in Paris from London</td>
</tr>
<tr>
<td>Calomiris and Hubbard (1996)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstfeld and Taylor (1998)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flandreau and Riviere (1999)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

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 vlaamisch Banco of Amsterdam, the British pound sterling, and the French écu (of three livres tournois) during the eighteenth century. This follows Eric Schubert who computes point wise eighteenth century shadow interest rates for Amsterdam and Paris, and Luckett (1992), who constructs a series of monthly average French shadow interest rates from exchange rates in London during 1740–1789.70

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. A convenient, if anachronistic, metaphor would be to liken our new 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 regulation Q.71 In other words, what we are really computing is, in a world of credit controls, the interest rate

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70 Specifically, Schubert, “Arbitrage,” computes average shadow interest rates from bills in London on Amsterdam and Paris for periods between four and fifteen years and then applies a uniform 4.3 percent to various series to derive spot exchange rates. The 4.3 percent is “in the range of interest rates observed in typical long bills in London on Amsterdam” (p. 3).

71 Schenk, “The Origins.”
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on “Euro-écus” and “Euro-schellings” in London as well as the interest rate on “Euro-pounds” in Amsterdam. The euro-currency metaphor 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 with briefly surveying the sources and move swiftly to the estimation techniques and results.

A. Minutiae

We have relied on Castaing’s Course of Exchange (London) and on the Koers de Koopmanschappen (Amsterdam). The Course of the Exchange is from the collections of the University of London Library and British Museum and the Lloyd’s List. Our database is more complete than similar ones used in literature. The Course provides the implicit interest rate in Amsterdam and Paris only since these are the cities for which both two-month and sight maturities are recorded. 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. For each date, a range of exchange rates is 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. 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 World War II. The original copies of Prijscourenten-Koers van de Koopmanschappen are located in Copenague Rijksarchief for 1708–1734 and in Words Arisp Nacional Jacarta for 1734–1789. The Koers provides two different maturities on London and Paris, starting fairly early on. Yet because most of the data for the first quarter of the eighteenth 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.

Previous research about the topic considers sight as spot and derives the implicit interest rate by straight application of formula (2). 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 physical delay involved with such things as the time needed for reaching Dover and crossing the Channel, as one late eighteenth century banker does in the opening pages of Charles Dickens’ Tale of Two Cities. Similarly, for long bills, one must reckon

76 See Schneider et al., Statistik.
77 Except for years 1757, 1759, and 1783, when no Prijscourenten has been kept; Posthumus, Inquiry.
78 According to the Prijscourenten, 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 Lesagnol, Missieux, although the Third Anglo-Dutch War (1672–1674) did not create major commercial disruptions, the following period of conflict between England and France (1668–1697) had major consequences on international trade about which see Clark, Dutch Alliance. 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.”
79 See Eagly and Smith, “Domestic and International Integration,” p. 201, and Schubert, “Arbitrage,” p. 4, for eighteenth century data, though these papers do not show the interest-rate graphs and data. See also Boyer-Xambeu et al., “L’intégration,” p. 2 for the nineteenth century calculations.
Table 6.2. Time horizon for "long" and "short" bills

<table>
<thead>
<tr>
<th></th>
<th>&quot;Long&quot;</th>
<th>&quot;Short&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maturity</td>
<td>Days of grace</td>
</tr>
<tr>
<td>In London on Amsterdam</td>
<td>2 months and/or 2.5 months</td>
<td>6</td>
</tr>
<tr>
<td>In London on Paris</td>
<td>2 months</td>
<td>10</td>
</tr>
<tr>
<td>In Amsterdam on London</td>
<td>2 months</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: (a) Hayes (1724, pp. 261–5; 1777, pp. 11, 260–5; (b) Hayes (1724, p. 261); Markham, General Introduction, p. 236; Hewitt (1740, p. 25); (c) Hayes (1724, p. 261); Markham ibid., p. 236); Hewitt (1740, p.25); Hayes (1777, p. 266); (d) Anonymous, La Guía d'Amsterdam (1701, p. 45) which indicates "Les lettres parrent 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".

with the grace period between the day the bill is presented and the day it is paid. Thus, the long exchange rate $a_t[n_t]$ and the short exchange rate $a_t[n_0]$, can be rewritten in terms of an imaginary spot exchange rate $x_{ij}$ as

$$a_t[n_t] = x_{ij} \left( 1 + r_j \cdot \frac{n_t}{365} \right)$$

$$a_t[n_0] = x_{ij} \left( 1 + r_j \cdot \frac{n_0}{365} \right)$$

Substituting for $x_{ij}$ gives the arbitrage condition that we have used to derive shadow interest rates (details for sources are shown in Table 6.2):80

$$r_j = \frac{(a_t[n_t] - a_t[n_0]) \cdot 365}{a_t[n_t] \cdot n_t - a_t[n_0] \cdot n_0}$$

80 The most used book about exchange rate in eighteenth century London is Hayes, Negotiator Magazine. See also Marius, Advice; Brinag, Sito; Hewitt, Treatise; de Sequeira, New Merchant's Guide; Dickinson, Foreign Exchange and Trade, Modern Combit.

81 We have relied on the sources indicated by Luckett, Credit, and "Crises" rather than on Luckett's own chronology of financial crises. The reason is that Luckett 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.
Table 6.3. List of financial crises, 1700–1789

<table>
<thead>
<tr>
<th>Crises</th>
<th>Source</th>
<th>Centers affected</th>
<th>Motive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lüthy (1959, vol. 1, p. 226)</td>
<td>Paris (1709 only)</td>
<td>Plague, famine, and fall of leading banking houses</td>
</tr>
<tr>
<td></td>
<td>Lüthy (1959, vol. 1, pp. 256–5)</td>
<td>Paris</td>
<td>Having lent to the king</td>
</tr>
<tr>
<td>1720</td>
<td>Kindleberger (1989)</td>
<td>London, Paris</td>
<td>South Sea, Mississippi</td>
</tr>
<tr>
<td></td>
<td>Neal (1990)</td>
<td>Paris</td>
<td></td>
</tr>
<tr>
<td>1725</td>
<td>Marion (1914, pp. 124–9)</td>
<td>Paris</td>
<td>Final liquidation of the Law system and devaluation of the <strong>livre tournois</strong></td>
</tr>
<tr>
<td>1745</td>
<td>Neal (1990, p. 169), from Ashton (1959)</td>
<td>London</td>
<td>Jacobite rebellion in Scotland; war of the Austrian succession (1740–8) with heavy influence on Amsterdam</td>
</tr>
<tr>
<td>1761</td>
<td>Neal (1990, p. 170), from Ashton (1959)</td>
<td>Panic confined to London</td>
<td>Unknown</td>
</tr>
<tr>
<td>1763</td>
<td>Kindleberger 1989; Luckett, (1992, p. 134)</td>
<td>Amsterdam, Hamburg, then London and Paris</td>
<td>End of the Seven Years war, Failure of De Neuvilles</td>
</tr>
<tr>
<td>1772-1773</td>
<td>Neal (1990, p. 170); Kindleberger (1989)</td>
<td>Scotland, then London and Amsterdam</td>
<td>Unknown</td>
</tr>
<tr>
<td>1788</td>
<td>Luckett (1992)</td>
<td>Paris</td>
<td>Partial default on French debt</td>
</tr>
</tbody>
</table>

reconstructed from foreign exchange data demonstrates the consistency between these alternative sources.

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
Commercial interest rates between two revolutions, 1688–1789

Figure 6.5 Commercial rates, five-year moving averages (%).

Source: see text.

retrieved. An implication of this is that commercial credit was sufficiently developed and efficient since there was 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 chapter. 82

A second finding is the consistency between the behavior of implicit interest rates and independent evidence on crises, suggesting here again that our computations are very informative. As already emphasized by Luckett (1992), monetary crises were accompanied by high interest rates and this is exactly what we find. Moreover, although many crises were idiosyncratic, we note that some had an impact on several interest 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 exhibit co-movements in periods of stress.

We now take a look at the long-run behavior of the three commercial interest-rate series thus computed. This is done in Figure 6.5, which depicts five-year moving averages. Differentials between series remain

small throughout, especially for the Amsterdam–London pair. Paris interest rates were slightly higher – say, between 4 percent and 5 percent when London and Amsterdam were between 3 percent and 4.5 percent – 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 6.1 (whereby Amsterdam rates were lowest, followed by British and French rates in that order) is modified. 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 Phil Hoffman et al. (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 US independence), the evidence reported here suggests that we should be dealing with late eighteenth century monetary tensions as European-wide phenomena. 83 An implication would be that the financial distress that preceded the Revolution might have more to do with European trends than with French ones.

C. Cycles and seasonality

The data also exhibit cyclical patterns. A glimpse at Figures 6.2–6.4 shows that Paris is relatively stable while London is less so and Amsterdam displays much variation. Some authors have argued that these flat interest rates bear no connection with the state of the economy. 84 But computing monthly average spreads against annual averages suggests a more nuanced characterization. As illustrated in Figures 6.6 and 6.7, Paris rates – although stable in the long run – displayed a highly seasonal pattern of fluctuations until 1770. This is also true of London and Amsterdam rates. Of all three economies, the French one was probably the most reliant on agriculture. We thus cannot rule out that money

82 Incidentally, note the strong similarity between the implicit interest rate we compute for Paris during the mid-eighteenth 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.

83 A rare exception emphasizing the international character of tensions in international credit markets of the 1780s is Bouchary, Le Marché.

84 See, for example, Hoffman et al. Pricelles Markets.
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.\textsuperscript{85} 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.

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 6.4): 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 instances where one maturity only 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.\textsuperscript{86} Paris bills in Amsterdam

\textsuperscript{85} Carrière et al., Banque et capitalisme, p. 87.

\textsuperscript{86} See Condillac, Commerce. 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
may have lacked liquidity, and their price must have behaved in a somewhat erratic way.

In any event, the result from our exercise is depicted on Figure 6.8, 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.

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 Guy 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 on each other. Paris would charge 5 percent and Amsterdam 4 percent; this was said to be in connection with the "usually lower" rate.

In July 1789, when the cost of money rose suddenly in Amsterdam to an "extraordinary level" of about 5–6 percent, Courtiau Echenique, Sanchez & Cie reneged on its promise to Greffuhle and started charging 5 percent. 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 percent, 10 percent, or even 12 percent."

The episode raises many interesting 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?

V. The bell jar: inside and outside

This chapter 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 yields 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 from The Course of Exchange; the series for France is the background series for François Velde and David Weir (1992). Returns on land are taken from Clark (2005), who computed a rent charges series for Britain and reports some values for France.

The result (Figures 6.9 and 6.10 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 in 1688 essentially established its credit on the same footing as the best commercial signatures in Amsterdam when they borrowed sterling from their London counterparts. And since we have assumed that the best conditions in London as measured in Amsterdam are informative of the opportunity cost of capital in London, we must conclude that the British government was not faring

better than London merchants. 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 6.9 tells anything, it is that commercial and sovereign credit behaved alike; thus it is not clear what drove what.

Figure 6.10, for its part, shows that the notion of a sovereign ceiling does not apply to the eighteenth 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. Of course there is an issue with the slope of the yield curve since we are comparing short and long term debt, but this cannot be the entire story. At the very least, this casts doubts on the costs-of-transfer risks and institutional moral hazard in the Ancien Régime economy. We conclude that in France, the benchmark interest rate was provided by corporate credit (just as Condillac argued). 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 eighteenth century as displaying a “corporate ceiling” rather than the “sovereign ceiling” that exists today.

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 converge to 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, 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 to attract the attention of merchants thus became an inclusive part of the bell jar. The rest were locked out.

VI. Conclusions

Owing to the fragmentary nature of the data, the evidence in this chapter must remain incomplete. But a number of truly 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 neo-institutional 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. They are bound to have trickledown effects on economic development, with the improvement in the quality of the sovereign percolating the economy at large through a reduction of all interest rates. The political transformations that took place in 1688 and after would then 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 merchants all over Europe. In effect, the low interest rates at which the British government managed to secure capital during the eighteenth century, after its reorganization of 1688, were identical to the cost at which Amsterdam or Paris merchant bankers lent money to their London counterparts.

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 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 seventeenth century, "benchmark" rates were provided by commercial credit so that there was no sovereign ceiling. Corporate governance was the basis of credit, and government had to adjust to it. The history of finance in the eighteenth 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 subjecting to 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. 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 eighteenth century.

We also emphasize, however, that our claim that financial development was in essence an international phenomenon does not mean that financial geography was a tabula rasa - a blank slate. 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.

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 eighteenth century, and the
Appendix A  Evidence on interest rates from secondary sources

Table 6A.1. Interest rates in the early modern period

<table>
<thead>
<tr>
<th>Date</th>
<th>Source</th>
<th>Holland</th>
<th>Britain</th>
<th>France</th>
<th>Italy</th>
<th>Spain</th>
<th>Portugal (a)</th>
<th>Turkey</th>
<th>North America</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>1444</td>
<td>Massie</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1640</td>
<td>1750</td>
<td>8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1650</td>
<td>Child</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1665</td>
<td>Massie</td>
<td>7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1668</td>
<td>Child</td>
<td>3%; war 6%</td>
<td>7%</td>
<td>&lt;3%</td>
<td>10%-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1668</td>
<td>4%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1666</td>
<td>Massie</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1668</td>
<td>Petty</td>
<td>3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1690</td>
<td>3.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (a) "Turkey" refers to either "Ottoman Empire" or so-called "Mahometan nations." Sources: Barbon, "Discount," p. 80; Child, Brief Observations; Condillac, Commerce, p. 135; Hatton, Merchant's Magazine and Gages Commercial; Law, Money, Chap. 2; Massie, Essay, pp. 44, 51; Petty, Political Arithmetic, Chap. 1; Smith, Inquiry, book 1, pp. 127-9 and 133. 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 B  Incidence on local rates on shadow foreign interest rates: nineteenth century evidence

Table 6A.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 nineteenth 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.

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88 Condillac, Commerce, Chap. 17: "If the art of exploiting land had progressed as much as the art of exploiting money, our peasants would not be as miserabule as they are."
### Table A.2: Regression output (1900.01–1914.06, least squares)

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>$\tau^f$</th>
<th>$t$-stat</th>
<th>$\Delta \tau^f$</th>
<th>$t$-stat</th>
<th>$\Delta^2 \tau^f$</th>
<th>$t$-stat</th>
<th>$\Delta^3 \tau^f$</th>
<th>$t$-stat</th>
<th>Error correction factor (one-period lagged difference between the price of gold in London and the price of gold in Paris)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\tau^f$</td>
<td>0.070969**</td>
<td>0.096869**</td>
<td>0.092021**</td>
<td>0.097978**</td>
<td>-0.004178</td>
<td>0.048909</td>
<td>1.20174</td>
<td>-0.035796</td>
<td>0.306791</td>
</tr>
</tbody>
</table>

**Note:** Error correction factor is the one-period lagged difference between the price of gold in London and the price of gold in Paris.

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