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Banking as an Emerging Technology: Hoare´s Bank 1702-1742

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BANKING AS AN EMERGING TECHNOLOGY: HOARE´S BANK 1702-1742*

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Abstract

Analysis of the financial revolution in England has often focused on changes in public debt management and the interest rates paid by the state. Much less is known about the evolution of the financial system providing credit to individual borrowers. We document the transition from goldsmith to banker in the case of Richard Hoare, and examine the operation of the loan market during the early eighteenth century. Learning how to use the relatively new technology of deposit banking was crucial for the bank's success and survival. Innovation during the early stages of the British Industrial Revolution was not limited to manufacturing and transport, but played a critical role also in the service sector.

Keywords: Banking and credit, English Industrial Revolution, interest rate determination, credit rationing, technological change and learning.

JEL code: G21, N23, N83, O16, O31.

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1. Introduction

London's financial market underwent a dramatic change after 1700. While more limited than Paris or Amsterdam in the 17th century, London became the leading financial center in Europe in the 18th. There is an extensive and growing literature on the causes of this change, but comparatively little on the change itself. This paper provides detailed information on the operation of the London financial market around 1700 by describing the actions of a nascent London bank. We have a window into an important market during a period of dramatic change.

Our view is into the detailed records of a West End bank in its formative years, during a crucial period of London's evolution as a financial market. Richard Hoare was a goldsmith who moved to Fleet Street in 1690 and began to make the transition from all-purpose jeweler to banker. He was successful in this effort, and Hoare´s Bank still exists as an independent private bank, operating from the same address as Richard Hoare and serving a selected group of families, some of whom have been with the bank for many generations – sometimes from the 1700s. The Bank's archives contain records for the early 18th century that document the process by which Richard Hoare made the transition from goldsmith to banker.

The increasing sophistication of Richard Hoare and his successors can be seen as the learning needed in the use of new technology. Initially, when switching from goldsmith to banker, Richard Hoare had to adopt banking practices that had been in use at merchant banks for a while. Once Hoare's had caught up with eighteenth-century "best practice", he joined a select group of West End bankers that transformed the process of credit provision. Hoare did not introduce a new spinning device, but he was engaged in a new economic activity, the extension of credit outside the tight-knit community of merchants, or the even smaller community of princely rulers. Organization and operating procedures had to be created almost without prior models. This is not to deny the existence of banks before 1700, but rather to note that they were specialized almost exclusively in the financing of trade, in providing payment services and extending loans

to a small group of international merchants.[1] We assert that to switch from goldsmith to credit intermediary at that time was to venture into a largely unknown activity.[2] Just as the use of any new machine requires a process of learning and adaptation, so too the introduction of commercial banking to the wider public of London required organizational innovation by Richard Hoare and his associates.

He was not alone in this exploration. Hoare's joined a small group of goldsmith bankers such as Child's, a handful of financial pioneers.[3] Joslin observed that it was not until 1725 that there were two dozen private bankers in the West End; the total number of banks in London did not exceed 42 in 1700.[4] Many firms and individuals drifted into the banking business, only to give it up after a few years – most bankers in 1700 were no longer in the business by 1725. Richard Hoare learned faster than most, and Hoare's Bank was a survivor.

This transition is of interest to three separate literatures. First, the discussion of the long-run development of financial markets makes frequent mention of the transition we observe, but seldom contains much about the actual process. Kindleberger, for example, dated the transition to the middle of the 17th century, citing the experience of a few goldsmiths without much information about their banking activities.[5] He also failed to make the important historical distinction between the growth of merchant bankers concerned with international trade and private London bankers extending credit domestically. The principal innovation that occurred in the transition from goldsmith to banker was to provide credit to a growing group of clients–not just the king and a few noblemen and merchants–and to finance this lending through deposits. One of the most

[1] L. Neal, *The Rise of Financial Capitalism* (Cambridge: Cambridge University Press, 1990); Stephen Quinn, "Goldsmith-Banking: Mutual Acceptance and Interbanker Clearing in Restoration London," *Explorations in Economic History* 34, no. 4 (1997); Herman Van der Wee, "Monetary, Credit and Banking Systems," in *The Cambridge Economic History of Europe*, ed. E.E. Rich and C.H. Wilson (Cambridge: Cambridge University Press, 1977).

[2] Earlier bankers had learned their trade in the form of apprenticeships, but again, their main business was either in offering payment services or very limited access to credit. Cf. Quinn, "Goldsmith-Banking: Mutual Acceptance and Interbanker Clearing in Restoration London," .

[3] Stephen Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705," *Journal of Economic History* 61, no. 3 (2001). We thank Stephen Quinn for pointing out that initially, Hoare's was simply adopting practices pioneered by other goldsmith banks that had made the switch at an earlier stage.

[4] D.M. Joslin, "London Private Bankers, 1720-85," *Economic History Review* 7 (1954). Quinn, "Goldsmith-Banking: Mutual Acceptance and Interbanker Clearing in Restoration London," , p. 411.

substantial goldsmith bankers, Alderman Backwell, lent very considerable sums to Charles II, as did other goldsmith bankers.[6] Their business was not fundamentally different from that of the Fugger in the 16th century and of the Ricciardi in the fourteenth.[7] Goldsmith banking in the late seventeenth century had already provided for efficient payments, and it allowed customers to keep their surplus cash in a safe place.[8] Scriveners offered the kind of matching services provided by Paris notaries throughout the eighteenth century, and also accepted deposits.[9] Yet in contrast with the French experience, banks and not notaries became the key financial intermediaries in England. The transition was gradual. Competition continued for an extended period, given that we find scriveners mentioned as important middlemen as late as 1713.[10] Also, Hoare's itself would pass on mortgages to its customers if it did not want to take them itself.[11]

Second, these were turbulent years for Londoners involved in finance. North and Weingast argued that the Glorious Revolution of 1688 put government finances on a solid footing providing a base on which the London financial market could grow.[12] They also emphasized the importance of financial deepening for subsequent economic development, an argument that is in line with recent macroeconomic research.[13] This claim has recently been disputed through an examination of private interest rates by Clark and by Quinn.[14] Sussman and Yafeh, examining yields on government bonds, claimed

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[5] Charles P. Kindleberger, *A Financial History of Western Europe*, 2nd ed. (Oxford: Oxford University Press, 1993), p. 53-4.

[6] R.D. Richards, *The Early History of Banking in England* (P.S.King & Son, 1929), p. 67-73. See also Quinn, "Goldsmith-Banking: Mutual Acceptance and Interbanker Clearing in Restoration London," .

[7] Kindleberger, *A Financial History of Western Europe* , p. 44

[8] One of the earliest records kept at Hoare's bank details payments made on the note of Samuel Pepys in 1680. While Pepys had an overdraft with the bank, most other customers deposited funds first, and then made payments through notes presented at the bank (Richards, *The Early History of Banking in England* , Appendix 2).

[9] Philip T. Hoffman, Gilles Postel-Vinay, and Jean-Laurent Rosenthal, *Priceless Markets : The Political Economy of Credit in Paris, 1660-1870* (Chicago: The University of Chicago Press, 2000); Richards, *The Early History of Banking in England* .

[10] An Act under Queen Ann (12 Anne, Stat. 2, c. 16, s. 2) mentions them prominently (Richards, *The Early History of Banking in England* , p. 17).

[11] Henry Peregrine Hoare, *Hoare's Bank. A Record 1673-1932* (London: Butler and Tanner, 1932).

[12] Douglas North and Barry Weingast, "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England," *Journal of Economic History* 49, no. 4 (1989).

[13] Ross Levine and Sara Zervos, "Stock Markets, Banks, and Economic Growth," *American Economic Review* 88 (1998).

[14] Gregory Clark, "The Political Foundations of Modern Economic Growth: England, 1540-1800," *Journal of Interdisciplinary History* 26, no. 4 (1996); Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705," .

that the financial innovations needed to pay for England's wars in the early 18th century were more important for the development of the financial market than any constitutional change in 1688.[15] O'Brien also emphasized that King William involved England in a series of expensive wars, and brought with him Dutch bureaucrats who facilitated the financing of his martial ambitions.[16] This broad view supports the more technical arguments made by Sussman and Yafeh.

Authors from Ashton to Brewer and Ferguson have noted the elastic supply of savings in 18th century England.[17] The government was able to borrow freely, financing its military adventures without causing interest rates to rise much, and without causing French-style crises. While the literature focuses on the government's ability to borrow, it contains the corollary that private savings were increasingly channeled through the financial system – and that, when the country was at peace, numerous individuals could borrow as well. Joslin articulated this position in a qualitative survey of private banks in London.[18] He argued that the private banks loaned domestically, while quite separate merchant houses provided credit for trade, as described by Neal.[19]

Quinn recently made a start on the quantification of the private domestic financial market. He analyzed the records of Child's Bank, testing the North and Weingast hypothesis.[20] Quinn therefore did not detail how London banks operated in these critical years. He also assumed that early London banks were thoroughly modern in their domestic operations, perhaps by analogy with the sophisticated international transactions of merchant banks. We assert that this analogy is not valid and that domestic bankers at the start of the 18th century were entering a new business, serving a new clientele. This was symbolized by their moves from the City to the West End; Hoare's Bank moved to a location just steps away from the Strand.

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[15] Nathan Sussman and Yishay Yafeh, "Constitutions and Commitment: Evidence on the Relation between Institutions and the Cost of Capital," *unpublished manuscript, Hebrew University, Jerusalem* (2002).
[16] Patrick O'Brien, "Fiscal Exceptionalism: Great Britain and Its European Rivals -- from Civil War to Triumph at Trafalgar and Waterloo," *LSE Economic History Working Paper* 65 (2001)
[17] T. S. Ashton, *The Industrial Revolution, 1760-1830* (London, New York [etc.]: Oxford U.P., 1968); John Brewer, *The Sinews of Power : War, Money and the English State, 1688-1783*, 1st Amer. ed. (New York: Alfred A. Knopf, 1989); Niall Ferguson, *The Cash Nexus : Money and Power in the Modern World, 1700-2000* (New York: Basic Books, 2001).
[18] Joslin, "London Private Bankers, 1720-85," .
[19] Neal, *The Rise of Financial Capitalism* .
[20] Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705," .

Third, the process of learning undertaken by the first West End London banks is the same as the processes involved in the adoption of other new technology. Productivity in services industries can be a key determinant of aggregate economic performance.[21] Entrepreneurs using a new machine or adopting a new production process often have to contend with a period of low earnings while they adapt procedures, change the layout of factory building, and locate their markets. This period often is accompanied by low profits, and even by frequent failures.[22] Joslin noted the very high attrition rate of aspiring West End bankers in the early 18th century. Hoare's bank was one of the successful ones, which is how we know about its experience.

Our argument is similar to the one advanced by Alfred Chandler.[23] He chronicled changes in business structures and strategies in a series of volumes, arguing that changes in managerial practices were innovations as important as introducing new machines. Hoare's Bank did not have any new machines to use; it was extending its expertise into new dimensions. There had been goldsmiths and merchant bankers, but only at the end of the 17th century were a few pioneers bringing these two activities together. Hoare's was one of these pioneers, extending credit to a West End clientele in the company of only a small group of peers. As Chandler did, we use the records of a successful business to represent changes in the industry.

We describe aspiring bankers around 1700 in the process of learning how to operate as a deposit-taking bank. They experimented with all aspects of their business, from the amount of required reserves to the treatment of family members. The transition from goldsmith to bank was gradual, and the bank conducted business that it later shed, such as acting as an elevated pawnbroker and a mortgage broker. Bankers therefore engaged in a more varied menu of activities than a modern bank, only learning over time

[21] Stephen Broadberry and Sayantan Ghosal, "From the Counting House to the Modern Office: Explaining Anglo-American Productivity Differences in Services, 1870-1990," *Journal of Economic History* 62, no. 4 (2002).

[22] Joel Mokyr, *The Lever of Riches : Technological Creativity and Economic Progress* (New York: Oxford University Press, 1990). Paul David and Gavin Wright, "General Purpose Technologies and Surges in Productivity: Historical Reflections on the Future of the Ict Revolution," in *Economic Challenges of the 21st Century in Historical Perspective*, ed. Paul David (London: 2003); A. Hornstein and P. Krusell, "Can Technology Improvements Cause Productivity Slowdowns?," in *Nber Macroeconomics Annual*, ed. J. Rotemberg (Cambridge and London: 1996).

which activities were dependable and profitable enough to endure. It is this process we try to illuminate.

Hoare´s Bank kept two kinds of accounts in addition to their correspondence. One ledger recorded the periodic balancing of the bank's books in the form of periodic balance sheets. The loan register was a sequential record of loans made by the bank, whether for interest or not. We first analyze the bank's balance sheets, and then proceed by describing the nature of Hoare´s accounts and our treatment of them. Only then can we discover an 'average' interest rate in private transactions, whose meaning we will explain below. Finally, we analyze the learning process of Richard Hoare and his partners that is our primary focus.

2. Balance Sheets

One type of ledger kept at Hoare's contains annual totals for the banks assets, liabilities, and profits. The bank's total assets fluctuated strongly from year to year, reflecting the short-term nature of many loans and deposits, as well as varying levels of capital committed to banking activities by the partners at Hoare's. Total asset values are shown in Figure 1 up to 1742, with only a few missing balance sheets during the South Sea Bubble. In the first year after the "initial" accounts were drawn up, Hoare's assets jumped from £146,000 to £207,000, but then declined; by 1711, Hoare's lending and other activities were smaller than in 1702. The high point in 1703 was not surpassed until 1720, during the South Sea Bubble itself, and it was followed by a sharp contraction and wide swings in overall lending activity. Only after surviving the financial chaos of the South Sea Bubble did Hoare's assets begin to grow steadily, except for a temporary windfall in 1727/28. The troubled two decades prior to the South Sea Bubble appear to have been a period of learning and exploration. It was only after the bubble that Hoare's Bank found a *modus operandi* that generated sustained growth.

[23] Alfred Dupont Chandler, *Strategy and Structure : Chapters in the History of the Industrial Enterprise* (Cambridge, Mass.: M.I.T. Press, 1990); idem, *The Visible Hand : The Managerial Revolution in American Business* (Cambridge, Mass.: Belknap Press, 1977).

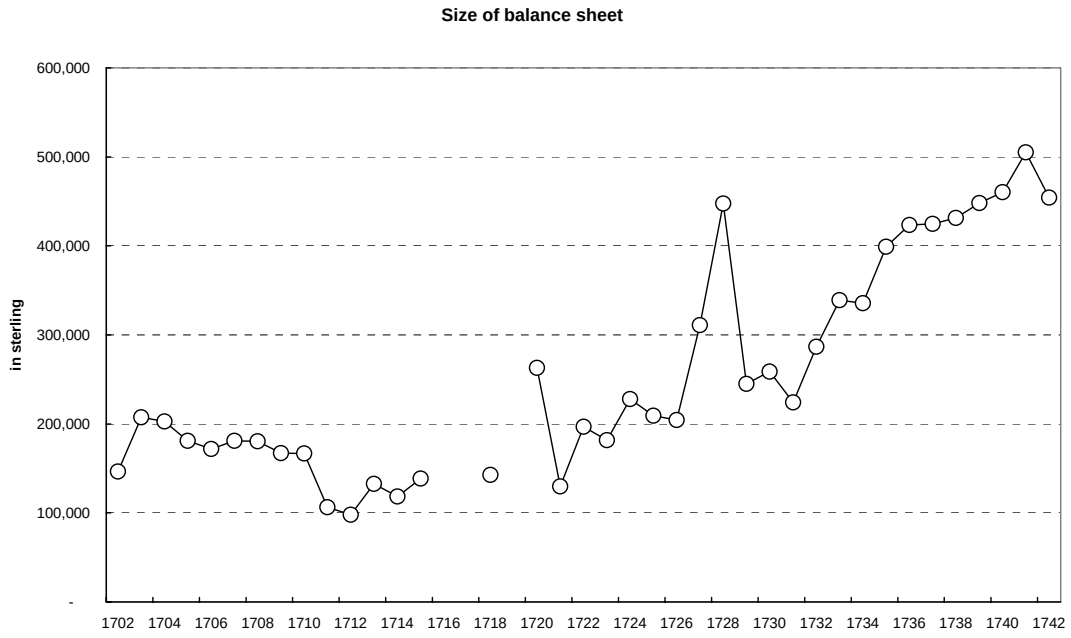

Figure 1

Just as in the case of modern balance sheets, Hoare's was separated into assets and liabilities. Assets were grouped into six broad categories – gold and silver, diamonds and pearls, "money due as lent upon interest and purchasing stocks", loans without interest, "several people for plate", and a balance remaining in cash. The composition of Hoare's assets is shown in Figure 2. Some of the assets in the 1702 balance sheet appear to be the remnants of Hoare's goldsmithing business – such as the £9,489 the firm held in September 1702 in the form of precious metals and stone. Loans to customers for plate fall into the same category. In his days as a goldsmith, Richard Hoare had financed clients' purchases of jewelry, with banking operations facilitating the transaction in the same way as the finance divisions of GM or Ford today extend loans to customers wishing to buy their cars. The bank also acted as a broker for its customers, executing trades in a variety of securities – and financing the purchases via short-term loans.

The initial balance sheet showed about two-fifths of Hoare's assets still were in the goldsmithing business when this first balance sheet was drawn up.[24] Customers borrowing for plate held 30 percent of all Hoare's assets. Holdings of silver, gold,

diamonds and pearls accounted for an additional eight percent of assets. These assets quickly declined as a share of Hoare's total; the bank terminated almost all of its goldsmithing activities such as producing silverware, mending plate and crafting jewellery, and redirected its activities toward banking. Assets used for goldsmithing were initially replaced by loans without interest, which may be seen as holdovers from the goldsmithing business. They show Hoare's providing liquidity to some of its customers. We cannot know, how many of these interest-free loans were courtesies to old customers and how many were introductory offerings to potential new customers. At least some non-interest loans and lending to customers for plate appear to be part of a pawnbroking operation.

The largest individual category of assets throughout the early 18th century was loans against interest (as well as money lent for securities purchases), fluctuating around half of the balance sheet. Loans bearing no interest (but not for plate) declined relatively quickly. The firm extended 62 loans without interest in 1704; by 1721, there were only 13 transactions in this category. Richard Hoare appears to have taken longer to reduce the volume of loans without interest than he took with loans against plate, but he clearly was reducing both in the first decades of the 18th century. As he learned banking and conceptualized himself as a banker, he moved out of these other activities.

The years before and during the South Sea Bubble showed a rise in the share of cash holdings. As the London financial market entered a period of great turbulence, Hoare's Bank reverted to some of its older practices to weather the financial storms. For 1718, there were £28,189 of diamonds, pearls, gold and silver on the balance sheet, equivalent to one fifth of its total value. These assets of Hoare's previous profession decreased in importance during the 1720s, but were not totally abandoned a decade after the bubble. Offsetting this conservative stance, Hoare's also invested in the newest of financial instruments: South Sea stock. In 1720, when the accounts were drawn up on June 24th, and South Sea stock stood at 250, the bank had 14 percent of its assets invested in it. The bank continued to trade (and hold positions) in South Sea stock after the bubble deflated, even though these transactions were not captured by successive balance sheets

[24] Child's recorded a similar proportion. Quinn (private communication).

(usually drawn up in September). Some dealing in South Sea stock was recorded as late as 1731.

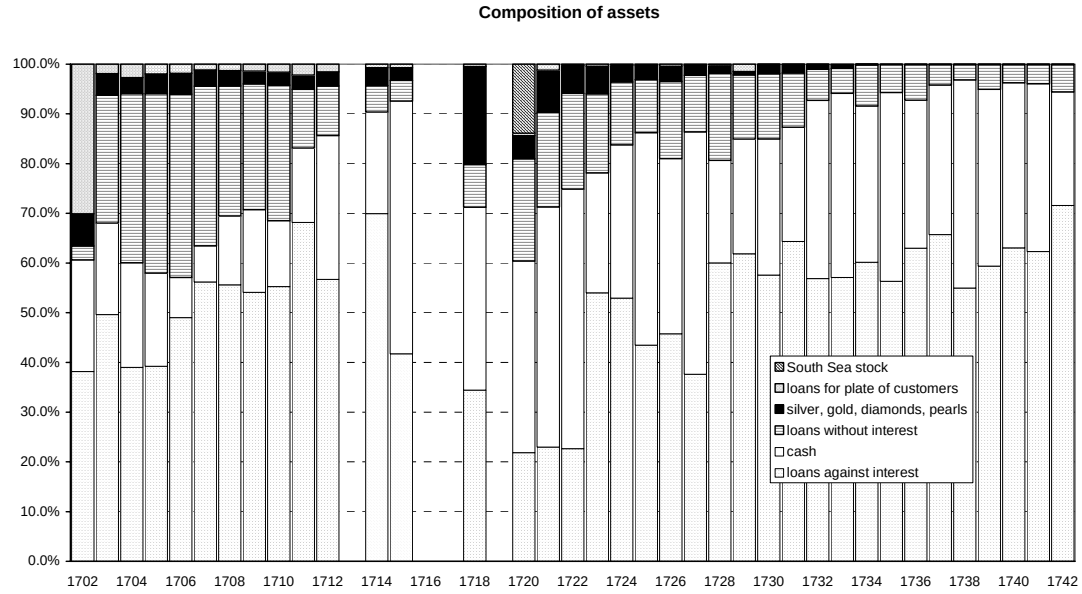

Figure 2

Cash balances rose sharply as a percentage of all assets after the end of the South Sea Bubble–where the bank had made do with £100 before the crisis, it now kept £172 in liquid funds.[25] If withdrawals had followed a normal distribution, the bank would have faced a 3 percent chance of running out of cash and consequently facing a crisis every 30 years. After the bubble, the bank reduced the risk to once every 1,500 years.[26] This is a highly conservative stance, but may have been warranted in a world without a lender of last resort when all the Hoare family assets were in the bank.

We tested the hypothesis that asset allocations changed significantly after 1720. The tests are summarized in Table 1. The share of assets in loans against interest did not change much after 1720. The share of cash increased enormously and significantly, from 20 percent to 34 percent of assets. Hoare's had been scared enough by the turmoil of the

[25] This result assumes that variances are equal. If we allow for the possibility of unequal variances, the t-ratio falls to 3.93, equivalent to a significance level of 99.93 percent.

[26] We calculated the average cash balance and the standard deviations, and derived the probability of the reserve ratio falling below zero. There is good reason to think that deposit withdrawals follow a lognormal distribution, which would mean that bank's risk of running out of reserves was markedly higher before and after 1720 – and that the relative difference is probably somewhat smaller. Cf. Roger Chen and Dale

bubble years to want a more secure cushion against a recurrence of financial turbulence. The rise in cash was accomplished by an almost equally large fall in the share of non-interest bearing loans after 1720. Hoare's thus did not lose much revenue. This finding documents our assertion that Hoare's was learning how to charge interest for its loans, as bankers do. The gamble of providing interest-free loans frequently in the earlier years in an effort to stimulate loans later seems to have paid off. It also is interesting that while the process was gradual, we can see accelerated change after 1720. This confirms our view that the learning period for this new activity was a long one.[27]

Table 1: Asset Shares at Hoare's – before and after the South Sea Bubble

	pre-1720	1720-42	difference	t-statistic[+]
interest-bearing loans	51.8	52.8	1	0.22
Cash	19.6	33.8	14.2	4.13*
non-interest bearing loans	19.8	9.9	-9.9	3.2*
loans for plate purchases	3.5	0.24	-3.26	2.2*
Plate	4.7	1.9	-2.8	0.74

Note: * indicates significance at the 1% level
+ assuming equal variances

The examination of Hoare's assets clearly shows a bank in the making. Starting from a base in the goldsmith business, Hoare's began to loan money both with and without interest. Gradually, over the course of a generation, the bank abandoned its previous modes of activity. To see how modern the bank in the early 18th century was, we need to examine its liabilities as well as its assets.

Hoare's liabilities were recorded as deposits by individuals of cash, money owed for plate and jewels, debts to goldsmiths and jewelers (as well as employees, in some years), the capital of the partner(s), plus profits for the past year.[28] In 1702, for example,

Osborne, "Random Deposits, Liquidation Discount and Deposit Insurance Pricing," *University of Texas working paper* (2002).

[27] We experimented with our sample selection, excluding the somewhat unusual year of 1718 – the results were almost identical. They are available from the authors upon request.

[28] This practice changed in later years, when the partners' capital is subsumed under the category of amounts due to others.

Richard Hoare held £31,788 of the bank's capital.[29] The bank also owed £113,997 to depositors, as well as £537 for plate and £42 to "several plate workers and other workmen". From 1703 onwards, Henry Hoare was in partnership with his father, Richard Hoare, and profits were divided according to a 2/3rd, 1/3rd allocation formula. Both Hoare's appear to have kept substantial fractions of their fortune invested in the bank. By 1706, for example, we see them dividing profits of £1,839. Henry Hoare also received £241 for interest on the £4,029 he had invested in the firm by then (for an interest rate of exactly 6 percent). In the same year, his father's investment stood at £52,934.

Equity in the firm fluctuated considerably from year to year, as the Hoares invested in the bank in some years and took money out in others. By 1710, Henry and Richard Hoare together had investments worth £74,939 in the bank, equivalent to 44 percent of all liabilities. In 1720, Henry Hoare was in business with Benjamin Hoare, his son, yet their combined equity in the bank only amounted to £39,608, approximately half the partner's capital in 1710. Family events, such as the death of an individual partner, were important determinants of the amount of business the firm could undertake, and of its financing structure. The Hoare family did not attain the favorable upward trend of joint equity until after the initial learning period. They clearly were invested (financially and materially) in the bank for the long term, although Richard Hoare did not live to see his son and grandson create a steadily growing business.

[29] Note that, with unlimited liability partnerships, this concept of equity in the family firm is somewhat artificial. Yet Hoare's used this as a distinct category of liability, and it is not identical with cash-on-hand at the time of drawing up balance sheets.

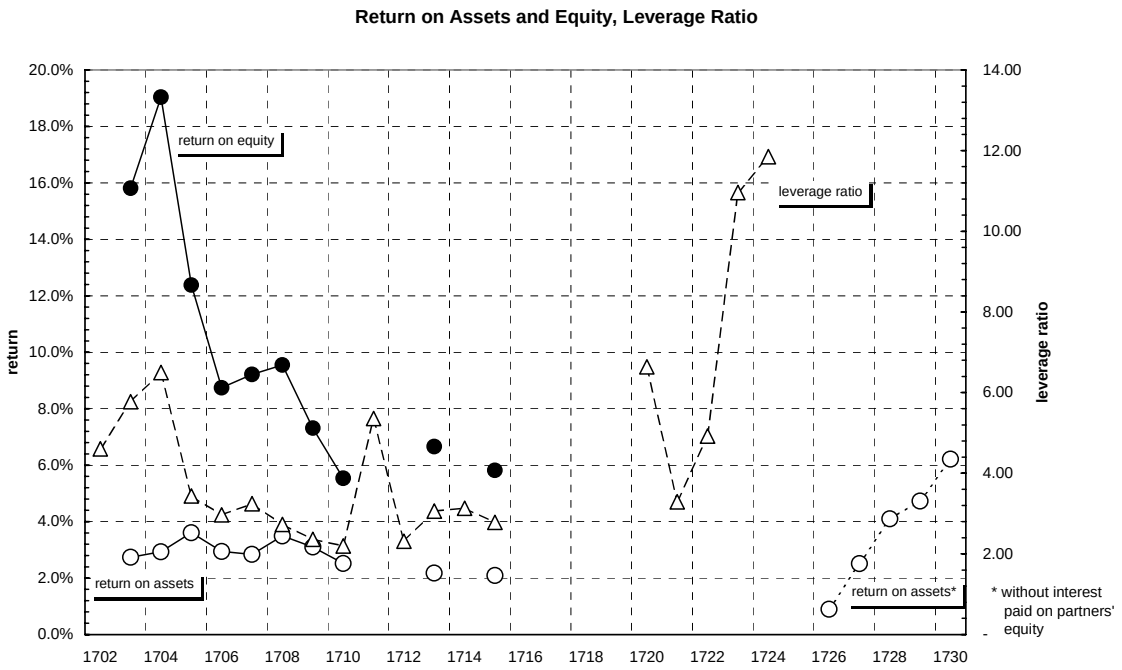

Figure 3

The partners at Hoare's leveraged their own investment in the bank via the money kept in the cash accounts of their clients. Since their move to Fleet Street, the bank as a general rule no longer paid interest on the deposits of its clients.[30] Before the South Sea Bubble, the size of the balance sheets tended to be between 2 and 6 times larger than the equity of the Hoares. Thereafter, the Hoares appear to have been more aggressive, with a leverage ratio that rose rapidly to 12 by 1725. The years after the South Sea Bubble saw a marked reduction in partner's equity – down to a minimum of £16,567 in 1723, a mere 22 percent of the pre-bubble peak. The balance sheet did not contract to the same extent, leading to higher leverage. At its most extreme, Hoare's had approximately £11 pounds in assets for every pound of partners' equity. This is a remarkably low figure for a bank that ultimately survived for centuries – the Basel I accords force modern banks to maintain a similar equity ratio to fulfill capital adequacy requirements.

[30] Richard Hoare to Madam Jane Hursey, dated Oct. 9th, 1703, cited in: Hoare, *Hoare's Bank. A Record 1673-1932* , p. 16.

The decline in equity is the mirror-image of the rise in cash holdings. The two changes appear in fact to be largely offsetting. Richard Hoare may have initially acted as a goldsmith, where his equity stood behind his offerings. This practice carried over to the banking business, and Richard and Henry Hoare may well have tided over the bank with their personal assets in the hard years after 1710. They certainly derived little or no income from the bank in those years. After the South Sea Bubble, the partners appear to have used cash reserves to serve the function that their equity formerly had. Cash would deal with temporary fluctuations in demand, and only in extreme cases would the partners' equity be called upon. After 1720, the balance sheet of Hoare's bank began to resemble a modern bank's balance sheet, albeit a very conservative modern bank.

Only some information on profits survived. The bank calculated "excess profits", after paying interest on partners' capital. We calculate the overall return, including interest payments. The average return on assets fluctuated between 2 and 4 percent. But while Hoare's bank showed a gain of 2.7 percent on assets in 1703, this translated into a return on equity of 15.8 percent. The following year was the best the bank had before the South Sea Bubble. The balance sheet contracted modestly, but profits rose by 12 percent. The Hoares took capital out, and their return on equity accordingly rose to 19 percent. By 1710, gearing had declined to 1:2.2, and the existing assets generated a very low return of only 2.5 percent. This translated into a return on equity of 5.5 percent for this year. While "excess" profits had averaged £2,775 in prior years, they dropped to £216, leaving Henry Hoare, as the junior partner, with £72 for his efforts in 1710. Between 1702 and 1715, the partners earned 10 percent on average, and probably less. The Hoare's did receive a return over and above the interest that they could have earned if they had put their money into (relatively safe) government bonds, but the margin was at times very small.[31] In 1710 and thereafter, it appears that the partners might have been at a point to abandon the business, but Hoare's Bank did not close its doors.

Information on profits is very rare for the years after 1720. When we find it recorded, however, profitability appears to have been high – "excess" profits averaged £9,492 after 1726, or nearly twice as much as for the years 1703-1715. At its high-point in 1730, the bank managed a return of 6.2 percent on assets, which implies that the return

[31] We disregard the years after 1710, when returns were possibly negative.

on equity must have easily been in the double digits. For the years 1702-12, when we have information on both total lending against interest and on profits for the partners, interest income constituted 84 percent of overall earnings.[32] This suggests that, in its early years at least, lending against interest was one of the main sources of profits – but by no means did it dominate completely. One additional source of profitability for Hoare's was proprietary trading. In the run-up to the South Sea Bubble, the partners earned ample profits. They were also wise enough to sell while prices were still high. After the bubble burst, in November 1721, they took some of their trading profits out of the bank (amounting to over £27,000).

Joslin stated that 1710 was a bad year for London banks and that many private banks disappeared in that year.[33] Hoare's suffered, but Richard Hoare stuck it out. The tumultuous years of the South Sea Bubble also witnessed high bank mortality. Hoare's was involved in the asset inflation, as noted earlier, but emerged intact from this crisis as well. Even though the rate of return earned by the Hoare's does not look impressive in all of its early years, their continuation in business while others were exiting shows great determination and considerable skill. They were making their investment in the intellectual capital needed to operate in this new business.

3. Loans

The bank reported loans in its register using two pages at a time. Credits were listed on the left-hand page and debits on the right-hand page. Each page was ruled into several sections in advance, where a customer's transactions were recorded. Only the simplest transactions, however, consisted of a single loan and repayment. The fixed space often contains records of multiple payments and receipts that were organized by the bank as part of a single transaction. The modern experience where interest is paid either regularly or at the end of a loan, signified by a single repayment of principal, describes some, but by no means all of the bank's loan activities.

The clerks at Hoare's were meticulous in recording the titles and positions of their clients, although all classes were entered sequentially in the same register. Whether in the

[32] We assume that Hoare's earned 5% on the amount labelled "as lent with interest" in the balance sheet.
[33] Joslin, "London Private Bankers, 1720-85," .

case of Lady Charlotte de Roye (borrowing £50 on a "yellow brilliant diamond ring") or the Hon. Brigadier Hastings, the exact position was recorded in a separate column in the ledger. In the years before the South Sea Bubble, it included *inter alia* Sir Samuel Barnadiston, governor of the East India Company, John Beaumont, geologist and Fellow of the Royal Society, Brooke Bridges, chancellor of the Exchequer, Sir William Booth, commissioner of the Navy, a bishop of Chichester, a director of the Bank of England, Sir Thomas Davies, Lord Mayor of London, the Countess of Dorchester, and Edmund Dunch, the master of the Royal Household.

Bank clerks appear to have recorded loans in the following order. First, the loan itself as a credit. Then, repayments as debits. Finally, there is sometimes an entry on the credit side for the interest, seen as a claim by the bank on the borrower, which enabled the debits and credits to agree. The rate of interest was almost never recorded, nor was the term of the loan. Occasionally, the clerk would enter the agreed interest rate along with interest payments. In most cases, we can only infer the *ex post* rate of interest, based on the payments recorded. This mode of record keeping makes it hard for the 21st-century economic historian to recover the interest rate being charged. It is an open question whether it made it hard for the early 17th-century banker to know what he was charging. One possible reason for this mode of record keeping may have been to avoid prosecution under the usury law that restricted interest to six percent before 1714 and five percent thereafter. We will see later, however, that Hoare's Bank generally was in compliance with the usury laws. This mode of record keeping instead may have been a hold-over from Hoare's days as a goldsmith where making, pawning and selling jewelry was all part of a day's work. In that business, the interest received was of secondary importance and possibly not recorded or even charged.

We transcribed the loan register, keeping the entries in any single space in the register together. If a loan was repaid in full before another was made to the same person, we recorded them as separate transactions, even though the clerk took the trouble to look up an old entry for that person and enter the new loan in the same space as the old. If the lender stayed indebted in part during several or even many payments and receipts of further loans, we counted this as a single, complex loan. We calculated the length of the loan as the time between the initial loan payment by the bank to the final receipt of the

principal by the bank. We recorded the size of the loan as the maximum borrowed in this time period. While this procedure over-estimates the average amount loaned out by the bank in the course of these complex loans, it provides a simple decision rule for us to use in recording the ledger—one possibly in tune with the rule used by the bank at the time. The clerk often recorded the source or intent of repayments, particularly in complex transactions, and we recorded these comments as well. They often indicate which repayments are of principal and which of interest.

The bank made a distinction between loans at interest and loans without interest in its balance sheets, but they all were entered sequentially in the loan register. We do not know with certainty if the bank decided that the interest rate would be zero at the time that the loan was made. It does, however, appear that the bank provided some financing as part of its goldsmithing business, and that the granting of small, interest-free loans was an echo of this earlier practice. We argued earlier that the granting of short zero-interest loans may have been part of a deliberate banking business strategy, leading to future lending business. Other loans at zero (or negligible) interest are what we would call defaults, that is, loans of long duration which were paid finally by selling the collateral (typically, jewelry) or by transferring the loan to a partner.

Many, but by no means all, loans were made against collateral assets. The collateral typically was jewelry at the start of the century, but it increasingly was stocks or bonds in the 1710s. Aristocratic borrowers were identified as such in the loan register, but they were recorded sequentially with other loans. Aristocrats may possibly have had easier access to credit in general, but they did not get segregated into a separate account. London had become sufficiently egalitarian by 1700 for aristocrat and commoner to use the same bank in the same way.

We concentrate on the years between the Glorious Revolution and the South Sea Bubble in our examination of loans to detail Hoare's learning process. Since Hoare´s Bank only moved to Fleet Street in 1690 and the surviving records start later in that decade, this gives us slightly more than two decades of banking activities. As we count them, Hoare´s Bank made about 800 loans in this time.

A typical set of payments entered in the loan ledger reads as follows: On April 1st, 1700, John Egerton, Esq. borrowed £200, using plate as collateral. He repaid the loan on

the 22nd of October in the same year, with principal and interest amounting to a total of £206 s.10. Between 1700 and 1702, John Egerton took out two more loans, both also for £200, which he always repaid within less than a year. Sometimes, both principal and interest were paid simultaneously; occasionally, interest was paid separately. John Austin, for example, borrowed a total of £800 in 1698, offering mortgages on houses as a security. In January 1699, he was charged £24 for 6 months' interest, equivalent to an annualized interest rate of exactly 6 percent. John Austin remained in debt with Hoare's until April 1711, when he repaid all interest and principal – having serviced the debt through frequent (but not regular) payments of accumulated interest and repayments. In addition to the original £800, John Austin borrowed another £789 before all his debts with Hoare's were cleared.[34]

The bank lent against a wide range of collateral, ranging from a sword hilt to diamonds and plate, from mortgages to bonds, and from Westphalian ham to Tuscan wine. Depending on its assessment of a client's trustworthiness, it pressed for securities to back up the loan. Thus Richard Hoare wrote to Thomas Povey, Esq., who had asked for a loan:[35]

> "The respect I always had for you makes me willing to comply with what you desire in your letter, but I hope that in my Patience & Civilitie will not doe me prejudice that if it shall please God to take you to himself …, you will now give me the satisfaction of one line to lett me know how I shall be paid."

If a client defaulted, the security deposited in exchange for the loan was often sold. On the 29th of June, 1706, for example, one Lady Adams received a loan of £100 against diamonds. In May, she had already borrowed £80 against a necklace. One year later, on the 21st of May 1707, Hoare's sold the necklace. Eight days later, the rest of the loan was paid off in full, with interest, yielding proceeds of £185 s.10 for the bank.[36] Not all of these transactions turned out as well for the bank. Its expertise in valuing jewellery and plate made it relatively simple to protect itself against having to write off a loan's principal. Interest due appears to have been another matter. The long lags between the original loan and the eventual decision to sell the collateral often caused the return to be

[34] One of these is against collateral, the other (the last one) is not.
[35] Hoare, *Hoare's Bank. A Record 1673-1932* , p. 16.

paltry: Madam Dorothy Kennett, for example, borrowed £10 against candlesticks in 1687. It was not before 1709 that Hoare's decided to sell them, netting the bank £10 s.12 d.6 – equivalent to an annualized percentage rate of 0.7 percent. Overall, the vast majority of clearly identifiable defaults in our dataset (12 out of 15) involved lending against jewelry, gold, silver, or plate. This underlines the declining role of pawns in the activities of Hoare's Bank.

Lending against collateral constituted approximately half of total lending against interest for the firm. Table 2 shows the number of loans and their value, by type of security offered. The size and duration of most loans is similar to those at Child's.[37] Transactions without collateral typically were relatively small, with an average value of £676. Secured loans were almost twice as large: £1,147. Loans without collateral also were relatively short; they were repaid after an average of 461 days, whereas some kinds of secured loans had substantially longer duration. Mortgages recorded an average duration of 2,013 days, comparable to some modern mortgages. The Marquis of Winchester, for example, borrowed £3,000, and only repaid after some 14 years. Legally speaking, however, mortgages had a six-month term, and could be recalled by the lender after that.[38]

Table 2: Loan values by type of collateral, 1692-1724

Collateral offered	Median value	Mean value	N	% of total	Value	% of total	duration (days)
securities	1000	2214	53	8%	117,342	20%	497
mortgage	1279	2432	31	5%	75,392	13%	2013
plate	200	454	52	8%	23,608	4%	1411
bond	300	727	73	11%	53,071	9%	1121
note	100	610	26	4%	15,860	3%	594
penal bill	65	478	10	2%	4,780	1%	1667
other	170	883	34	5%	30,022	5%	444
none	200	676	378	58%	255,528	44%	461
total			657		575,603		

[36] The bank thus received payment equivalent to the full principal, plus interest at 6 percent on the £100. The initial loan was apparently interest-free.
[37] Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705," , table 4, p. 608.
[38] Brewer, *The Sinews of Power : War, Money and the English State, 1688-1783* .

The composition of lending by security offered as summarized in Table 2 does not reveal the striking changes that occurred in the first decades of the eighteenth century. Loans against plate declined from 14 percent of the total before 1700 to three percent in the first decade of the new century to one percent thereafter as Hoare's Bank became ever more distinct from Richard Hoare's previous enterprise. Mortgages were the single most important security offered in the years before 1710, accounting for approximately one third of collateralized lending. Securities were also popular, and their importance grew significantly after 1710. Over half of all lending secured through assets held by the bank was in the form of securities in the years 1710-1721, which contain the South Sea Bubble.[39]

Loans without interest appeared alongside all other transactions, as part of the continuous records of transactions with all customers. In some cases, these loans were clearly designed to help overcome a temporary cash shortage. While the mean duration of 502 days suggests long-term lending, it is heavily influenced by a few outliers. The maximum length recorded was in the case of William Dobbs, who borrowed £40 in 1707 and only repaid in 1715. In a more typical case, on April 14th, 1699, Madam Elizabeth Gough received £10, leaving candlesticks as collateral. According to the loan ledger, she returned the next day to repay the loan. The median duration of an interest-free loan was 84 days (versus 334 days for non-zero loans). The typical zero-interest loan lasted less than 3 months, while the median interest bearing loan lasted almost a year.

Some transaction seem puzzling to the modern historian's eye. Ann and Catherine Goare borrowed £20 in August 1698, and repaid £20 s.8 in December (equivalent to an APR of 6.3 percent – Hoare's evidently aimed to charge them 6 percent interest). In February of the next year, the two Goares borrowed again, for the same amount, leaving the same type of collateral – a bond – and repaid some nine months later. This time, however, there was no charge for interest. The evolution and the payment details of non-interest bearing loans at Hoare's casts doubt on Quinn's interpretation of them at Child's, a rival London bank.[40] He argued that these loans contained hidden interest charges, in an effort to circumvent the usury laws that limited the maximum interest rates that could be

[39] This was partly because of the bank's role in the market for South Sea stock and other speculative securities, which we explore in a separate paper.

paid. In effect, according to this interpretation, the Goares would have actually only received a fraction of the £20, and then had to repay in full, a practice known as paying out amounts loaned with an agio. We find no evidence to support this hypothesis in the case of Hoare's. Given that the bank had just completed a successful transaction with the Goares, receiving its money back on time and with interest, what possible reason could there have been to charge a higher interest rate? Also, the bank recorded loans with interest separately from other loans on its annual balance sheet, again suggesting that the other loans were not interest-bearing. Average yields of 4-5 percent on this portion of the balance sheet can account for almost all of the recorded profits.[41] Finally, in those years when the annual balance sheets recorded interest received separately, these must refer to "loans against interest" – otherwise, the ratio of interest received to loans outstanding suggests that loans with an agio were charged interest below the usury rate.

Why would a bank provide interest-free loans at all, given that this entails opportunity costs? Hoare's may have decided that there were no interest-bearing loan opportunities of sufficiently high quality available, and that lending out some funds may at the same time be good for future business. As time went by, Hoare's learned how to acquire customers and provide them with a service that they valued – and eventually came to pay for. The statistical tests in Table 3 demonstrate that the decline in zero-interest loans was permanent. Note that there are good theoretical reasons for such a pattern. Recent work by Abhijit Banerjee on credit intermediation in emerging markets also emphasizes the importance of "loss leading", and predicts that it will be particularly prevalent in environments where information on the quality of borrowers is rare.[42]

The bank faced almost no problem with defaults. This was not the result of a diversified loan portfolio. Instead, low default rates were key. Over the period 1692-1724, there are only 15 cases that were clear defaults. The average value of these defaulted loan was £387, for a total loss of £5,817. There may have been other non-performing loans, not marked clearly as such in the loan ledger and so identified by us only as interest-free loans. We should note that our method of constructing a database of

[40] Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705," .
[41] This does not rule out that the bank could have made additional profits, and hidden them in annual balance sheets, too. Yet this would have been a highly complicated undertaking at a time when balance sheets were not published nor audited and there were no taxes on profits.

loan transactions may lead us to lose some cases. Whenever we could not match loans and repayments, we marked the loan transaction as incomplete. Cases in this category may contain some defaults. In general, however, we have clear indication whether a loan was in default or not – clerks would clearly mark the state of the loan if it was transferred to one of the partners, or if collateral was sold. Also, it may be the case that a few of the zero-interest rate loans of long duration were in partial default. Most long-term zero loans terminated with a clerk's entry of "paid in full as lent" or were followed by another loan, which rules out default. We obviously cannot know how many bad loans we missed, but we suspect the number is not large. Most interest-free loans were short, as we have noted, and there were only a few longer loans that may have been long by virtue of not being repaid as anticipated. Counting the tail of the length distribution of interest-free loans as defaults changes only the details of our conclusions. The bank's strategy of selecting high-net worth customers of impeccable social standing, instead of spreading its credit risk over a larger number of borrowers, apparently made good business sense. We do not know with certainty if bank failures were often caused by competitors having greater difficulty in identifying the right kind of customers, but Hoare's did not appear to face this problem to any significant extent.

Lists of customers compiled at Hoare's do not differentiate between those from the goldsmith's business and those from the lending side. Overall, the acquisition of new clients seems to have been relatively rapid in the early eighteenth century. In the first decade, the bank was adding close to 100 customers per year. It slowed down markedly in the following decades, dropping to less than half the earlier rate. In addition to aristocrats, the bank also had extensive business with minor noblemen. In contrast to commoners, the number of new clients from the aristocracy, as well as minor noblemen, grew at a broadly steady rate. While the annual growth in the bank's client base slowed down, it also became increasingly blue-blooded.

[42] Abhijit Banerjee, "Contracting Constraints, Credit Markets and Economic Development," (2001).

4. The interest rate

We initially inferred the interest rate charged by Hoare's by solving

$$0 = \sum_{j=1}^{N} \frac{P_j}{(1+r)^{(d_j - d_0)/365}} \quad (1)$$

for r, where d_j = the jth, or last, payment date, d_0 is the first payment date, P_i is the ith, or last, payment, and r is the rate of return in question. This provides a good measure of a loan's profitability for the bank, and has been used by earlier authors.[43] However, we found that this method yields many fractional interest rates that were hard to understand. Deviations in payment dates due to holidays, calculation errors, rounding of payments or time periods, as well as defaults, affected the calculated rate of return. But the calculated rates still did not fall into a pattern that would explain its complexity.

For a subset of loans, we know the intended interest rate from entries in the ledger. For example, Mrs. Mary Kerwood, who took out a loan of £60 on June 24th, 1692. On January 16th, 1697, the clerk received a payment of £16.2, and entered "4.5 years interest on £60 to 24 Dec. last". This suggests that the intended interest rate was exactly 6 percent. The cash flow method, however, implies that when Mary Kerwood repaid £61.3 of principal and additional interest on the fourth of May, 1697, the internal rate of return (calculated by solving equation 1) for the bank was merely 5.5 per cent. The bank did not charge more even though the borrower made the first interest payment after 4.5 years, instead of annually. Hoare's appears to have lacked the concept of compounding at this point in time. The bank, while learning other lessons of banking, did not abandon its reliance on simple interest.

The nature of our evidence complicates the calculation of an average interest rate charged by Hoare's. It is quite clear in many cases that the interest rate was six percent, or later, five percent. The bank either received exactly that amount, or the amount was only slightly different. The differences were often small enough so that payment a day or two earlier or later would have made the rate exactly six percent (or five percent). The bank never accepted payment on Sunday, and we infer that they were not scrupulous

[43] Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705,"

about the day of the week on which they were paid, or perhaps on which they recorded a payment.

We cannot reconstruct all of the various techniques employed by the clerks at Hoare's Fleet Street office. However, it is relatively straightforward to calculate what the bank should have received if it had used exact methods in an error-free fashion, remembering always that the bank charged simple interest. Before we can determine the expected repayment, we need to decide what the intended interest rate was. We assume that the bank intended to charge integer interest rates and calculated the difference between the actual repayment and the one expected under a variety of integer interest rates, ranging from 4 to 7 percent, using no compounding. We applied this method for the subset of transactions that only involve one repayment and no interim interest payments (referred to in Table 3 as the "straight interest method").[44] The results are striking; our procedure suggests that the bank aimed for rates of 5 or 6 percent in almost all cases of interest-bearing loans.[45]

We compare the rates calculated via this method with the interest rates that were noted in the loan register when the loan was recorded, as in the loan to Mrs. Kenwood, in Table 3, in the column marked "direct information." We also report the results of internal rate of return calculations using equation 1 (referred to as the "cash-flow method"). Since the latter is subject to various errors, we give the distribution of loans within a +/-0.5 per cent error band. Note that the sample size differs between columns since not all methods can be used for all loans.

The vast majority of simple loans (444 out of 563) was made at 0, at 5, or 6 per cent. The most common interest rate was 6 per cent—in both the sample with direct information on interest rates, and in the one using the cash flow method. Changes over time are not recorded in Table 3, and we need to recall that most loans without interest were made earlier in the period and anticipate that most loans at 5 percent were made after the reduction in the usury rate in 1714. The results from the straight interest-rate calculations reinforce the impression from the other 2 methods—loans at 6 percent are more common than loans at 5 percent, and zero-interest rate loans are an important

[44] Applying this method to complex loans would require too many judgement calls to yield reliable results.
[45] We also added the single-transaction loans where repayment amount was equal to loan value.

component of simple loan transactions (which explains the higher share of the total, compared to the other two methods).

Table 3: Interest rates on simple loans by Hoare's bank

	Direct information on interest rate		Cash-flow method +/-0.5%		Straight interest method on simple loans	
Interest rate	N	%	N	%	N	%
0%*	28	21%	197	23%	163	37%
5%	22	17%	192	23%	106	24%
6%	74	56%	272	32%	175	39%
Loans at 0, 5, and 6%, sum	132		846		444	
% of total		94%		78%		100%

Note: * no error band, only loans with exactly zero difference between amount loaned and principal repaid.

It is instructive to compare the interest rates calculated by the three methods directly. In 129 cases, we can calculate the inferred rate of interest via cash flows, and we also have information on the ex ante interest rate recorded by the clerks. The mean difference between the two is –0.16 per cent, and the median difference is precisely zero. Also, the "straight interest method" and the directly observed interest rate agree in every one of the 10 cases where the two samples overlap. This strongly suggests that most deviations from 5 or 6 percent are the result of spurious influences like clerks' errors, lack of compounding, and rounding. Initially, Hoare's simply lent at 6 per cent in almost all cases where interest was charged. When the usury rate was reduced in 1714, the bank did not follow immediately and in all cases – and entered the evidence for this in its ledger books, without obvious concern about any legal problems that might arise. At the same time, loans at 5 per cent became more common.

The lack of compounding benefited the bank for loans of less than a year's length, and it cost the bank money on credit extended for a longer period. Additional rounding errors and the like sometimes cost the bank money and sometimes benefited it. A typical case is Simon Harcourt, borrowing £500 on the 20th of February, 1711. He repaid £503.61 in April, 43 days later. The cash-flow method suggests that the interest rate charged was equivalent to 6.3 percent. Based on the legal maximum and with continuous compounding, the bank should have charged him £3.44 in interest instead of £3.61. Without compounding, the correct charge would have been £3.53. Rounding errors and

the like therefore contributed 9 pence to the bank's excess charges, and the compounding effect contributed another 8 pence. The results, aggregated for all simple loans for which we reconstructed (non-zero) interest rates, are summarized in Table 4.

Table 4: Accounting practices and their cost, 1690-1725

			Average loss to Hoare's (in £)		total loss	
Quin-quennial	Number of loans	Average duration	due to lack of compounding	due to other errors	in £	in % of the balance sheet
1690	3	1,912.00	13.61	0.01	40.86	8.17%
1695	28	891.64	1.57	0.05	45.45	0.55%
1700	77	261.77	0.10	0.21	23.93	0.04%
1705	68	290.47	0.05	0.11	10.88	0.05%
1710	30	257.97	0.00	0.01	0.35	0.00%
1715	47	199.02	- 0.07	0.10	1.42	0.00%
1720	25	263.64	- 0.03	0.17	3.35	0.01%
1725	3	219.00	- 0.37	0.05	- 0.96	-0.02%

A positive value indicates that the bank should have collected a higher amount. The table shows that the bank initially did lose some money on even the most basic loans, and did so on a non-negligible scale in its early years. For the first five-year period, the £40.86 lost were equivalent to 8% of the value of all loans. In the next quinquennial, when our sample size is much larger, the bank loses more in absolute terms, but the total value is equivalent to only 0.55% of the sum loaned. By the 1710s, losses were at negligible levels, and after 1715, the bank started to make money on its "errors".

The changes over time are largely the result of two factors. First, lack of compounding mattered most for very long loans, and as the average duration of transactions fell, the bank lost less. Second, the bank improved its accuracy in rounding and calculating. By the end of the period, it often managed to "err" in its own favor, that is, it would charge customers more than should have been the case had they calculated interest exactly. This change was driven by rounding in the case of relatively short loans – when customers borrowed for less than a year, they would sometimes pay rates that were very high. During the period 1690-1725, Hoare's clearly learnt how to charge its

customers more accurately. It also changed the average duration of its loans in such a way as to profit from its accounting practices, such as the lack of compounding. Overall, however, the peculiarities of its system never made a large difference to the bank's profitability. There does not seem to have been a strong incentive for the bank to adopt compound interest.

As Table 3 shows, there was a substantial number of loans without interest. If they are included, the average interest rate at which people received loans was always less than six percent. In fact, most of the fluctuations in the "average" are a result of changing proportions of interest-bearing and non-interest bearing loans. If the non-interest loans are excluded, then the meaning of an average interest rate becomes less clear; yet we capture the "typical" cost of loans against interest (to the customers) much more adequately. Figure 4 compares the median interest rate on two types of loan. The top line refers to the median interest rate for all loans contracted by Hoare's against interest; the bottom is the average for all loans. Including the zero-interest rate loans markedly increases the volatility of the series. It also obscures the downward shift in interest rates that occurred after 1714, when the legal maximum was lowered from six to five percent – which is clearly apparent in the first series.[46]

[46] When we estimate a median regression for the whole period, with the average interest rate on loans against interest as the dependent variable and a dummy for the "new" usury ceiling from 1714 onwards, we obtain a coefficient of –0.9, significant at the 0.1 percent level. This strongly suggests that the bank followed the new legal requirements rather closely, and that lending before and after 1714 was almost always at the legal maximum. For methodological background, cf. Roger Koenker and Kevin F Hallock, "Quantile Regression," *Journal of Economic Perspectives* 15, no. 4 (2001).

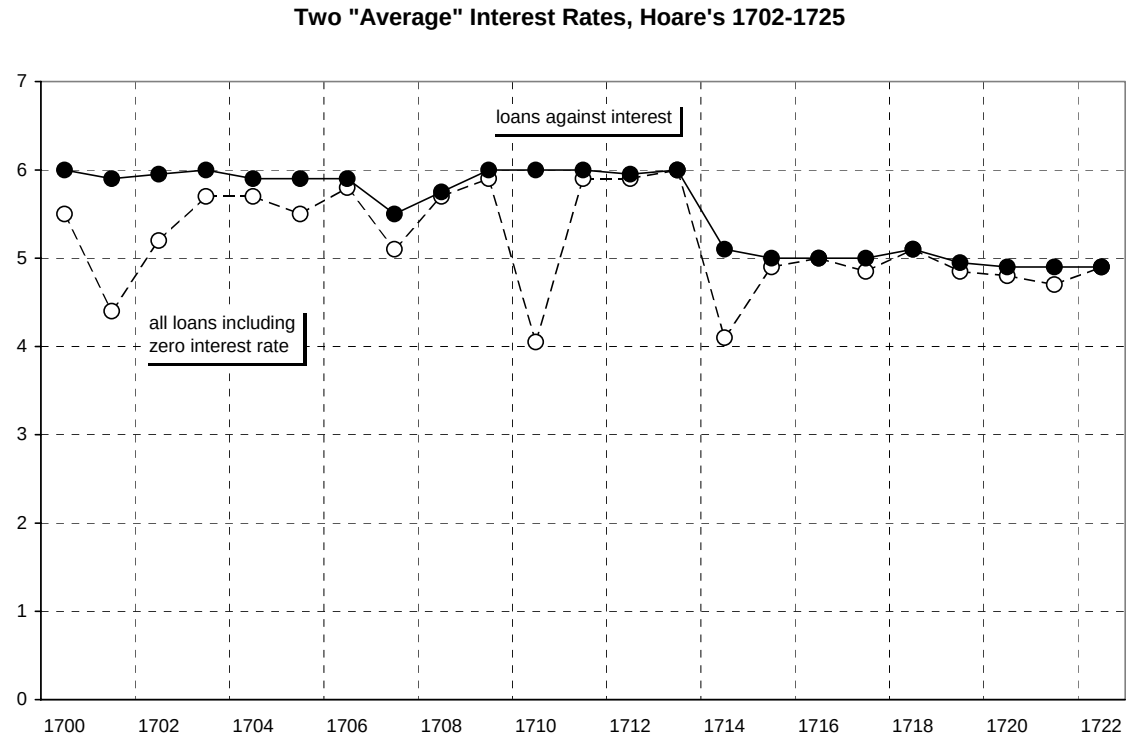

Figure 4

The frequent use of standardized interest rates also suggests that the loan market probably did not balance through changes in the interest rate. Contracted rates certainly did not adjust smoothly in response to demand and supply. Instead, times of greater or lower loan demand must have led to a tightening or loosening of borrowing criteria. The first kind of loans to be recalled were probably zero-interest loans. This is similar to what has been observed in modern credit markets, where there is also abundant evidence of credit rationing.[47] Thus, the average interest rate at any one point in time is unlikely to be a good indicator of scarcity in the market for private loans – casting doubt on the alleged effects of the Glorious Revolution on the cost of private credit.[48]

The static rate of interest also diminishes the contrast between the London and Paris financial markets in the 18th century described by Hoffman, Rosenthal and Postel-

[47] Joseph E Stiglitz and Andrew Weiss, "Credit Rationing in Markets with Imperfect Information," *American Economic Review* 71, no. 3 (1981).
[48] North and Weingast, "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England," .

Vinay.[49] In both cases, interest rates do not appear to have differed much between individual borrowers, and banks and notaries only faced the choice of whether or not to lend. At the beginning of the century, if Hoare's Bank was typical, the London financial market was also a "priceless market". From these similar conditions at the start of the centuries, however, London's banks eventually developed in a direction that was very different from that of the Paris notaries.

5. Banking as an emerging technology

The evolution of Hoare's banking activities shows a particular form of learning-by-doing. The annual balance sheets reflected the influence of three factors – of the demand for banking services, the supply of capital and deposits, and the managerial decisions by the partners at Hoare's on how to run their business. Having decided to leave the goldsmith's business around 1700, the scale and scope of their banking activities evolved rapidly over time, only to shift in a very significant fashion after the South Sea Bubble. Lending against plate – and debt to plate workers etc. – disappeared very quickly at the beginning of the period. Over the banks' first forty years, we see the gradual decline of many businesses that modern banks sometimes eschew – such as lending without interest – and a rise in loans yielding a standard 5 or 6 percent. The most striking discontinuity that interacted with the long-term rise of lending against interest was the change in the bank's attitude to risk. Cash reserves were high by modern standards even before the South Sea Bubble (close to 20 percent), and they increased markedly thereafter.

How do we make sense of these dramatic shifts in the way business was done at the Fleet Street office of Hoare's? Three crucial changes need to be explained – the decline in loans without interest, the change in cash reserve ratios, and the rise in leverage. If our interpretation emphasizing learning is correct, we should first be able to show that the bank's changing fortunes were not driven by changes in the overall environment. The bank's difficult years before 1720 could, for example, have been the result of a more uncertain or depressed business environment. Aggregate evidence on

[49] Philip T. Hoffman, Jean-Laurent Rosenthal, and Gilles Postel-Vinay, "Private Credit Markets in Paris, 1690-1840," *The Journal of Economic History* 52, no. 2 (1992). Hoffman, Postel-Vinay, and Rosenthal, *Priceless Markets : The Political Economy of Credit in Paris, 1660-1870* . They show that the majority of

business conditions before 1750 is not abundant. 1710 marks the year of a severe financial panic, but the bank's fortunes had been declining even before this date – and the crisis of 1720 brought no similar drop in profitability.[50] Ashton classified eight years as periods of depression before 1720 – exactly the same number as during the period 1720-42.[51] Also, the number of bankruptcies does not suggest that low and highly variable returns were the result of an unusually unstable macroeconomic environment. Using Hoppit's time series, we find that that the average number of individuals going bankrupt was higher before 1720 than thereafter. The year-to-year variability was lower after the South Sea bubble, but the difference is not large.[52] Since defaults were never key to Hoare's profitability, the link would have to be very indirect. Nor do political events provide a ready explanation for the swings in Hoare's fortunes. The War of the Spanish Succession raged for most of the initial period that we describe as a period of learning. According to the calculations by Yafeh and Sussman, the government faced particularly high borrowing rates in 1702/03 and 1710. Strong competition from the government for deposits could be the kind of shock that may have undermined bank profitability, but it should have had similar effects in 1702/03 as it did in 1710. Yet profits were relatively good at the beginning of the period, and much lower in the years before and including 1710. Also, the decline in deposits in 1710 was small – a mere 4.7%. We therefore conclude that exogenous shocks can probably not account for the evolution of lending behavior and profits over time, and that differences in business practice reflect deliberate decisions made by the staff at Hoare's, partly in response to its successes and difficulties in its early years.

The bank reduced loans without interest to increase cash reserves. This added flexibility and safety which eventually proved useful; the growth of profits from 1702 to 1742 reflected this change. Providing liquidity short-term to current or prospective customers clearly made sense to the partners at the start of the century, given business

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loans in England were made below the usury limit. Their data is from Gregory Clark's work on English Charity returns, which apparently are not representative of private loan transactions.

[50] T. S. Ashton, *Economic Fluctuations in England, 1700-1800* (Oxford: Clarendon Press, 1959), p. 116-121.

[51] Ibid. , p. 172-73.

[52] The t-test shows a significant increase from an average of 227 in 1704-19 compared to 289 bankrupcies in 1720-43. Based on Julian Hoppit, *Risk and Failure in English Business, 1700-1800* (Cambridge: 1987); adjusted series.

practices at the time. Nonetheless, they were apparently aware of the negative impact that this particular activity had on their bottom line and strove to reduce it over the medium term. The partners experimented with the degree to which they needed to offer interest-free loans, the type of collateral required for each group of customers, the appropriate terms for loans, etc. How do we know that the changes in the allocation of assets were not simply random, or the result of market forces pointing in one direction? We already demonstrated that the differences in balance sheet composition are statistically significant. The crucial shift out of non-interest-bearing loans into those against interest and cash was a gradual process, but it was accelerated by the events of 1720. Learning appears a valid interpretation because any given reduction in lending without interest in 1705 would have been as useful, *ceteris paribus*, as a reduction in 1725. Yet Hoare's earlier probably had not developed a good sense of which kind of customers merited this kind of service, either in terms of probability to repay or in terms of possible future business.

The trend away from interest-free loans progressed moderately smoothly, as shown in Figure 2, but the transformation of Hoare's business practices were affected by two events that stand out in the financial history of London in the early 18th century. The first of these is the *annus horribilis* of 1710 (with its high number of bankruptcies and relatively low profitability at Hoare's), which became a turning point for lending decisions at Hoare's.[53] In 1710, the bank earned only a modest £216, equivalent to 0.13 percent on its assets. By the time the next balance sheet was drawn up (on 20th of September, 1711), the bank had reduced lending against interest by 21 percent, cash reserves by 28 percent – and loans without interest by 72 percent. In 1711 and 1712, we find no profits being allocated to Richard and Henry Hoare. During the first year of apparent crisis, the value of the former's equity declined by almost eighty percent, only to rise to approximately half of the 1710 level thereafter; the latter's equity fell by 27 percent, and then rose above the value recorded for 1710. We do not know with certainty what developments caused the changes in recorded equity values. It appears likely, however, that 1711 was a year of very low (or negative) profitability, and that 1712 may

[53] Ibid. , p. 130.

have seen a rebound – in which case the brutal cuts in loans without interest would have paid off relatively quickly.

The second key event in the evolution of banking practices at Hoare's was the South Sea Bubble of 1720. The main impact of the South Sea Bubble on the financial sector had been in the form of a scramble for liquidity.[54] Neal argues that the third subscription of stock led to a general tightness in the money market, with lenders calling in loans in many cases. We do not know exactly how many early banks went out of business in 1720 and 1721. The total number of bankruptcies in all sectors of the economy did not reach particularly high levels in these years.[55] At the same time, there is some evidence to suggest that partnerships engaged in banking were dissolved or went bankrupt at an unusually high rate in 1720/21, as a result of problems remaining liquid.[56] At least five distinguished houses stopped payment in October alone.[57] Hoare's partners apparently decided that illiquidity – not insolvency – was the greatest risk they faced. We do not know if the bank itself had come close to running out of cash in September 1720. Yet as goldsmiths they had not been subject to the same risks as bankers, and may have needed the spur of crisis to embrace safer practices. Anderson, writing two generations after the bubble burst, described the situation as follows:[58]

> "The stock … had fallen to one hundred and seventy-five per cent… whereupon there appeared great uneasiness and clamour amongst the monied men, which produced a great run or demand for cash at the Bank, and a greater one on the private bankers who had generally lent out much of their cash on South Sea stock and subscriptions, in consequence of which several very substantial ones were obliged to stop payment for some time."

Since only a small part of Hoare's balance sheet was actually exposed to adverse price movements when the bubble burst (the bank had sold many of its substantial holdings in time), the partners probably felt that more equity – ready to absorb losses arising from defaults and losses on investments – was not crucial. This apparently led to a key change in the bank's way of managing risks. While the early years showed a

[54] Neal, *The Rise of Financial Capitalism* .
[55] Hoppit, *Risk and Failure in English Business, 1700-1800* , p. 132.
[56] Joslin, "London Private Bankers, 1720-85," , p. 174.
[57] John Carswell, *The South Sea Bubble* (London: Cresset Press, 1960), p. 163. Others experienced great difficulty in meeting their obligations.

combination of low cash reserves and relatively healthy equity cushions, the partners' reversed this policy after 1720. Accordingly, they held enough cash to satisfy depositors' demands, even in extreme circumstances. Before 1720, the bank had on average kept one pound sterling in cash for every £3.3 in deposits; after the bubble, it increased this to one pound for every £2.5 in deposits.

We should note that Hoare's earlier practice easily qualified as relatively prudent already, at least by the standards of eighteenth-century manuals on banking and commerce. Richard Cantillon, who knew the partners at Hoare's bank, advised in his *Essai sur la nature du commerce en général*:

> "It is easy to understand … that the sums of money which a Goldsmith or a Banker can lend at interest or divert from his cash are naturally proportionable [sic] to the practice and conduct of his clients; that while we have seen Bankers who were safe with a cash-reserve of one-tenth, others can hardly keep less than one half or two-thirds, though their credit be as high as that of the first… The most fortunate is the Banker who has for clients rich gentlemen who are always looking for safe employment for their money without wishing to invest it at interest while they wait."[59]

Cantillon argued that 10 percent was a perfectly adequate cash ratio for this group, while wealthy individuals, such as landowners, who deposited working capital with a bank, normally required a cash ratio of up to 50 percent. In the case of merchants and traders, 66 percent would have been necessary, as withdrawals could be highly irregular and rapid.[60] Given Hoare's client base, it must have resembled the ideal-type of the "most fortunate banker" relatively closely. Relative to the standard of 10 percent described by Cantillon as normal for a bank in this group, Hoare's pre-bubble lending already looked highly cautious, and its cash ratios afterwards were very conservative.

The opportunity costs were substantial. In 1724, the balance sheet recorded £70,286 in cash. At an average effective rate of interest of 4 percent, this would have been tantamount to £2,811 in potential revenue lost. Had the bank maintained the cash-

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[58] Adam Anderson, *An Historical and Chronological Deduction of the Origin of Commerce,* vol. 3 (London: J. White, 1801), p. 114.
[59] Richard Cantillon, *Essai Sur La Nature Du Commerce En Général* (New York: A. M. Kelley, 1755 [1964]), p. 299-303 [spelling and capitalization as per the original].
[60] Ibid. , p. 302-5.

liability ratio of the pre-1720 period, it could have earned some additional £1,022.[61] Whether from direct difficulty or through observing the general distress, Hoare's had learned during the turbulent years 1710-1720 that banking requires ample liquidity. After the bubble, the bank decided to accept lower earnings by keeping more reserves so as to deal with fluctuations in demand.

The rise in cash reserves is probably best interpreted in the context of the simultaneous decline in partners' equity in the firm. The latter was not the result of capital losses during the South Sea Bubble. By and large, the bank's dealings during the bubble period were highly profitable.[62] However, Richard Hoare died in 1718, and only part of his capital remained in the bank. Yet the bank decided not to reduce the size of the balance sheet to the same extent as the death of Richard Hoare had reduced its equity. In only one year did the leverage ratio drop below its pre-bubble average. Another way of describing the change post-1720 is to argue that the Hoare's preferred profit foregone in the form of cash reserves to the danger of capital losses in bad years – a way of using clients' deposits as the "first line of defense" against adverse shocks.

An early-eighteenth century banker had to manage a number of risks, most of them familiar to bank managers today. Default of loan customers was a constant threat, albeit small in the case of Hoare's, and sudden withdrawals of cash deposits could raise the specter of illiquidity. Investment securities could sharply decline in value, and counterparties might not live up to their obligations – especially in bill and stock exchange transactions. Economists normally conceive of these risks as the spread of a distribution around an expected mean. In a classic book, Frank Knight proposed a distinction between "risk" and "uncertainty".[63] In the case of risk, a probability distribution can be calculated. Uncertainty however refers to a situation when information is insufficient to even calculate probabilities.[64] Eventually, as certain types of business become more common, uncertainty is reduced to mere risk. Yet banks at the time of

[61] Hoare's had a cash-liability ratio of 30.8 percent in 1724, similar to the post-bubble sample average. The pre-crash average was 19.6 percent. 2,811*((30.8-19.6)=1,022. This would have been equivalent to more than one third of the average annual pre-bubble profit.
[62] In a separate paper, we explore Hoare's trading in South Sea stock in detail: Peter Temin and Hans-Joachim Voth, "Riding the South Sea Bubble," *MIT Economics Department working paper* (2003).
[63] Frank Knight, *Risk, Uncertainty, and Profit* (Boston: Houghton Mifflin, 1921).
[64] Larry Epstein and Tan Wang, "Intertemporal Asset Pricing under Knightian Uncertainty," *Econometrica* 62, no. 3 (1994).

Richard Hoare faced substantial "Knightian uncertainty". They could not know much about their customers' expectations, and the extent to which customers were likely to switch accounts if some services such as occasional interest-free loans were not forthcoming. While individuals can always act "as if" they could assign probabilities, their freedom for experimentation is severely constrained. Only when faced with a severe crisis of profitability did the firm take drastic steps to curtail interest-free lending. In addition, the evolving financial system of eighteenth-century Britain was subject to infrequent but very considerable shocks, brought on by financial crises, wars, and individual bankruptcies.[65] For bankers who had only been taking deposits for a few years (or decades at most), the crises of 1710 and 1720 must have appeared like the "perfect storm" that sank the hedge fund LTCM in 1998.[66] This implies that, ex ante, finding the right responses to the dangers of illiquidity and insolvency, arising from sharp asset price changes and a general scramble for liquidity, was next to impossible. The survival of individual firms would then be the result of idiosyncratic factors that, ex post, turned out to have provided a sufficient safety margin. Indeed, generalized Knightian uncertainty – amongst investors, depositors, and bankers – at a time when traded joint stock companies and deposit banking were new and as yet untested in their effects, may well have contributed to the very wide swings in asset prices and in the demand for cash themselves.[67] It is also likely to have kept the number of entrants in the new business of deposit banking at a lower number than it otherwise would have been – most individuals have a strong preference to avoid Knightian uncertainty, a regularity known as the "Ellsberg paradox".[68]

[65] Julian Hoppit, "Financial Crises in Eighteenth-Century England," *Economic History Review* 39 (1986); Hoppit, *Risk and Failure in English Business, 1700-1800* ; Isabel Schnabel and Hyun Song Shin, "Foreshadowing Ltcm -- the Crisis of 1763," *University of Mannheim working paper* 02-46 (2002).
[66] Roger Lowenstein, *When Genius Failed* (London: Fourth Estate, 2001).
[67] Epstein and Wang show that Knightian uncertainty can lead to multiple equilibria in asset prices, opening up the possibility of substantial volatility as a result of "animal spirits" (Epstein and Wang, "Intertemporal Asset Pricing under Knightian Uncertainty,").
[68] Daniel Ellsberg, "Risk, Ambiguity, and the Savage Axioms," in *The Economics of Uncertainty. Volume 2. Uncertainty and Dynamics*, ed. John D. Hey (1997) .

6. Conclusion

The modern literature on financial system development distinguishes four main functions – the transfer of resources, the pooling of savings, the allocation of capital, and the management of risk. Much of the recent research on the development of banking and finance prior to the Industrial Revolution has emphasized the payments function, and the development of public creditworthiness.[69] We argue that the transition from goldsmith to deposit-taking banker was at least as important economically because it dramatically improved the financial system's ability to act as an aggregation device for savings, and as an allocation mechanism for capital.[70]

The records at Hoare's bank provide us with evidence on how these new financial techniques were used as the basis for a business that has prospered over the long run. We have been able to observe in detail the transition from goldsmith to banker. Several aspects of this transition are important. First, it was not quick. It took two decades for Hoare's Bank to find a way to expand its banking business on any kind of regular basis. Second, it was not easy. There were crises in 1710/11 and 1720 that doomed other nascent bankers, and it was only the skill and determination of Richard Hoare and his descendants that avoided failure. Third, the process was one of learning a new business. The low profits before 1720 are best seen as foregone earnings in goldsmithing, invested in the knowledge needed to succeed in banking.

Hoare's in 1700 was hardly a modern bank, and we suggest that its competitors also were not. It therefore probably was inaccurate for Quinn to assume that loan registers of Child's Bank could be interpreted as if they came from a sophisticated financial institution that could differentiate its interest rates based on the risk profile of its borrowers and the duration of its loans.[71] The average interest rate is not a historically meaningful statistic in the years around 1700. In addition, the median private interest rate hovered around the usury maximum. This suggests that North and Weingast were wrong to use relatively small changes in the interest rate for government borrowing as an

[69] P.G.M. Dickson, *The Financial Revolution in England: A Study in the Development of Public Credit, 1688-1756.* (New York: 1967); Neal, *The Rise of Financial Capitalism* ; Stephen Quinn, "Money, Finance and Capital Markets," in *Cambridge Economic History of England*, ed. Roderick Floud and Paul Johnson (Cambridge: Cambridge University Press, 2003).

[70] We examine the recipients of credit in a separate paper.

indicator of financial ease and constitutional change. Also, Hoffman et al. may have exaggerated the contrast between Paris and London, at least at the start of the 18th century.[72] None of the new techniques applied by Richard Hoare and his partners and successors necessarily required any of the institutional innovations emphasized by North and Weingast.[73]

Finally, the records at Hoare's provide us with a striking image of how business practices had to be adapted to successfully use a new business model. Deposit banking is not an easy technique to master – profitability is often low, and risks can be high. We know that bank mortality in the early years of England's financial revolution was significant. Hoare's increased its cash reserves dramatically after 1720, suggesting that, while the bank was probably more cautious than some of its competitors, it too faced some drain on its liquidity. The crises that didn't affect Hoare's tell us as much about the likely causes of failure as the problems that caused the bank to alter course. Default rates were very low – fewer than 1.4 percent of loans were not repaid. Hoare's policy of knowing its (selected) customers well turned out to be more important than the potential benefits of risk diversification through a large portfolio of small loans. To be sure, Hoare's did not approach the standards of modern banking by mid-century; they still used simple, not compound, interest, probably did not fix the duration of loans, and did not establish regular payment dates for its clients. As we have shown, their earnings did not suffer greatly from these elementary deficits. Learning and the evolution of England's financial system therefore operated through two channels – the successful adaptation of techniques at the level of the individual financial institution such as Hoare's, and by "Darwinian" learning at the aggregate level through the elimination of unsuccessful entrants.

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[71] Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705," .

[72] Hoffman, Postel-Vinay, and Rosenthal, *Priceless Markets : The Political Economy of Credit in Paris, 1660-1870* ; Hoffman, Rosenthal, and Postel-Vinay, "Private Credit Markets in Paris, 1690-1840,"; North and Weingast, "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England," .

[73] The only possible exception is the use of government debt as collateral in loan transactions. We thank Stephen Quinn for this observation.

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