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THE FINANCIAL DEVELOPMENT OF LONDON IN THE 17TH CENTURY REVISITED: A VIEW FROM THE ACCOUNTS OF THE CORPORATION OF LONDON

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Abstract

A novel, annual series of interest rates paid by the Corporation of London extracted from archival sources shows that interest rates in London declined by 350 basis points over the 17th century. Most of the decline followed a similar pattern in Amsterdam. Records extracted from the Corporation's archive provide evidence for financial deepening: an increase in the number and volume of debt instruments, an increase in the number of people holding them, and development of a secondary market. Econometric analysis establishes that financial deepening contributed to the convergence of interest rates between London and Amsterdam. England's financial evolution and path towards modern growth date, therefore, to the 17th century.

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Financial Integration and Financial Deepening in London in the 17th Century: The Financial Revolution Revisited

Nathan Sussman[*†]

A novel, annual series of interest rates paid by the Corporation of London extracted from archival sources shows that interest rates in London declined by 350 basis points over the 17th century. Most of the decline followed a similar pattern in Amsterdam. Records extracted from the Corporation's archive provide evidence for financial deepening: an increase in the number and volume of debt instruments, an increase in the number of people holding them, and development of a secondary market. Econometric analysis establishes that financial deepening contributed to the convergence of interest rates between London and Amsterdam. England's financial evolution and path towards modern growth date, therefore, to the 17th century.

Keywords: Interest rate, Financial Development, Financial Intermediation, Growth, England.

JEL codes: N2, N23, O16, O43, G23.

1   Introduction

The relationship between financial development and economic growth was extensively researched before the onset of the global financial crisis (GFC) in 2007. In an environment of rapid historical and recent financial globalization and deregulation,[1] numerous scholars, from earlier pioneers such Bagehot (1873), Schumpeter (1934)[2] and Goldsmith (1969), through summaries of the theoretical and empirical findings by Levine (2005), demonstrated the link between financial development and growth. After the GFC, attention naturally shifted to the risks involved in financial development (e.g., Reinhart and Rogoff 2009; Schularick and Taylor 2012), leading economists to argue that perhaps there is too much finance (Arcand et al. 2015).[3]

In this paper, we turn to an overlooked aspect of financial development in England during the 17th century, when financial development was still in its infancy.[4] We extracted individual debt contracts from the accounts of the Corporation of London to construct a novel, annual series of interest rates paid by the Corporation to its lenders from 1638 to 1683.[5] Our key finding is that a significant financial development occurred in the 17th century, in particular after the Restoration in 1660. We show (**Figure 1**) that from the 1630s to the 1680s, interest rates in London declined in parallel to those in Amsterdam, the most developed financial center of the time (Carlos and Neal, 2011). Interest rates in London during the 17th century, therefore, exhibited a similar declining trend to that observed in other parts of Europe.[6] However, significant *convergence* between London and Amsterdam was also achieved by 1680 when interest rates reached 4%. This development is in contrast with the divergence of interest rates that followed the Glorious Revolution in 1688 and lasted until the 1730s (Sussman & Yafeh 2006).

We attribute the *convergence* of interest rates between London and Amsterdam to financial deepening. Kiyotaki and Moore (2005) present a model of financial deepening, where interest

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[1] For comparison of historical and recent globalization, see Bordo et al. (2007) and Kose et al. (2009).
[2] The original published in German in 1911.
[3] See Arcand et al. (2015) for a thorough discussion of the growth and development literature.
[4] The early history of the financial intermediation by the Corporation of London was studied by Ashton (1960) who mainly looked at the forced loans imposed on the Corporation before the Civil War. Carlton (1974) studied the Corporation of London's orphan's fund, which we analyze in (Coffman et al. 2019).
[5] We also extracted a shorter and incomplete series of interest rates paid by borrowers from the Corporation from 1616 to 1639, see section 1.2.
[6] See (Epstein 2000) for Europe, (Hoffman et al. 2000) for Paris, (Chilosi et al. 2018) for Italy and Germany and (Schmelzing 2020) for an updated European and global data on interest rates.

rate differentials represent a liquidity premium. According to that model, as financial deepening progresses, the liquidity premium goes down, and with it, interest rate differentials. The IMF recently compiled indices of financial deepening (Sahay et al. 2015). The indices include two broad categories – financial institutions and financial markets.

In this paper, we document the emergence of the Corporation of London as a significant financial institution in London's financial market. Sub-indices of financial development include the variety of instruments, their marketability, spreads, and measures of financial intermediation to GDP (Sahay et al. 2015). On the macroeconomic level, we show that from the 1660s, debt levels relative to British GDP increased significantly and that the cost of capital for non-sovereign debt declined. On the microeconomic level, the Corporation of London used four debt instruments: annuities, bonds, notes, and very short-term loans. We provide evidence of the development of a secondary market for debt. We also document an increase in the number of people holding bonds and their heterogeneity and the variety of debt maturities.[7]

Figure 1
Borrowing cost of the Corporation of London and Province of Holland: 1638-1683
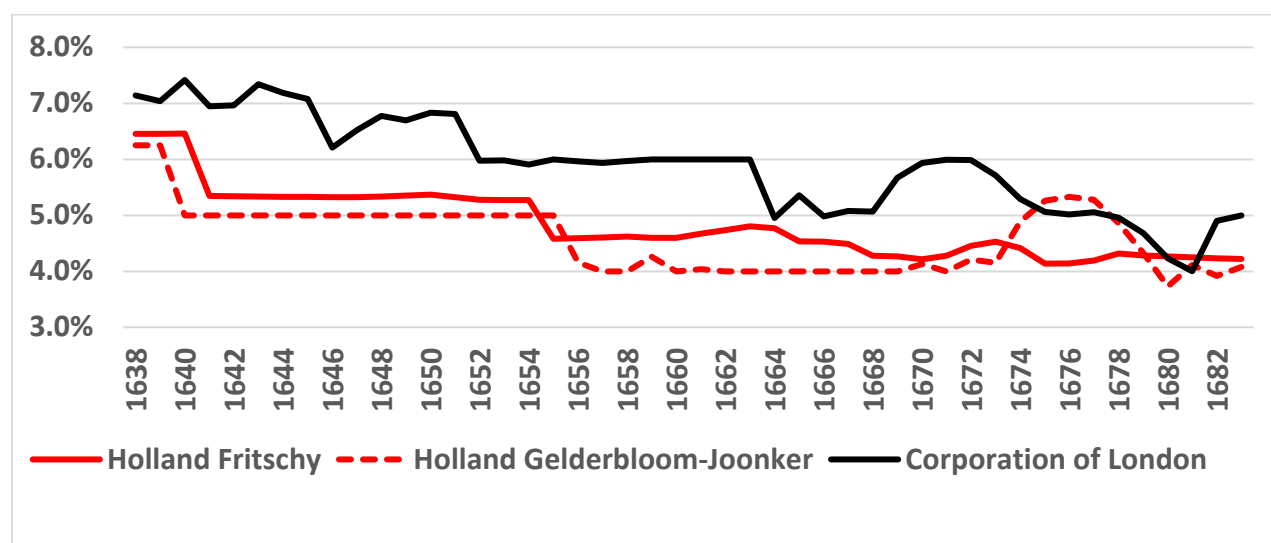
Sources: London: COL/CHD/LA/01/001-002; COL/CHD/CT/01/002-017. Borrowing rates weighted by loan amount.
Province of Holland: average cost of debt from Wantje Fritschy Gewestelijke Financiën ten tijde van de Republiek der Verenigde Nederlanden 1572-1795
Province of Holland G-J: market prices communicated by Gelderbloom and Joonker.

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[7] Our findings supplement earlier accounts on the rise of the goldsmith-bankers (Quinn 1997).

In the early modern period, governments spent to finance wars. Williamson (1984) provocatively claimed that government debt crowded out the Industrial Revolution. Voth and co-authors ((Temin & Voth (2005) and Ventura & Voth (2015)) argued convincingly that larger government debt crowded in private investment. Our focus in this paper is on direct evidence on the cost of civilian (civic) borrowing that supported economic growth and social security and deepened the British capital market.

The autonomous Corporation of London, like its some successful continental counterparts (Stasavage 2011), managed to borrow at a lower cost than its sovereign because it enjoyed greater credibility than the Crown. Unlike Stasavage's grim conclusion that city oligarchies became rentier societies siphoning credit to unproductive uses, the Corporation of London borrowed to the hilt to rebuild a modern city (Coffman et al. 2019), financed the Crown and provided social security to its orphans. The declining interest rates we observe in the data were also the manifestation of financial deepening embodied in a rising stock of debt that increased liquidity (Gorton & Pennacchi 1990). More liquid capital markets and lower cost of credit following the Restoration helped propel the English economy forward (Broadberry et al. 2011).

Our findings, therefore, support the view that the break from the Malthusian trap and the accelerated growth that led to the Industrial Revolution in England began by the mid-17th century (e.g., Clark (2005), Kelly & Ó Gráda (2016) and Broadberry et al. (2015)). We show in *Figure 2*, a strong correlation between the reduction in the cost of capital and increases in real GDP per capita. The picture that emerges is one of a close association between financial development and economic growth (Levine 2005).[8]

Most of the research in economic and financial history has focused on the development of financial markets in England *after* the Glorious Revolution in 1688. Earlier accounts already disputed the starting date of the financial revolution in England. 'Dickson's (1967) "The Financial revolution…1688-1756" was followed by Roseveare's (1991) "The Financial Revolution, 1660-1760." However, North and Weingast (1989), a highly influential paper, argued that institutional reforms, namely establishing credible commitment, enacted after the Glorious Revolution contributed to financial development and growth. Some of the key financial innovations were: the

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[8] Calderón & Liu (2003) provide evidence that the direction of causality run from financial development to growth.

establishment of the Bank of England (1694), a stock-exchange and a deep market for perpetual government securities. The main criteria they used for the successful financial transformation and its most significant contribution to economic growth was evidence of declining interest rates.

Figure 2

Corporation of London Borrowing rates and GDP per capita: 1638-1683
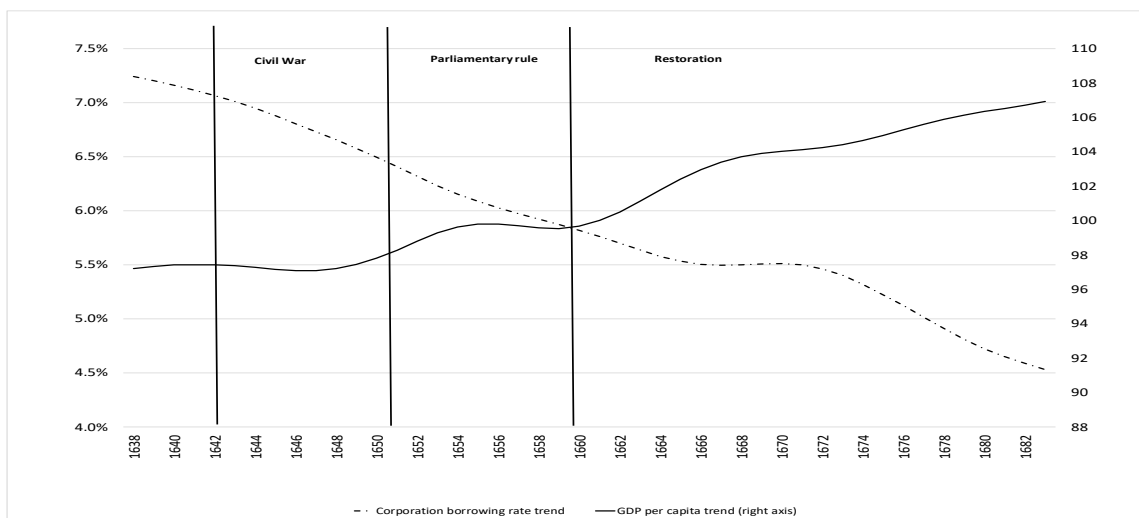
Sources: London: Corporation of London COL/CHD/LA/01/001-002; COL/CHD/CT/01/002-017. Borrowing rates weighted by loan amount. Real GDP from Broadberry et al. (2011). The population of England from Clark (2010). GDP per capita is an index with 1660=100. The trends are based on an HP filter.

The North and Weingast hypothesis sparked an ongoing debate on facts and explanations. Clark (1996) showed that real interest rates measured as the return to capital were not affected. Sussman and Yafeh (2006) showed that interest rates increased for more than three decades after the Glorious Revolution. Subsequent research offered a more nuanced view of the Glorious Revolution's impact on financial development and economic growth.[11] It emphasized the change in the ability of the state to rule efficiently and raise taxes to finance wars and debt (e.g.: ('O'Brien 2011); (Cox 2012); (Pincus & Robinson 2014)). Another strand of the literature emphasized the effects of partisan politics and the growth-enhancing economic policies of the Whig party (e.g.: (Stasavage 2007); (Pincus & Robinson 2014)).

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[11] For the sake of not repeating the extensive arguments raised in this debate, I refer the reader to excellent summaries of the debate in Cox (2012); Coffman et al. (2013), in particular Coffman (2013) ; Pincus and Robinson (2014); Hodgson (2017); Dimitruk (2018).

Recent accounts argue that the Glorious Revolution was not about securing property rights but about enabling Parliament to transfer landed property rights effectively. This brought a more efficient allocation of resources and the development of capital markets. (e.g., (Bogart 2011); (Bogart & Richardson 2011); (Hodgson 2017); (Dimitruk 2018)). The emphasis on the Glorious Revolution as a watershed in the development of efficient (capital) markets fits with research that claims that Britain's (legal) institutions were more conducive to the development of efficient financial markets (Glaeser and Shleifer 2002) and the extensive empirical literature that followed (La Porta et al. 2008).

Our aim is not to dispute the contribution of the Glorious Revolution for British economic history. We provide novel evidence that shows that interest rates in London declined during the 17th century, before the Glorious Revolution and in parallel with their decline in Continental Europe. More importantly, the Restoration of the Stuart monarchy in 1660, despite initial apprehensions, was associated with financial deepening. Financial development brought about the convergence of London interest rates with those of Amsterdam – the financial center of Europe.

The rest of the paper is organized as follows: Section 2 describes the lending and borrowing by the Corporation of London and provides quantitative evidence on the financial deepening as reflected in the accounts of the Corporation. In Section 3, we present the methodological framework and report the results of our econometric analysis. Section 4 provides an analysis of the spread between secured and unsecured debt. Section 5 concludes.

2   Lending, borrowing and interest rates based on the Corporation of London accounts

In this section, we provide a novel, annual series of interest rates for the 17th century. We extracted the data from the accounts of the Corporation of London. The data is comprised mainly of the borrowing accounts of the Corporation of London (1638 to 1683). We supplemented it by a short series on lending by the Corporation of London (1616 to 1639). We also present data on amounts borrowed and various characteristics of the market for the Corporation of 'London's debt. Finally, we show the distribution of loan amounts and loan maturities.[12]

The Corporation of London was a chartered corporation that originated in the 12th century. Its governance structure included the Lord Mayor, the Court of Aldermen (executive branch), and the

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[12] We provide more details on the lenders and the socio-economic situation in Coffman et al. (2019a).

Court of Common Council (a deliberative institution).[13] In the 17th century, it enjoyed autonomy and was essentially an oligarchy of wealthy merchants with mainly Whiggish inclinations.[14] The accounts we studied reveal that the Corporation of 'London's financial activities intensified during the 17th century. Ashton (1960) studied its financial importance before the Civil War. Richards (1929) characterized its role as a financial intermediary to the Crown (similar to the goldsmith-bankers, only on a larger scale). It also administered an 'orphans' fund that acted as a savings (insurance) for (potential) orphans.[15] Coffman et al. (2019) show that the Corporation undertook and financed the reconstruction of infrastructure and public buildings destroyed by the Fire of 1666.

The Corporation of London's financial activities were similar to those of their counterparts on the Continent, especially in the Low-Countries. However, historians and economic historians hardly researched its financial operations.[16] Munro (2003) and Carlos and Neal (2011), therefore, arrived at their conclusion on the unique history of financial development in London based on incomplete data. London is, therefore, also missing from the comprehensive analysis by Stasavage (2011), who studied in detail the debt of autonomous cities in Europe.[17]

Our data analysis ends in 1683. In that year, the Corporation of London suspended interest payments on its unsecured debt. In Coffman et al. (2019), we suggest that the default was a result of higher than expected commitments and insufficient cash flows related to the reconstruction of the infrastructure and public buildings of the City destroyed in the Fire of 1666. A few months after the default, in October of 1683, the King suspended the privileges of the Corporation of London in what is known as the 'Quo 'Warranto' act.[18] Parliament restored the privileges in 1688 immediately after the Glorious Revolution. However, the Corporation of London, riddled with debt in default, did not resume its role as a financial intermediary. Subsequent financial development in England proceeded on the well-known and heavily researched trajectory.

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[13] See City of London fact sheet:
https://web.archive.org/web/20130815012629/http://www.cityoflondon.gov.uk/about-the-city/history-and-heritage/mansion-house/Pages/History-of-the-Government-of-the-City-of-London.aspx

[14] See Unwin (1908) and Roseveare (1991).

[15] In particular, see Richards (1929) pp. 107-109. On the Orphans fund, see Carlton (1974). See also

[16] Notable exceptions are (Harding 2003); (Kellett 1958), (Wren 1948); (Wren 1949);.

[17] See Table 2.1 p. 31. One can argue that London was 'autonomous' but not a 'city-state' and therefore, does not qualify to be included in the analysis.

[18] Roseveare (1991).

2.1 The Sources

We extracted our data from the Chamberlain's account books kept at the London Metropolitan Archive. The 'Cash 'Books' contain the borrowing and lending activities of the Chamberlain of the Corporation of London from 1633 until 1648.[19] As was customary in the accounts of the time, borrowing was recorded in the receipts '('charges') section of the account. There was no distinction between an operating budget and a capital account.[20] From 1649 to 1683, the Chamberlain kept the detailed financial accounts in a separate ledger – the 'Loan Books.'[21] The Cash Books listed only the totals.

The accounts detail the origination date of the loan, the name/s of the lender/s, their gender (widows or spinsters), and whether they resided outside of the City of London. The records provide information on the status of the lenders, whether they belonged to the gentry (gentlemen, esquire, and nobility), the City government, and members of the livery companies (usually with specific occupations listed). They also record the amount lent, the nature of the loan (very short-term loan, six 'months' loan or annuity), and the rate of interest on the loan. The accounts also record the redemption of the loan and the name of the person receiving the principal. This information allows us to establish whether the loan was assigned to another person.

We extracted additional accounting data from the Cash Books. They include annual receipts, expenditures, and balance sheets. The provision of a detailed annual balance sheet, including assets and liabilities, started to appear in the Cash Book in the fiscal year 1654. The fiscal accounts ran from Michaelmas to Michaelmas (29 September). The accounts allow calculating the annual operating deficit of the Corporation (excluding borrowing and debt redemptions) and the 'Corporation's stock of debt and additional financial ratios. The accounts are complete except for the ledger for the years 1665 to 1667, which burned in the London Fire.

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[19] The Cash Books consulted were COL/CHD/CT/001 to 019. For an early analysis see (Wren 1949)

[20] For a detailed explanation of the accounting system used by the Chamberlain of the Corporation, see: 'Introduction: Medieval accounts and their arrangement,' in *Chamber Accounts of the Sixteenth Century*, ed. Betty R Masters (London, 1984), pp. ix-xxxii. *British History Online* http://www.british-history.ac.uk/london-record-soc/vol20/ix-xxxii.

[21] The Loan book consulted were COL/CHD/LA/001, and 002.

2.2 Lending by the Corporation of London

The Corporation of London advanced loans to individuals and companies before 1640. Afterward, the Corporation of London started to borrow from individuals and no longer lent them. Since surviving records began in 1633, we have detailed lending data only from 1633 to 1640. We used the stock of unpaid debt borrowed from the Corporation of London to infer, albeit from an incomplete sample, the lending rates before 1633.

2.2.1 The loans

The Corporation of London lent directly to wealthy individuals and two companies; the East India Company and the company of the Merchant Adventurers of London. The Corporation also administered the forced loans levied by the Crown (Ashton, 1960). The loans made by the Corporation were extended initially for 6 or 12 months and were approved by the '*consent of the court (of Aldermen)*." The Corporation made these loans without asking for collateral. The stock of unpaid debt also includes several loans, made in the 1620s, that were in default.[22] These loans were part of the forced loans imposed by the Crown on the Corporation in 1616 and 1625 that were unpaid (Ashton 1960).

Table 1
Summary statistics of unsecured lending by the Corporation of London: 1616-1640

Number of loans	Number of borrowers	Total lent	Mean	Median	Min	Max
121	115	£ 181,695	£ 969	£ 650	£ 25	£ 4000

Sources: COL/CHD/CT/001-003

Table 1 provides summary statistics for the unsecured lending we extracted from the account books. The average loan totaled about £1000, while the median loan was £650. Depending on various assumptions, £1000, then, are worth today between £150,000 to £2,250,000.[23] We can compare these loans to lending by ' 'Hoare's Bank from 1695 to 1724. Temin and Voth (2013) showed that the average loan made by ' 'Hoare's was £1040. This amount was similar to the one we calculated for the Corporation of London.

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[22] We infer that the loans were in default from accrued interest charges and the absence of current interest payment.
[23] Calculation based on measuring worth website https://www.measuringworth.com/index.php

The accounts of the Corporation of London reveal that it lent to the East India Company and the Company of the Merchant Adventurers. The East India Company borrowed £15,000 a year from 1632 to 1635 and £12,000 in 1636 at 6%. In 1639, it borrowed only £5,500 at 7%. The borrowing by the Company of Merchant Adventurers was more modest than that of the East India Company. It borrowed £2,000 at 6% in 1632 and 1633 and £1,500 at 6.5% in 1634 and 1635.

2.2.2 Lending rates

Figure 3

Corporation of London lending: 1616-1640
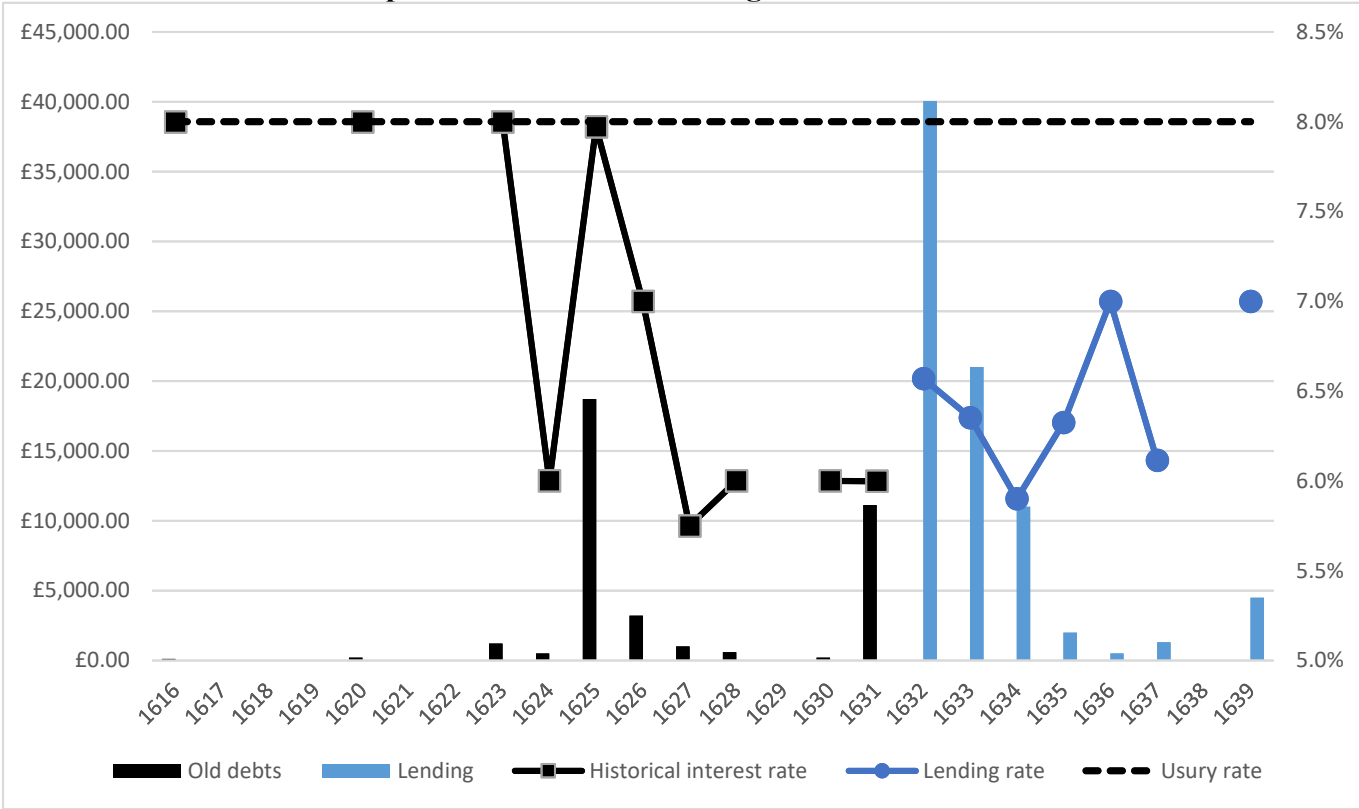
Sources: COL/CHD/CT/01/001-003.
Old Debts and historical interest rate based on the stock of outstanding debt owed to the City in 1633 (COL/CHD/CT/01/001). Lending and lending rate based on reported actual lending.

We show the lending rates charged by the Corporation of London and amounts lent in **Figure 3**. Interest rates declined from the usury ceiling of 8% in 1625 to 6% during the 1630s and then increased to 7% in 1640. We can compare the loans made in the 1630s with those made by Hoare's Bank after the Glorious Revolution. Temin and Voth (2013) report that the usury ceiling of 6% constrained Hoare's lending rates until 1714 and 5% after that. Therefore, they argue that

administrative rather than market forces dominated lending rates. Our data show that almost a century *earlier*, the Corporation advanced equal-sized loans (on average) at *market* rates. We also show that lending rates, albeit to privileged borrowers affiliated with the City's government, in the 1630s were similar to those that prevailed a century later, decades after the Glorious Revolution.

Figure 4
The cash flow of Corporation of London: 1633-1683
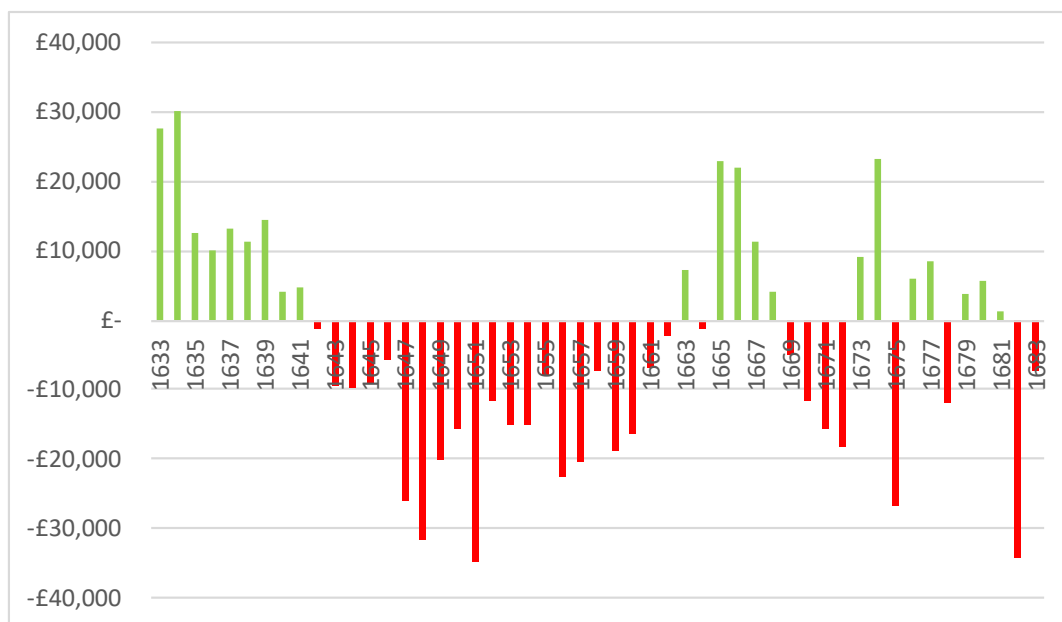
Sources: COL/CHD/CT/01/001-17.
Cash flow is equal to the cash balance reported in the account minus the cash obtained by borrowing.

2.3   Borrowing by the Corporation of London

The Corporation of London started borrowing from individuals in 1638. From 1640, it faced borrowing needs as its cash flow, which before then was positive and allowed it to lend, became negative for most years (*Figure 4*). In this subsection, we begin by detailing the characteristics of the loans to establish our hypothesis that financial deepening occurred in London during this period. We will show the types of debt contracts used, their duration, volume, and their liquidity. We then present the interest rates at which the Corporation of London borrowed.

2.3.1   Borrowing

The Corporation of London borrowed money from individuals to cover its deficits. These loans were secured only by the Corporation's reputation. The accounts record them as "*borrowed for the "City's use on the City's bond.*" Habakkuk (1952) cites Benbrigge's *Usura Accommodata* from 1646, claiming that the City's Chamber was a place "*whereunto men may put their moneys, for the*

assurance whereof, and the payment of its use (which is five in the hundred per annum), they have the security of the Chamber, which is accounted the best this day in England."[24]

Table 2 provides summary statistics for the unsecured borrowing we extracted from the account books. The accounts record 2184 loans advanced by 1203 individuals for a total of almost £920,000 over 40 years. The average loan totaled about £419, while the median loan amounted to £200. These were substantial investments, £200 then are worth today, between £30,000 to £450,000.[25]

Table 2
Summary statistics of unsecured borrowing by the Corporation of London: 1638-1683

Number of loans	Number of Lenders	Total Borrowed	Mean	Median	Min	Max
2184	1203	£ 918,715	£ 419	£ 200	£ 5	£ 7100
Distribution of lender types/Share of total lending						
Aldermen	**Gentlemen**	**Livery members**	**Widows**	**Spinsters**	**Non-City**	
2% / 9%	25%/40%	33%/26%	18%/11%	16%/9%	6%/5%	
Distribution of loan types / Share of total lending						
Bonds	**Annuities**	**Notes**	**On-Demand**			
83%/82%	2.2%/1.5%	4.6%/3.2%	10.2%/13.2%			
Loan duration in months						
Number of loans	**Defaulted loans**	**Weighted mean**	**Median**	**Min**	**Max**	
2184	246	43.6	24.5	1day	42 years, 6months	
Assigned loans						
Third-Party	**Husband**	**Heirs**	**Total**	**Total amount**		
5.7%	2.7%	6.5%	14.9%	£ 118,565		

Sources: COL/CHD/CT/001 to 019; COL/CHD/LA/001 and 002.

2.3.1.1   *The volume of debt and bonds*

An important measure of financial deepening is the ratio of financial assets to GDP (Sahay et al. 2015). The Corporation of London started to borrow using bonds in 1638, although it had already administered an orphans' fund that dated to the middle ages. We can see (**Figure 5**) that debt

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[24] Footnote 4 in and page 5 in the original.
[25] Calculation based on measuring worth website https://www.measuringworth.com/index.php

volumes rose during the period of the English Civil war and declined during the Interregnum. Debt volumes increased again following the Restoration, and especially after the London Fire of 1666 and the reconstruction carried out by the Corporation. We can scale the debt volumes by British GDP (Broadberry et al. 2015) and show that until the Restoration, this ratio did not exhibit a trend. However, after 1660 the Corporation of London's debt to British GDP ratio tripled.[26]

The balance sheet of the Corporation of London was largest that than of Goldsmith Banks. Before the Restoration, the Corporation's balance sheet averaged around £200,000 and tripled to £600,000 in the 1680s. In contrast, according to Temin and Voth (2013), the assets of individual Goldsmith Banks from 1688 to 1730 were in the range of £100,000 to £200,000. The rise of the Corporation's debt following the Restoration marks a significant development for London's financial market.

Figure 5
Measures of financial deepening: Debt volumes, debt to GDP, number of loans outstanding and number of lenders: 1633-1683
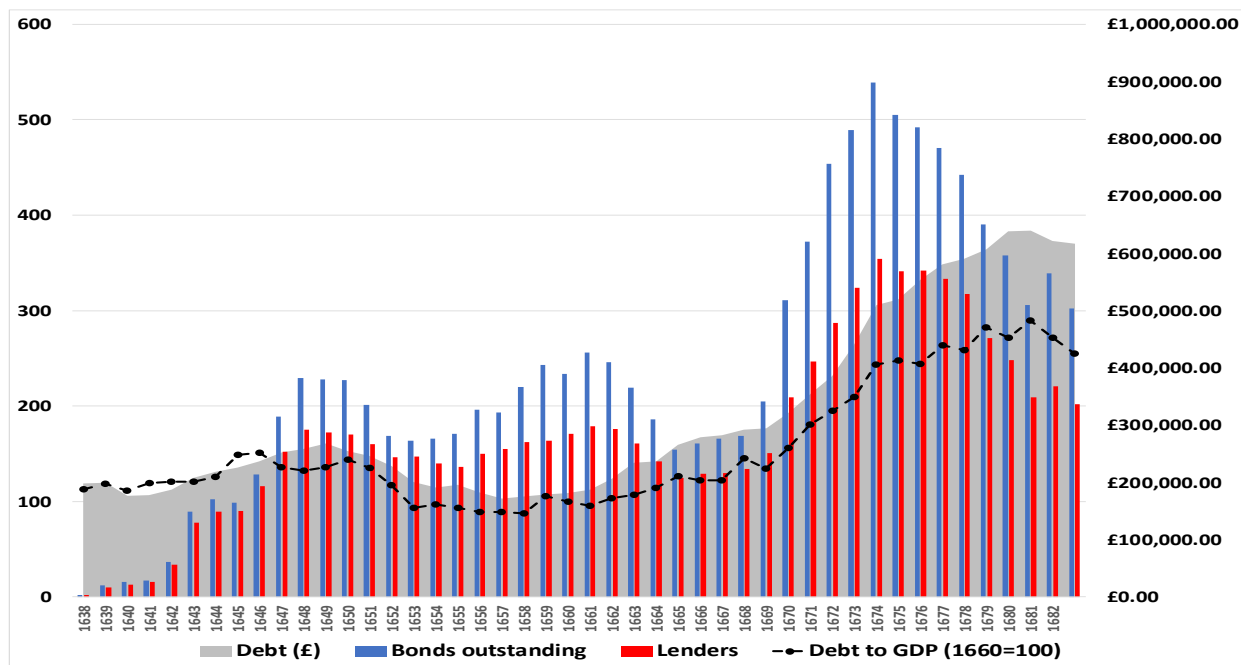
Sources: COL/CHD/CT/001 to 019; COL/CHD/LA/001 and 002.

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[26] One may argue that following the Stop of Exchequer in 1672, loans to the Corporation of London substituted lending to the Crown and therefore do not provide evidence for financial deepening. However, the debt to GDP ratio increased by 2.5 times before 1672 and did not increase during the period of default, it increased to 3 times its rate in 1660, only in 1679-81 when the financial crisis of 1672 was already over.

Financial deepening is also represented by the number of bonds and the number of lenders holding the Corporation's debt instruments. The data show (**Figure 5**) that the number of individuals holding the Corporation's debt increased during the first decade of borrowing to around 150 and remained at this level until 1669. It then increased rapidly to levels higher than 300. The number of bonds outstanding followed a similar trend; More than 500 bonds were outstanding in 1674. In all, the data show that the Corporation of London's borrowing was associated with significant financial deepening. Moreover, the exogenous event of the Fire of London that strained the finances of the Corporation accelerated these developments.

2.3.1.2   Who were the lenders?

The Corporation of London borrowed mainly from wealthy residents of the City (**Table 2**). The documents classify the lenders into five categories: 1) members of the Corporation's governing body (Aldermen). They accounted for 2% of the loans, but 9% of the amount lent. The alderman can be considered as insiders – lending to the institutions they governed. 2) gents and esquires that resided in the City. They provided 25% of the loans and 40% of the amount lent. 3) members of livery companies (guilds) that supplied the largest share of loans (33%) and 26% of the amount lent. 4) widows that provided 18% of the loans and 11% of the amount lent. 5) spinsters that provided 16% of the loans and 9% of the amount lent. Independent women, therefore, provided 23% of the loans and 20% of the amount lent. 6) a small subset of lenders did not reside in the City. Many resided in London and some in the surrounding shires. They accounted for 6% of the loans and 5% of the amount lent.

Lending to the Corporation of London increased the variety of assets Londoners could hold. Records of Backwell Bank – one of the three most prominent goldsmith banks that operated in London after the Restoration (Quinn 1997; Richards 1929) – allow us to show that 322 of the 1203 lenders to the Corporation (27%) also held bank accounts in that bank.[27] Our records show that those that also had bank accounts with Backwell lent on average significantly larger amounts to the Corporation than those that did not have an account with Backwell.[28]   The share of women who lent to the Corporation and also had an account with Backwell was only 13%. Though we

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[27] We used the *Customer account ledgers of Edward Backwell, 1663-72* and matched the names of depositors with names of lenders to the Corporation.
[28] We can reject the hypothesis that both the median amount lent and the average amount lent are equal.

have data from only one, albeit the largest bank in London, we can conclude that the Corporation of London offered an additional investment opportunity allowing individuals to diversify their portfolios. More tenuously, we can conclude that the Corporation of London offered investment opportunities to those that did not have access to bank accounts, especially women. These findings support our hypothesis that the Corporation of London contributed to financial deepening following the Restoration.

The evidence that individuals that lent to the Corporation also held accounts at Backwell's Bank establishes that the Corporation of London was integrated within the London financial market. Its lenders always faced the option of either depositing funds at a Bank or lending to the Corporation. Therefore we can argue that the Corporation competed with London Goldsmiths and offered the option to diversify financial investments. The Goldsmith Banks were integrated and part of the financial information network with continental Europe and, in particular, with Amsterdam (Neal & Quinn 2001). Therefore, the Corporation of London, though not directly exposed to Amsterdam's capital market, was integrated with it trough its competition with Goldsmith Banks.

2.3.1.3 Debt Contract types

In this subsection, we present evidence that the Corporation of London offered a variety of debt contracts that differed in their initial liquidity (minimal holding period) and also provided flexible withdrawing options, in terms of maturity and repayment options. All debt contracts were unsecured, and they were not issued against collateral or assigned (tax) revenues. During the reconstruction of the City after the Fire of 1666 (from 1671 to 1677), the Corporation also issued bonds secured by secured the Coal Tax receipts.[29]

In the period from 1638, when borrowing began, to 1662 most of the loans were recorded as ***bonds*** borrowed for six months. In effect, most loans were repaid after longer periods (**Table 2**). In 1663, the accounts stopped mentioning the duration of the bonds altogether.[30] Thus, we can characterize them as bonds with a flexible redemption option making them a liquid investment. The loans were contracted at a given interest rate, which could vary between lenders. During their holding period,

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[29] These bonds were issued by the Coal Cash fund which was an independet entity run by the Corporation of London's Chamberlain. We analyze in detail the finances of the rebuilding of London in Coffman et al. (2020).

[30] This is similar to the practice in Holland (Gelderblom & Jonker 2004) and to earlier forms of city finance like *rentes* that can be treated as annuities (Munro 2003).

the bonds were subject to variable interest rates, based on prevailing borrowing costs. Only a small number of loans (2% of the total borrowed) were life rents or annuities.

When the Corporation needed immediate liquidity, it raised loans that were recorded as loans to "*cover the want of cash,*" which could be repaid within a very short period. These loans amounted to more than 10% of the total. They were, on average, of a higher value, and their median holding length was half that of bonds (17 months). Finally, the Corporation also issued ***notes*** (similar to the royal exchequer notes). These debt instruments amounted to 4.6% of all loans, were of lower value than bonds, and were held for even shorter durations (median holding period of 11 months).

The Corporation, therefore, issued a variety of debt instruments that varied in their minimum holding period. However, none of the debt instruments had a maximum redemption maturity, and most of them were redeemed on the lenders' demand, well after the minimal contractual holding period expired. Another interesting aspect of the debt contracts is that they could be redeemed in installments. The Corporation repaid about 17% of all loans in installments: 9% of loans were repaid in two installments, 3.5% in three installments, and the rest repaid in 4 to 14 (one loan) installments.

2.3.1.4   The bonds' maturities

As we saw above, except for a small share of annuities, most of the lending to the Corporation was under short term contracts. However, the lenders had the option of holding the debt instruments beyond the initial contract period. Therefore, de facto, the Corporation was able to raise long term debt and, at the same time, offering a liquid investment to the investors. **Figure 6** shows the distribution of the holding periods. About a third of the loans were redeemed within 18 months, and the median was about two years. However, about a quarter of loans were held for periods above five years. Ten percent of the loans were held for more than ten years.[31] While most of the investments in the Corporation's bonds were, therefore, held for short maturities, these debt instruments allowed the investor to keep them for longer periods. For some investors, the bonds served as an annuity.

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[31] Because the Corporation defaulted in 1683 the durations are biased downwards as we do not have the maturity of the loans taken out in the last years before the default.

Figure 6

Distribution of loan maturities in months: 1640-1683
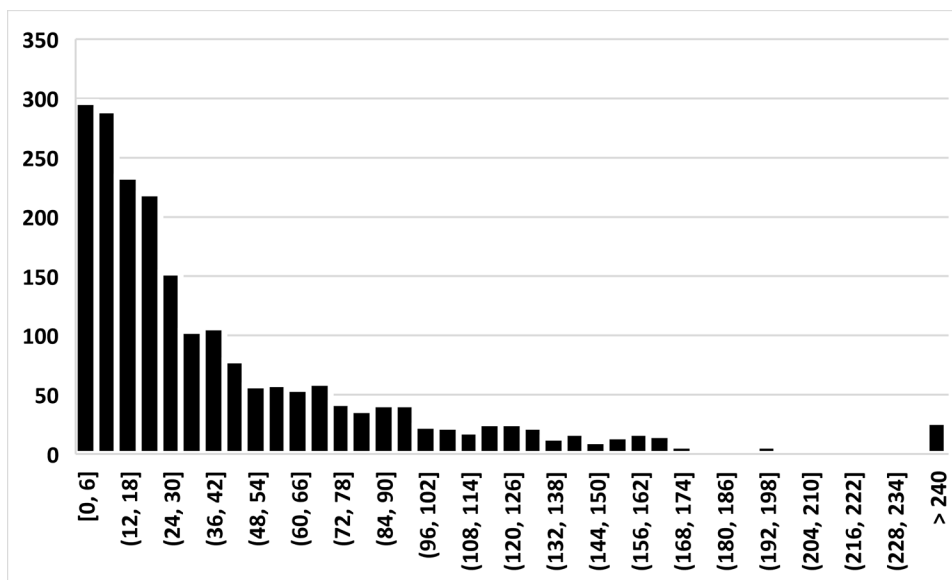
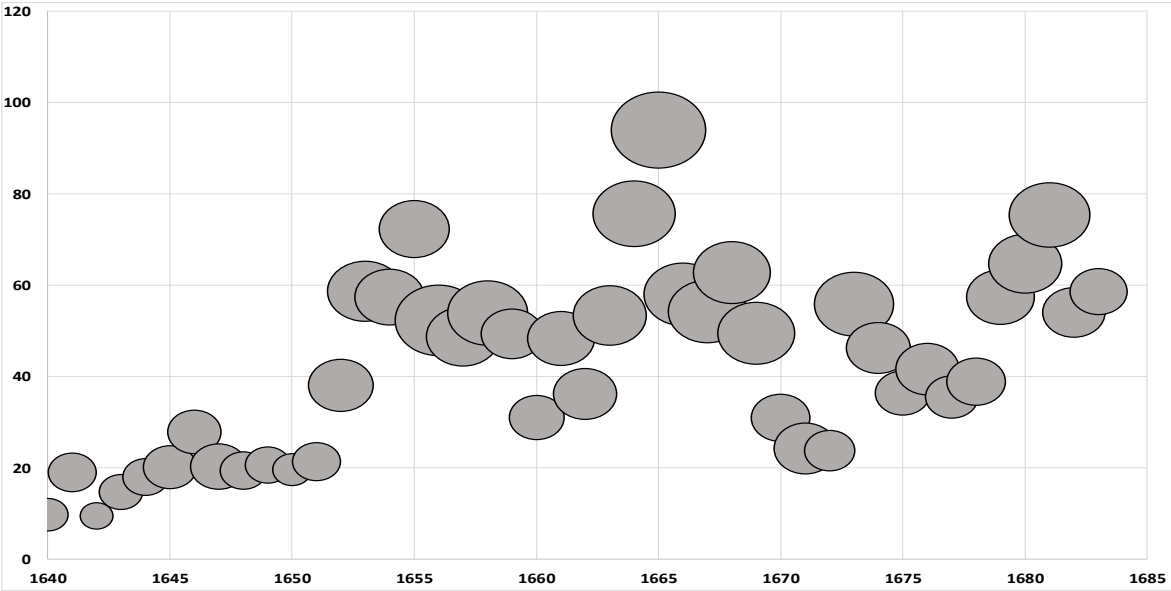Sources: COL/CHD/CT/001 to 019; COL/CHD/LA/001 and 002.

The data on loan redemptions show that during the Interregnum, the median duration of redeemed loans increased almost threefold, from 20 to 60 months (**Figure 7**). It seems that the Corporation was able to establish its credibility as a borrower during the Civil War and was subsequently able to borrow for longer maturities. During the 1670s, the median duration of redeemed loans declined to three years and then increased back to five years in 1681. We may explain this by noting that the early 1670s were a period when the Corporation increased its demand for loans to finance the reconstruction work after the Fire of 1666. At the same time, the Stop of the Exchequer in 1672 and the related failure of some goldsmith banks may have increased the demand for more liquid investment opportunities.

The maturity of the loans also depended on the characteristics of the lenders and the type of debt instrument used. To find out what affected the holding periods of individual bonds, we estimated a survival model on the length of time loans were held until redemption. We report the estimation results in the Appendix (Table A-7). Controlling for the year of redemption fixed effects, we found that loan duration decreased with the amount lent. i.e., large loans were held for shorter durations. We also found that loans advanced by insiders – the Aldermen – were held for 40 percent shorter durations than those advanced by members of the liveries. On the other hand, loans by widows were held for about 30 percent longer. Annuities were held for periods twice as long as regular

bonds and notes, and short-term debt was held for nearly half the duration of bonds. Those that withdrew their loans in installments held them for 60% longer than others. Finally, bonds assigned to third-parties were held for almost twice as long as those redeemed by the original lenders.

Figure 7

Loan maturities in months at redemption: 1640-1683

Sources: COL/CHD/CT/001 to 019; COL/CHD/LA/001 and 002.
Note: We plot the median duration of loans redeemed in each year. The size of the bubble indicates the total amount of debt redeemed each year.

Evidence from loan maturities allows us to conclude that lending to the Corporation provided lenders with debt instruments that suited their preferences. On the one hand, widows that held smaller bonds, held them for much longer durations – serving as an equivalent to an annuity. Insiders, on the other hand, lent large amounts for shorter durations.

2.3.1.5   A secondary market for debt

When the Corporation paid back the loans, the records mentioned the name of the person paid. If that person was not the original bondholder, they recorded the name of the assignee. The records show (**Table 2**) that 15% of the loans were assigned. Natural cases for assignments were when lenders died, and when women were married. Married women's financial assets were legally required to be held by the husband. However, about 6% of all loans worth over £41,000 were assigned to third parties.

Figure 8

Share of bonds redeemed by assignees: 1640-1683
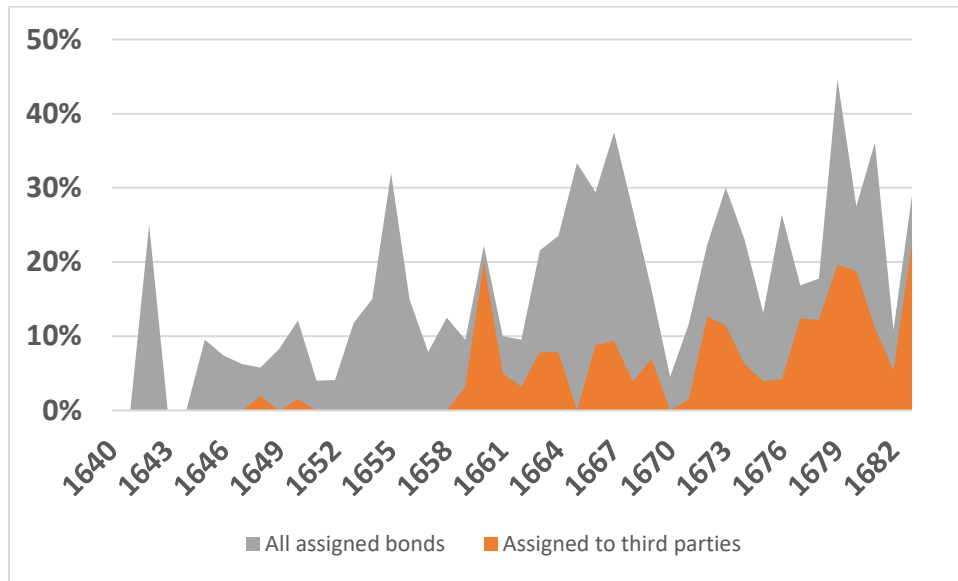
Share of bonds redeemed by assignees: 1640-1683 (area chart with series "All assigned bonds" in grey and "Assigned to third parties" in orange; y-axis 0%–50%, x-axis years 1640–1682)

As we saw in the previous section, assigned loans were held for longer durations than unassigned loans, suggesting that those that bought them did so for investment purposes. Recall that investors could cash their bonds after six months. Moreover, only 4 of the assigned bonds were cashed six months after their issuance. Since we have no record of the assignment transaction, we do not know when, in the life of the bond, it took place. We can only observe bonds when they are redeemed. Nevertheless, we can see that the share of assigned bonds redeemed increased over time (**Figure 8**). In particular, we note that assignability to third parties was rare before the Restoration.

The data on bond assignability completes our picture of financial deepening: the assets created by the Corporation could not only be held for any duration but also became negotiable. Negotiability, or liquidity, of the bonds, made them not only a means to diversify financial investments (compared with bank deposits) but also offered an advantage of liquidity that bank accounts do not (Kiyotaki & Moore 2005).

2.3.2 Borrowing interest rates

The Corporation of London did not issue standardized bonds. It borrowed varying amounts from various types of individuals and using a variety of debt instruments. Therefore, we would expect some heterogeneity in the rates of interest offered to its lenders. In **Figure 9**, we group loans to the Corporation by the interest paid. The size of the bubble represents the amount of lending, at a given interest rate for every year. We can see that lending rates, within a year, were concentrated. However, some variation, up to 200 basis points, occurred within the year. The heterogeneity of interest rates suggests that the Corporation was not borrowing at a predetermined institutional rate, rather that it was active in a credit market.

Figure 9

Interest paid on all loans: 1638-1683
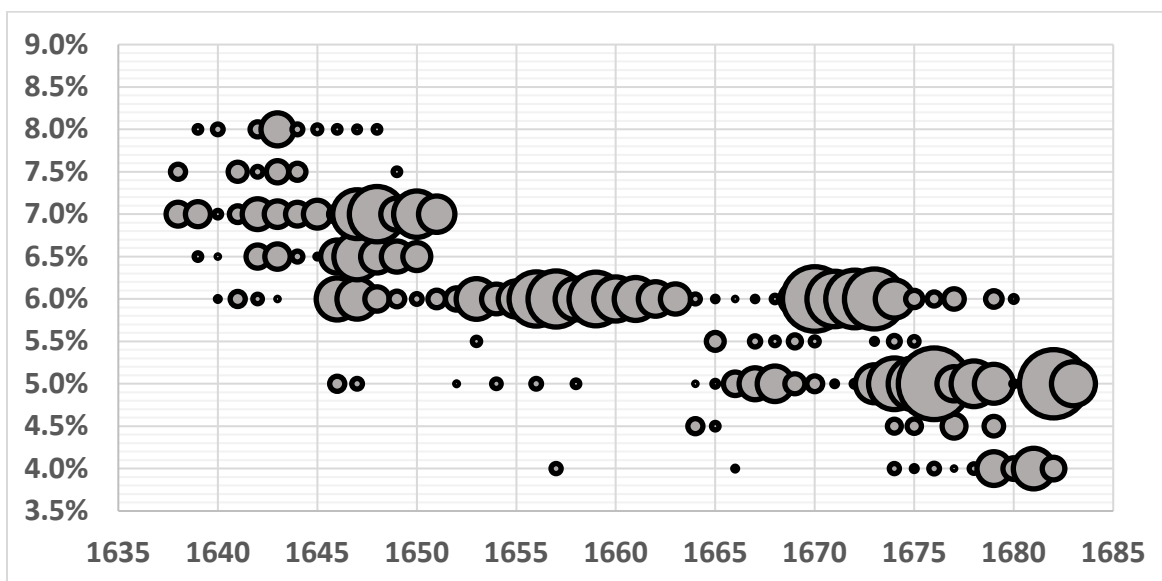
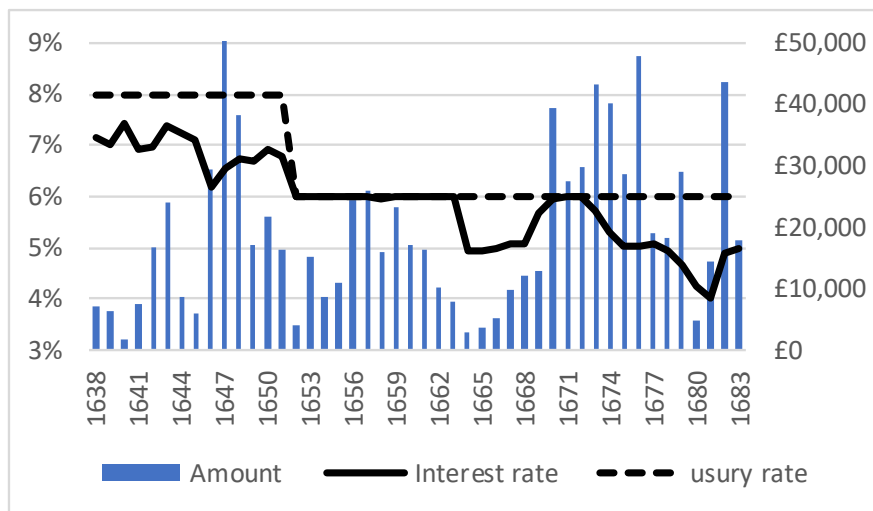Sources: COL/CHD/LA/01/001, and 002.

The data extracted from the loans recorded in the accounts also allow us to construct a macroeconomic time series of borrowing rates for the Corporation of London. We report annual borrowing rates calculated using a weighted (by loan size) average of the borrowing rates on all bonds. In **Figure 10**, we plot the weighted borrowing rate together with the amounts borrowed and

the usury ceiling. One can note a clear downward trend in the interest rate series. From 1640 to 1680, borrowing rates declined by 350 basis points to 4%. Interest rates declining before the Civil War and in 1651, reached 6%. In 1651, the Commonwealth Parliament lowered the usury rate from 8% to 6%. Charles II reaffirmed the act after the Restoration in 1661.

Figure 10
Borrowing by the Corporation of London: 1638-1683

Sources: COL/CHD/LA/01/001-002; COL/CHD/CT/01/002-0017.

It is likely that during ' 'Cromwell's protectorate and the initial years of the Restoration, the usury rate was a binding constraint on borrowing rates (Munro 2003). Beginning in 1664, we observe a decline of interest rates towards 5% (in 1665). The rebuilding of London after the Fire and the outbreak of the Third Anglo-Dutch War placed considerable demands on the capital market. By 1672 during the default of the Crown - the Stop of the Exchequer - rates reached 6% again. However, the peak was short-lived, and already in 1673, rates started their rapid descent and reached 4% by 1681. In 1682, when the Corporation of London borrowed heavily to avert default, rates increased to 5%. Our series ends in 1683 when the City defaulted on its debt services and stopped borrowing.

It is noteworthy that in January 1672, Charles II stopped paying interest on loans he raised mainly to finance the fleet (Horsefield 1982). The infamous 'Stop of the 'Exchequer' lasted throughout the 1670s. In 1677, the treasury paid interest on the defaulted debt at the rate of 6% (Li 2019). Li

(2019, table 7) shows that discounted defaulted debt was trading in the secondary market at an average rate of 15%.[32] At the same time, unsecured borrowing by the Corporation of London, albeit constrained by the usury ceiling, was financed at some 200 basis points *less* than the sovereign debt.[33]

The decline of borrowing rates, especially after 1660, supports Roseveare's (1991) claims that the Restoration marked the beginning of the Financial Revolution in England. During the reign of Charles II, interest rates on the debt of the Corporation of London further declined by 200 basis points to reach 4%. The rate of 4% would be reached again only in the 1720s and remained the average Consol yield in the 18th century (Sussman & Yafeh 2006). These findings offer further evidence that the effect of the Glorious Revolution on borrowing costs was not as significant as claimed by North and Weingast (1989).

3   The determinants of interest rates paid by the London Corporation

In this section, analyze the macroeconomic determinants of the Corporation of London's borrowing cost. We test the hypothesis that the decline in the cost of borrowing of the Corporation of London reflects both the declining interest rates in Europe proxied by the cost of borrowing in Amsterdam and the financial deepening we documented above. We begin by presenting the empirical framework that we use to test econometrically for the determinants of the cost of capital. We then present and discuss the results of the estimations.

3.1   Empirical framework

In the previous section, we established that the Corporation of London acted as a significant financial institution in London during the 17th century alongside Goldsmith Banks. It, therefore, competed in a market for deposits and faced a perfectly elastic supply of capital. Following the bond pricing literature (Acharya et al. 2013), the cost of borrowing of a particular borrower i_t, is

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[32] Milevsky (2017) calculated the internal rate of return on the defaulted debt held from default to 1706 was around 1%.

[33] Following Quinn (2001), in the short run, the king's default probably resulted in a substitution effect in financial markets that increased the supply of funding available for safer borrowers like the Corporation of London.

equal to the time-varying risk-free rate r_t plus a time-varying risk premium α_t, and a time-varying liquidity premium l_t.[34]

$$(1)\ i_t = r_t + \alpha_t + l_t$$

Usury laws might have affected the market for loans. We can characterize it by credit rationing (Pincus & Robinson 2011). We, therefore, follow Temin and Voth (2008) and account for the impact of the usury law on the borrowing rate paid by the Corporation of London.

The equation for estimation is:[35]

$$(2)\ i_t = c + \beta r_t + \gamma_i \alpha_{it} + \delta l_t + u_t$$

Following Sussman Yafeh (2006), we assume that Amsterdam is the European financial center and consider the debt of the government of the province of Holland as the risk-free asset of the time. We justify our assumption that the Amsterdam rate is relevant for investors by recalling that a significant number of the lenders to the Corporation also banked with Backwell Bank that was engaged in discounting bills with Amsterdam. Therefore, r_t is proxied by Dutch yields .[36] In *Figure 1* we presented the Corporation's weighted borrowing rate and two measures of the cost of capital for the province of Holland. The first, based on Gelderblom and Joonnker (2016), is the tax-free market yields of the provinces' debt and the second, based on the average cost of capital from the financial accounts of the Province of Holland (Fritschy 2017). Fritschy used a similar measure of the costs of capital as in Sussman and Yafeh (2006) and divided interest payments by the stock of debt outstanding. The co-movement of the yield series is shown in *Figure 1*. In our principal analysis, we used the series provided by Fritschy (2017).[37]

To account for the time-varying risk premium of the Corporation of London, α_{it} we introduced a set of dummy variables that capture England specific events. The English civil war: 1642 to 1648; the Protectorate: 1649 to 1659; The year of the Restoration (1660); The three Anglo-Dutch Wars (152-4, 1663-5, 1672-4) The Stop of the Exchequer, 1672, when King Charles II defaulted on the

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[34] We abstract from other premia such as the cost of moving capital between Amsterdam and London.
[35] The historical literature, Grassby (1969) and Habakkuk (1952) claim that the supply of funds to the Corporation of London was indeed elastic.
[36] An alternative is to use the rental rate of return on land as the risk-free rate of return. However, the real rate of return calculated by Clark (2010) is stationary and therefore not cointegrated with the Corporation of London borrowing rate.
[37] The Gelderbloom and Joonker series did not perform as well, see Table A-6 columns 3-5 in the Appendix.

interest payments of the government's debt. Two notable events that affected London were the plague of 1665 and the Great Fire of 1666. We also calculated some financial ratios related to the fiscal borrower-risk of the Corporation of London: i. The budget deficit, ii. The debt to income ratio (leverage), iii. The debt service to income ratio, iv. The current ratio – cash reserves to current liabilities.[38]

Liquidy affects asset prices and returns (Amihud et al. 2006). In our analysis, the liquidity premium l_t of the interest rate differential captures financial deepening (Kiyotaki & Moore 2005). To proxy for financial deepening, we use two measures: the outstanding stock of debt of the Corporation of London divided by nominal GDP (Sahay et al. 2015) and the percent of assigned bonds out of total bonds outstanding. The literature on corporate debt assumes and has validated empirically that the larger is the issue of the debt, the more liquid it is (Houweling et al. 2005). Habakkuk (1952) and Keirn and Melton (1990) attribute part of the decline in interest rates in London in the 17th century to the increased liquidity of the Corporation of 'London's debt. Ventura and Voth (2015) argue that rising public debts in England in the 18th century had not only crowding out effects but also increased the liquidity of debt assets that crowded in financial investment from more traditional (e.g., land) investments.

The cost of borrowing by the Corporation of London was likely constrained by the usury law of 1651 (**Figure 10**). Because for some years, we believe that our outcome variable, the cost of borrowing is censored, we estimated equations (2) using censored (Tobit) regressions. In our estimations, we also controlled for the composition of borrowing by bond type to capture any possible effect the type of bond used could have on the borrowing rate.[39]

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[38] As we saw above, the average duration of the loans contracted by the Corporation of London was about four years, we calculate the current ratio as the cash reserves divided by a quarter of the debt.

[39] Because our dependent variable is censored, accounting for unit roots is not straightforward. In the Appendix, we show that our variables are integrated of order 1 (*Table A- 2*). We test for cointegration in several ways: We ran a cointegration rank test (*Table A- 3*) and obtained a single cointegrating equation. We used a traditional ADF cointegration test using only the uncensored observations (*Table A- 4*). Finally, we provide estimates of FOMLS and DOLS estimations of the model (*Table A- 5*) that show that the London and Amsterdam interest rates are cointegrated with a coefficient of unity. Therefore, albeit imperfect tests of cointegration, we cannot reject cointegration.

3.2 Results

We estimated the cost of borrowing for the Corporation of London using equations (2) and present the results of our preferred estimations in **Table 3**, columns (1) to (3). Complete estimation results appear in Appendix *Table A- 6*.

Our main result shows that the borrowing rates of the Corporation of London, our dependent variable, co-moved with Dutch rates. The coefficient of the dutch borrowing rate in all our regressions is not significantly different from 1. This result supports the qualitative evidence presented above that the London and Amsterdam capital markets were interconnected. Put differently, this result also suggests that the decline in interest rates we observe in London was not significantly different than that on the Continent.

Table 3
Estimating annual borrowing costs of the Corporation of London

	(1) i_t	(2) i_t	(3) i_t
Dutch rate	1.216***	1.024***	0.891***
	(0.147)	(0.129)	(0.104)
Share assigned		-0.025**	
		(0.011)	
Debt to GDP			-0.004***
			(0.001)
Current ratio		-0.002***	-0.002***
		(0.001)	(0.000)
Deficit		0.001	0.002***
		(0.001)	(0.000)
Restoration		0.020***	0.011***
		(0.002)	(0.001)
Anglo-Dutch III		0.002	0.002**
		(0.001)	(0.001)
Constant	0.002	0.007	0.014***
	(0.007)	(0.006)	(0.005)
AIC	-289	-306	-328
BIC	-284	-290	-312
N	46	46	46

Standard errors are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

Source: COL/CHD/CT/01/002-017. Dutch rates: Wantje Fritschy Gewestelijke Financiën ten tijde van de Republiek der Verenigde Nederlanden 1572-1795,. GDP from Broadberry et al. (2011). Dummy variables equal 1 for Restoration (1660); Third Anglo-Dutch War (1672-4).
Regressions were estimated using *Tobit* in Stata with weighting by annual loan amount using robust standard errors. The debt to GDP, current ratio, and deficit were standardized.
Descriptive statistics for the data used are provided in Appendix Table A-1.

Interest rates in London not only co-moved with Amsterdam, but they also converged by 1680 (*Figure 1*). Financial deepening as captured by either the share of assigned bonds out of total

bonds (column 2) or the Corporation debt to British GDP ratio (column 3), contributed to this convergence. The regression results also show that the time-varying risk premium of the Corporation also significantly affected the Corporation's borrowing costs. While the regression results (columns 2 and 3) are very similar, those based on the Corporation debt to British GDP ratio are somewhat more significant. The AIC and BIC information criteria point in that direction too. In the following analysis, we discuss the results reported in column 3.

Interest rates in London co-moved with those of Amsterdam, and the regression coefficient is equal to 1. We can frame the analysis of the convergence of interest rates between the two financial centers in terms of the spread - the yield difference between London and Amsterdam. We sum all the risk premia effects (the deficit, the current ratio, and the impact of the Restoration and the Third Anglo-Dutch War) and compare them with the effect of financial deepening as captured by the Corporation debt to British GDP ratio.

Our findings show (**Figure *11***) that until the Restoration, the spread was relatively stable. During that period, the sound fiscal state of the Corporation finances, captured by low deficits, and a healthy cash flow contributed towards the lowering of the spread. In contrast, the relatively small scale of debt operations and the fact that no secondary market for bonds existed, was reflected in a positive liquidity premium. The decline in the spread, after 1670, is associated with a reduction in the liquidity premium as financial deepening progressed. The deteriorating balance sheet of the Corporation and the effect of the Third Anglo-Dutch War and the associated royal default and banking crisis mitigated to a minor extent, the strong positive effect of financial deepening. In all, financial deepening, captured by the liquidity premium, accounts for about 100 basis points reduction in the difference in the borrowing posts between London and Amsterdam.

It is interesting to note that only two events had a significant impact on the borrowing costs of the Corporation. The Restoration in 1660, was associated, according to our regression results, with a significant increase of 110 basis points in the cost of borrowing. This may suggest that financial markets viewed, ex-ante, the Restoration as a risk to financial markets in general, and the Corporation of London in particular. Ex-post, the Restoration, especially most of the reign of Charles II, was a period that favored the development of financial markets. The Third Anglo-Dutch War (1672-4) also significantly increased the Corporation's borrowing costs, but the impact was quite small, a mere 20 basis points increase. This small increase, though, could reflect a flight to

safety by investors in government debt and depositors with goldsmith banks that were affected by the Stop of the Exchequer of 1672.

Figure 11
The spread between interest rates in London and Amsterdam and its determinants:
Liquidity and time-varying risk: 1638-1683

(Percentage points)
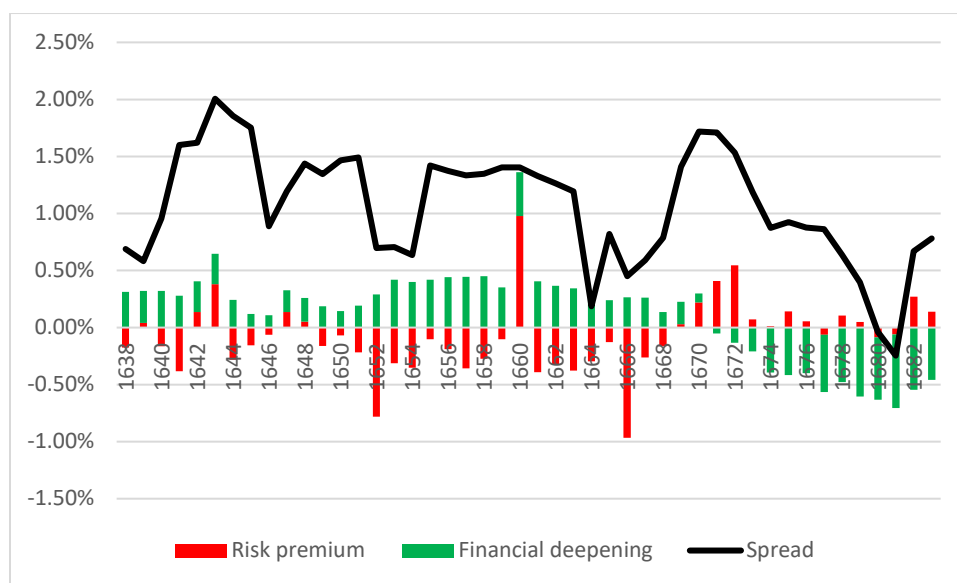
Note: Based on the estimation results reported in **Table 3**, col. 3.

4   Estimating the risk premium on unsecured debt

The Corporation of London borrowed throughout the period without offering any collateral or employing a sinking fund to assure investors. For two years, 1672 and 1673, the Corporation of London borrowed both on its own, unsecured, credit, and on the security of the Coal Tax receipts. The collection of a Coal Tax was granted by Parliament to the Corporation of London to finance the public rebuilding projects.[40] The practice of assigning tax revenues earmarked to repay borrowing emerged, according to Murphy (2013), during 'Downing's tenure at the exchequer in

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[40] For further discussion, see Coffman et al. (2019).

the 1660s.[41] The total amount borrowed on either account from January 1672 to September 1673 was comparable - £69,000 and £61,000, respectively. In **Figure *12***, we plot the weighted (by loan amount) average of monthly borrowing rates and the corresponding borrowing amounts. We can divide the period into two – the first, from January 1672 to January 1673 and the second from February to September 1673. During the first sub-period, the unsecured borrowing rate was 6%, and that of the secured borrowing was lower. The average monthly risk premium - the difference between the two borrowing rates - in that sub-period was about 50 basis points.

Figure 12
Secured versus Unsecured Borrowing by the Corporation of London: 1672-1673
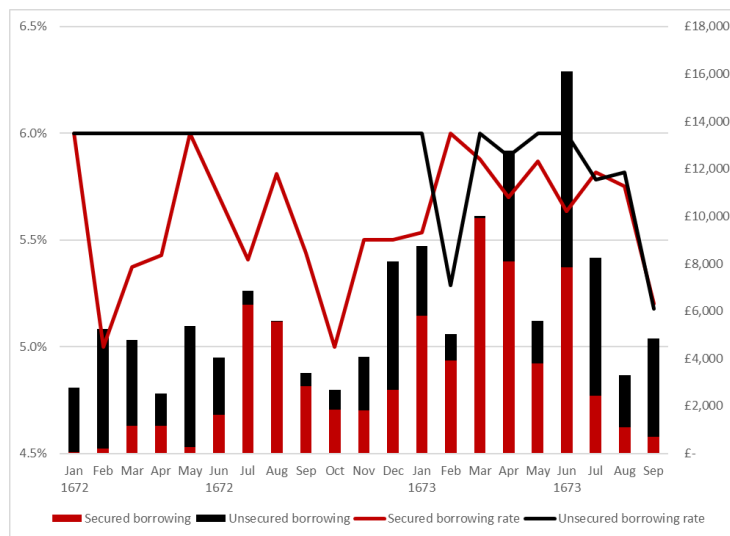
Sources: COL/CHD/LA/01/001 and COL/CHD/DM/01/001.

In the second sub-period, the spread between the borrowing rates is much smaller and eventually disappeared. One possible explanation for the reduction in the spread is the perception that the precedent of granting the Corporation of London the right to collect a tax, could be applied in other circumstances. This explanation is consistent with the literature on the effect of the fiscal capacity and the cost of (sovereign) borrowing.[42] Alternatively, once the effect of the financial crisis triggered by the 'stop of the 'exchequer' subsided and interest rates declined (**Figure 1**), the premium commanded by secured debt disappeared. This explanation suggests that in typical times,

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[41] Coffman (2013) argues that this development occurred much earlier.
[42] In the British historical context see: Seghezza (2015) and O'Brien (2002).

reputation may be as good as collateral. During a financial crisis, investors prefer a harder commitment.[43]

5   Conclusions

The financial development of London in the 17th century, as reflected in borrowing costs of the Corporation of London, advanced along similar lines to those of its rival Amsterdam. In both countries, as in other countries on the Continent, the cost of capital declined through the 17th century by between 300 and 400 basis points. The supply of capital came mainly from London's wealthy citizens and the gentry who resided in its vicinity. During the 17th century, and especially after the Restoration, the economy experienced financial deepening. The volume of financial assets held by individuals increased, the number of bondholders increased, bonds started to be assigned in a secondary market, and investors diversified their portfolio of financial assets, holding bank deposits as well as Corporation of London's debt. The amount of the Corporation of London's debt alone increased threefold.

We show that the spread between London and Amsterdam was eliminated by 1680. The decline is primarily explained by financial deepening. The similarity between interest rates in England and the decline in the spread mainly during the reign of Charles II provides another piece of the story of the emergence of British economic supremacy. It dates back to the mid-17th century.

In an age when governments did little to finance growth, the relevant prism to evaluate the finance-growth nexus should be the development of non-governmental financial intermediaries. The contribution of the state was to allow them to operate. In that regard, the 'Quo 'Warranto' revocation of the rights on the Corporation of London in 1683, after its default, is perhaps the equivalent of allowing a systemically important bank to fail. The Restoration of the rights of Corporation by the Parliament in 1688, immediately flowing the Glorious Revolution, the restructuring of its debts and providing it with tax revenues to service and repay the debt, can be viewed as a 'bail-out.' This bail-out and financial restructuring increased the public's confidence in financial markets. We conclude this paper with yet another twist in the story of the Glorious Revolution's contribution to the (continuation of) the financial revolution and development in Britain.

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[43] For theoretical explanations, see Gorton and Ordonez (2014) and Ordoñez (2013).

References

Acharya, V. V., Amihud, Y., & Bharath, S. T. (2013). 'Liquidity risk of corporate bond returns: conditional approach,' *Journal of Financial Economics*, 110/2: 358–386. Elsevier.

Amihud, Y., Mendelson, H., & Pedersen, L. H. (2006). *Liquidity and asset prices*. Now Publishers Inc.

Arcand, J. L., Berkes, E., & Panizza, U. (2015). 'Too much finance?', *Journal of Economic Growth*, 20/2: 105–148.

Ashton, R. (1960). *The Crown and the money market, 1603-1640.* Oxford: Clarendon Press.

Bagehot, W. (1873). *Lombard Street: A description of the money market*. London: HS King.

Bogart, D. (2011). 'Did the Glorious Revolution contribute to the transport revolution? Evidence from investment in roads and rivers 1', *The Economic History Review*, 64/4: 1073–1112.

Bogart, D., & Richardson, G. (2011). 'Property rights and parliament in industrializing Britain,' *The Journal of Law and Economics*, 54/2: 241–274.

Bordo, M. D., Taylor, A. M., & Williamson, J. G. (2007). *Globalization in historical perspective*. University of Chicago Press.

Broadberry, S., Campbell, B., Klein, A., Overton, M., & van Leeuwen, B. (2011). 'British Economic Growth, 1270-1870: an output-based approach',.

Broadberry, S., Campbell, B. M., Klein, A., Overton, M., & Van Leeuwen, B. (2015). *British economic growth, 1270–1870*. Cambridge University Press.

Calderón, C., & Liu, L. (2003). 'The direction of causality between financial development and economic growth,' *Journal of development economics*, 72/1: 321–334.

Carlos, A. M., & Neal, L. (2011). 'Amsterdam and London as financial centers in the eighteenth century,' *Financial History Review*, 18/1: 21–46.

Carlton, C. (1974). *The court of orphans*. Leicester University Press.

Chilosi, D., Schulze, M.-S., & Volckart, O. (2018). 'Benefits of empire? Capital market integration North and south of the Alps, 1350–1800', *The Journal of Economic History*, 78/3: 637–672.

Clark, G. (1996). 'The political foundations of modern economic growth: England, 1540-1800', *The Journal of Interdisciplinary History*, 26/4: 563–588.

——. (2005). 'The condition of the working class in England, 1209–2004', *Journal of Political Economy*, 113/6: 1307–1340.

——. (2010). 'The macroeconomic aggregates for England, 1209–2008'. *Research in Economic History*, pp. 51–140. Emerald Group Publishing Limited.

Coffman, D., Leonard, A., & Neal, L. (2013). *Questioning credible commitment: perspectives on the rise of financial capitalism*.

Coffman, D'Maris. (2013). 'Credibility, transparency, accountability, and the public credit under the Long Parliament and Commonwealth, 1643–1653'. Coffman Dm., Leonard A., & Neal

L. (eds) *Questioning Credible Commitment*, pp. 76–103. Cambridge University Press: Cambridge. DOI: 10.1017/CBO9781139856034.005

Coffman, D'Maris, Stephenson, J., & Sussman, N. (2019). 'Financing the rebuilding of the City of London after the Great Fire of 1666'.

Cox, G. W. (2012). 'Was the Glorious Revolution a constitutional watershed?', *The Journal of Economic History*, 72/3: 567–600.

Dickson, P. G. M. (1967). *The financial revolution in England: a study in the development of public credit, 1688-1756.* London: Macmillan.

Dimitruk, K. (2018). '"I Intend Therefore to Prorogue": the effects of political conflict and the Glorious Revolution in Parliament, 1660–1702', *European Review of Economic History*, 22/3: 261–297.

Epstein, S. R. (2000). *Freedom and growth: the rise of states and markets in Europe, 1300-1750.*, Vol. 17. Routledge.

Fritschy, W. (2017). *Public Finance of the Dutch Republic in Comparative Perspective: The Viability of an Early Modern Federal State (1570s-1795)*. Brill.

Gelderblom, O., & Jonker, J. (2004). 'Completing a financial revolution: the finance of the Dutch East India trade and the rise of the Amsterdam capital market, 1595–1612', *The Journal of economic history*, 64/3: 641–672.

Gelderblom, O., Jonker, J., & Kool, C. (2016). 'Direct finance in the Dutch Golden Age', *The Economic History Review*, 69/4: 1178–1198.

Glaeser, E. L., & Shleifer, A. (2002). 'Legal origins,' *The Quarterly Journal of Economics*, 117/4: 1193–1229.

Goldsmith, R. W. (1969). *Financial structure and development*. New Haven: Yale University Press.

Gorton, G., & Ordonez, G. (2014). 'Collateral crises,' *American Economic Review*, 104/2: 343–78.

Gorton, G., & Pennacchi, G. (1990). 'Financial intermediaries and liquidity creation,' *The Journal of Finance*, 45/1: 49–71.

Grassby, R. (1969). 'The rate of profit in seventeenth-century England,' *The English Historical Review*, 84/333: 721–751.

Habakkuk, H. J. (1952). 'The long-term rate of interest and the price of land in the seventeenth century,' *The Economic History Review*, 5/1: 26–45.

Harding, V. (2003). 'The Crown, the City, and the Orphans: the City of London and its Finances, 1400-1700'. *Urban public debts, urban government and the market for annuities in Western Europe (14th-18th centuries)*, pp. 51–60.

Hodgson, G. M. (2017). '1688 and all that: property rights, the Glorious Revolution and the rise of British capitalism', *Journal of Institutional Economics*, 13/1: 79–107.

Hoffman, P. T., Postel-Vinay, G., & Rosenthal, J.-L. (2000). *Priceless markets: the political economy of credit in Paris, 1660-1870*. University of Chicago Press.

Horsefield, J. K. (1982). 'The "stop of the exchequer" revisited,' *The Economic History Review*, 35/4: 511–528.

Houweling, P., Mentink, A., & Vorst, T. (2005). 'Comparing possible proxies of corporate bond liquidity,' *Journal of Banking & Finance*, 29/6: 1331–1358.

Keirn, T., & Melton, F. T. (1990). 'Thomas Manley and the Rate-of-Interest Debate, 1668–1673', *Journal of British Studies*, 29/2: 147–173.

Kellett, J. R. (1958). *Some Late Seventeenth-century Schemes for the Improvement of the Corporation of London's Revenues*. Corporation of London.

Kelly, M., & Ó Gráda, C. (2016). 'Adam Smith, Watch Prices, and the Industrial Revolution *,' *The Quarterly Journal of Economics*, 131/4: 1727–52. DOI: 10.1093/qje/qjw026

Kiyotaki, N., & Moore, J. (2005). 'Financial deepening,' *Journal of the European Economic Association*, 3/2–3: 701–713. Oxford University Press.

Kose, M. A., Prasad, E., Rogoff, K., & Wei, S.-J. (2009). 'Financial globalization: a reappraisal,' *IMF Staff papers*, 56/1: 8–62.

La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2008). 'The economic consequences of legal origins,' *Journal of economic literature*, 46/2: 285–332.

Levine, R. (2005). 'Finance and growth: theory and evidence,' *Handbook of economic growth*, 1: 865–934.

Li, L.-F. (2019). 'The Stop of the Exchequer and the Secondary Market for English Sovereign Debt, 1677–1705', *The Journal of Economic History*, 79/1: 176–200.

Milevsky, M. A. (2017). *Day the King Defaulted*., Vol. 40. Springer.

Munro, J. H. (2003). 'The medieval origins of the financial revolution: usury, rentes, and negotiability,' *The international history review*, 25/3: 505–562.

Murphy, A. L. (2013). 'Demanding "credible commitment": public reactions to the failures of the early financial revolution 1', *The Economic History Review*, 66/1: 178–197.

Neal, L., & Quinn, S. (2001). 'Networks of information, markets, and institutions in the rise of London as a financial centre, 1660–1720', *Financial history review*, 8/1: 7–26.

North, D. C., & Weingast, B. R. (1989). 'Constitutions and commitment: the evolution of institutions governing public choice in seventeenth-century England,' *The Journal of economic history*, 49/4: 803–832.

O'Brien, P. K. (2002). 'Finance and Taxation,' *A Companion to Eighteenth-Century Britain*, 30–39.

O'brien, P. K. (2011). 'The nature and historical evolution of an exceptional fiscal state and its possible significance for the precocious commercialization and industrialization of the British economy from Cromwell to Nelson', *The Economic History Review*, 64/2: 408–446.

Ordoñez, G. L. (2013). 'Fragility of reputation and clustering of risk-taking,' *Theoretical Economics*, 8/3: 653–700.

Pincus, S. C., & Robinson, J. A. (2011). *What really happened during the Glorious Revolution?* National Bureau of Economic Research.

——. (2014). 'What Really Happened During the Glorious Revolution?', *Institutions, Property Rights, and Economic Growth: The Legacy of Douglass North*, 192.

Quinn, S. (1997). 'Goldsmith-Banking: Mutual Acceptance and Interbanker Clearing in Restoration London,' *Explorations in Economic History*, 34/4: 411–32. DOI: 10.1006/exeh.1997.0682

——. (2001). 'The Glorious Revolution's effect on English private finance: a microhistory, 1680–1705', *The Journal of Economic History*, 61/3: 593–615.

Reinhart, C. M., & Rogoff, K. S. (2009). *This time is different: Eight centuries of financial folly*. Princeton university press.

Richards, R. D. (1929). *The early history of banking in England*. London P.S. King & son, Ltd.

Roseveare, H. (1991). *The financial revolution, 1660-1760 / Henry Roseveare*. Seminar studies in history. London: Longman.

Sahay, R., Čihák, M., N'Diaye, P., Barajas, A., Bi, R., Ayala, D., Gao, Y., et al. (2015). 'Rethinking financial deepening: stability and growth in emerging markets, IMF Staff Discussion Note,' *International Monetary Fund*.

Schmelzing, P. (2020). 'Staff Working Paper No. 845 Eight centuries of global real interest rates, RG, and the 'suprasecular' decline, 1311–2018'.

Schularick, M., & Taylor, A. M. (2012). 'Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870-2008', *American Economic Review*, 102/2: 1029–61.

Schumpeter, J. A., & Opie, R. (1934). *The theory of economic development; an inquiry into profits, capital, credit, interest, and the business cycle*. Cambridge, Mass.: Harvard University Press.

Seghezza, E. (2015). 'Fiscal capacity and the risk of sovereign debt after the Glorious Revolution: A reinterpretation of the North–Weingast hypothesis,' *European Journal of Political Economy*, 38: 71–81.

Stasavage, D. (2007). 'Partisan politics and public debt: The importance of the 'Whig Supremacy' for Britain's financial revolution,' *European Review of Economic History*, 11/1: 123–153.

——. (2011). *States of credit: size, power, and the development of European polities.*, Vol. 35. Princeton University Press.

Sussman, N., & Yafeh, Y. (2006). 'Institutional reforms, financial development and sovereign debt: Britain 1690–1790', *The Journal of Economic History*, 66/4: 906–935.

Temin, P., & Voth, H.-J. (2005). 'Credit rationing and crowding out during the industrial revolution: evidence from Hoare's bank, 1702–1862', *Explorations in Economic History*, 42/3: 325–348.

——. (2008). 'Private borrowing during the financial revolution: Hoare's Bank and its customers, 1702–24 1', *The Economic History Review*, 61/3: 541–564.

——. (2013). *Prometheus shackled: Goldsmith Banks and England's financial revolution after 1700*. Oxford University Press.

Unwin, G. (1908). *The gilds and companies of London.* London: Methuen.

Ventura, J., & Voth, H.-J. (2015). *Debt into growth: how sovereign debt accelerated the first industrial revolution*. National Bureau of Economic Research.

Williamson, J. G. (1984). 'Why was British growth so slow during the industrial revolution?' *The Journal of Economic History*, 44/3: 687–712.

Wren, M. C. (1948). 'The Chamber of London in 1633', *The Economic History Review*, 1/1: 46–53.

——. (1949). 'The chamber of the city of London, 1633-1642', *The Accounting Review*, 24/2: 191–198.

Appendix

Table A- 1

Summary statistics of the data used in the regressions

Variable	Mean	Std. Dev.	Min	Max
Interets rate	0.058	0.007	0.040	0.074
Holland rate	0.046	0.005	0.041	0.065
Share assigned	0.062	0.060	0	0.226
Debt to GDP	0.000	1.011	-1.352	1.941
Current ratio	0.000	1.011	-1.029	2.875
Deficit	0.000	1.011	-4.168	1.422

Notes: Interest rate weighted by loan amount. Holland rate: average cost of debt from Wantje Fritschy Gewestelijke Financiën ten tijde van de Republiek der Verenigde Nederlanden 1572-1795. Province of Holland rate G-J: market prices communicated by Gelderbloom and Joonker. Debt and deficit in millions of pounds.

Table A- 2

Results of Augmented Dickey-Fuller unit-root tests

Variable	level ADF p-value	first difference ADF p-value
Interets rate	0.4834	0
Holland rate	0.0948	0
Debt	0.9614	0
Current ratio	0.1014	0
Deficit	0.2684	0

Table A- 3
Cointegration rank test

Number of cointegrating vectors	trace statistic	critical value
0*	83.972	60.061
1	37.211	40.175
2	17.404	24.276
3	0.982	12.321

Notes: Estimated regression: *equation* (2) $i_t = c + \beta r_t + \gamma_i \alpha_{it} + \delta l_t + u_t$
Johansen method with a trend.

Table A- 4
Result of Augmented Dickey-Fuller unit-root test,
residuals from equation (2): $i_t = c + \beta r_t + \gamma_i \alpha_{it} + \delta l_t + u_t$

Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
-4.864	-2.62	-1.95	-1.61

Notes: Based on estimating an OLS regression for 34 observations where the usury ceiling was not binding. Test on levels without constant.

Table A- 5
Results of cointegration regressions using equation (2): $i_t = c + \beta r_t + \gamma_i \alpha_{it} + \delta l_t + u_t$

	(1)	(2)
Method	FMOLS	DOLS
r_t	1.009***	1.090***
	(8.76)	(7.62)
l_t	-0.003***	-0.004***
	(-4.04)	(-4.2)
current ratio	-0.002***	-0.003***
	(-2.13)	(-2.69)
deficit	0.002***	0.003***
	(3.62)	(3.03)
N	45	43
adj. R^2	0.819	0.92

Notes: FOMLS: Cointegrating equation deterministic: C; Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000). DOLS: Cointegrating equation deterministic: C; Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000); Lead=1, lag=1.

Table A- 6
Alternative estimation results

	(1) i_t	(2) i_t	(3) i_t	(4) i_t	(5) i_t
holland	1.009***	0.709***	0.229	-0.279	0.315**
	(0.180)	(0.161)	(0.287)	(0.177)	(0.127)
Share assigned	-0.023*			-0.047***	
	(0.013)			(0.016)	
Debt to GDP		-0.004***			-0.006***
		(0.001)			(0.001)
Current ratio	-0.002**	-0.002***		-0.000	-0.002**
	(0.001)	(0.001)		(0.001)	(0.001)
Deficit	0.000	0.002***		-0.001	0.002**
	(0.001)	(0.001)		(0.001)	(0.001)
civilwar	0.000	0.002		0.010***	0.005***
	(0.002)	(0.002)		(0.002)	(0.002)
Parliament	-0.000	0.001		0.001	-0.000
	(0.002)	(0.002)		(0.002)	(0.002)
Restoration	0.020***	0.010***		0.026***	0.012***
	(0.003)	(0.001)		(0.004)	(0.002)
Plague	0.005	-0.002		0.000	-0.004
	(0.004)	(0.003)		(0.005)	(0.005)
Fire	0.001	0.001		-0.006	-0.001
	(0.004)	(0.003)		(0.004)	(0.003)
Stop of Exchquer	0.000	-0.003*		0.005	-0.003
	(0.003)	(0.001)		(0.003)	(0.002)
Anglo-Dutch III	0.002	0.003***		0.002	0.006***
	(0.002)	(0.001)		(0.003)	(0.002)
Constant	0.007	0.022***	0.049***	0.066***	0.043***
	(0.009)	(0.008)	(0.012)	(0.007)	(0.005)
Obs.	46	46	46	46	46

t statistics in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: COL/CHD/CT/01/002-017. Dutch rates: Wantje Fritschy Gewestelijke Financiën ten tijde van de Republiek der Verenigde Nederlanden 1572-1795,. GDP from Broadberry et al. (2011). Dummy variables equal 1 for Restoration (1660); Third Anglo-Dutch War (1672-4).
Regressions were estimated using *Tobit* in Stata with weighting by annual loan amount using robust standard errors. The debt to GDP, current ratio, and deficit were standardized.
Holland rate: Colum (1) and (2) based on Fritschy, columns (3)-(5) based on Gelderbloom and Joonker.

Table A- 7
Survival regression on duration to redemption

	(1)	(2)
Loan amount	-0.000***	-0.000***
	(0.000)	(0.000)
Alderman	-0.644***	-0.507***
	(0.137)	(0.159)
Gent	-0.205*	-0.108
	(0.106)	(0.111)
Non-City	0.041	0.076
	(0.103)	(0.135)
Spinster	0.066	0.133
	(0.098)	(0.098)
Widow	0.242***	0.283***
	(0.080)	(0.098)
Annuity	0.648***	0.760***
	(0.187)	(0.250)
Note	-0.800***	-0.868***
	(0.201)	(0.165)
Short	-0.766***	-0.823***
	(0.197)	(0.205)
Assigned third-party	0.522***	0.521***
	(0.109)	(0.120)
Assigned heir	0.683***	0.680***
	(0.107)	(0.112)
Assigned to Husband	-0.221	-0.271*
	(0.180)	(0.161)
Restoration	-0.264***	
	(0.083)	
Stop of Exchequer	-0.145***	
	(0.046)	
Plague	0.503***	
	(0.151)	
Fire	-0.357**	
	(0.144)	
Parliament	-0.037	
	(0.102)	
installment	0.973***	0.971***
	(0.075)	(0.052)
Constant	6.805***	7.990***
	(0.081)	(0.636)
lnsigma	0.114***	0.071**
	(0.025)	(0.028)
kappa	0.643***	0.711***
	(0.080)	(0.071)
Obs.	2162	2162
Year fixed effects	No	Yes
Clustered errors	Year	ID

Standard errors are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1
Estimated using **streg** in Stata, gamma distribution.