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FOREIGN BANKS AND THE LONDON MONEY MARKET DURING THE FIRST GLOBALISATION

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Foreword

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Abstract

This study examines the relationship between the London Money Market (LMM) and the credit provision of non-British overseas banks during the first wave of globalisation. Using monthly data between 1889 and 1913, we find a positive relationship between the amount of credit authorised by the German Brasilianische Bank für Deutschland in Brazil and the spread between the London market and floating rate. Our results suggest that an increase in demand for foreign bills and/or a decrease in borrowing costs in the LMM leads to an increase in credit supply. We use the impact of annual tax payments on the spread between market and floating rate as an instrumental variable (IV) to show that this relationship is causal. Although there is a significant amount of literature on London's historic role as a global financial centre and a growing number of studies on foreign banking history, little quantitative evidence is available about the connection between the two. This study bridges this gap.

Keywords

1. Introduction

In the 19th century, London was the world's financial centre, and a country's ability to finance its trade and government was highly dependent on its access to the London Money Market (LMM) (Kindelberger 1974, Flandreau and Jobst 2005, Accominotti et al. 2021). However, as the global capital and trade markets became more interconnected and competitive in the late 19th century, some nations began to question their financial reliance on London and started to look for alternatives. One strategy was to establish a foreign banking presence, which had the capacity to provide informational and financial support to their businesses and commerce abroad and to provide alternatives to sterling as key trade currency. While research has demonstrated the benefits of foreign banks in supporting a nation's trade and business overseas (Kisling 2020, 2022), attempts to break the dominance of sterling and the LMM were less successful (Tilly 1992, Schneider 2019). Yet, we lack quantitative evidence of how the continuing dominance of the LMM affected the performance of non-British foreign banking.

This paper empirically examines the relationship between the LMM and the credit provision of non-British overseas banks during the first wave of globalisation. Specifically, it studies whether fluctuations in the LMM influenced the credit supply of the German foreign bank *Brasilianische Bank für Deutschland* from its establishment in Brazil in 1889 until the outbreak of WWI.

The case of the *Brasilianische* is significant for several reasons. Firstly, it represents the importance of foreign banks in the internationalisation of Germany, a rapidly emerging economy at the time. By the turn of the century, it had become the second most important trade nation behind the UK and the third largest economy in the world (Daudin, Morys, and O'Rourke 2010; Carreras, Josephson 2010). German foreign banks were key to this successful expansion by providing financial services and informational assistance abroad (Hertner 2012). The *Brasilianische* is commonly acknowledged by coeval observers as a successful and representative blueprint of German overseas banking during the first globalisation (Diouritch 1909; Hurley 1914). Secondly, the emerging economies of Latin America were a major destination for European foreign banking during this period, with foreign banks playing an essential role in the region's economic development and integration into international trade

markets[1]. According to Jones (1993), Latin America was one of the markets where, after their first-mover advantage, British multinational banks faced harsher competition, in particular from German banks. Finally, the case of the *Brasilianische* highlights the competition faced by British banks from non-British banks, while also demonstrating London's continued centrality in the global financial network. Despite attempts by German foreign banks to promote the independence of German international commerce from London and to offer the German Mark as an alternative international currency, we find that they were unable to break away from the hegemony of the pound sterling.

Studies on the internationalisation of modern banking during the first wave of globalisation focus on the dynamics of geographical expansion, the impact of foreign banking on receiving countries, and the role of foreign banks in trade. Chapman (1984) and Llorca-Jaña (2014 and 2016) highlight the importance of merchant banks, particularly London merchant bankers, in shaping the globalisation process by providing financial services, promoting the movement of capital and trade, and creating a global network of economic actors. Battilossi (2006) shows that trade, institutional factors, and competitive interaction are critical determinants of banks' decisions to invest in foreign countries during the first globalisation. British banks were the first to expand overseas in the early 19th century, followed by German, French, and US banks in the second half of the 19th century. However, British foreign banks remained dominant in terms of numbers and business throughout the entire period of the first globalisation (Jones 1993). Platt (1968) argues that Britain's need to maintain access to foreign markets was a major factor in its foreign policy and examines how Britain's financial interests influenced its relations with other countries, in particular its support for the gold standard, its free trade policy, and its efforts to maintain the convertibility of the pound. Kisling (2022) provides a comparative analysis of global British and foreign banking, showing a positive relationship between the establishment of independent financial networks and a country's engagement in international trade. European overseas banking in the 19th and 20th centuries had a strong focus on emerging countries in Latin America. Research on this topic, such as Briones and Villela (2006), has found that the impact of European banks on the financial development of countries like Brazil and Chile varied depending on the institutional environment in those

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[1] Dominated by the European industrial countries and their constantly increasing need for natural resources, agricultural products and new markets, Latin America exported primary products and raw materials in exchange for manufactured goods, amongst them military and industrial equipment (Bértola and Ocampo, pp. 93–94, 99 and Bulmer-Thomas, pp. 76, 95).

countries. European banks were able to gain a dominant market share in Brazil, but faced more competition from domestic banks in Chile. Studies such as Triner (2006) have confirmed the positive effect of foreign bank entry on infrastructure and industry. Young (1991) examines the dynamics between German and British foreign banking in Latin America, arguing that their competition increased competition among domestic banks and positively impacted investment in industry and infrastructure. Kisling (2020) shows that German bank entry had a significant positive effect on Brazilian trade by reducing previously existing credit and transaction frictions. In an effort to increase competitiveness in the international trade and capital markets, the US government conducted a series of investigations into the financial situation in emerging economies and provided detailed information on domestic and foreign banking, credit, and trade regulations (e.g. Hurley 1914). Yet, studies on the dominance of London as a financial centre and how it affected the credit provision of foreign banks seem absent. In particular, the exact transmission mechanisms between changing money market conditions and foreign lending remain unclear. This study aims to fill this gap.

The *Brasilianische Bank für Deutschland*, founded in 1887 in Hamburg, Germany, aimed to facilitate trade relations between Germany and Brazil. It opened its first branch in Rio de Janeiro in 1889, providing direct credit and primarily using bills of exchange as a financing instrument. However, by statute, the bank was not allowed to use funds denominated in the Brazilian currency, the Milreis, for international business. To avoid exchange rate risks, it drew on European places that offered the most favourable conditions. As a result, over 80% of the bills of exchange it discounted were denominated in pounds sterling. Despite not having a branch in London, the bank had direct access to the LMM through its London agents and correspondent banks, and later through the London subsidiary of its mother institution, the *Disconto-Gesellschaft*.

Two principal mechanisms determined the link between the spread of the London market and floating rates and the credit supplied by foreign banks, which primarily used sterling-denominated bills of exchange to finance international transactions. The market rate reflects the price at which bills are bought and sold on the discount market, while the floating rate reflects the cost of short-term borrowed capital made available by London banks to banks and other agents, such as bill brokers and discount houses. The first mechanism involves London joint-stock banks. When the market rate is higher, it becomes more profitable for London

banks to discount foreign bills. At the same time, low floating rates indicate that London banks have ample availability of funds to invest. As a result, demand for foreign bills in London increases when the spread between the market and floating rates is larger. The second mechanism involves bill brokers and discount houses, which play a key role in the discount market by intermediating between acceptors and final investors in bills of exchange by buying bills from the former and selling them to the latter. These actors rely on narrow margins between the price of buying and selling bills for their profits, and therefore require large volumes of transactions to be profitable. Yet, their own capital is limited and most of their funds are borrowed from London bankers at the floating rate. A larger spread between the market and floating rate means that bills and borrowed money are relatively cheaper, allowing bill brokers and discount houses to intermediate larger amounts of bills. In some cases, discount houses do not re-sell the bills, but instead hold them until maturity. In this case, a larger spread between the market and floating rates means that they can borrow cheaply and lend at high-interest rates.

Using an OLS regression, we find a positive relationship between the monthly amount of credit lines authorised by the bank and the spread between the London market discount rate on prime bills (market rate) and the day-to-day loans rate (floating rate). Our results suggest that the amount of credit authorised by the *Brasilianische* Bank increases when there is either (i) increasing demand for foreign bills in the London market or (ii) a decrease in borrowing costs for bill brokers and discount houses in London.

Our findings are not affected by reverse causality between our dependent and independent variables, as it is unlikely that the credit provision of the *Brasilianische* would impact London's interest rates. However, our model may be subject to omitted variable bias. We include time-fixed effects and control for several additional variables to address this issue. We also employ an instrumental variable (IV) strategy to test the robustness of our results. Specifically, we use annual tax revenue collection in Great Britain and its effect on the spread of the market and floating rate as our IV. Individuals and companies based in Great Britain had to pay their annual income and other taxes at the end of March. Consequently, throughout the months of February and March, large amounts of money deposited at British joint-stock banks were withdrawn and transferred to the Government accounts at the Bank of England. This contraction in funds forced the joint-stock banks to reduce the amount of money they had

available for daily loans. This led to an increase in the floating rate, and hence the spread decreased. As the *Brasilianische* Bank was not present in Britain and not impacted by British fiscal dynamics, we consider this shock to be exogenous. Our IV estimations support the findings of our OLS regression.

Our findings are relevant to literature on the history of international banking and London's money market during the first wave of globalisation. Research on the development of financial centres commonly focuses on their formation, competition between them, and London's dominance. Kindelberger's (1974) classic study illustrates the emergence of different financial centres from the 18th century, emphasizing the role of government regulations and policies in their formation, and the importance of banks and stock exchanges in their growth. Cassis (2010) highlights the impact of financial centres on the international financial system, the competition among them, and the factors that contributed to shifts in dominance. Both studies highlight London's financial supremacy during the 18th, 19th, and early 20th centuries and its importance as a hub for international investment and trade. Einzig (1931) explains London's dominance in the global financial market as a result of the stability and international acceptance of sterling as a currency, as well as London's unique position in the global banking industry. Established British banking houses were considered reputable, experienced in international banking, and held high international prestige. They were able to offer competitive profit margins, as London's banking turnover was higher than any other financial centre at the time. This reputation and large banking turnover attracted more international investment and trade to London, solidifying its position as a global financial centre. Accominotti et al. (2021) further emphasise London's leading role in the issuance, trade, and spread of the sterling bill of exchange, which was the principal instrument of trade finance at the time. Other studies highlight the growing competition London faced from emerging economies, such as Germany, which played a significant role in the growth of international financial markets through the expansion of its banking sector and government-backed industrialisation and political stability that helped attract foreign investment (Bersch and Kaminsky, 2008).

The remainder of this paper is organised as follows. The next chapter describes the Brazilian economy and the history of the *Brasilianische Bank* in the late 19th and early 20th century. Chapter 3 illustrates the dynamics and mechanisms of the LMM. Chapter 4 discusses the

specifications of our econometric analysis, including the OLS and IV methods. The final chapter, Chapter 5, concludes the paper.

2.   The *Brasilianische* Bank in the Brazilian Economy of the Late 19th, Early 20th Century

The Brazilian economy in the late 19th and early 20th centuries was driven by exports, primarily coffee and rubber. Between 1889 and 1919, coffee made up over 57% of Brazilian exports and 71% of the world's total production. Rubber's share in exports grew from 14.2% to 25.6%. The coffee industry faced a major setback due to overproduction and saturation in the international market, leading to a drop in prices. This resulted in a decrease in production between 1900 and 1905, until the Brazilian government stepped in as a direct buyer in 1905/6. The financial crisis, worsened by a deflationary monetary policy, also affected the coffee sector[2]. Rubber exports also declined when Southeast Asian producers entered the market in the 1910s, accounting for only 5% of Brazilian exports in 1919 (Strasser, p. 148, Abreu and Bevilaqua, pp. 6–8; Bértola and Ocampo, p. 99, see also Absell and Tena Junguito, pp. 19, 27). Table 1 shows the export shares of the principal commodities of Brazil between 1870 and 1919.

In 1889, Brazil's First Republic was established after the ousting of the emperor, and the new government quickly liberalised the financial markets[3]. Liability and mandatory disclosure were introduced, making it easier for investors to access information on companies and incentivising borrowing and investment. Banks were allowed to engage in all financial transactions, including long-term loans and corporate securities investments. This resulted in a rapid expansion of the banking sector and securities markets, causing a speculative bubble that burst in 1891/92. The collapse of the financial markets and the increase of Brazil's foreign debt led to the failure of many domestic banks, with only ten still operating in 1906 and with

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2 Between 1899 and 1900, the latter reduced the money supply by more than 11.5 per cent –it actually burnt the notes-, causing a sudden revaluation of the Brazilian currency. The revaluation was additionally accelerated by the banks in Brazil, foreign and national, speculating on and investing intensively in the Brazilian currency. In only ten days in the month of March in 1900, the exchange rate increased from 10 to more than 14d. This overvaluation of the currency not only caused an overall stagnation of the Brazilian trade, but also gave incentive to foreign investors to sell their Brazilian bonds and securities on large scale. The consequent money outflow together with the increasing foreign debt of Brazil ultimately ended up in a financial crisis (Strasser, p. 148).

3 The growing republican movement had long seen the monarchy as the main obstacle for the transition to a modern economy and society (Haber, p. 152). A military coup d'etat, backed ironically by still discontent former slave owners, established the First Republic in November 1889.

capital down to 11% compared to 1891 ((Triner and Wandschneider 2005; Haber, pp. 5–7, 15–16, 152).

Table 1: Commodity export shares Brazil (% of total), 1870 - 1919

Year	Coffee	Sugar	Cotton	Rubber	Total
1870-79	56.3	11.8	9.7	5.5	83.3
1880-89	60.5	10.6	4.4	7.6	83.1
1890-99	65.4	6.1	2.5	14.2	88.2
1900-09	53.1	1.5	2.3	25.6	82.6
1910-19	52.1	2.4	1.7	16.4	72.6

Source: Abreu and Bevilaqua, 1996 p. 9

It took some time to recover. Eventually, in 1905 the banking sector and capital market regulations were changed to allow for the government's control of financial development. The federal government established national authorities to implement its monetary and financial policies on a national level. From now on, the Treasury Ministry and the *Banco do Brazil* were responsible for the implementation of the government's monetary and financial policies on a national level.[4] The reconstruction of the banking system helped consolidate Brazil's economy. By the first decade of the 20th century, Brazil was recovering well.

The principal foreign actors in the Brazilian banking business were the British and the Germans (Briones and Villela, pp. 5–6). The driving force of British banking engagement in the second half of the 19th century in Brazil was the increasing investment possibilities in the capital markets and infrastructure projects (Hurley 1914, pp. 14ff). The integration of the Brazilian economy into global markets made large-scale infrastructure work necessary. Mainly driven by coffee, the export boom triggered the construction of harbours and, most importantly, railway systems.

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4 The currency issue was centralized, the gold standard was reinstalled, and the money supply maintained under the control of the Treasury Ministry. The Banco do Brazil was back in charge, and since then, was the Treasury's proxy of the government, and responsible for the administration of the currency and exchange transactions of the state (Triner, p. 224).
One of the principal objectives of the government's financial policy at this time was the development of a nationwide infrastructure of financial transactions, able to facilitate the expansion and integration of the different local markets. These had suffered from a stagnation of its overall commerce, due to a lack of financial services since the breakdown in 1891. Therefore, the *Banco do Brazil* established a national network of branches, served as correspondent for regional banks in order to facilitate transactions between small local banks and financial centers. So, in the words of Triner, the Banco do Brazil gained its importance from providing "institutional stability to the banking system for the first time in Brazil`s history" (Triner, pp. 227–229). This stability was generally welcomed by entrepreneurs and investors alike.

The two largest and most influential German and British financial institutions in 19th century Brazil were the *Brasilianische Bank für Deutschland* and the *London and Brazilian Bank*. The latter was the first foreign bank established in Brazil, opening its first branch in 1863 in Rio de Janeiro (Orbel and Turton, 2001 342ff).

Table 2: Principal foreign banks in Brazil, 1914

| Bank	Nationality
London and Brazilian Bank	English
London and River Plate Bank	English
British Bank of South America	English
Banco Espanol de Rio de la Plata	Spanish
Banco Aleman Transatlantico	German
Banco Germanico de la America del Sud	German
Brasilianische Bank für Deutschland	German
Banque Francais et Italienne pur l´Amerique du Sud	French/Italian

Source: Hurley, 1914, p. 36

In 1887, the *Diskonto-Gesellschaft* in Berlin and the *Norddeutsche Bank* in Hamburg founded the *Brasilianische Bank für Deutschland*. It opened its first branch in 1889 in Rio de Janeiro. Both banks, independently of each other, had already shown an interest in expanding to Latin American markets in previous years. While the *Diskonto* was interested in entering the infrastructure and railway construction business in Brazil, the *Norddeutsche* had already been an important player in Brazil's export and import sectors in previous decades (*Brasilianische Bank für Deutschland*, p. 4). Yet, the risk and capital intensity had prevented an earlier market entry and ultimately led to the decision of *Norddeutsche* and *Diskontobank* to combine their efforts in establishing a foreign bank.

The *Brasilianische* Bank was the only German bank operating in Brazil until 1911, when the *Deutsche Überseeische* and the *Deutsch-Südamerikanische* Bank were established in Rio de Janeiro. In 1913, together these three banks possessed over nine branches in Brazil. The *Brasilianische,* however, was the only institution that exclusively concentrated its business on the Brazilian market. In the same year, three British banks with twenty-two branches were operating in Brazil; the *London and Brazilian*, the *London and River Plate*, and the *British Bank of South America* (see Hurley 1914, pp. 12–22, 36ff; Hauser 1901, pp. 54ff). Yet, the increasing competition from German banks had its impact. In 1906, British banks held some 77% of the foreign deposits in the major financial centres: in 1930 this figure was down to 31%. German

banks "were by far the second most relevant actors in the region. (…) in terms of indicators such as total deposits, paid-in capital or profits, they were far bigger than their continental competitors, such as the French" (Briones and Villela, pp. 5–6).

The *Brasilianische* was closely linked to its mother institutions and the European money market. In 1887, the joint-stock capital of the *Brasilianische* was 2.5 Million Mark, of which 1.5 Million were deposited at the *Diskonto-Gesellschaft* and 1 Million at the *Norddeutsche Bank* (Supervisory Report Brasilianische, March 1888). Furthermore both mother institutions held the majority of the *Brasilianische's* (*Brasilianische Bank für Deutschland*, p. 31) stock shares. The bank's headquarters, including the directorate and the supervisory board, were located in Hamburg, Germany. The supervisory board was responsible for final decision-making with regard to the bank's operations. It was responsible for the appointment of staff, with the directorate in Brazil being in its entirety of German nationality (*Brasilianische Bank für Deutschland*, pp. 31, 36), and it controlled the bank's strategy and provision of credit. Every credit line granted by the *Brasilianische* had to be confirmed by the supervisory board which held a meeting every 1 to 3 months in Hamburg (Supervisory Reports Brasilianische).

Figure 1: Monthly authorised credit lines of the *Brasilianische* Bank – bills discounting and direct credit – all currencies and in sterling pounds, 1889-1913
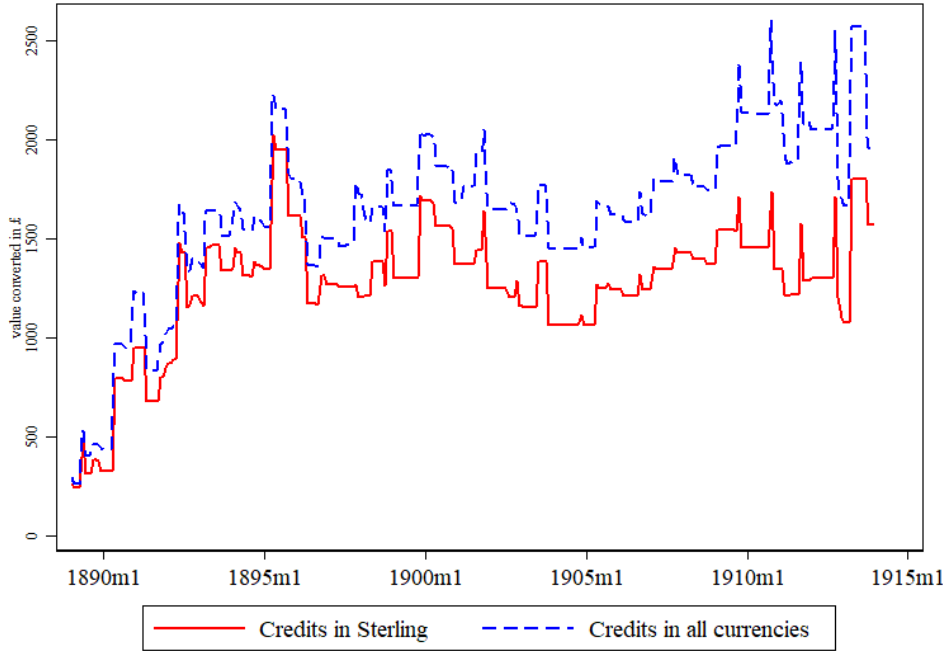
The *Brasilianische* financed business in Europe and in Brazil in multiple currencies.[5] Yet, its use of domestic capital denoted in Milreis, was restricted to finance business in Brazil only. This was the bank's attempt to protect itself against the high volatility of the Brazilian currency and the resulting exchange rate risks (*Brasilianische Bank für Deutschland*, pp. 12, 16; Diouritch 1909, p. 563). The capital to finance international business had to be acquired exclusively by drawing on Hamburg and Berlin, and, if more favourable conditions were available, on the international financial centres in foreign currencies (Supervisory Report Brasilianische, March 1888). From the 1870s, Germany tried to establish the German Mark as alternative trade currency in the international markets (Tilly 1992). However, throughout the entire period of observation, on average 80% percent of the credit lines provided by the bank were denoted in the sterling pound (Figure 1), hence, the focus of the bank was the LMM. The *Brasilianische* accessed European money markets via three main channels: (i) the bank held current accounts at its mother institutions that provided unlimited access to capital denoted in German Marks, (ii) the *Diskontogesellschaft*'s London Office (which opened in 1901), and (iii) the bank's London correspondents and agents gave access to the LMM (Supervisory Report Brasilianische, March 1888, Diouritch 1909 p. 566).

Table 3: Correspondents and agents of the *Brasilianische* in London

Bank	*Years active**
Disconto Gesellschaft	1901-1913
International of London Limited	1897-1904
N. M. Rothchild & Son	1898-1913
Union of London & Smith's Bank Limited	1898-1913
William Brandt's Sons & Co	1898-1913
Manchester and Liverpool District Banking Company Limited	1898-1913

Source: The Banking Almanac & Directory and The Brazilian Review

Note: *Period of year of establishment until 1913.

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5 Including British Sterling, German Mark, French France, Italian Lire, and Brazilian Milreis.

3. The London Money Market

The financial centre of the world at that time was the City of London. In 1912, the *Brasilianische* Bank reported: "London is not only the largest, but commonly also the cheapest discount market in the world. […] Even today, one has to admit - it would be disingenuous not to - the first thing you need to start an overseas banking business is (…) a drawing address in London"[6].

The main financial instrument exchanged on the LMM was the sterling bill of exchange. Sterling bills of exchange payable in London were issued worldwide (Accominotti et al 2021). Initially conceived to finance trade, bills became a liquid and safe instrument to borrow short term, irrespective of whether they represented an actual commercial transaction. Ultimately, the signatures of the acceptor and the endorser(s) made a bill of exchange a sound investment. The return on investment was the market discount rate, which was determined by market conditions and by the policy of the Bank of England[7]. Indeed, the Bank of England was the cornerstone of the LMM[8]. Its commitment to converting sterling notes into gold without restrictions made the sterling bill of exchange as safe as gold.

Figure 2: The functional roles in the London Money Market
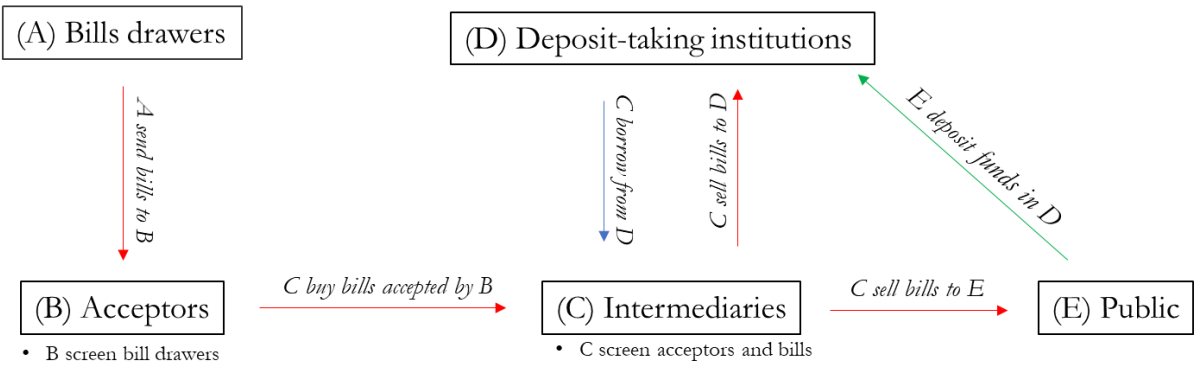
Figure 2 provides a schematic representation of the functional roles of the actors in the LMM. Bills were drawn on London and sent there for acceptance. The role of acceptors was to screen

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6 BRA 1912, page 28. Translated from German by the authors.
7 Ceteris paribus, in non-crisis times, higher market rates indicated that business flourished.
8 There is indeed a vast literature on the role the Bank of England played in the LMM, repeating its role here would be redundant.

the drawers of bills, i.e. to collect information on them and guarantee payment by accepting their bills. Once accepted, bills were bought by intermediaries, who had insider knowledge of the market and acted as screeners for acceptors and bills. These intermediaries usually did not hold the bills until maturity but endorsed them and re-sold them to deposit-taking institutions and the public. Deposit-taking institutions employed the funds collected among the public to make advances and buy bills from intermediaries. As a norm, they never rediscounted their bills but held them until maturity. Furthermore, besides investing in bills, deposit-taking institutions played another critical role in the LMM. In fact, they also lent to the intermediaries most of the working capital they needed. Intermediaries borrowed short-term funds at the floating rate. When deposit-taking institutions had plenty of funds to lend, the floating rate was low, and vice versa.

In practice, most bill drawers were importers and exporters in Britain and overseas. Traditionally, merchant banks and accepting houses were the primary acceptors of bills. Still, London joint-stock banks, Anglo-foreign banks, and foreign banks with branches in London increasingly became involved in the remunerative acceptance business[9]. Bill brokers and discount houses played the role of intermediaries. Joint-stock banks and London bankers played the lion's share in the functional role defined in the scheme as deposit-taking institutions. The position of Anglo-foreign and foreign banks with London offices merits particular attention as they could play different roles in the scheme presented. This category of banks supplied most of the foreign bills exchanged in the LMM. One way to do so was to allow their customers to draw on them, and then after accepting their customers' bills, pass them to the hands of intermediaries. Alternatively, they bought bills drawn on different London acceptors by agents in the countries where they operated, sent these to London for acceptance, and rediscounted them in the market – generally with bill brokers and discount houses. This business allowed Anglo-foreign and foreign banks with London offices to often have positive balances in London. They invested these surpluses in bills or lent short term to intermediaries.

The role of intermediaries, i.e. bill brokers and discount houses, was a peculiar characteristic of the LMM. Accominotti et al (2021) found that the acceptance market was much less

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9 The involvement of London joint-stock banks in the acceptance business started in the second half of the 1860s, (Cottrell, Money and Banking in England, 1974, p.330–334).

concentrated than previously thought, with many acceptors involved in the business[10]. This helps to explain the role of discount houses and bill brokers. Instead of investing considerable sums in screening information on merchant houses and individual acceptors and in studying the conditions of different markets, joint-stock banks outsourced the monitoring to bill brokers and discount houses (Clare 1897, p.142). The bill brokers and discount houses acted as intermediaries between the merchant and accepting houses and the market. In screening a bill, two sets of information are needed to determine its price, i.e. the appropriate discount rate. The first set of information concerns the origin of the bill, i.e. the standing of the borrower abroad (usually a merchant). We can think of this set of information as indicative of the ultimate solvency of the bill, and, indeed, the competence of the acceptor. The second set of information relates to the *hic et nunc* risk of the bill once it started circulating in the market i.e. its financial (or liquidity) risk: even the most respectable accepting house might have periods of poorer cash flow or have accepted an unusually high number of bills. Furthermore, after the acceptance of the bill, the conditions of the main markets in which the acceptor and/or drawer mainly operated could change. This would undoubtedly affect the price despite not affecting the ultimate solvency of the bill. This specific knowledge could be acquired only through daily experience in personally transacting bills in the market. Bill brokers and discounting house agents would visit the offices of banks interested in buying bills (usually London joint-stock banks) and the offices of banks interested in selling bills (usually foreign and colonial banks) multiple times a day. In this way, they obtained fresh, first-hand information that would otherwise be costly for joint-stock banks.

The market discount rate determined the price at which bills were bought and sold by bill brokers. The volume of bills the bill brokers transacted was a multiple of their capital, and they operated at leverage by borrowing short-term.[11] While discount houses also collected deposits from the public, bill brokers relied exclusively on borrowing at the floating market rate from London banks and Anglo-foreign and foreign banks. As fragile as this system might seem, it proved remarkably stable. As King (1936, p.183) observed:

> "Then, as now, the call loan system rested upon the fundamental assumption that if one London banker were calling in loans, another banker would shortly receive a roughly equivalent amount, which he would seek to re-lend. In normal times, that was,

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10 Accominotti et al. (2021) find 1,439 acceptors out of 23,493 bills rediscounted by the Bank of England in 1906.

11 As the old joke said, a pair of good boots and a bill case were the only capital that a bill broker had.

and is, a warrantable assumption, and is the basic principle of deposit banking, as well as of bill dealing".

In case of need, they could also sell their paper at a discount at the Bank of England – provided it was not a 'Foreign Domicile' or 'Foreign Agency' bill[12]. The floating rate hence determined how much leverage bill brokers and discount houses could take, and thus how large the turnaround of bills would be. When the discount rate was relatively high compared to the floating rate, bill brokers had all the incentives to move large amounts of bills. Furthermore, if market conditions were particularly favourable, they could even hold some bills until maturity. *De facto,* they would do maturity transformation by borrowing at the floating rate, and lending at the market discount rate. Therefore, when the spread between the discount and the floating rate was large it was easier for international banks to place their bills on the LMM. Another even more straightforward mechanism through which the spread could affect the demand for foreign bills was taking the perspective of the deposit-taking institutions. If the floating rate was low, it meant that these banks had an abundance of funds to employ. If the discount rate was high, it implied that investing in bills was more remunerative. Therefore, a large spread indicates that discounting bills was particularly profitable, relative to the liquidity of deposit-taking institutions.

4. Empirical Strategy: Credit Provision and the London Money Market

This empirical section investigates the relationship between the London spread of market and floating rate and the monthly amount of credit authorised by the *Brasilianische* Bank between 1889 and 1913. Our main hypothesis is that the London spread positively affects the bank's monthly credit lines. Expressed in the form of equation, the model is as follows:

(1)

$$X_m = \alpha_0 + \beta LonSpread_m + \Upsilon_m + \lambda_y + \lambda_m + \varepsilon_t$$

Where X_m is the total value in sterling pounds of credit lines authorised by the *Brasilianische* in month m, α_0 is a constant. For this study, the key coefficient of interest is β, which shows

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12 'Foreign Domicile' were bills payable in London by a local bank but accepted in a different country than Britain. 'Foreign Agency' were bills accepted in London by branches of foreign banks not headquartered in Britain. The Bank of England did not accept this kind of paper at its discount window because in case the bills were dishonoured the assets that backed the signatures were in great part abroad.

the impact of the London spread on the credit lines of the *Brasilianische*. Υ_m is a set of control variables accounting for the different influences on the credit provision of the *Brasilianische* and/or the LMM conditions. The estimated model also includes year (λ_y) and month (λ_m) fixed effects. We use Ordinary Least Squares (OLS) to estimate equation 1.

The data on monthly credit was first published in Kisling (2020). The information on the London spread, and the other independent variables are from the NBER Macrohistory Database and Nishimura (1970).[13] We test for the stationarity of the dependent and independent variables using the augmented Dickey-Fuller test. We use 12 lags to account for monthly data. Table A4 in the appendix presents the results. At the 10% level, we can always reject the hypothesis that the dependent variable, our variable of interest, and our main control variables are non-stationary. They are thus considered I(0).

We include four main controls in our baseline regression. The variable 'spread between discount and call money rates in New York', is the difference between the *Commercial Paper Rate for New York* and the *Call Money Rate for United States*. As the US was a major trade partner of Brazil and New York was a significant financial centre, this variable could affect the dynamics of the LMM. The variable 'Mark/$ exchange rate' represents the *Average Monthly Berlin Rate of Exchange on New York for Germany*. It controls for changes in the foreign exchange rate that could affect the investment decisions of the *Brasilianische* Bank. Additionally, as German banks play a significant role in the LMM, fluctuations in the value of the Mark could also influence the LMM. The 'spread between Reichsbank and Bank of England (BoE) official rates', is the difference between the *Official Bank Discount Rate for Germany* and the *Bank of England Policy Rate in the United Kingdom*. Interest rate differentials between the official rates in Britain and Germany could induce gold movements, which were closely tied to the fluctuations in the LMM. The spread between the two rates could also affect credit limits in £, as the bank could privilege its credit lines in Marks, if it were more favourable to do so[14]. Finally, we consider the variable 'Trade Union Members Unemployed in UK, % (log)', which is the *Trade Union Members Unemployed, Total for United Kingdom*. It serves as an indicator of

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13 Please see section 6.1. Data and Sources in the appendix for more details on the data and sources
14 As a robustness check, we also use the spread between the London market discount rate and the Berlin market discount rate. However, we prefer the specification with the spread between the official interest rate because to avoid mechanical correlation due to the inclusion of the same variable twice: The London market discount would be minuend in both spreads.

the state of the British economy, which at 8.22% of the global GDP in 1913 had a significant impact on not only the LMM but also the Brazilian economy.

Table 4: Results Regression Estimations – Baseline model – Equation (1)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Spread between discount and floating rates	75.767*** (23.170)	65.801*** (24.535)	71.054*** (18.782)	64.273*** (20.897)
Spread between discount and call money rates, New York			19.959** (9.722)	18.435* (10.194)
Mark/$ exchange rate			- 1,685.396*** (499.661)	- 1,468.660** (601.113)
Spread between Reichsbank and BoE official rates			-26.927** (13.396)	-23.289* (12.642)
Trade Union Members Unemployed in UK, % (log)			-93.210** (39.440)	-53.216 (44.533)
Constant	290.345*** (12.471)	218.145*** (27.574)	7,404.490*** (2,090.060)	6,406.049** (2,539.114)
Observations	300	300	300	300
Month indicators	No	Yes	No	Yes
Year indicators	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
adjR2	0.825	0.827	0.830	0.829
F test model	873.2	1427	492.5	455.1
P-value of F model	0	0	0	0

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the total monthly credit authorised by the *Brasilianische* between 1889 and 1913 in thousand £. Standard errors are estimated with Newey-West and reported in parentheses.

Table 4 presents the results of our baseline regression (1). They confirm our main hypothesis. The coefficient of the London spread is positive and significant, confirming a positive correlation between the difference between the market and floating rate in London and the monthly amount of credit authorised by the bank. The effect is sizeable. A one-unit increase in the spread is associated with an average rise in monthly-authorised credit by 64,273 pounds, which is ~5 % and ~ 20 % of the mean and the standard deviation of our dependent variable, respectively (column 4).

Column (1) shows the coefficient of London spread with only yearly indicators; Column (2) includes monthly and yearly indicators. Columns (3) and (4) add our main controls using only year and year and month indicators, respectively. The inclusion of monthly indicators ensures that seasonal patterns do not drive our results. The comparison of the results of our estimations with and without month indicators shows that seasonality is not likely to be the main driver of the correlation we find. In fact, the coefficient of the London spread is only marginally smaller when including monthly indicators. This is especially true in our models (columns 3 and 4), which include our main control variables.

To test the robustness of our findings, we run our estimations with two additional sets of control variables. They are described in detail in section 6.2 "Robustness Checks" in the appendix. Only some variables are stationary at I(0), while others are at the I(1) level. In the case of the latter, we take the first differences (see Table A4 in the appendix). The results confirm our main hypothesis, with the size and significance of the coefficient of London spread being consistent. They are presented in Tables A1 and A2 of the appendix. Firstly, we control for the possible influence of German and British exports and imports[15]. Secondly, we account for potential shocks to the Brazilian economy by including the monthly coffee prices and the number of coffee bags exported from Rio de Janeiro. Thirdly, we control for the possible influence of German business cycles by including German monthly pig iron production, the clearing of the Reichsbank, and the earnings of Prussian-Hessian railways from Freight. Furthermore, Table A2 controls for (i) the London stock price index, (ii) Milreis exchange rate with the $, (iii) the price of rubber, (iv) the spread between German official and market discount rate, (v) the spread between the market discount rate in London and Berlin, (vi) the Reichsbank's official discount rate, and (vii) the market discount in Berlin.

Our OLS regression analysis should not suffer from the common problem of possible endogeneity between our dependent and independent variables. It seems quite implausible that a German foreign bank in Brazil had the capacity and market power to influence the European money market. Thus, reverse causality can be excluded. However, despite all the robustness checks confirming our results, we cannot exclude the possible influence of omitted

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15 While monthly data on monetary value is available for Britain, for Germany we have to rely on weights, because monetary values are available only from 1909.

variables. To address potential endogeneity issues that could arise, we adopt an IV approach based on our historical knowledge of the functioning of the LMM.

Our IV is the collection of British tax revenues and the effect it had on the LMM due to a movement of funds from the joint-stock banks to the Bank of England's Government account.[16] The tax revenue collection in Great Britain concentrated from February until April. British firms and individuals had to withdraw their money from London joint-stock banks to pay income and other taxes by the end of March. The reduction of deposits reduced the amount of money available for lending. It caused a squeeze in liquidity, as the banks had fewer funds. This eventually led to an increase in the floating interest rate from the end of February until the beginning of April. This taxation only affects banks operating in Great Britain.[17] The tax collection and the transfer of money from joint-stock banks to the Government account of the Bank of England, hence, can only possibly influence the credit lines of the *Brasilianische* in Brazil indirectly via the spread of the London floating and market rate. Although we do not directly observe monthly tax collection, taxes were paid directly at the Bank of England (BoE). We then use the fluctuations in these public accounts as IV[18].

Figure 3 displays the monthly average for the floating rate, the London market discount rate, and the spread between the two. It shows a clear contraction of the spread around March when the floating rate increased and the market rate continued its trend. Contemporaries widely acknowledged this phenomenon.[19]

In his *Academic study of the London money market,* Peake (1926, p.9) displayed precisely the graph we plotted in Figure 3 and commented "the rise in the floating rate to March is due, of course, to the collection of the taxes at the end of the financial year". In his seminar study, *The London Money Market,* Spalding (1922, p.77) identified four periods of fluctuations in the LMM:[20]

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16 Our IV approach also guarantees that the, if any, remaining concerns of revers causality are addressed
17 Banking and Currency, Sykes (1908)
18 Data on BoE public deposits are taken from Huang and Thomas (2016).
19 See for example the "Money Market" sections in The Economist, The Journal of the Institute of Bankers, or The Bankers' Magazine in any issue around March to confirm this interpretation
20 The first period run from January to the beginning of February, the second period from February until the beginning of April, the third period from April to September, the fourth and last period from September to December.

"This brings us to the second period, one in which the market is largely under the shadow of the tax-gatherers' demand. Owing to the ingathering of revenue, stringent conditions are usually expected and experienced towards the end of the Government's financial year in March. In fact, it is in March that the balances of the Chancellor of the Exchequer with the Bank of England reach their high-water mark and, as the money is kept off the market for a time, those who require accommodation have to pay high rates for it."

Figure 3: Market rate, floating rate and spread in London (monthly averages)
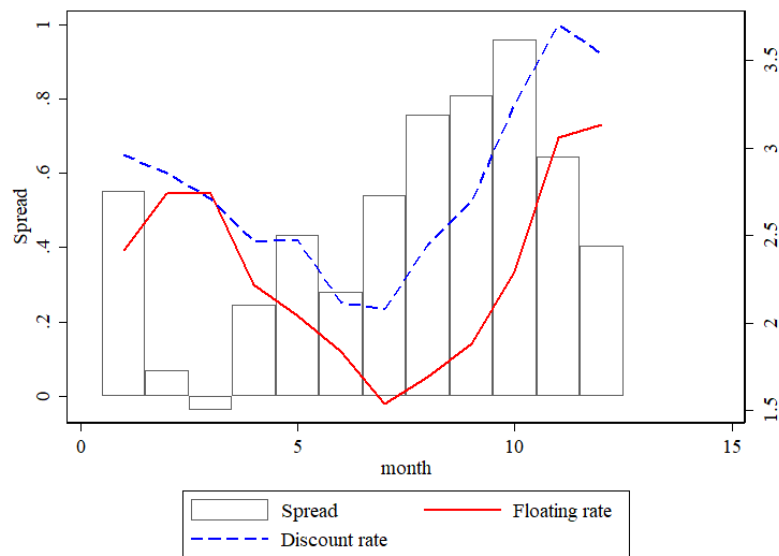
One challenge our IV faces is the seasonality of the tax collection. It always happens during the same months in the year. The inclusion of monthly indicators in our estimation, however, would absorb much of the correlation between our spread variable and our instrument. At the same time, the results of our OLS estimation show (Table 1) that the correlation between our dependent variable and the spread holds well with and without including monthly indicators, suggesting that seasonality should be a minor concern. However, *a priori*, we cannot rule out that the squeeze in the spread and the collection of taxes are a spurious correlation that depends on unobserved seasonal factors. We could not find any trace of such unobservable in the coeval press, but, fortunately, the constitutional crisis that followed the People Budget of 1909 allows us to dispel any doubt. In 1909, Lloyd George proposed a fiscal Budget with substantial progressive measures, including a land tax and a 'super tax' (or surtax) to be levied on incomes over £5,000. The House of Lords vetoed the proposal, and new general elections were called. The Finance Bill was finally approved only in April 1910, and income tax collection for that year took place in May and June rather than in March. Figure 4 shows that

the London spread and Government deposits typically show a robust opposite dynamic in February – March. In 1910, when tax collection took place in May – June, the same pattern emerged but shifted by three months. The absence of any pattern in February – March 1910 confirms that the strong divergence we observe in other years can be safely attributed to tax collection and not to unobserved seasonal patterns. Therefore, estimating our IV without month indicators should not be a problem.

Figure 4: London spread and Government deposits at BoE – Average 1889–1913 and 1910
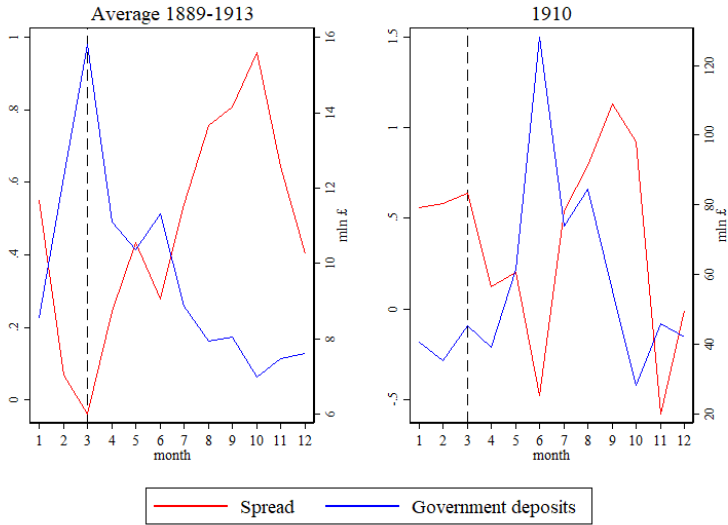
We use a 2SLS approach for our IV estimation. In the form of an equation, our model is expressed as follows:

(2)

$$\widehat{LonSpread}_m = \alpha_0 + \zeta TR_m + \Upsilon_m + \lambda_y + \varepsilon_m$$

(3)

$$LnX_m = \alpha_0 + \beta \widehat{LonSpread}_m + \Upsilon_m + \lambda_y + \varepsilon_m,$$

with $(Corr\ (\zeta TR_m\ \varepsilon_m) = 0)$

Where LonSpread is the spread between the London market and floating rate in month m. TR is the percentage difference between the mean public deposits at the BoE per year and the mean public deposits at the BoE in each month, relative to the mean public deposits at the

BoE per year. λ_y are year indicators. The rest of the specifications of equation (3) are identical to regression (1). Table 5 compares the results of our OLS baseline model with the results of our IV estimation. They confirm our previous findings. The coefficient of our main variable of interest, the London spread, is positive and significant.[21] Our IV coefficients are larger than our OLS coefficients, but this should not be due to a weak instrument problem. The First Stage IV F statistics (reported in table 5) confirms that our instrument is very strongly correlated with our dependent variable, and thus we can rule out the issue of a weak instrument.

Table 5: Results Regression Estimations – IV model – Equations (2) and (3)

	(1) OLS	(2) IV	(3) OLS	(4) IV
Spread between floating and discount rates	75.767***	95.472**	71.054***	97.032**
	(23.170)	(43.448)	(18.782)	(46.916)
Spread between discount and call money rates, New York			19.959**	16.657*
			(9.722)	(8.691)
Mark/$ exchange rate			-	-
			1,685.396***	1,799.487***
			(499.661)	(510.990)
Spread between Reichsbank and BoE official rates			-26.927**	-21.684*
			(13.396)	(11.421)
Trade Union Members Unemployed in UK, % (log)			-93.210**	-97.649**
			(39.440)	(39.183)
Constant	290.345***	282.069***	7,404.490***	7,878.006***
	(12.471)	(19.499)	(2,090.060)	(2,134.820)
Observations	300	300	300	300
Month indicators	No	No	No	No
Year indicators	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
R-squared		0.839		0.846
adjR2	0.825	0.825	0.830	0.829
F test model	873.2		492.5	
P-value of F model	0	0	0	0
First Stage IV F-stat		103.1		69.89

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Note: The dependent variable is the total monthly credit authorised by the *Brasilianische* between 1889 and 1913 in thousand £. Standard errors are estimated with Newey-West and reported in parentheses

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21 Our results are robust when including our additional set of variables, category three, in the IV model.

5. Concluding Remarks

This article studies the role of the LMM in determining the credit supply of non-British international banks during the first wave of globalisation. At that time, London was the global financial hub, and sterling was the key international trade currency. Research and coeval studies have illustrated the importance of foreign banking in financing foreign trade of British competitors, such as Germany. At the same time, literature affirms that attempts to break the dominance of sterling and the LMM have failed. Yet, there seems to be a lack of quantitative research on the impact of the London Market Market dominance on the financial capabilities of non-British banks abroad.

Using the example of the German bank *Brasilianische Bank für Deutschland* in Brazil between 1889 and 1913, we find that the monthly credit lines authorised by the bank were positively related to the spread between the London market and the floating rate. Our findings suggest that the bank increases the provision of credit when there is either a rise in demand for foreign bills in the London market or a decrease in borrowing costs for bill brokers and discount houses in London. Even without a branch in London, the *Brasilianische* was able to benefit from the LMM thanks to its network of correspondents and agents, and, since 1901 from its mother institution, the *Diskonto-Gesellschaft*.

We provide robust evidence that this relationship is causal. Firstly, we exclude possible issues of reverse causality since it is implausible that the *Brasilianische* had the capacity to influence conditions in the LMM. Secondly, the introduction of a large set of control variables that account for potential confounding effects does not change the results of our econometrical analysis. Thirdly, we develop an identification strategy (IV) based on the effect that the annual tax collection in Great Britain had on the liquidity conditions in the LMM and on the spread between the market and floating rate. Since the *Brasilianische* Bank was not subject to British taxes, we argue that this shock is exogenous.

These empirical results offer important new evidence and insights on the dynamics of the rising competition of economies challenging Great Britain's global financial hegemony before WWI. It broadens our understanding of the development of financial centres, financial institutions, and their interdependence.

References

Abreu, M., and Bevilaqua, A. (1996) 'Brazil as an export economy, 1880–1930', Department of Economics, Catholic University of Rio de Janeiro.

David Absell, C., and Tena-Junguito, A. (2016) 'Brazilian export growth and divergence in the tropics during the nineteenth century', *Journal of Latin American Studies*, 48(4), pp. 1–30.

Accominotti, O., Lucena Piquero, D., and Ugolini, S. (2021), 'The Origination and Distribution of Money Market Instruments: Sterling Bills of Exchange during the First Globalisation', *Economic History Review*, 74(4), pp. 892–921.

Battilossi, S. (2006) 'The Determinants of Multinational Banking During The First Globalization, 1870–1914', Working Paper 114, Österreichische Nationalbank.

Bersch, J., and Kaminsky, G.L. (2008) 'Financial Globalization in the 19th century: Germany as financial center', mimeo, http://129.199.194.17/files/capitalisback/CountryData/Germany/Other/Pre1950Series/RefsHistoricalGermanAccounts/BerschKaminsky08.pdf

Bértola, L., and Ocampo, J.A. (2010) 'Desarrollo, Vaivenes y Desigualdad: una Historia Económica de América Latina desde la Independencia', SEGIB, Madrid.

Brasilianische Bank für Deutschland (1912) 'Brasilianische Bank für Deutschland. Hamburg – Brasilien. 1887–1912', Hamburg.

Briones, I., and Villela, A. (2006) 'European bank penetration during the first wave of globalization: Lessons from Brazil and Chile, 1878–1913', European Review of Economic History, 10(3), pp. 329–359.

Bulmer-Thomas, V. (2003) *The Economic History of Latin America since Independence*, Cambridge Latin American Studies, Cambridge: Cambridge University Press.

Carreras, A., and Josephson, C. (2010) 'Aggregate growth, 1870–1914: growing at the production frontier', in Broadberry, S.N. and O'Rourke, K. (eds.), *The Cambridge Economic History of Modern Europe, Vol 2*, Cambridge: Cambridge University Press, pp. 30–58.

Cassis, Y. (2010) *Capitals of Capital: The Rise and Fall of International Financial Centres, 1780–2009*, Cambridge: Cambridge University Press.

Chapman, S. (1984) *The rise of merchant banking*, London: George Allen & Unwin.

Clare, G. (1896) *A money-market primer, and key to the exchanges with diagrams,* England: E. Wilson.

Daudin, G., Morys, M., and O'Rourke, K. H. (2010) 'Globalization, 1870–1914', in Broadberry, S.N. and O'Rourke, K. (eds.), *The Cambridge Eeconomic Hhistory of Mmodern Europe, Vol 2*, Cambridge: Cambridge University Press, pp. 5–29.

Diouritch G. (1909) *L'Expansion de banques allemandes a l'etranger*, Paris: Librarie Nouvelle de Droit et Jurisprudence.

Einzig, P. (1931) *The Fight for Financial Supremacy*, London: Macmillan.

Flandreau, M., and Jobst, C. (2005) 'The Ties that Divide: A Network Analysis of the International Monetary System, 1890–1910', *The Journal of Economic History*, 65(4), pp. 977–1007.

Haber, S.H. (1997) 'Financial Markets and Industrial Development. A Comparative Study of Governmental Regulation, Financial Innovation, and Industrial Structure in Brazil and Mexico, 1940–1930', in Haber, S.H. *How Latin America fell behind : Essays on the economic histories of Brazil and Mexico: 1800-1914*, Stanford, Calif.: Stanford University Press, pp. 146-178.

Hauser, R. (1901) 'Die Deutschen Überseebanken', in Pierstorff, J. (eds.) *Abhandlung des Staatswissenschaftlichen Seminars zu Jena*, Jena: Verlag Gustav Fischer.

Hertner P. (2012) 'German banks abroad before 1914', in Jones, G. (ed.) *Banks As Multinationals*, London: Taylor & Francis Group.

Huang, H., and Thomas, R. (2016) 'The weekly balance sheet of the Bank of England 1844–2006', OBRA dataset, Bank of England.

Hurley, E.N. (1914) 'Banking and Credit in Argentina, Brazil, Chile and Peru', U.S. Department of Commerce, Special Agents Series No. 90. Washington D.C.

Jones, G. (1993) *British Multinational Banking 1830–1990*, Oxford: Clarendon Press.

Kindelberger, C. (1974) 'The Formation of Financial Centers: A Study of Comparative Economic History', Princeton Studies in International Finance, 36, Princeton University.

King, W. (1972) *History of the London Discount Market*, London: Cass.

Kisling, W. (2020) 'A Microanalysis of Trade Finance: German Bank Entry and Coffee Exports in Brazil, 1880–1913', *European Review of Economic History,* 24(2), pp. 356–89.

Kisling, W. (2023) ''Los Von London': A Comparative, Empirical Analysis of German and British Global Foreign Banking and Trade Development, 1881–1913', *The Economic History Review,* 76(2), pp. 445-476.

Llorca-Jaña, M. (2014), 'Shaping Globalization: London's Merchant Bankers in the Early Nineteenth Century', *Business History Review*, 88(3), pp. 469–495.

Llorca-Jaña, M. (2016) *The Globalization of Merchant Banking before 1850*, Routledge.

Nishimura, S. (1971) *The decline of inland bills of exchange in the London money market, 1855–1913,* London: Cambridge University Press.

Orbell, J., and Turton, A. (2001) *British Banking: A Guide to Historical Records*, Aldershot: Ashgate.

Pan American Union (1920) 'Brazil. General Descriptive Data', Washington D.C.

Peake, E. (1926) *An academic study of some money market and other statistics (2nd ed.),* London: P.S. King.

Platt, D.C.M. (1968), *Finance, Trade, and Politics in British Foreign Policy, 1815–1914*, Oxford: Clarendon Press

Schneider, S. (2019) 'Imperial Germany, Great Britain and the Political Economy of the Gold Standard, 1867–1914', in Hoppit, J., Needham, D., and Leonard, A. (eds.), *Money and Markets: Essays in Honour of Martin Daunton,*) Boydell & Brewer, pp. 127–144.

Spalding, W. (1922) *The London money market: A practical guide to what it is, where it is, and the operations conducted in it*, London, New York etc.: Sir I. Pitman & Sons.

Strasser, K. (1924) 'Die Deutschen Banken im Ausland', PhD Dissertation, University of Lausanne.

Sykes E. (1908) *Banking and Currency, 2nd Ed.*, London: Butterworth.

Tilly, R. (1992) 'An overview on the role of large German banks up to 1914', in Cassis, Y. (ed.) *Finance and Financiers in European History 1880–1960*, Cambridge University Press, pp. 93–112.

Triner, G.D. (2006) 'British Banks in Brazil during an Early Era of Globalization (1889–1930)', prepared for: European Banks in Latin America during the First Age of Globalization, 1870–1914, Session 102, XIV International Economic History Congress Helsinki.

Triner, G.D. (2005), and Wandschneider, K. 'The Baring Crisis and the Brazilian Encilhamento, 1889–1891: An Early Example of Contagion Among Emerging Capital Markets', *Financial History Review*, 12(2), pp. 199–225.

Young, George F.W. (1991) 'British Overseas Banking in Latin America and the Encroachment of German Competition, 1887–1914'", *Albion: A Quarterly Journal Concerned with British Studies*, 23(1), pp. 75–99.

6. Appendix

6.1 Data and Sources

We provide a data set containing information on the monthly credit lines provided by *Brasilianische* Bank from 1889, the year the bank started operating, until 1913. The data was first published in Kisling (2020). The data are taken from the official reports of *Brasilianische* Bank's supervisory board (Aufsichtsratberichte)[22]. The supervisory board's meetings were held three or four times a year at *Brasilianische* Bank's headquarters in Hamburg, Germany. During these meetings, the supervisory board defined for all its subsidiaries the monthly credit lines granted to each company for the period until the next meeting took place. The minimum duration of one credit line was the minimum time between two supervisory board meetings. In the reports, financing was differentiated into: (i) lines of direct credit and (ii) the maximum value for the discount of bills of exchange. For this study, we are interested exclusively in the credit lines and bills of exchange denoted in sterling pounds.

For our econometric analysis, we test for the possible influence of a series of variables on the monthly credit authorised by the *Brasilianische.* Unless otherwise stated, we retrieved the information for these independent variables from the NBER Macrohistory Database: National Bureau of Economic Research, various variables, retrieved from FRED, Federal Reserve Bank of St. Louis. For reasons of clarity, we maintained the original names of the variables as indicated in the source, which we report in *italics*.

The Monthly Floating Rate in London was taken from Nishimura, S. (1971). *The decline of inland bills of exchange in the London money market, 1855–1913*. London: Cambridge University Press, who retrieves the data from the Economist.

6.2 Robustness Checks

Besides our main controls, we assemble a set of additional controls that we believe could affect our estimations. The results of our estimations with the additional variables are presented in Table A1 and A2 in the section 6.3. Tables and Graphs of this appendix.

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22 Availabe at the Historische Archiv der Deutschen Bank, Frankfurt am Main—Aktenzeichen KA/799— Brasilianische Bank für Deutschland—Sitzung des Aufsichtsrats—Sitzungssaal Norddeutsche Bank Hamburg.

Table A1 includes the following variables: 'Total Imports for Great Britain, mln £ (difference)' is the first difference of *Total Imports, Value for Great Britain*. 'Total Exports of Produce and Manufactures for Great Britain, mln £ (difference)' is the first difference of *Total Exports of Produce and Manufactures for Great Britain*. Since the main function of the LMM was to finance international trade, it is crucial to control for British imports and exports, especially because the *Brasilianische* Bank did not only finance German trade, but also British firms. 'Total exported bags of coffee from Rio de Janeiro (log) (difference)' is the log value of the number of bags of 60 kg that were exported every month from Rio de Janeiro. We take this variable from Kisling (2020). Since coffee was the main export of Brazil, the rational for including this variable in the model concerning the lending of the *Brasilianische* is evident. It is less straightforward why this variable should affect the LMM. In fact, we do not control for this variable because we believe that it affects the LMM directly. However, this variable is an excellent proxy for the seasonality of the coffee trade. Coffee was an important commodity whose trade was financed largely in London and its fluctuations could have an effect on the LMM. In addition, to account for demand shock to Brazilian economy due to changes in the price of coffee we include 'Price of coffee (log) £', that is *Brazil Santos Arabicas Spot Price (Cents/Pound) (with GFD Extension)* from Global Financial Data Database[23]. Since in our IV specification we cannot include monthly indicators, the inclusion of these variables should guarantee that we at least control for the seasonal fluctuations that should worry us the most – those in the coffee market. 'Pig Iron Output for Germany, '000 metric tons (difference)' is *Pig Iron Output for Germany*. 'Clearings of Reichsbank for Germany, bln Marks (difference)' is *Clearings of Reichsbank for Germany*. 'Earnings of Prussian-Hessian Railways from Freight for Germany, mln Marks (difference)' is *Earnings of Prussian-Hessian Railways from Freight for Germany*. We control for these three variables together, as this is our best attempt to control for the German business cycle – lacking alternative suitable proxies for Germany like 'Trade Union Members Unemployed in UK, % (log)' for Britain. The *Brasilianische* funded trade between Germany and Brazil, and its lending was likely dependent on the macroeconomic conditions at home. At the same time, Germany was the second largest European economy, and therefore its macroeconomic fluctuations inevitably could have an impact on the LMM. 'Weights of Imports for Germany, '000 metric tons (difference)' is *Total Imports - Weight for Germany*. 'Weights of Exports for Germany, '000 metric tons (difference)' is *Exports, Total,*

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23 https://globalfinancialdata.com/ accessed on 25 October 2022.

Weight for Germany. In Fred, these time series are available only from 1891. Ideally, we would have liked to use value instead of weights, but these statistics are not available at monthly level before 1909. The mechanism through which these variables could affect both lending and the LMM has already been explained for Trade UK and Germany fluctuations so it does not need to be repeated.

Table A2 includes the following variables: 'Market discount rate in Berlin' is the *Private Discount Rate, Prime Banker's Acceptance, Open Market for Berlin, Germany*. 'Official discount rate Reichsbank' is the *Official Bank Discount Rate for Germany*. The 'Spread between German official and market discount rate' is the difference between the two. This spread should capture the tightness of the credit conditions in Germany. Bignon et al (2012) argue that when this spread is negative, this is a crucial indicator of whether a Central Bank is rationing credit. Furthermore, when the market rate is very much below the official rate, it intuitively means that banks do not need to rely on the Central Bank for financing, suggesting that liquidity is abundant in the market. Being the *Brasilianische,* a German bank headquartered in Hamburg, variations in the German rates and the liquidity conditions in Germany might well affect its lending strategies. However, since Germany was the second largest European economy after Britain, it is not implausible to believe that exogenous variation in German rates and market conditions could have an effect on the LMM too. 'Spread between market discount rate in London and Berlin' is the difference between *Open Market Rates of Discount for London, Great Britain* and *Private Discount Rate, Prime Banker's Acceptance, Open Market for Berlin, Germany*. The rationale for their inclusion in the model is the same as for the 'Spread between Reichsbank and BoE official rates'. 'Security Price Index for London (difference)' is *Security Price Index for London, Great Britain*. We control this variable to account for dynamics in the British capital market. While the effect on the LMM is straightforward, since many stock brokers borrowed short term on the Money Market, we are concerned that a surging capital market could provide alternative investments opportunities for the *Brasilianische* Bank. Hence, the need to check whether it affects our estimates. Finally, we retrieve the following variables for Brazil from Global Financial Data Database[24]. 'Milreis/$ exchange rate (difference)' is *Brazil Real per US Dollar (with GFD Extension)*, We want to control for this because we believe that a currency crisis such as that which occurred in the mid-1890s could

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24 https://globalfinancialdata.com/ accessed on 25 October 2022.

have an impact on the Brazilian domestic economy, in turn affecting the demand for credit. Furthermore, Brazil issued bonds in London and therefore if depreciations in the currency triggered concerns about Brazil's long-term solvency this might have repercussions in London too. Furthermore, we discussed how the Brazilian economy was highly dependent on the export of rubber. A sudden change in prices in this commodity could trigger a demand shock in the Brazilian economy, which potentially could have repercussions also in the LMM. 'Price of rubber (log) $' is *Rubber Spot Price (USD/Kilogram) (with GFD Extension).*

6.3 Tables and Graphs

Table A1: Results Regression Estimations – OLS – Equation (1) – Including set of additional control variables

	(I)	(II)	(III)	(IV)	(V)	(VI)
Spread between floating and discount rates	67.626***	62.749***	70.622***	63.972***	71.731***	64.524***
	(18.813)	(21.402)	(18.594)	(21.009)	(23.113)	(20.453)
Spread between Reichsbank and BoE official rates	-26.893**	-24.130*	-25.207*	-21.690*	-26.591**	-24.528*
	(13.416)	(12.845)	(13.001)	(12.696)	(13.184)	(12.748)
Trade Union Members Unemployed in UK, % (log)	-86.797**	-47.746	-87.403**	-49.015	-89.067*	-50.565
	(40.813)	(46.852)	(40.359)	(44.840)	(45.852)	(44.071)
Mark/$ exchange rate	-1,826.000***	-1,548.534**	-1,805.641***	-1,570.491**	-1,829.448***	-1,570.000**
	(504.998)	(614.893)	(510.502)	(612.729)	(491.270)	(620.751)
Spread between discount and call money rates, New York	19.570**	19.523*	21.479**	20.593*	20.936**	18.941*
	(9.279)	(10.688)	(10.190)	(11.141)	(10.446)	(10.566)
Total Imports for Great Britain, mln £ = D,	2.546	3.790				
	(2.206)	(3.523)				
Total Exports of Produce and Manufactures for Great Britain, mln £ = D,			2.967	6.687*		
			(2.313)	(3.413)		
Total exported bags of coffee from Rio de Janeiro (log)					-9.303	0.790
					(27.339)	(40.268)
Price of coffee (log) £ = D,					260.514	310.023
					(237.702)	(237.309)
Pig Iron Output for Germany, '000 metric tons = D,						
Clearings of Reichsbank for Germany, bln Marks = D,						
Earnings of Prussian-Hessian Railways from Freight for Germany, mln Marks = D,						
Weights of Exports for Germany, '000 metric tons = D,						
Weights of Imports for Germany, '000 metric tons = D,						
Constant	8,000.697***	6,749.458***	7,913.535***	6,832.133***	8,128.750***	6,822.006**
	(2,107.315)	(2,595.265)	(2,130.793)	(2,587.250)	(2,066.123)	(2,697.258)
Observations	299	299	299	299	299	299
Month indicators	no	yes	no	yes	no	yes
Year indicators	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes		
adjR2	0.825	0.824	0.825	0.824	0.825	0.824
F test model	639.7	421.4	606.4	454.3	470.5	333
P-value of F model	0	0	0	0	0	0

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the total monthly credit authorised by the *Brasilianische* between 1889 and 1913 in thousand £. Standard errors are estimated with Newey-West and reported in parentheses. The regressions are estimated with Ordinary Least Squares (OLS).

Table A1 continued: Results Regression Estimations – OLS – Equation (1) – Including set of additional control variables

	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)
Spread between floating and discount rates	68.890***	61.136**	58.242***	55.844*	58.717***	54.198**
	(18.671)	(24.637)	(17.318)	(28.671)	(16.768)	(25.103)
Spread between Reichsbank and BoE official rates	-25.532	-22.832	-23.238	-22.877	-23.685	-23.369
	(21.841)	(20.548)	(22.396)	(21.477)	(16.357)	(15.049)
Trade Union Members Unemployed in UK, % (log)	-87.193*	-50.303	-109.562**	-69.587	-107.193***	-68.374
	(47.865)	(47.143)	(45.902)	(46.157)	(39.483)	(48.532)
Mark/$ exchange rate	-1,794.891**	-1,500.934*	-1,719.048**	-1,544.421*	-1,622.508***	-1,507.759**
	(706.150)	(853.931)	(733.403)	(878.192)	(563.611)	(701.864)
Spread between discount and call money rates, New York	21.080**	18.859	19.667*	17.635	19.517*	17.798
	(10.385)	(11.722)	(10.556)	(12.331)	(10.789)	(11.798)
Total Imports for Great Britain, mln £ = D,						
Total Exports of Produce and Manufactures for Great Britain, mln £ = D,						
Total exported bags of coffee from Rio de Janeiro (log)						
Price of coffee (log) £ = D,						
Pig Iron Output for Germany, '000 metric tons = D,	-0.137	-0.222				
	(0.143)	(0.233)				
Clearings of Reichsbank for Germany, bln Marks = D,	10.654	21.507				
	(19.340)	(29.271)				
Earnings of Prussian-Hessian Railways from Freight for Germany, mln Marks = D,	0.801	1.458				
	(0.968)	(1.221)				
Weights of Exports for Germany, '000 metric tons = D,			0.006	-0.014		
			(0.016)	(0.018)		
Weights of Imports for Germany, '000 metric tons = D,					0.012	0.005
					(0.008)	(0.005)
Constant	7,869.410***	6,546.134*	7,984.943***	7,125.639*	7,576.415***	6,982.474**
	(2,950.835)	(3,597.390)	(3,054.401)	(3,684.378)	(2,349.754)	(2,959.489)
Observations	299	299	273	273	273	273
Month indicators	no	yes	no	yes	no	yes
Year indicators	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
adjR2	0.824	0.822	0.664	0.661	0.665	0.660
F test model	158.4	146.7	111.1	77.48	315	221.4
P-value of F model	0	0	0	0	0	0

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the total monthly credit authorized by the *Brasilianische* between 1889 and 1913 in thousand £. Standard errors are estimated with Newey-West and reported in parentheses. The regressions are estimated with Ordinary Least Squares (OLS).

Table A2: Results Regression Estimations – OLS – Equation (1) – Including set of additional control variables

	(I)	(II)	(III)	(IV)	(V)	(VI)
Spread between floating and discount rates	71.091***	64.401***	71.294***	63.866***	71.648***	64.503***
	(19.263)	(20.525)	(18.975)	(20.943)	(19.307)	(21.488)
Spread between Reichsbank and BoE official rates	-26.217**	-22.789*	-25.568*	-22.678*	-26.248**	-23.151*
	(13.084)	(12.645)	(13.499)	(13.102)	(13.022)	(12.741)
Trade Union Members Unemployed in UK, % (log)	-92.623**	-54.150	-86.935**	-50.092	-89.984**	-52.845
	(40.588)	(44.623)	(40.853)	(45.078)	(41.171)	(46.005)
Mark/$ exchange rate	-1,819.396***	-1,468.153**	-1,734.161***	-1,466.511**	-1,806.717***	-1,520.757**
	(522.510)	(634.905)	(501.548)	(597.937)	(518.249)	(633.025)
Spread between discount and call money rates, New York	22.035**	20.609*	21.007**	18.877*	21.031**	18.991*
	(9.784)	(10.889)	(10.049)	(10.583)	(9.945)	(10.594)
Security Price Index for London = D,	7.362	14.249*				
	(7.328)	(8.231)				
Milreis/$ exchange rate = D,			-19.725	-18.668		
			(33.313)	(33.352)		
Rubber prices = D,					35.814	35.649
					(90.801)	(79.654)
Spread between German official and market discount rate						
Spread between market discount rate in London and Berlin = D,						
Official discount rate Reichsbank						
Market discount rate in Berlin						
Constant	7,972.163***	6,397.796**	7,613.656***	6,401.016**	7,918.987***	6,629.293**
	(2,181.380)	(2,679.860)	(2,094.727)	(2,525.612)	(2,163.191)	(2,671.501)
Observations	299	299	299	299	299	299
Month indicators	no	yes	no	yes	no	yes
Year indicators	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes
adjR2	0.825	0.824	0.825	0.823	0.824	0.823
F test model	585.4	465.1	620.8	503.7	581.9	465.9
P-value of F model	0	0	0	0	0	0

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the total monthly credit authorised by the *Brasilianische* between 1889 and 1913 in thousand £. Standard errors are estimated with Newey-West and reported in parentheses. The regressions are estimated with Ordinary Least Squares (OLS).

Table A2 continued: Results Regression Estimations – OLS – Equation (1) – Including set of additional control variables

	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)	(XIV)
Spread between floating and discount rates	70.967*** (19.397)	69.802*** (21.583)	78.049*** (19.641)	68.988*** (21.532)	72.774*** (21.554)	57.479*** (22.115)	72.372*** (21.980)	60.604*** (22.965)
Spread between Reichsbank and BoE official rates	-26.995** (13.346)	-15.333 (11.800)						
Trade Union Members Unemployed in UK, % (log)	-92.775** (42.161)	-79.215* (46.358)	-81.783** (40.803)	-46.145 (45.143)	-77.211* (44.685)	-9.214 (40.581)	-73.548* (42.631)	-16.186 (40.262)
Mark/$ exchange rate	-1,679.522*** (540.846)	-1,746.033*** (665.038)	-2,075.143*** (536.498)	-1,731.185** (583.098)				
Spread between discount and call money rates, New York	19.831* (11.912)	22.300* (11.573)	20.633** (9.839)	19.147* (10.617)	8.629 (10.485)	6.423 (11.462)	7.901 (11.938)	8.250 (12.710)
Security Price Index for London = D,								
Milreis/$ exchange rate = D,								
Rubber prices = D,								
Spread between German official and market discount rate	-1.034 (28.949)	81.052 (57.326)						
Spread between market discount rate in London and Berlin = D,			-3.342 (9.231)	8.632 (11.163)				
Official discount rate Reichsbank					9.628 (17.792)	40.552** (16.984)		
Market discount rate in Berlin							8.755 (17.190)	16.920 (19.075)
Constant	7,380.768*** (2,252.000)	7,450.166*** (2,788.637)	9,040.184*** (2,238.832)	7,502.832*** (2,461.935)	305.365** (54.506)	58.716 (69.514)	315.820** (44.144)	187.751*** (46.357)
Observations	300	300	299	299	300	300	300	300
Month indicators	no	yes	no	yes	no	yes	no	yes
Year indicators	yes	yes	yes	yes	yes	yes	yes	yes
Controls	yes	yes	yes	yes	yes	yes	yes	yes
adjR2	0.830	0.832	0.824	0.822	0.826	0.830	0.826	0.827
F test model	486.8	268.8	750.5	537.3	1321	2021	1372	1968
P-value of F model	0	0	0	0	0	0	0	0

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the total monthly credit authorised by the *Brasilianische* between 1889 and 1913 in thousand £. Standard errors are estimated with Newey-West and reported in parentheses. The regressions are estimated with Ordinary Least Squares (OLS).
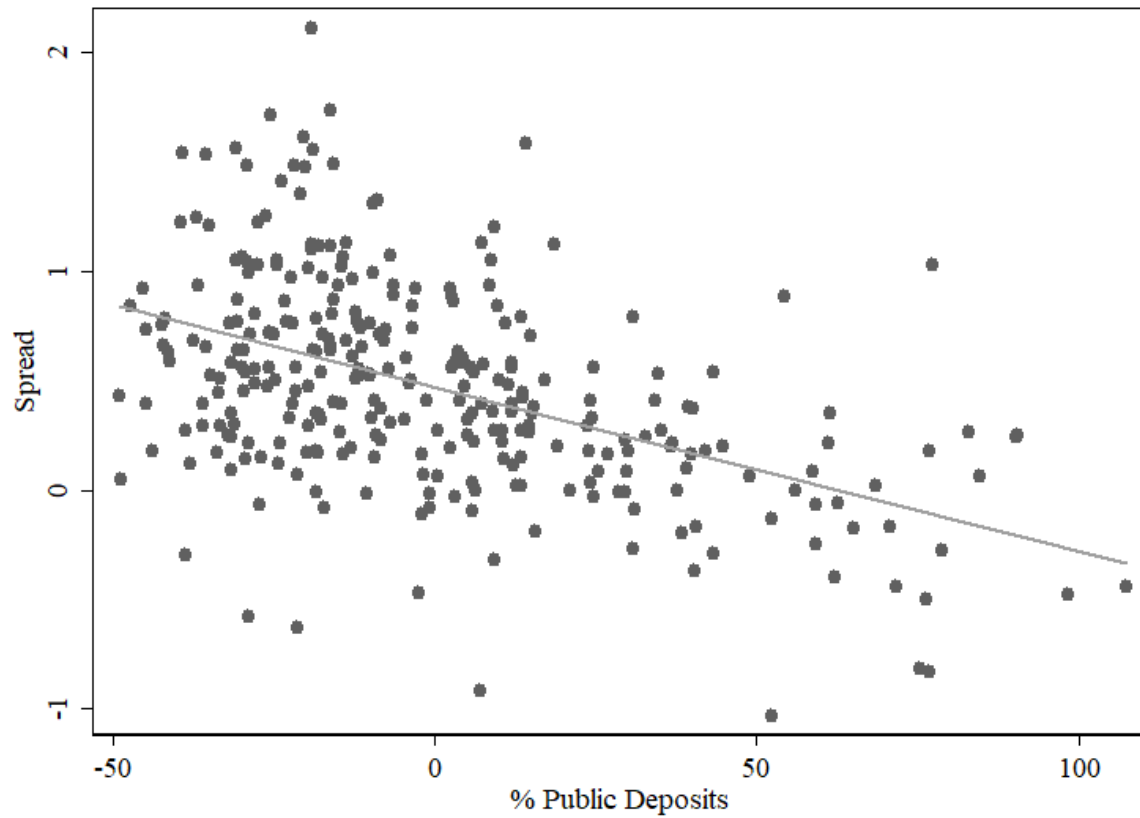
Table A3: Descriptive Variables Econometric Analysis

Principal variables	Obs	mean	Sd	min	Max
Total credit in £, thousands	300	1,260.76	322.47	243	2,027.00
Spread between floating and discount rates, London	300	0.471	0.488	-1.03	2.11
BoE public deposits (% change w.r.t. annual average)	300	0	31.53	-48.99	107.535
Main control variables					
Mark/$ exchange rate	300	4.195	0.013	4.17	4.25
Spread between discount and call money rates, New York	300	1.43	1.197	-1.45	6.75
Spread between Reichsbank and BoE official rates	300	-0.842	0.629	-2.4	1
Trade Union Members Unemployed in UK, % (log)	300	1.34	0.472	0.336	2.425
Additional control variables					
Official discount rate Reichsbank	300	4.255	0.994	3	7.5
Market discount rate in Berlin	300	3.31	1.137	1.26	7.07
Spread between German official and market discount rate	300	0.945	0.422	0.06	2.05
Spread between market discount rate in London and Berlin	300	-0.535	0.803	-2.68	1.52
Total Imports for Great Britain, mln £ (difference)	299	0.111	3.899	-8.61	13.84
Total Exports of Produce and Manufactures for Great Britain, mln £ (difference)	299	0.076	2.178	-7.8	7.4
Total exported bags of coffee from Rio de Janeiro (log) (difference)	299	0	0.349	-1.25	0.995
Pig Iron Output for Germany, '000 metric tons (difference)	299	4.156	45.475	-187.2	223.4
Clearings of Reichsbank for Germany, bln Marks (difference)	299	0.017	0.387	-1.416	1.8
Earnings of Prussian-Hessian Railways from Freight for Germany, mln Marks (difference)	299	0.277	6.654	-17.4	19.6
Weights of Imports for Germany, '000 metric tons (difference)	191	2.791	53.935	-196.67	217.33
Weights of Exports for Germany, '000 metric tons (difference)	191	3.445	45.798	-186	154
Security Price Index for London (difference)	299	0.045	0.813	-4.5	4.3
Milreis/$ exchange rate (difference)	299	0.004	0.236	-1.16	1.25
Price of coffee (log) £ (difference)	299	-0.002	0.045	-0.163	0.181
Price of rubber (log) $ (difference)	299	0	0.071	-0.275	0.298

Table A4: Augmented Dickey - Fuller Test

Variables	Dfuller statistic	p-value	Dfuller statistic (1st difference)	p-value (1st difference)
Total credit authorised in £, thousands	-3.757	0.003		
Spread between floating and discount rates	-2.853	0.051		
Bank of England public deposits (% change w.r.t. annual average)	-7.069	0.000		
Spread between Reichsbank and BoE official rates	-2.825	0.055		
Mark/$ exchange rate	-3.041	0.031		
Spread between discount and call money rates, New York	-4.871	0.000		
Trade Union Members Unemployed in UK, % (log)	-2.961	0.039		
Total Imports for Great Britain, mln £	1.662	0.998	-7.062	0.000
Total Exports of Produce and Manufactures for Great Britain, mln £	0.915	0.993	-4.237	0.001
Total exported bags of coffee from Rio de Janeiro (log)	-2.552	0.103	-7.905	0.000
Pig Iron Output for Germany, '000 metric tons	0.991	0.994	-4.014	0.001
Clearings of Reichsbank for Germany, bln Marks	3.485	1.000	-4.544	0.000
Earnings of Prussian-Hessian Railways from Freight for Germany, mln Marks	2.888	1.000	-6.035	0.000
Weights of Imports for Germany, '000 metric tons	-0.320	0.923	-4.038	0.001
Weights of Exports for Germany, '000 metric tons	1.815	0.998	-4.174	0.001
Security Price Index for London	-1.790	0.385	-3.044	0.031
Milreis/$ exchange rate	-1.568	0.500	-4.679	0.000
Spread between German official and market discount rate	-3.354	0.013		
Spread between market discount rate in London and Berlin	-2.497	0.116		
Official discount rate Reichsbank	-2.857	0.051		
Market discount rate in Berlin	-3.950	0.002		
Price of coffe (log) $	-2.033	0.272296	-3.61005	0.005572
Price of rubber (log) $	-3.30719	0.01456	-3.70994	0.003975

Figure A1: Correlation between spread of the London market and floating rate and the percentage change in public deposits at the BoE, 1889 – 1913.

Acknowledgements