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TESIS DOCTORAL

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1. Introduction

This work studies the nexus of German banking and foreign trade development in the late nineteenth and early twentieth centuries. It is designed and structured as three independent but interrelated articles linked by the study of trade finance in historical perspective. The first article analyzes and compares the role of foreign banks, focusing on geographical banking penetration in the German and British world trade dynamics from 1880 to 1913. The second part investigates how the connection between the German export sector and the first German banks in Argentina influenced the development of German exports to Argentina between 1875 and 1913. The third article provides a micro perspective of trade finance, analyzing how the provision of credit of German banks in Brazil affected the performance of Brazilian coffee export houses between 1880 and 1913.

From the early 1870s Germany experienced a period of accelerated economic growth and expansion. In 1871, political unification was achieved and the German Empire was founded. As a result of an intensive process of industrialization and the development of domestic markets, the German economy was in a position to expand beyond national frontiers. The home market had become too limited to provide the increasing needs of the German population and industries for commodities, raw materials and capital goods. Thus, the exploration of new markets became a necessity (Hurley, 1914, 18, and Forbes, 1978, 384-85). The major global player in foreign trade at that time was Great Britain. Yet, German commerce grew considerably faster, and as Great Britain`s share in world trade gradually diminished, Germany gained in dominance. By the turn of the century, Germany had become Great Britain`s most important competitor in world trade markets (see Table 1 and Figure 1 section 2.4). The principal requirement that was defined as indispensable to guarantee the successful expansion of German foreign trade from a financial perspective was independence from British trade finance (Hauser, 1906). At that time, London was the "clearing house" of international payments and the center of trade finance. German industrial and commercial interests in foreign countries had to rely nearly entirely on the intermediary of English banks (Hauser, 1906, Frankfurter Zeitung, 1915, Einzig, 1931). The solution was seen in creating an independent, global network of German financial institutions; the first German foreign banks (*Auslandsbanken*) (Hauser, 1906, Riesser and Jacobs, 1911, and Young, 1991).

The first article of this work studies the capacity of foreign banks to promote trade by providing financial assistance abroad. It argues that the *Auslandsbanken* were key factors in the dynamics of German trade expansion, and moreover played a more pivotal role in the establishment of external trade than the British banks. The particularity of German foreign banking seems to have been the concentration of activities primarily in those markets where German trade was only marginally developed. This contrasts with the banking dynamics of Great Britain. The qualitative evidence suggests that British banking internationalization in the second half of the nineteenth century was motivated by a ´gravitational pull effect´, emerging from increasing trade and investments in the overseas settlements (Jones, 1993, Battilossi, 2006). Using a novel data set on German and British bilateral trade and foreign banks on a global scale between 1881 and 1913, the first chapter analyzes and compares the development of international commerce and finance of the two nations. Furthermore, using an augmented gravity model of trade, it empirically studies the nexus of German and British world exports and geographic banking penetration. The results suggest a positive and significant correlation between the number of German banks in and exports to a country. In particular, the impact of bank presence seems to be more significant in 1881 than in 1913, affirming the central idea of banks as initiators of trade. In contrast, the results do not confirm such a relation between British foreign bank and export development. With the aim to establish a causal chain between banking internationalization and trade development, I additionally investigate, using a probit regression, the reasons why German banks entered a certain country. The results show that German foreign banks were more likely to position themselves in markets where German exports were only marginally developed in the years previous to bank entry.

One of the principal destinations of German foreign trade in the nineteenth centuries was the emerging economies of Latin America, particularly the three largest, most economically developed and politically stable republics: Argentina, Brazil and Chile. Between 1880 and 1913, German trade with South America grew on average by 9.2 per cent, increasing its share of total German trade from nearly two to almost ten per cent. This accelerated expansion did not only challenge British dominance in these markets, but also outperformed the other leading economies and competitors of Germany. In 1874, the German share in Argentine imports was four per cent, ranking the country fifth among the main Argentine trading partners behind the United Kingdom, France, the USA, and Italy. By the turn of the century, Germany had become Argentina's second most important trading partner following Great Britain (see section 3.4).

The aim of the second article is to identify and analyze the determinants of the success of German exports in comparison with the exports of other leading industrial economies to Argentina between 1875 and 1913. Concretely, it concentrates on the effect of German bank entry. The major hypothesis is that German export companies connected to German banks operating in Argentina benefited from relatively easier access to financial support and privileged information in the Argentine market; in other words, a reduction of transaction costs and information asymmetry. As a result, Germany exported more of those products that were exported by one or more companies connected to the banks. I create a novel dataset containing disaggregated Argentine imports and the connections between German banks in Argentina and German export companies for the period 1875 - 1913. First, I use an augmented gravity model to define the major determinants of exports and the extensive and intensive margins of Argentina's trading partners, and find that Germany's success can be attributed primarily to higher productivity and export intensification, especially when it comes to the export of high skill products. Second, I use a difference-in-difference approach to estimate the effect of German bank entry on German exports to Argentina between 1875 and 1912. The results confirm the initial hypothesis and show a positive and significant impact of German bank presence on exports of the products exported by bank-connected companies.

In 1888, one of the first German overseas banks the *Brasilianische Bank* für Deutschland opened its first branch in Rio de Janeiro. One of the principal purposes of the bank was to engage in the financing of Brazilian coffee exports (Brasilianische Bank für Deutschland, 1912 4). At that time, Brazil was the world`s leading producer and exporter of coffee and Germany was the second most important importer, behind the USA, and the hub for European coffee imports. The demand for credit grew over time as exporters´ ability to assure the availability of trade finance defined their competitiveness and they became increasingly involved in upstream activities such as storage and packing (Krause, 2004 144ff, Rieschbieter, 2011 42ff).

The aim of the third article is to empirically address the questions whether the *Brasilianische's* entry contributed to easing firms' credit constraints in the coffee market, and how its entry affected the export performance of financed coffee export houses. I create an original and unique data set on the yearly quantities of coffee exported and the credit received from the Brasilianische by 389 export houses in Rio and 152 in Santos for the period 1880-1913. The results of a difference-in-difference model confirm the idea that the companies that obtained

the *Brasilianische's* credits performed significantly better than their counterparts. Moreover, the results suggest that companies that received credit more frequently performed better. Preliminary logit analysis testing the influence of companies' heterogeneity on their changes in receiving a credit show that though larger companies were more likely to be supported by the bank, the major focus of the bank's credit policy was on young companies. This provides strong evidence that the *Brasilianische Bank* contributed to ease the credit constraints of new entrants. Most interestingly, the results affirm the idea that the bank channelled credit to export houses of German origin and / or companies exporting to Germany. This, on one hand, suggests that previous to the bank´s entry, German companies had suffered from credit constraints. On the other hand, it confirms the idea of the significant role of the bank in promoting trade between Brazil and Germany.

Contributions

This work contributes to two major literatures. First, it enters the ongoing debate on the nexus between trade and finance, from both, macro- and microeconomic perspectives. Analyzing German and British foreign bank and trade dynamics in the late nineteenth and early twentieth centuries, I contribute to the literature on the determinants of banking internationalization (Buch,1999) and provide quantitative evidence of the relation between foreign banking penetration and export developments. My findings support the idea that the significance of such a relation depends on a country´s market share, suggesting a positive effect of banks on trade in the case of late-comer economies (Germany), whereas such an effect is absent in the case of established economies (Great Britain). Though there are several studies on 19th century German and British banking and trade development (see Hoffmann, 1964, Platt, 1968, Fremdling et at, 1978, Neuburger and Stokes, 1979, Pohl, 1987, Born, 1992, Bulmer-Thomas, 1998, Briones and Villela, 2006), analysis of the foreign banking – export nexus seems to be left beyond the scope of existing research. My analysis provides the first empirical confirmation of contemporaneous qualitative studies, which claimed that German trade expansion was facilitated by German foreign banks (Hauser, 1901, Riesser and Jacobson, 1911, Strasser, 1924).

I widen the perspective by establishing a connection between German foreign banks and the German export sector. Studies on the connection between banks and firms suggest that companies facing liquidity constraints are more likely to enter a close relationship with banks (Mizruchi and Stearns, 1988) and that companies connected to banks benefit from easier access to capital (Mintz and Schwartz, 1985). On the other hand, studies have shown that a close relation between German banks and industrial firms was crucial in the economic development of industrializing Germany (Lough, 1915, Gerschenkron, 1962, Da rin and Hellmann, 2002). Literature on German foreign banking history suggests that this relation was maintained in foreign markets as well, yet fails to provide evidence (Hauser, 1901, Strasser, 1924). This study provides first empirical evidence on the link between export companies and German foreign banks and on the positive effect of this link on German export performance.

From a microeconomic perspective, this study contributes to the strand of literature that focuses on the impact of credit availability on the performance of export companies (see e.g. Chaney, 2005, Minetti & Zhu 2011, Manova, 2008 and 2013, Wang 2015). My findings empirically confirm that foreign bank entry eases credit constraints for exporters and thereby improves their performance. In particular, I show that German banks eased the credit constraints of German companies and companies involved with German trade.

Finally, this work addresses the literature on the determinants of trade developments (e.g. Hummels and Klenow, 2005, Huberman et al, 2015). Emphasizing the competition between the leading economies in an emerging market during the first globalization, I show that the key drivers of export expansion were a country`s relative productivity, its capacity to increase its intensive margins of trade, and the presence of financial institutions.

Limitations

Of course, this work has its limitations. Such limitations, however, pave the way for future research. Firstly, the comparison between late-comers and established economies is based on contrasting the development of German and British foreign bank and trade dynamics. The results however, might not be representative for a larger sample of countries. The research also lacks the data on the banks' heterogeneity. Hence, future research may widen the sample of

countries and include more detailed information on bank characteristics. One useful next step would be to consider the importance of a bank's size.

Another issue is establishing causality between bank presence and trade developments. Though I provide empirical evidence that German foreign banks were more likely to position themselves in markets where German exports were only marginally developed in the years previous to bank entry, the findings could be strengthened by applying an appropriate instrumental variable.

Thirdly, the analysis of the connection between banks and export companies would improve by including the connection between German foreign banks and their mother institutions. I have shown that the foreign banks were closely connected to their mother institutions, much of the time sharing the same management. The mother institutions, in turn, were closely connected to industrial firms in Germany. This indirect connection might have also influenced the export performance of certain industries.

Finally, my analysis on the effect of German bank entry on German exports to Argentina does not include the possible influence of other financial institutions; whether they be local or of a nationality other than German. We cannot totally be sure that companies not connected to banks did not receive any financial and informational support from alternative sources. My approach, however, is justified, as equally bank-connected companies had access to all sources of finance. Hence, the objective of the study is to show the effect of creating privileged access to financial and informational support in the target market. This includes privileged access in comparison to those companies that did not possess such access, as well as to those that did possess the same and alternative sources of finance. The same logic applies to the case of the financing of coffee export houses in Brazil. Future research, however, would benefit from including the information of the financial support from other institutions. A start could be the consideration of British banks.

2. Essay 1: Banks and trade, is there a link? – A comparative, empirical analysis of German and British global foreign banking and trade development, 1881-1913

2.1. Introduction

Having previously completed an intensive process of industrialization, in the late 1870s the now fully developed German economy began to expand beyond national frontiers. Effectively, it had become necessary for German commerce and industry to overcome the limitations of the supply of commodities, raw materials and capital goods afforded by the home market (Hurley, 1911 18, and Forbes, 1978 384-85). The major global player in foreign trade at that time was Great Britain. Yet, since the 1880s Germany had been expanding its foreign commercial relations constantly, challenging British hegemony intensively. In the period between 1881 and 1913, the compound growth rate of German trade was 4.4 per cent, whereas British exports only grew by 2.4 per cent (see Appendix A – Sources). Indeed, by the turn of the century, Germany had become Great Britain`s most important competitor in the world trade markets[1].

The subject of this study is to examine and illustrate the role of German and British banks in the development of German and British trade in the late nineteenth and early twentieth centuries. It argues that the rapid and successful expansion of German trade in the international markets from the 1870s was facilitated by the establishment of the first *Auslandsbanken* (foreign banks), able to meet the informational and financial need of the foreign commerce sector. The particularity of German foreign banking seems to have been the concentration of activities primarily in those markets where German trade was only marginally developed. This contrasts with the banking dynamics of economies that by that time already had established themselves in the international commercial markets, such as Great Britain (see e.g. Hauser, 1906, Whale, 1930). The qualitative evidence suggests that the internationalization of British banking in the 1860s and 1870s was rather motivated by a ´gravitational pull effect´, emerging

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1   As stated by Neuburger et al (1979): "In 1897 the largest exporting country was the United Kingdom (U.S.$1431.9 million) followed closely by the United States (U.S. $1153 million), Germany (U.S. $865.13 million) and then France (U.S. $694.41 million). […] The dominant position of the United Kingdom in exports at the beginning of the period was seriously eroded by the end. Although the United Kingdom still exported more than other countries, it appears that if the prevailing pattern continued, Germany would have overtaken the United Kingdom before long." In Neuburger, Hugh and Stokes, Houstan H. (1979), "The Anglo-German Trade Rivalry, 1887-1913: A Counterfactual Outcome and Its Implications", *Social Science History, Vol. 3, No. 2. (Winter, 1979), pp. 187-201*

from increasing trade and investments in the overseas settlements (Battilossi, 2006 7). Additionally, German foreign banks apparently concentrated their activities more on the establishment of industry and commerce in the long run, whereas the British banks focused on the maximization of investment benefits in the short run. Studies highlight the differences in information and credit policies, denoting that German banks provided the export sector with more detailed information about international market conditions and seemingly granted longer credits (Hurley, 1911, Riesser Jacobs, 1911, Young, 1991).

This study provides new insights and empirical evidence on the link between foreign banking and trade development in the cases of Germany and Great Britain between 1881 and 1913. It creates a new panel data base on (i) the bilateral trade of both Germany and Great Britain with the rest of the world, and (ii) the number and geographical distribution of German and foreign banks abroad for benchmark years between 1881 and 1913. With the purpose of providing the first quantitative approach to defining the direct link between German foreign banking and trade, it then, using an augmented gravity model of trade, tests for a possible correlation between world export developments and geographic banking penetration in the cases of Great Britain and Germany. The model furthermore includes the notion of German banks being initiators of trade, accounting for possible differences in the magnitude of the relation between bank penetration and export growth over time.

The empirical results confirm a positive and significant correlation between the number of German banks in and the respective exports to a country. The impact of bank presence seems to be more significant in 1881 than in 1913, affirming the central idea of banks as initiators of trade. In contrast, the results do not confirm such correlation in the case of British foreign bank and export developments. To overcome the limitation of the gravity model of only predicting correlation, but not illustrating causality, I use a probit regression to test for the determinants of German bank entry between 1881 and 1913. The results indicate that German banks were more likely to establish themselves in markets that showed a high demand for foreign goods but where German trade only had a marginal market share previous to bank entry.

The article is structured as follows. The next section discusses the dynamics of German banking internationalization and trade finance in the late nineteenth and early twentieth centuries. The history of German foreign banks and their role in foreign trade finance is illustrated in section

three. Section four provides a comparison of German and British foreign trade and foreign banking development between 1880 and 1913. The specifications and the results of the econometric analysis, the augmented gravity model of trade, are presented in section five. The final section concludes.

2.2.   Related Literature - German bank internationalization and trade finance

The literature on banking internationalization commonly defines three main triggers of banks going abroad. First, banks follow their clients. By taking advantage of competitive advantages –such as size, reputation, information, customer base, human capital- in comparison to domestic banks, foreign banks are able to support their clients more efficiently (Buch, 1999). Second, foreign markets yield higher profit opportunities than the home market, due to institutional and economic advantages, inter alia taxation, externalities and competition, and additional macroeconomic circumstances such as return on capital, economic growth rates and exchange rate risk. Finally, banks go abroad in order to overcome market failures, caused by information asymmetries, and to reduce transaction costs (Battilossi, 2006).

Studies on German foreign banking in the nineteenth century suggest that the principal purpose of the *Auslandsbanken* (foreign banks) was to (i) conduct German foreign investment and (ii) provide financial and informational assistance for German trade and industries abroad (Hauser, 1906 1ff, Riesser, 1911 420 ff, Hertner, 1991 100ff). However, although, German banks participated to some extend in investment banking in foreign markets (Young, 1991 86-93), the primary motivation for German banks to go abroad was commercial interests (Tilly, 1992 98).[2] Effectively, as a consequence of rapid industrialization it had become necessary for German commerce and industry to overcome the limitations of the supply of commodities, raw materials

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[2]   The principal form of involvement of German banks in capital export was the issuing of foreign government securities in the German markets such as Berlin, Hamburg or Frankfurt (Ahrens, 1938, 53 57, Hertner, 1991 101, and Bersch and Kaminsky, 2008 2-3). The majority of portfolio investment throughout the nineteenth century was directed to European countries, accounting for more than fifty-three per cent of total investments. However, in the 1880s there was a slight shift to the eastern hemisphere, with the nascent railway industries in Russia and China, and the American and Latin continent where in particular government bonds promised high returns (Strasser, 1924 18, Tilly, 1991 92ff). In the case of the latter, the *Deutsche Überseeische Bank*, the *Brasilianische Bank für Deutschland*, and the *Deutsch Südamerikanische Bank* put extra effort into participating in government flotations from the 1880s (Young, 1991 93). The enthusiasm was dampened by political instability and financial crisis in the 1890s, such as the Baring crisis in Argentina, and apart from a small second wave directed to Latin America, from then foreign investment played a relatively minor role in German capital issue (Strasser, 1924 18, Tilly, 1991 92ff).

and capital goods afforded by the home market (Hurley, 1914 18, Lange, 1926 1ff, and Forbes, 1978 384-85).

The positive relationship between the access to finance and trade development has been shown by qualitative and empirical studies alike. Kletzer and Bradhan (1987), for example, highlight the link between the quality of a country´s financial system and the development of sectors and industries that depend on external finance, i.e. the export sector. They show that imperfections in credit markets, such as moral hazard and credit contract enforcement under incomplete information, may define a country`s comparative advantage in international trade markets (see also Contessi and de Nicola, 2012 7). The perspective has been widened by the work of Beck and Bordo and Rousseau showing that trade flows are positively correlated with the size of a country`s banking system (Bordo and Rousseau, 2012 1236-7)[3], and confirming that countries with a higher level of financial development have higher export shares and trade balances (Beck, 2004 1-4)[4]. Turner moreover affirms that the impact of finance on exports is not only defined by the reliance of the sector on external finance, but also on the availability and efficiency of financial intermediaries. He finds a significant positive correlation between geographic bank penetration, in terms of total number of branches, and export volumes (Turner, 2011 269-70 279-80).

Studies on nineteenth century German and British international bank and trade developments contemplate different aspects. Some deal with wider perspectives, illustrating German and British international trade developments (Platt, 1968, Forbes, 1978, Bulmer-Thomas, 2003), the emerging trade rivalry between the two nations (The Standard, 1914, Hoffmann, 1964, Neuburger and Stokes, 1979) and the general characteristics of German and British banking (Riesser and Jacobs, 1911, Born, 1977, Pohl, 1982, Tilly, 1992). Other work analyzes specific details: the influence of German and British foreign banks on the development of local banks (Briones and Villela, 2006), the role of, British banks in fostering investments in emerging markets (Arndt, 1908, Halsey, 1918, Rippey, 1948 and 1959, and Corley, 1994), the possible

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[3]   Trade is measured as the sum of total exports and imports, the size of the banking system is defined as the ratio of broad money to GDP (Bordo and Rousseau, 2012, 1237)

[4]   The indicator of trade in manufactured goods was defined as exports, imports and their difference relative to GDP. Financial development was measured as credit to the private sector by deposit money banks and other financial intermediaries as share of GDP (Beck, 2004, 4).

effects of competition between German and British banks (Young, 1991), and the individual history of selected banks (Joslin, 1963, Pohl, 1987). Empirical analysis of the relation between global bank and trade dynamics comparing the case of Germany and Great Britain is left wanting. This work aims to provide empirical evidence supporting the idea that banking penetration is positively correlated with trade development via the case of the expansion of German banking and trade.

2.3. The German strategy of trade finance - "Los von London"

"The object of the company is the transaction of all sorts of banking business, particularly the fostering and facilitating of commercial relations between Germany, the other European countries, and over-sea markets."
(Denkschrift Deutsche Bank, 1869).[5]

The principal strategy of German banks in fostering the advancement of German trade in the international markets in the late nineteenth and early twentieth centuries was simple and ambitious at the same time: "*Los von London*" (Away from London), or become financially independent from Great Britain. At the time, London was the "clearing house" of international payments and the center of trade finance. German industrial and commercial interests in foreign countries had to rely nearly entirely on the intermediary of English banks (many, but see for example Hauser, 1906 13, Frankfurter Zeitung, 1915).

The financial supremacy of Great Britain derived most importantly from two facts. First, with the Sterling, Great Britain possessed the most stable and internationally accepted currency in the world.[6] Second, London possessed a unique position in the banking world. The old,

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5   Translated from German by author. See also Riesser (1911), p 421, Hauser (1906), pp. 18-19 and Whale (1930), p.16

6   According to Einzig (1931 26ff) the dominance of London can additionally be explained by (i) firstly, the existence of a well-developed money market that included a distinctive call money market -the sterling bill was the principal payment in international trade- a market for short-term loans, and a discount market unrivaled by any other market at this time. Secondly, the British financial market was highly liquid. Great Britain at this time possessed immense resource in the form of external investments representing the accumulation of favorable trade balance. In addition, British government bonds and other securities, considered to be particularly safe, enjoyed high prestige among foreign investors. Thirdly, the high degree of liberalization of the British financial market, being reflected by (i) the easy access of foreign banking to London with no discriminating legal conditions, only with the exception of being part of the clearing house, and no special establishment requirements, (ii) no legal restrictions regarding employment, (iii) nor in dealings in exchanges and international transfer of funds, (iv) and the absolute freedom of the gold market with the Bank of England following strict neutral policy with respect to gold movements. Latter was partly due to the high reserves and constant gold inflows from the British colonies in South Africa. Fourthly, the existence of large wealthy class of investors willing to invest in foreign

established British banking houses were considered to be trustworthy, experienced in international banking and enjoyed a high international reputation. They, moreover, were able to narrow their profit margins considerably in comparison with banks of other nations, as London showed a larger banking turnover than any other financial center at this time (Einzig, 1931 26ff). The advantage of British banks in narrowing their yields significantly is considered as one of the major struggles their German counterparts, and with them foreign trade, faced. One of the consequences was that British discount rates were constantly beneath those offered in Berlin or Hamburg. London was simply the cheaper alternative for German merchants (Hauser, 1906 14-17 and Strasser, 1924 23).[7]

Consequently, given the dominance of the financial intuitions and markets in Great Britain, German banks focused on the creation of their own independent network of financial institutions in international markets; The *Auslandsbanken*[8]. In their aim to support German trade, they applied two approaches. First, (i) to provide German exporters and importers with adequate credit, both in foreign and the home market, and (ii) to foster the establishment of the German *Valuta* (currency) in the international market (various, see for example Riesser, 1911, 420-21, Hurley, 1911 7 19, Whale, 1930 66-67, and Tilly, 1991 106). One of the first

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markets. This might be derived from their historical experience in foreign investments, with the British colonies ever since having been destination of British investments, and their trust in the British financial institution, that inhered the image of following rather risk-adverse investment policies ´

7   In 1904, the bank discount rate offered in Berlin was in twenty-one out of twenty-four cases one per cent higher than the London rates (Hauser, 1906 14-15). Moreover, contemporaneous calculations suggest that the loss of German banks in fees and commissions to their British competitors for handling the German payment transaction accounted until the late 1880s for up to 3.5 Million Marks per year (Hauser, 1906 17 and Strasser, 1924, 23).

8   German banks applied three principal approaches to establish their presence in foreign markets. (i) The extent of their organization to foreign countries, (ii) the establishment of close relations to foreign banking firms, (iii) and the creation of affiliated foreign banks as subsidiary companies; The *Auslandsbanken*. (Barrett, 1930 68-69, see also Strasser, 1924 37ff). The earliest method implemented was to enter into a "sleeping" partnership (*Kommandite*) with a foreign private banking firm, with the principal purpose to strengthen commercial relations with countries already disposing of well-developed financial institutions. It was the leading *Grossbanken* that made the first step to enter into such relations with foreign financial institutions. In 1870, the *Darmstädter Bank* entered into a silent partnership with the *Austrian Dutschko&Co* Bank, based in Vienna (Riesser, 1911 439 987). Already five years earlier the *Deutsche Bank* had established relations with the United States in the form of a commandite with the New Yorker Bank *Knoblauch&Lichtenstein* (Riesser, 1911 987). In addition to the *Kommandite*, German banks and foreign institutions in some cases established partnerships by agreeing on the cooperation on certain matters of common interest, but with each retaining full freedom of action. This so called "community of interest" was especially formed, similar to the *Kommandite*, to gain ground in the financial and commercial centers which afforded little scope for new institutions (Whale, 1930 66-67). Although creating closer relations than that formed by so far existing correspondent networks, the *Kommandite* and the community of interest inhered the risk that the management remained in foreign hands, which again likely defined the support of German interests as their first objective and furthermore tended to hazard the German capital on speculations of their own. Besides, such connections were limited to be formed with partners of relatively minor importance (Whale, 1930, 66, 67). In regions showing less development in financial terms and in maintaining commercial relations with Germany, German banks aspired to obtain more direct and distinctive control and created subsidiary banks (Whale, 1930 68-69).

Auslandsbanken was established in London in 1870, a subsidiary of the *Deutsche Bank.* In the same year the *London and Hanseatic Bank* to be based in London was founded by the *Commerz Bank* together with the *Disconto Gesellschaft*. Soon other European countries followed, such as the Netherlands (*Amsterdamsche Bank*) in 1871 or Italy in 1894 (*Banco Commerciale Italiana)* (Riesser, 1911 433-36 985-87, Forbes, 1978 392-93). Following the initial step of gaining independence from London and ground in neighboring countries, in the late nineteenth century German bank expansion focused more on the emerging periphery than the core European countries, particularly on the Southern American and Asian regions. The first overseas bank with German participation was established in Argentina. In 1872 the *Disconto-Gesellschaft* together with banking institutions founded the *La Plata Bank.* The bank was partially taken over by the *Deutsche Bank* in 1874. Although they succeeded in expanding their operation to Uruguay, the life span of the bank was short. Extensive investments in Uruguayan government bonds in the 1870s led to an even more intensive loss after a regime change in 1874, when the new government in Uruguay refused to honor its debts. The situation was worsened by an intensive depreciation of silver in the late 1870s, diminishing invested capital. Never really recovering in the following years, the *Deutsche Bank* finally managed, with great losses, to liquidate the bank in 1884/5 (Jones, 1991 103, Riesser, 1911 423 433 443, Young, 1991 89, Gall et al, 1995 59).

Soon after this first tentative and unfortunate intent, in the early 1880s a government-run "*Überseeische Reichsbank*" (1881/1884) was launched, with the idea of establishing a single bank responsible for all German oversea banking activities. Besides the idea of the German government of gaining influence in the commercial ventures of German business men and banks, it clearly followed the aim to establish some sort of political influence in foreign countries via the *Auslandsbanken*. However, this idea was met with little enthusiasm amongst private bankers, who in fact ruined the initiative of an *Überseeische Reichsbank* in 1886 (Deutsche Ökonomist, 1884, Young, 1991, 90). Instead, the largest and most important institute, the *Deutsche Bank*, founded in the same year, became one of the most influential *Auslandsbanken*, die *Deutsche Überseeische Bank* (*Geschäftsberichte Deutsche Überseeische Bank, 1886).* In general, the influence and involvement of German politics in foreign banking can be described as rather marginal. The expansion of the German banks in foreign countries

indeed was driven primary by private- and economic reasons (Strasser, 1924 29-30).[9] Literally all the *Auslandsbanken* were founded by one of the *Grossbanken* or in corporation between them in the form of a *Konsortium*. The latter may confirm the idea of historical scholars that one special feature of German banks was their ability to finance risky and capital-intensive ventures by corporation (Foxwell, 1917). This dynamic apparently was not limited to the operations within Germany, but also applied to German banking activities abroad. In 1886 the *Deutsche Überseeische Bank* was founded by the *Deutsche Bank*, focusing on the Latin American market. Only one year later the *Brasilianische Bank für Deutschland* followed, founded as a co-venture between the *Norddeutsche Bank* and the *Diskonto-Gesellschaft*. Subsequently, German banking expanded to the Asian continent. In the mid-1880s, German industry and with it the German *Grossbanken* focused more and more on Asian markets. The German railway companies aimed to establish new business in China. In 1889, the already previously discussed *Deutsch-Asiatische Bank* was created. In the early-twentieth century Germany started to expand its presence in Africa. In 1905 the *Deutsche Afrika Bank* was founded, concentrating its activities on the Empire´s colonies, such as Namibia and Tanzania. In 1905, the *Deutsche Orientbank* followed, operating mainly in the Far East and competing directly with the British in Egypt, especially in becoming one of the principal financiers of the cotton sector (see Schwanitz 2002) (Riesser, 1911 443 446). Table 13 in the Appendix A provides an overview of the German *Auslandsbanken* and their mother institutions founded between 1869 and 1913.

Recent work suggests that German banks failed in breaking the dominance of the sterling or London bills as the key currency and access to cheap credit. Nevertheless, they were successful in converting the German Mark into an international currency. Not being able to challenge the

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9   A minor exception and and an example of the intent of the German government to maintain some counterbalance to the private *Grossbanken*, was the *Seehandlungsgesellschaft* (Maritime Trade Association), later called the Prussian State Bank. Founded in 1772 by Frederick II as a Joint-stock Company with the primary purpose of fostering commerce, with special privileges to trade transmarine salt, and finance state expenditures, it passed under the control of the Prussian Ministry of Finance in 1848 (Wirth, 1896 11, and Stiftung Seehandlung - Historie). The most famous example may be its involvement in the foundation of the *Deutsch-Asiatische Bank*. Internal struggles among the leading Grossbanken, mainly the growing competition among the two largest institutions - the *Deutsche Bank and the Diskonto-Gesellschaft* - impeded the foundation of the China bank created by a Bank Konsortium. It was the *Seehandlungsgesellschaft* that finally intervened and subscribed the capital of the new China Bank. Founded in 1889 it was named the *Deutsch-Asiatische Bank* (Hertner, 1999 107-109). Besides the involvement of the *Seehandlungsgesellschaft*, it was also the *Deutsche Bank*, the *Darmstädter Bank*, the *Diskonto-Gesellschaft*, the *Berliner Handelsgesellschaft*, the *A Schaafhausen´scher Bankverein*, the *Nationalbank für Deutschland* and the *Dresdner Bank* that participated in its foundation.

British pound, it became a "key currency" and possible alternative that enjoyed increasing utilization in some European countries, such as Sweden, Italy or Austria-Hungary, and in Asia and South America that were the focus of German foreign banking activities (Tilly, 1992 108-109). The credit policies, however, of the German banks and their *Auslandsbanken* is commonly defined in literature as the preeminent feature of their successful financing of foreign trade. The *Auslandsbanken* were known to grant comparatively longer credits then their competing counterparts from Great Britain or any other nation at that time. German banks discounted bills of exchange up to 240 days on credit (Strasser, 1924 22, see also Whale, 1930 87, and Young, 1991 86) and it was common practice that German banks paid German exporters up to seventy per cent of the total value of their delivery before the actual arrival of the same (Hauser, 1906 5). They moreover granted *Kreditbriefe* (direct letters of credit) that permitted the exporter to receive the payment at the moment of arrival of the shipping and paying documents (*Konossement*), but before the actual arrival of the delivery. The *Kreditbrief* was emitted by the *Auslandsbank* and send to its mother institution based in Germany. At the time the *Konossement* arrived at the *Auslandsbank* in the country of destination of the exports, the German exporter was paid the full amount by the German mother institution (Hauser, 1906 5). Most interestingly, German banks seemed to act as some sort of "buyer of last resort" for German exporters. In case of non-payment by the overseas importer, German banks granted an "*Akkzeptkredit*" ("reimbursement" credit) to the German exporter with an amount up to 74% of the invoice. Furthermore, they received and stored the shipment and administrated further sales (Hauser, 1906 6, Riesser, 1911 246-428). Some studies even argue that the involvement of the German banks in supporting the establishment of industrial companies abroad exceeded the pure financing as they provided the German home market with information on foreign trade and investment opportunities and eventually even took initiatives in the foundation of foreign business ventures themselves (Strasser, 1924 27-28, Tilly, 1992). They thus served as some sort of ´pioneer´ for German industry in foreign markets. They aimed to win new trade markets, contrasting the objectives of the banks of other nations, such as Great Britain, of accommodating already existing trade (Hurely, 1914 18). This argumentation is most interesting, as it paves a certain kind of causality between the development of German foreign trade and banking. At the same time, it somehow contradicts the literature on banking internationalization, assuming that banks tend to follow their clients, in a chronological sense, and not vice versa (Buch, 1999).

2.4. German and British foreign banks and world trade

The aim of this section is to empirically analyze and compare German and British foreign trade and banking development in the late nineteenth and early twentieth century. For this purpose, I create a new panel dataset on German and British global bilateral trade and number of banks, including their branches. The data on trade includes observations for the periods from 1880 to 1884, 1898 to 1902, and 1909 to 1913. The number of countries presented in the data set varies over time in accordance with the official trade statistics, with 66 countries for the years 1880-1884, 92 for the years 1898-1902, and 102 for the years 1909-1913. The bank data cover the years 1881, 1900, and 1913, for the same number of countries as trade in the respective years. The sources for the data are presented in Appendix A – Sources.

Figure 1: German and British exports and imports (in Mio USD) - 1880-84, 1898-1902, 1909-1913
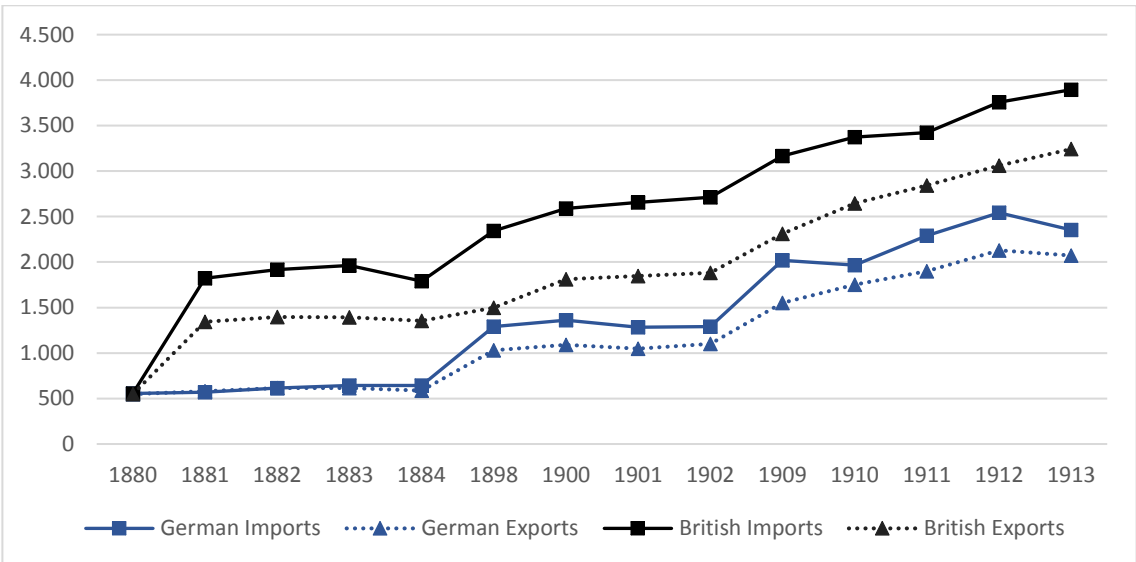
Source: See Appendix A - Sources

The British were the dominant force in international trade markets when Germany started to intensify its foreign trade in the 1880s, and continued to dominate during the entire period of investigation. In 1880, German foreign commerce accounted for a total value of 1.104 million USD. British trade, with 3.366 million USD, valued more than three times as much (see Tables 18 and 21 Appendix A). However, having reached a relatively high level of maturity, British trade grew far less impressively than German trade. Between 1880 and 1913 German trade grew at a rate of 4.33 per cent, British trade merely at 2.35 per cent. Especially in the period

between 1880 and 1884, Germany managed to catch up, showing an annual growth rate above 3.67 per cent in the first four years of the 1880s, while British trade in contrast slowed down, showing even a reduction in growth in the same period (see Table 1 below and Tables 20 and 23 in Appendix A). By 1913, Germany had reduced the gap with Great Britain considerably, with British total exports and imports accounting for 7.136 million USD, and German trade for 4.424 million USD (sources see Appendix A – Sources).

Table 1: German and British trade by continent - Growth rates (%) – 1880-1900, 1900-1913, 1880-1913

1880-1900	*Germany*	*Great Britain*
Africa	*11.23*	*3.69*
America Central	*15.34*	*-2.49*
America North	*7.33*	*1.18*
America South	*11.37*	*2.81*
Asia	*10.05*	*0.22*
Australia	*15.62*	*0.36*
Europe	*2.91*	*1.53*
Oceania	*12.12*	*83.99*
Total	*4.20*	*1.41*

1900-1913		
Africa	10.92	5.54
America Central	5.06	5.79
America North	4.79	1.95
America South	8.01	7.47
Asia	8.38	6.39
Australia	6.61	3.93
Europe	3.87	3.26
Oceania	109.35	5.05
Total	*4.92*	*4.03*

1880-1913		
Africa	*10.76*	*4.27*
America Central	*11.01*	*0.69*
America North	*6.15*	*1.43*
America South	*9.76*	*4.47*
Asia	*9.11*	*2.53*
Australia	*11.75*	*1.69*
Europe	*3.18*	*2.14*
Oceania	*48.20*	*51.76*
Total	*4.34*	*2.35*

Source: See Appendix A - Sources

The major part of German foreign commerce was directed to the European core countries, with Great Britain, Austria-Hungary and France as its main trading partners. Figures 2 and 3 illustrate the geographical distribution of German and British trade in the world in 1881 and 1913 (see also Tables 19 and 22 in Appendix A). Likewise, British trade was concentrated in Europe, but to a far less extent. In 1880, German and British trade with Europe accounted for more than 87 per cent and a little more than 41 per cent of total trade, respectively. At the time Germany intensified its external commercial relations, British foreign commerce was already more regionally diversified and present in international trade markets. Besides Europe, British trade concentrated on the prospering peripheral countries in the western and eastern hemisphere. In 1880, trade between Great Britain and the American countries made up for more than 31 per cent and with Asia for more than 15.5 per cent of total trade. They are followed by Australia and the African colonies, responsible for 5.05 per cent and 6.39 per cent of total trade, respectively. Yet, the global distribution of British foreign commerce remained relatively stable during the entire period of investigation. In 1913, British trade with Europe still accounted for about 31 per cent of total trade, followed by America with 27.64 per cent and Asia with 16.48 per cent.

By the turn of the century, Germany began to expand its market shares, especially in South America and Asia, showing comparatively higher growth rates than British trade in these regions. As shown in Table 1, between 1880 and 1913 German trade with South America increased by 9.76 per cent and with Asia by 9.11 per cent. British trade, on the other hand, grew by 2.5 and 1.6, respectively. Interestingly, while German trade with America constantly gained in importance and share relative to total trade, Great Britain eventually lost ground. In 1880, German trade with America accounted for 9.75 per cent of total trade and for 24.76 per cent in 1913. Trade with South American countries such as Argentina, Brazil and Chile gained constantly in importance. Similarly, trade with Asia, in particular China, increased from 1.86 per cent of total trade in 1880 to 9.75 per cent in 1913. Trade with Europe diminished to a little bit more than 60 per cent of total trade in 1913.[10]

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10   The impressive growth rates of Oceania, mainly New Zealand and Australia, were the results of an increase from an initially, nearly non-existent to a yet rather marginal trade between Germany and these countries (for growth rates see also Table 19 and 22 in Appendix A). In 1913, trade with Oceania accounted for 0.11 per cent and trade with Australia for a little more than 2.2 per cent of total German foreign trade.

Figure 2: British trade by continent – Share on total trade (%) – 1881 and 1913
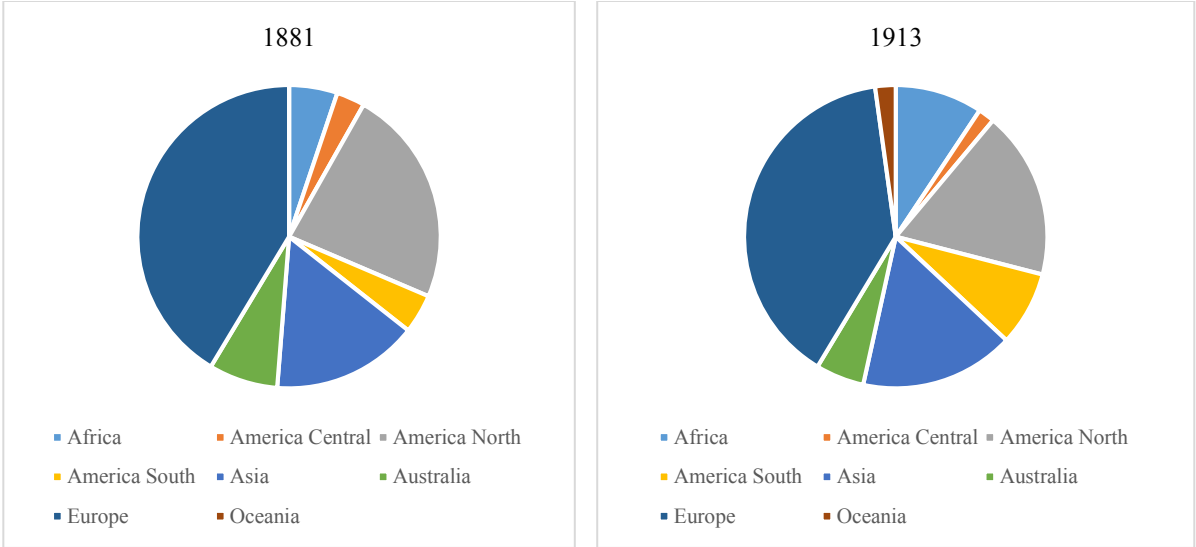
Sources: See Appendix A – Sources

Figure 3: German trade by continent – Share on total trade (%) – 1881 and 1913
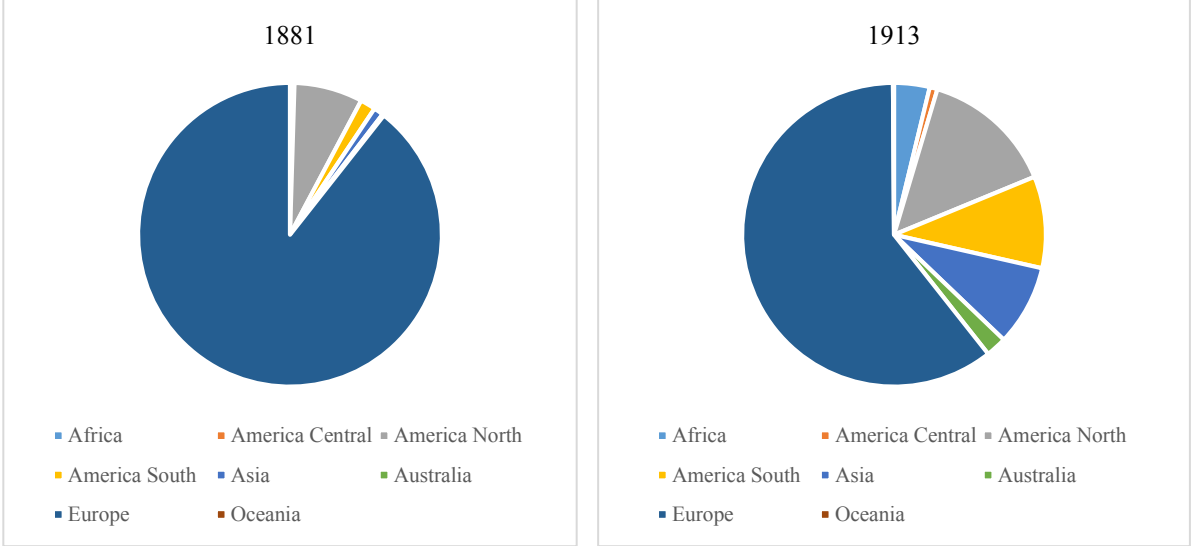
Sources: See Appendix A – Sources

The financial supremacy of Great Britain was equally striking. In 1881, a total number of nineteen German banks with 21 branches were operating in twelve different countries. In the same year 137 British banks with more than 450 branches were operating in forty-eight countries (see Table 24 and 25 in Appendix A). Figures 4 and 5 show the geographical distribution of German and British banks in the world in 1881 and 1913. Similar to trade, British foreign banking was comparatively more diversified than German foreign banking, with a focus on the emerging economies of America and Asia, followed by Australia and the African colonies. Between 1881 and 1913, the percentage of banks operating in America in relation to the total number of banks rose slightly from 15.4 per cent to 19 per cent and in Africa and Asia from 14.5 to 18.7 per cent and 27.7 to 29.9 per cent, respectively. In Australia, the share in total number of banks remained more or less the same, and in Europe even, although only marginally, decreased. Remarkably, British banks expanded their subsidiary network constantly and notably, especially in those countries of the Commonwealth that had adopted the "Scottish" free banking model, such as Canada, New Zealand and Australia. In the latter for example, the total number of branches rose from 148 in 1881 to an impressive 602 in 1913.

Yet, at the same time Germany managed to create its own network of overseas banking that stood in direct competition with the British banks. It seems that particularly in those markets where German trade initially was only marginally developed, especially in the emerging economies of Latin America, Germany was able to successfully penetrate the financial markets and establish a competitive banking network. This reflects the idea of German banks being promoters of trade and contrasts with the British foreign banking dynamic. The primary purpose of the latter was to broaden already existing trade and engage in the increasing investment opportunities in the prospering peripheral markets and British colonies. Until the second half of the nineteenth century, British trade and its financing were managed by the merchant houses, maintaining offices in England and abroad. With British trade and investment accelerating intensively from the 1860s[11], Banks became indispensable to managing the increasing amount of financial transactions (Hurley, 1911 14ff).[12] Following the premise "Los von London" and

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11   However, British banks already expanded their activities to foreign countries in the 1820s. Founded in 1809 in London, the Nathan Mayer Rotschild (NMR) started its operations in Brazil from independence in 1822. Initially concentrating on merchant banking activities, the NMR became the exclusive financial agent of the Brazilian government in London in 1855. They managed every Brazilian Government fund and every purchase of the Brazilian government in England, as well as the payment of the dividends of Brazilian debt in London (Marichal and Triner, 2001, 261-262).

12   Besides being better suited to managing the increasing capital movements, British banks also released the merchant houses from the necessity to maintain expensive representation abroad, and thus, enabled smaller firms to enter into foreign

the aim to establish financial representation in the immediate neighboring countries, the initial focus of German foreign banks was Great Britain and the other European core countries. However, over the 30-year period there was a significant shift in the geographical distribution of the German banks, showing similar patterns as German foreign banking. While in 1881 more than 84 per cent of all German banks and their branches were located in Europe, by 1913 this figure decreased to 45 per cent as the interest of German banks moved outside of Europe. The remaining 56 per cent were concentrated mainly - 72% of the non-European share – in South and Central America and Asia.

In 1913, a total number of 74 German banks were operating with 235 branches in 53 different countries. Still, Great Britain possessed nearly more than twice as many foreign banks, 127, with 1251 branches in 72 countries. Yet, Germany caught up in establishing banks outside of Europe, in particular in the Latin American countries that at the same time were the focus of German foreign trade. Between 1862 and 1886 a total number of ten British banks were founded while Germany only established one that was liquidated in 1885. By the end of 1913, fourteen German[13] and eighteen British Banks were operating in Latin America (see Table 24 and 25 in Appendix A).

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trade business. Moreover, prevailing conditions in their home country triggered British banks to go abroad in the 1860s. In 1857-58, the British parliament passed two company acts that extended the privilege of incorporation with limited liability to banks, leading to a boom of joint-stock bank foundations, with many of them aiming for foreign markets (Hurley, 1911, 14, Young, 1991, 82-85, and Briones and Villela, 2006, 334).

13   For the purpose of correctness; these included eight different institutions, accounting for fourteen banks in the different countries in Latin America.

Figure 4: Geographical distribution of British foreign banks (% of total) – 1881 and 1913
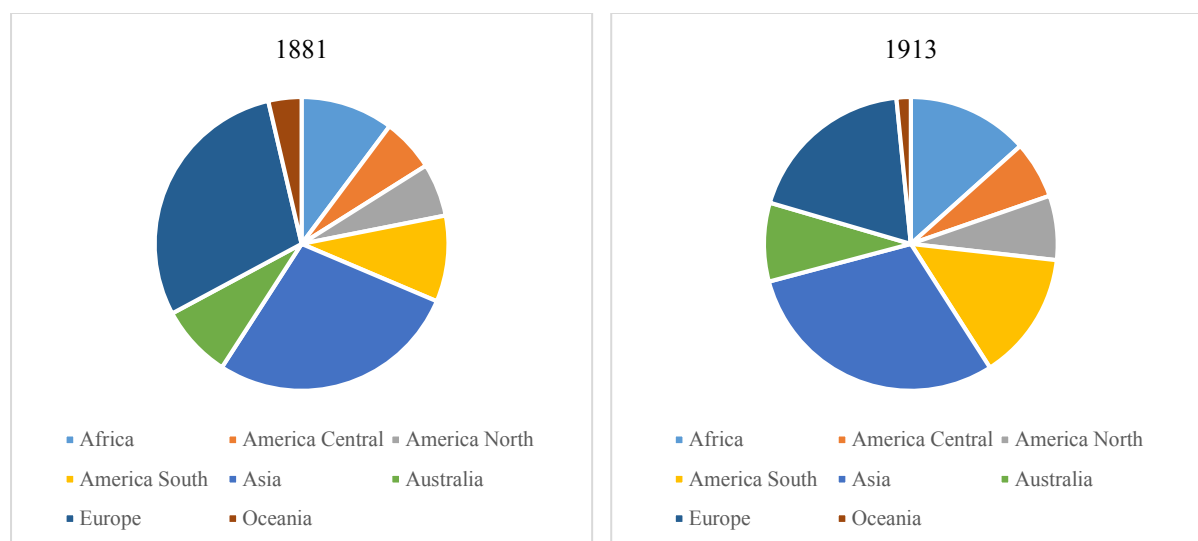
Sources: See Appendix A – Sources

Figure 5: Geographical distribution of German foreign banks (% of total) – 1881 and 1913
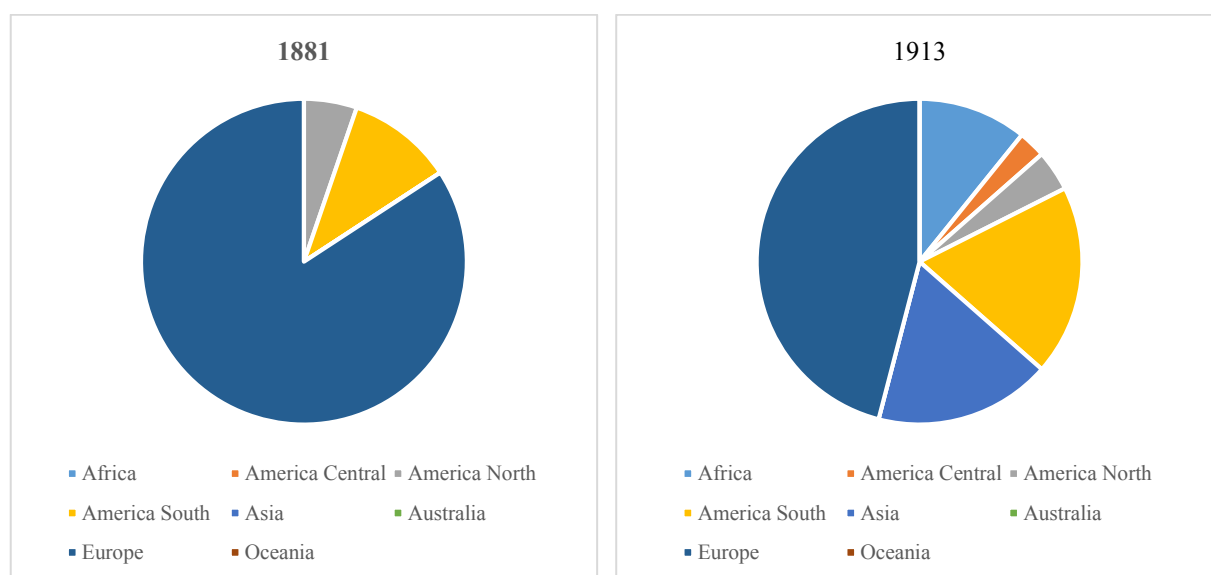
Sources: See Appendix A – Sources

2.5. Banks and trade – Is there a link?

Using an augmented gravity model, based on the theoretical assumptions of Head and Mayer (2013), this part investigates and compares the nexus of German and British world export development and geographic banking penetration between 1881 and 1913. It tests for three principal hypotheses: (i) Germany exports relatively more to those countries where German banks are present than to the countries where they are not; (ii) German banks initiate trade, hence exports increase with bank entrance into the market; (iii) The same or a similar relation between British banks and exports does not exist. Expressed in the form of an equation, the model is designed as follows:

(1.1 - OLS)

$$LnX_{ijt} = \beta_0 + \beta_1 ln(Y_{it} + Y_{jt}) + \beta_2 lnD_{ij} + \beta_3 B_{ijt} + \beta_4 ComLang_{ij} + \beta_5 SharedBord_{ij} + \beta_6 LandLock_{ij} + \beta_7 ColLink_{ijt} + \beta_8 GS_{ijt} + \beta_{it} + \beta_{jt} + \varepsilon_{ij}$$

(1.2 - PPML)

$$X_{ijt} = \beta_0 + \beta_1 ln(Y_{it} + Y_{jt}) + \beta_2 lnD_{ij} + \beta_3 B_{ijt} + \beta_4 ComLang_{ij} + \beta_5 SharedBord_{ij} + \beta_6 LandLock_{ij} + \beta_7 ColLink_{ijt} + \beta_8 GS_{ijt} + \beta_{it} + \beta_{jt} + \varepsilon_{ij}$$

Where X_{ijt} is the nominal value of exports from i to j in t, β_0 is a constant, Y_{it} and Y_{jt} are the nominal national incomes of each country (GDP) in t, and D_{ij} is the great circle distance between the capital cities of i and j in kilometers. B_{ijt} is a numeric variable, representing the number of banks of country i present in country j at the time t. Cultural barriers and natural borders are taken into account as forces of resistance additional to distance, as they are expected to influence trade and communication. $ComLang_{ij}$ and $SharedBord_{ij}$ are binary variables which are unity if i and j have a common language or share a land border, respectively. The variable $LandLock_{ij}$ takes the value of one in the event of j being a landlocked country, and zero in the opposite case. The colonial links between i and j are expressed in the binary variable $ColLink_{ijt}$, equally becoming unity in case of j being a colony of i. The dummy variable GS considers the adherence of i and j to the Gold Standard, as it assumingly eases capital flows, and hence has a positive effect on bilateral trade relations. For this study, the key coefficient of interest is β_3, which shows the impact of banks on exports. The estimated model also includes time-variant country fixed effects for each exporter and importer country (β_{it} and β_{jt}) (Head and Mayer, 2013, based on Anderson & Wincoop, 2003). εij is an error term, representing the myriad other

influences on exports. Technically, panel data is used to estimate equation 1.1 and 1.2 with ordinary least squares (OLS) and Poisson-maximum likelihood (PPML) alternatively.[14] Two models are defined: (i) the `standard` model that includes the explaining variables real GDP, distance, banks, land lock, shared borders and common language, and (ii) the ´advanced´ model, which adds the variables colonial link and Gold Standard. Furthermore, each model differentiates between the overall effects of bank presence and the specific effect of banks in each year.

The results of the OLS and PPML estimations are presented in Table 2 (OLS) and Table 3 (PPML). They reflect the general theoretical assumptions for gravity models and confirm the main hypothesis of this paper. While economic size has a positive impact on export volumes, higher distance leads to less trade. The coefficients for shared borders and colonial link are always positive and significant. Speaking the same language likewise has a positive impact on exports, and though the coefficient lacks significance in the ´advanced´ OLS model, it is significant at the 1 per cent level in the ´advanced´ PPML model, which has the advantage of including zero values and hence more observations. The fact whether or not countries are landlocked does not seem to have any significant influence on export flows and neither does the adherence to the Gold Standard, although the coefficient of the latter shows consistently positive values. The key hypothesis of this paper seems to be affirmed; German banks matter, British banks do not. The results, for each OLS and PPML ´standard´ and ´advanced´ model, show an overall significant and positive correlation between the number of banks operating in a country and the respective German exports to that country. In the case of British banks and exports, such a correlation cannot be confirmed. Most interestingly, German banks and exports seem to be more significantly and positively correlated in 1881 than in the following years. This encourages the second central idea of banks being initiators of trade. The effects are also qualitatively large. The contemporaneous effect of banks on exports in 1881 is 0.402, implying that the level of exports increases by 49 per cent (since 1-e $^{0.402}$ = 0.495)[15] with each additional bank. In 1900 and 1913 the effect is still considerable, though an increase in banks by one unit

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14   Santos Silva and Tenreyro (2006), "Log," have shown that LS estimates of log-linear models (like equations 1 and 2) are likely inefficient, biased, and/or even inconsistent. They proposed PPML with robust standard errors as a superior alternative. Additionally, PPML allows for including "0" observations in the dependent variable, which have to be excluded or treated improperly under log-linear OLS estimates (Lampe, 2009).

15   See Wooldrige, Jeffrey (2002), "Introductory Econometrics: A Modern Approach", Itps Thomson Learning; 2nd Revised edition

resulted in the comparatively lower increase of 15.5 and 8.5 per cent in exports (since $1-e^{0.144}$ = 0.144 and $1-e^{0.082}$ = 0.0802), respectively.[16]

Table 2: Estimates of Equation 1.1 – German and British banks and exports – OLS

	´Standard´ Model		´Advanced´ Model	
	(1.1.a)	(1.1.b)	(1.1c)	(1.1d)
lnGDP	1.094*	1.079+	1.177*	1.245*
lnD	-0.792***	-0.782**	-0.836***	-0.811***
B-Ger	0.356***		0.321***	
B-GB	0.037		0.04	
LandLock	0.719	0.291	1.374	1.055
SharedBord	1.124***	1.047***	1.308***	1.212***
ComLang	0.743**	0.699**	0.18	0.127
B-Ger_1881		0.532***		0.566***
B-Ger_1900		0.506**		0.391*
B-Ger_1913		0.273**		0.235**
B-GB_1881		0.015		0.031
B-GB_1900		0.069		0.069
B-GB_1913		0.093		0.085
ColLink			1.279***	1.316***
GS			0.446	0.525
Exp Time (βit)	Yes	Yes	Yes	Yes
Imp Time (βjt)	Yes	Yes	Yes	Yes
Method of est.	OLS	OLS	OLS	OLS
N obs.	251	251	251	251

*** 0.001 ** 0.01 * 0.05 + 0.1

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16   Numbers and calculations based on the estimates of the ´Advanced´ ppml model – Table 3, columns (2.1c) and (2.1d).

Table 3: Estimates of Equation 1.2 – German and British banks and exports – PPML

	´Standard´ Model		´Advanced´ Model	
	(2.1.a)	(2.1.b)	(2.1c)	(2.1d)
lnGDP	1.066***	1.205***	0.980***	1.248***
lnD	-1.617***	-1.493***	-1.669***	-1.446***
B-Ger	0.136***		0.130**	
B-GB	-0.003		0.001	
LandLock	-0.584	-0.778	-0.458	-0.227
SharedBord	1.126*	1.058*	1.357***	1.264***
ComLang	1.835***	1.858***	1.062**	1.011**
B-Ger_1881		0.387***		0.402***
B-Ger_1900		0.147*		0.144*
B-Ger_1913		0.093*		0.082+
B-GB_1881		0.027		0.031
B-GB_1900		-0.026		-0.02
B-GB_1913		0.024		0.029
ColLink			1.232***	1.379***
GS			0.563	0.603
Exp Time (βit)	Yes	Yes	Yes	Yes
Imp Time (βjt)	Yes	Yes	Yes	Yes
Method of est.	PPML	PPML	PPML	PPML
N obs.	340	340	340	340

*** 0.001 ** 0.01 * 0.05 + 0.1

Yet, this study suffers from the traditional disadvantage of a possible inconsistent parameter estimation due to endogenous regressors. In other words, although disclosing clear tendencies, it is limited in its capacity to provide axiomatic empirical information on what comes first, banks or trade. An attempt has been made to remedy this problem by including time effects, as well as importer and exporter fixed-effects varying over time. The preferable approach from a theoretical and empirical perspective would be the inclusion of an instrumental variable, accounting for the establishment of banks not driven by trade developments. The identification and definition of such an instrument remains an unsolved challenge. However, there are some indicators that provide first quantitative evidence on the reasons why German banks entered a

certain country, establishing a certain causal chain between banking internationalization and trade development. The assumption is that German banks first entered into markets that in years previous to the bank entry showed (i) a comparatively high demand for foreign products, (ii) a constant increase in demand, (iii), and in which German exports so far only showed a marginal market share. Using a probit estimation I test for the influence of these three determinants on the geographical distribution of German foreign banks between 1881 and 1913. In the form of an equation, this is expressed as follows:

$$\text{BGer}_{ct} = \beta_0 + \beta_1 \text{LnImp}_{ct=b} + \beta_2 \text{LnGrowth}_{ct=b} + \beta_3 \text{LnShare}_{ct=b} + \varepsilon_{ct}$$

(1.3)

Where BGer_{ct} is a dummy variable that represents the presence (value=1) or absence (value=0) of German banks in country c in the years from 1881 to 1913. β_0 is a constant. The variables Imp_{ct} and Growth_{ct} are the average of the nominal value of imports and the annual average growth rate of imports of country c in the years from 1860 to 1870 (t=b). They consider the two assumptions that German banks established themselves in economies that showed a high and growing demand for foreign goods previous to the bank entry. The first German foreign bank was the *Deutsche Bank* in London, founded in 1870. The importance of German exports in a certain market is captured by Share_{ct} that is the average share (per cent) of imports from Germany on the total imports of country c between 1860 and 1870, and ε_{ct} is an error term. C are all countries (59) that Germany exported to between 1881 and 1913, based on the data on German exports by country used in the augmented gravity model. The number of observations is limited according to the available data on trade (56). The information on the share of German imports is particularly scarce.[17] The remaining 32 countries, however, represent around 65 per cent of the German export markets between 1881 and 1913[18].

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17 The data for the average, and the annual average growth rate of imports have been extracted from: Federico Giovanni and Antonio Tena-Junguito (2016) "World trade, 1800-1938: a new data-set" *EHES Working paper n.93*. http://www.ehes.org/EHES_93.pdf. With special thanks to Antonio Tena Junguito for providing the data. The information on the shares of Germany of imports have been obtained from: Dedinger, Béatrice, et Paul Girard. (2017) "Exploring trade globalization in the long run: The RICardo project" *Historical Methods: A Journal of Quantitative and Interdisciplinary History 50 (1): 30-48*. For some countries, the import data is not available for the whole period between 1860 and 1870. In this case, the share of imports from Germany of total imports has been calculated from the available years.

18 Their average share of total German exports in 1881 was 67 per cent, in 1901 59 per cent, and in 1913 71 per cent (see Appendix A – Sources)

The results of the probit estimation are presented in Table 4. The coefficients – columns (1.3a) and (1.3b) - indicate whether or not an independent variable had a significant positive or negative effect on the probability that a German bank established itself in a country. [19] The marginal effects – columns (1.3c) and (1.3d) - quantify the effect. The coefficient for the average nominal value of imports shows a positive, significant influence, indicating that German foreign banks were more likely to position themselves in markets with a high demand for foreign goods in the years previous to the bank entry. If a market grew comparatively more than others seems to have had no effect. The coefficient for the share of imports from Germany is significantly negative, supporting the idea that the decision of German banks to establish themselves in a certain country was driven by the relative importance of German commerce in the country. Banks established themselves in those markets where German exports were only marginally developed. Eventually, the German share in the market was even more important than the actual size of the market. A one-unit change in the imports of a country increased the probability of the establishment of a German bank in that country by 25 per cent. In the case of the market share, a one-unit increase would diminish the probability for German bank entry by 231 per cent.

Table 4: Estimates of Equation 1.3 – Determinants of German bank entry - Probit and Marginal effects

	(1.3a)	(1.3b)	(1.3c)	(1.3d)
Imports (LnImp)	0.382***	0.945***	0.134***	0.250***
	(0.1368)	(0.2446)	(0.0392)	(0.0359)
Import growth (LnGrowth)	5.835	1.274	2.039	0.337
	(3.896)	(8.428)	(1.304)	(2.229)
Share Germany (LnShare)		-8.747**		-2.315***
		(3.591)		(0.803)
Observations	56	32	56	32
Pseudo R2	0.1115	0.3096	-	-
Method of est.	Probit	Probit	Probit- Marginal	Probit- Marginal

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

Note: The marginal effects are the average marginal effects based on the Delta-method. Robust Standard errors are indicated in brackets.

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19   Probability that the dependent variable takes the value one.

2.6.   Concluding remarks

The aim of this study has been to investigate the role of German and British foreign banks in the development of German and British foreign trade in the late nineteenth and early twentieth centuries, following the principal hypothesis that banks promoted international trade by providing financial and informational assistance abroad.

Therefore, I created a novel data set on German and British foreign banks and world trade in the years between 1881 and 1913. Using an augmented gravity model of trade, I investigate the relation between the geographical banking distribution and export developments of the two countries. The results confirm a significant and positive correlation between German banks and trade; Germany exported more to countries where German banks were present. Such correlation could not be confirmed in the case of British foreign banks and trade. Most interestingly, German banks and exports seem to be more significantly and higher correlated in the 1880s, the years of establishment of the first German foreign banks, than in the following years. With the aim to establish a causal chain between banking internationalization and trade development, this study additionally investigated, using a probit regression, the reasons why German banks entered a certain country. The results show that German foreign banks were more likely to position themselves in markets where German exports were only marginally developed in the years previous to bank entry.

This study contributes to the literature on trade finance, providing quantitative evidence on a positive relation between foreign bank penetration and export developments. Moreover, the findings not only lend empirical support to the literature on German foreign banking during the period of the First Globalization, but also to the study of the role of finance in the development of foreign trade of a "latecomer" in comparison to an economy already established in the international markets. Qualitative studies affirm that the primary purpose of the *Auslandsbanken* was to provide financial assistance to trade in those markets where German foreign commerce was underrepresented. They hence acted as promoters of trade. In contrast, the primary purpose of British foreign banks was to broaden already existing trade and engage in the increasing investment opportunities in the prospering peripheral markets and British colonies. This finds support by the fact that I only find a positive correlation between foreign banking penetration and export developments in the case of Germany and that this effect was

initially more significant. The idea of the *Auslandsbanken* being initiators of trade is moreover reinforced by the empirical evidence affirming that German banking focused on markets with a comparatively low German export share.

Future research on one hand should concentrate on including additional information on German and British foreign banks going beyond the aspect of pure banking presence, such as for example bank size, age etc. On the other hand, it would be useful to identify and include an instrumental variable, which explains the internationalization of German banks independent from German export developments, in future econometric work.

3. Essay 2: Trade finance and the importance of knowing a bank - Determining the success of the German trade expansion in nineteenth century Argentina, 1875-1912

3.1. Introduction

By the end of the nineteenth century, the rising economies of the so-called second industrial revolution, and particularly Germany, began to intensively challenge British dominance in manufacturing productivity and its leadership in international trade markets. The emerging economies of Latin America were one of the principal destinations of both German and British foreign trade at that time, with focus on the three largest, most economically developed and politically stable republics: Argentina, Brazil and Chile. Yet, German trade with these countries grew significantly faster than British trade.[20] In 1874, the German share of Argentinian imports was four per cent, ranking fifth among the main Argentine trading partners behind the United Kingdom, France, the USA, and Italy. By the turn of the century, Germany had become Argentina's second most important trade partner following Great Britain (see Figure 6 and Appendix B – Sources).

This article studies the effect of German bank entry in Argentina on the development of German exports to Argentina between 1875 and 1912. The major hypothesis is that German export companies connected to German banks operating in Argentina benefited from relatively easier access to financial support and privileged information in the Argentine market; in other words, a reduction of transaction costs and information asymmetry. Consequently, Germany exported more of those products that were exported by one or more companies connected to the banks - bank-connected exports- after their entry.

Therefore, I create two novel data sets. The first set includes Argentine imports by product for all Argentina's trading partners for five benchmark years between 1875 and 1912.[21] I

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20   Between 1880 and 1913, German trade with South America grew on average by 9.8 per cent. British trade by 4.5 per cent. In 1881, trade with South America accounted for nearly two per cent of total German foreign trade, in 1913 for almost ten per cent. In case of Great Britain, it accounted in the same years for 4 and 8 per cent respectively (see Appendix B - Sources).

21   The use of Argentinian import statistics instead of the individual export statistics of each trading country with Argentina has two major advantages. First, it allows to control for effects of demand and possible variations in it. Second, it assures the comparability between countries, as the information is homogenous and covers all the Argentinian trading

differentiate between imports of high skill intensity products – mostly second industrial revolution manufactures- and low skill intensity products – mostly textiles – to discuss and compare the market entry strategies of the new and old industrial powers. The second data set contains the connection between the two German foreign banks established in Argentina between 1875 and 1913 – the *Deutsche Überseeische* and the *Deutsche Südamerikanische Bank* – and German export companies. The connection is measured as Interlocking Directorates; that is the number of representatives a bank had on a company's supervisory board. To identify the effect of bank entry, I then classify the German exports by products exported by companies linked and not linked to the banks.

I first empirically examine and compare the determinants of the exports and the extensive/ intensive trade margin of Argentina's trading partners between 1875 and 1912, using an Augmented Gravity Model of trade based on a Poisson Maximum Likelihood (PPML) approach. Seen from the supply side, I test for the influence of the relative productivity and the size of the economy of the exporting countries. On the demand side, I focus on trade costs in the form of geographical distance, the absence of freight costs, and tariff frictions – measured as product specific tariffs and the presence of financial institutions of the exporting countries in Argentina to account for the presumable influence of finance. I additionally differentiate between the effect of the explaining variables on the exports of each class of products, High-, and Low-skill manufactures. At the second stage, I use a difference-in-difference model, measuring the effect of bank entry on the German bank-connected exports.

The results show that although Great Britain dominated the Argentine market, and France and Belgium also enjoyed some privileges there, at the turn of the century Germany and the US were particularly successful in intensifying and expanding their (high skill) manufacture exports in that market. The success of the newly emerging industrial countries, especially Germany, seems to be explained by a higher degree of productivity and an increased intensification of exports. This is especially evident in the case of high skill products, as I find a significant and stronger influence of the explaining variables when looking at exports from the high skill sector. Finally, the results confirm the idea that German companies that maintained a special network with German foreign banks in Argentina benefited from their

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partners.

privileged financial support, as I find a positive and significant effect of the German bank entry on bank-connected exports.

The paper is structured as follows. The next section discusses the literature on trade finance, with an emphasis on the history of German foreign banking. Section three presents the data. Sections four and five describe and analyze the performance of German exports to Argentina in comparison to its main competitors and the connection between German banks in Argentina and the German export industry. The specifications and the results of the econometric analysis, the augmented gravity model of trade and the difference in difference model, are presented in sections six and seven. The final section offers some concluding remarks.

3.2.   Related Literature - German banks and export companies

"German banking does not stand aloof as ours (British) does…The men who direct the German banks are all the time in close touch with the […] industries […]. With them finance, industry and transportation go hand in hand, and are regarded as integral parts of the same problem…The German banker has its finger in everything that is going on. He is presented directly or indirectly on the boards of the manufacturing, trading, shipping, and mining companies."
(Foxwell, 1917).[22]

The literature on German foreign banking suggests that the driving force behind the internationalization of German banks in the 1880s were the German *Grossbanken*[23] (great banks). One of the primary concerns of the latter was to support their important clients in the

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22   In Foxwell, 1917, p. 513, based on a statement of W.R. Lawson

23   The term *Grossbanken* has been subject to several interpretations. The *Deutsche* and the *Dresdner Bank*, together with the created *Discontogesellschaft* and *Darmstädter Bank* (*für Handel und Industrie*) created in 1851 and 1853 are often referred to as the "*Vier D-Banken*". Commonly, the concept *Grossbanken* describes the nine, in terms of capital and branches, largest German banks of the second half of the nineteenth and early twentieth centuries: *A. Schaafhausen`scher Bankenverein (1848), Discontogesellschaft (1851), Darmstädter Bank (1853), Berliner Handelsgesellschaft (1856), Mitteldeutsche Creditbank (1856), Deutsche Bank (1870), Commerz Bank (1870), Dresdner Bank (1872)*, and the *Nationalbank für Deutschland (1881)* (among others, Riesser, 1911 and Whale, 1930).

In addition, the *Grossbanken* are quite frequently referred to as the Joint-stock companies, Kreditbanken, mixed banks or universal banks (Sylla, 1991 51). However, these denominations distinguish the legal composition and the type of these banks, rather than their actual importance in the German economy at this time. Perhaps one of the most commonly used name in the literature besides Grossbanken is the term Universal banks. For a straight forward definition of the term Universal bank see George J. Benston (1994), p. 121

German industry in their effort to expand in foreign markets. And they did so effectively by establishing the first *Auslandsbanken* that provided financial and informational assistance abroad. A decisive factor in this dynamic was the unique connection between the *Grossbanken* and the German industrial sector. The close link between banks and industry was the result of a simultaneous process of industrial and banking concentration. With Germany's general economic ambitions shifting in the 1870s from industrial catch up to the development of foreign commercial markets, German industry and banks entered an intensive process of concentration. Based on the idea that competitive advantage in international markets is achieved by production on a large scale, the focus was on creating big concerns (*Konzerne*) that soon dominated the industrial sector. This process was accompanied by the consolidation of the German banking system and the creation of new large financial institutions able to satisfy the increasing financial needs of the industrial sector; the German *Grossbanken* (Hauser, 1906 1-5, Lough, 1915 44, Ahrens, 1938 53, Hertner, 1991 100ff, Tilly, 1992 90-9). This unique bank-industry nexus occurred in three principal forms: (i) the extension of current account privileges to firms, (ii) banks holding securities of firms, and (iii) the assignment of bank officials on the *Aufsichstrat* (directory or supervisory board) of firms; the so-called Interlocking Directorates[24].

The existence of interlocking directorates (ID) is commonly defined as the most important and powerful nexus between bank and industry, as it, besides inhering voting rights, enabled banks to access internal information about the management and working processes of the firms, and furthermore acted as a mutual commitment mechanism between the organizations (Fohlin, 1995 4-5). The literature explaining the emergence and function of interlocks have focused on different aspects. Analyzing interlock relationship among US banks and firms in the 1960's, Mintz and Schwartz (1985) show that one of the primary motives of bank positioning in companies` boards was to gain valuable information about industry conditions and investment opportunities. The companies, on the other hand, profited from participating in the banks decisions about capital allocation. Along this line, Meeusenn and Cuyvers (1985) affirm a positive relation between financial interlocking and profitability. Questioning the causality between profitability and interlocking, Thompson and McEwen (1959) stress the view that companies tend to name the representatives of banks members of the supervisory board to

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24   A straight forward definition of Interlocking directorates is given by Mizruchi, "An interlocking directorate occurs when a person affiliated with one organization sits on the board of directors of another organization." (Mizruchi, M., 1996, p. 271)

which they are highly indebted, and Mizruchi and Stearns (1988) find that unprofitable firms a more likely to interlock. Consequently and consistent with the idea that interlocking appears with decreasing profitability, other studies highlight the aspect of monitoring, suggesting that interlocking is an instrument of corporate control (Mizruchi, 1982).[25]

The literature on interlocking directorates in pre-World War I Germany focuses on how the relation between banks and industry influenced the allocation of capital in the process of industrialization. Analyzing the rate of expansion and magnitude of capital mobilized together with the direct involvement of the universal banks in equity ownership of industrial firms, Fohlin and Temin (1998) do not find that universal banks were more efficient in accumulating and ultimately channeling capital to growth enhancing industries in comparison to other German banking types or even in comparison to British banks (see also Fohlin 2006). Equally, studying the liquidity sensitivity of investment in Germany between 1903 and 1913 as a measure of financial constraints, Fohlin (1998)[26] does not find that related banking promoted investment or produced large effects on companies' liquidity sensitivity. On the other hand, studies on the finance growth nexus commonly suggest that this bank industry link was crucial in the process of German industrialization, as it gave initiative to the banks to concentrate and channel capital towards the leading German industrial companies.[27] Besides their ability to allocate large amounts of capital, moreover, numerous studies stress the extraordinary perpetuity between German banks and their clients. Analyzing the development of networks

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25   For a very good overview and discussion on the evolvment and function of interlocks see Mizruchi, Mark (1996), „What Do Interlocks Do? An Analysis, Critique, and Assessment of Research on Interlocking Directorates", *Annual Rev. Sociol. No.22, pp. 271 - 98*

26   A condensed form of the here discussed publications of C. Fohlin on the history of German banks, their relation with industrial companies and their role in the economic development of nineteenth century Germany are provided in the form of a book, published in 2007, „*Finance Capitalism and Germany´s Rise to Industrial Power*", Cambridge University Press

27   Pre-World War I Germany is certainly one of the most intensely studied cases of the finance-growth-nexus in economic history (Burhop, 2006 40). Classic studies on German banking history by Riesser (1911), Lough (1915), Whale (1930), Gerschenkron (1962), Cameron (1967, 1972) highlight the importance of banks in the crucial process of capital accumulation and the channeling towards industry in Germany`s initial phase of industrialization. This view has been highly debated. Some scholars argue that industrialization itself rather depends on retained profit independently from banks (Sylla, 1991) and German industry actually tended to rely more on internal finance than on external finance provided by the banks (Edwards and Oglivie, 1996). Benston (1995) and Fohlin (1999) affirm bank-led growth, but stress the point to not only relate the performance of the German industrial sector to the *Grossbanken*, but the overall financial system and other types of banks. Others even find that banks actually restrained growth by missallocating capital in favor of "heavy industry" (Neuburger and Stokes, 1974). In contrast, other recent studies are more in line with the classical scholars. Burhop (2006) e.g. finds only weak evience of a positive bank growth nexus on a nation-wide level, yet affirms bank led-growth of the modern sector of the German economy during industrialization. Following the principals of the ´new growth theory´, assuming that coordination failures in investment may inhibit economies to reach multiple equilibria in their growth, Da Rin and Hellmann (2002) argue that universal banks were a crucial factor in initiating the process of industrialization in Germany because they took the lead in the coordination of investments.

between German banks and industrial firms in the nineteenth and twentieth centuries, Hopner et al affirm that German banks accompanied companies "from the cradle to the grave" (Hopner et al, 2004 342). On one hand, this implied the capacity of German banks to finance business ventures in the long-run (Hurley, 1911, Foxwell, 1917, Fohlin, 1998, and Lehman and Neuberger, 2001). On the other hand, in theory, it improved a company's access to external finance by reducing transaction and information costs (i.e. Edwards and Ogilvie, 1996, Agarwal and Elston, 2001, and Fear and Kobrak, 2010).

Yet, research that examines the importance of such a link in the development of German foreign banks and trade seems absent. At the same time, recent studies confirm a positive link between export trends and access to credit for export firms. Minetti and Zhu (2011), for example, show that credit limitations restrain exports considerably and that companies with few and only short-established relationships with creditors especially suffer from those negative effects. Berman and Héricourt utilize a cross country firm-level analysis in nine different countries to study the impact of financial constraints on firms' export decisions and the amount exported by firms. Their results affirm a positive relation between credit access, productivity and exports. While productivity increases the amount of exports possible, credit access defines a firm's actual capacity to enter the export market (Bergman and Héricourt, 2012, 206-209).

In the vein of this literature, this article analyses the impact of German bank entry in a market on the development of German exports to that market. Following the idea that the link between banks and industry prevailing in nineteenth century Germany equally existed between the *Auslandsbanken* and the German export sector, it examines if industries that maintained a close relation to *Auslandsbanken* exported more, as they especially benefited from the banks´ financial and informational support abroad.

3.3. The Data

I construct two novel data sets. The sources for both are presented in the Appendix B - Sources. The first data set contains Argentine imports (value in pesos de Oro) by product and country for the years 1875, 1885, 1895, 1901, and 1912, and was extracted from the original official trade statistics. It also includes the specific tariff imposed on each product. The number of products and countries per year and their classification presented in the official statistics change over time.[28] Thus, to ensure the homogeneity and comparability of the classification of products over time I re-classified the imports, using the classification of exported manufactures from the United Kingdom in 1905 as presented in the British Parliamentary Papers (LXXXIV, p. 352-353). This uniformed and standardized classification for manufactured exports defines the principal classes of goods according to their comparative importance in terms of their export value in the year 1905. I expanded the original British classification by adding the following commodity groups: Food, Tobacco, Beverages, Mineral and Stones, Wood, Crystal & Ceramic Manufactures, and Other Articles. My resulting classification consists of 25 main commodity groups with various sub-groups, forming a total number of 217 different products. Each product is assigned a specific commodity group that is consistent over time. I then assign each commodity group a specific value of "skill intensity", distinguishing between; High-Skill products (HS), Mid-Skill products (MS), Low-Skill products (LS), and primary products (PP). The skill intensity of a commodity group is defined by the relative wages in the sector that produces the commodities of the respective group (see Tena-Junguito, 2010)[29.] This classification follows the principal idea of differentiating between the imports of second and first industrial revolution products. The Low-skill class consists of manufactures that typically dominated international trade during the first industrial revolution, such as textiles of all sorts (wool, linen, cotton etc.). The HS-class, on the other hand, represent the products that defined

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[28] In 1875, Argentina imported a total of 167 different products from 17 different countries. In 1885, 346 products from 18 countries, in 1895 464 products from 15 countries, in 1901 691 products from 15 countries and in 1912 1145 products from 32 countries respectively. In 1875 products are organized and presented in alphabetical order. In the years 1885, 1895, 1901 and 1912 products are organized by commodity groups. However, the number and character of commodity groups change from each year. Also, in some cases, specific products are assigned to different commodity groups in different years.

[29] For the estimation of skill intensity and its relative ranking we applied the classification developed by Tena-Junguito (2010, pp. 122-125). He assembled 26 industrial products from 32 countries in 1875 in 16 different industrial sectors and estimated the relative skill intensity of these 16 sectors based on (i) the general structure of USA industrial wages in 1890 using the wage distribution for male production workers in 12 manufacturing industrial sectors in Iowa offered by Claudia Goldin and Frank Katz (1999, appendix table 1, p.46), and (ii) the information on wage distribution in the textile sector (cotton, wool, hemp, jute and silk) in 1885 in Spain, Barcelona, included in Scheuch (1885).

trade during the second industrial revolution, such as machinery, especially electrical machinery, and iron and steel manufactures. The MS-class includes apparel and alkali products. Food, beverages, tobacco, and raw products are grouped in the PP class. Table 32 in Appendix B shows the classification of commodity groups, their relative "skill-intensity" and the high, mid and low skill cut off.

The second data set introduces the connection between German banks and export companies. The connection is measured as the number of representatives a bank has on a company´s supervisory board. I differentiate between two types of connection; (i) The first one I define as direct connection, which is the representation of the *Auslandsbanken* operating in Argentina from 1887 to 1913 in German export companies. (ii) The second one is the representation of the mother institutions of the *Auslandsbanken* in German export companies. I refer to this as indirect connection. The information contains the character (chairman, vice-chairman, and member) and number of representatives from the directorate (*Vorstand),* including observations on 371 indirect and 117 direct connections. In the case of the *Auslandsbanken*, I differentiate between (i) the total number of their representation (ii) and their representation in exporting companies. Such connection between the *Auslandsbanken* and German companies was possible, as both, the directorate (*Vorstand*) of the banks and the supervisory boards (*Aufsichtsrat*) of the companies were situated in Germany. The data have been obtained from two different sources. (i) The names of the members of the directorate of both banks are taken from the official annual reports of the banks, consolidated in the *Historische Institut der Deutschen Bank.* (ii) The representation of the bank supervisory members in German industries are extracted from the *Adressbuch Deutscher Exportfirmen*, 1897, and the *Handbuch deutscher Aktiengesellschaften*, 1913/14. These two Almanacs provide detailed information on all German joint stock companies, including the members of the supervisory board. This permits one to identify the representation of the members of the directorate of each bank in the supervisory board of German companies. The *Adressbuch deutscher Exportfirmen,* furthermore, gives information on which types of products each company mainly produced and exported. A company hence has been assigned as an exporting company in each class of products in the case it was defined as such in the *Adressbuch*. In the case that the company was founded after 1897, and thus does not appear in the *Addressbuch*, it has been defined as an exporting company if it was one of the one-hundred largest German companies, following the assumption that larger firms are more likely to export. For the assignment and ranking of the companies according to their size, I use the information on the Top 100 largest German

companies in 1907, measured in terms of number of employees, provided by *Martin Fiedler and Howard Gospel* (2010). The German export companies with banking representation are than classified by industry according to the Standard Industrial Classification (SIC-1968), and by the type of products they export according to my classification of HS, MS, LS and PP products.

Finally, for the empirical analysis of the effect of German bank entry on German exports, I combine the information on imports and the interlocking data. I classify each of the 217 products exported by Germany in each year according to whether it was exported by at least one of the export companies that were connected with at least one of the two *Auslandsbanken* operating in Argentina between 1887 and 1913 or not. For ease of reference, I henceforth refer to products exported by connected companies as bank-connected exports. I assume that the bank connection didn't alter over the period of investigation. The data for 1913 is used. This creates a homogenous treatment group over time. A change in the treatment group eventually could bias the effect of the treatment, as changes in exports of the treated group may be the simple result of a change in the number and/or character of the exporting companies linked to banks rather than the effect of the treatment. Yet, the data show that even if the interlocking directorates are subject to change over time, this only marginally influences the composition of products exported by the companies linked to the banks.

3.4. The advancement of German trade in Argentina – Exports, margins, and competitors

Argentina emerged as one of the most promising markets in the last decades before World War I. In 1861, the victory of centralist forces and the reunification of the country finally ended the series of civil wars and revolts, and once the costly Paraguayan War was over, Argentina's development accelerated. The massive European immigration – mainly Italian and Spanish -, urbanization, colonization of the inner country, rapid progress in agriculture and foreign trade, and partial industrialization all combined to augment the economy and society. The population more than quadrupled between 1870 and 1912 from 1.8 million to some 7.3 million (Bulmer-Thomas, 2003, 412), and the economy followed suit. Between 1870 and 1914, Argentina experienced rapid economic growth, which changed to a real boom in the 1880s. "From 1880

to 1913, Argentina had an average growth rate of 5% p.a. in output, or about half that in terms of per capita. Argentina's income per capita had risen from 67% of developed-country levels in 1870, to 90% in 1900, and 100% in 1913." (Della Paolera, 2003 3). The massive growth of the 1880s was interrupted by the equally massive crisis of 1890, when a crash of Argentina's financial system spread panic to the European financial markets. Around the third quarter of the 19th century, most income estimations situate Argentine living standards in a better position than most of the Latin American countries, however, still closer to the European periphery than to the rich European or new settler countries (Australia, New Zealand and the United States). By the early 20th century Argentina had become a member of the exclusive club of the top ten richest countries in the world[30].

As Figure 6 shows, between 1875 and 1914 on average 77 per cent of Argentine imports came from Europe, with clear dominance of the United Kingdom (around 35 per cent). Yet, German and US products constantly gained in share as their exports grew significantly faster, in particular by the turn of the century. Between 1890 and 1914, the annual average growth rate of British, German and US exports was 2, 5, and 6 per cent, respectively. Consequently, while Germany started with a 4 per cent share in 1874, by the beginning of the 20th century it had become the second biggest exporter to Argentina, slightly overtaking the US with a 15 per cent share. More than 60 per cent of Argentine imports were manufactures, almost half of which were products from the HS sector (see Figure 7a). Even though the Baring crisis temporarily diminished the share of the latter, at the same time it presented opportunities for other countries to gain market share and challenge the dominance of Britain. Taking the chance, Germany nearly doubled its share in HS imports from 12 per cent in 1885 to 21 per cent in 1895 (the British share declined from 57.63 to 38.02 per cent) and thereby established its relative importance in the Argentine market (See Figure 7b).

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30   Based on GDP data according to Bolt, J. and J.L van Zanden (2013)

Figure 6: Argentine imports by country – Share of each country on total imports (%) - 1875-1914
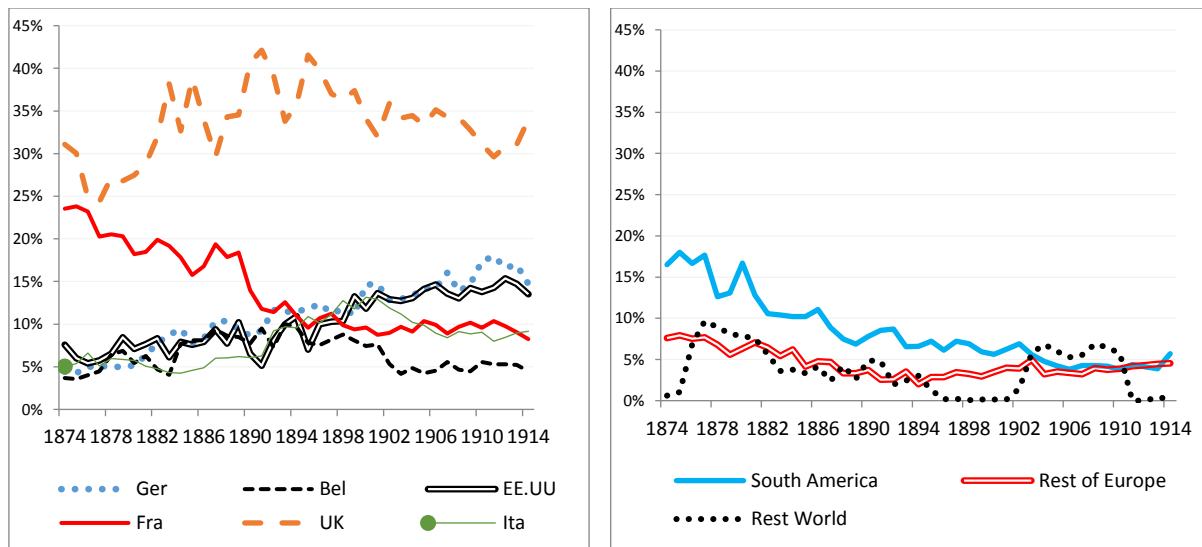
Sources: See Appendix B - Sources

Figure 7: Argentine imports by skill class - Share of each class on total imports (%) - and HS imports of main trade partners – Share per country (%) on total HS imports – 1875, 1885, 1895, 1901, and 1912
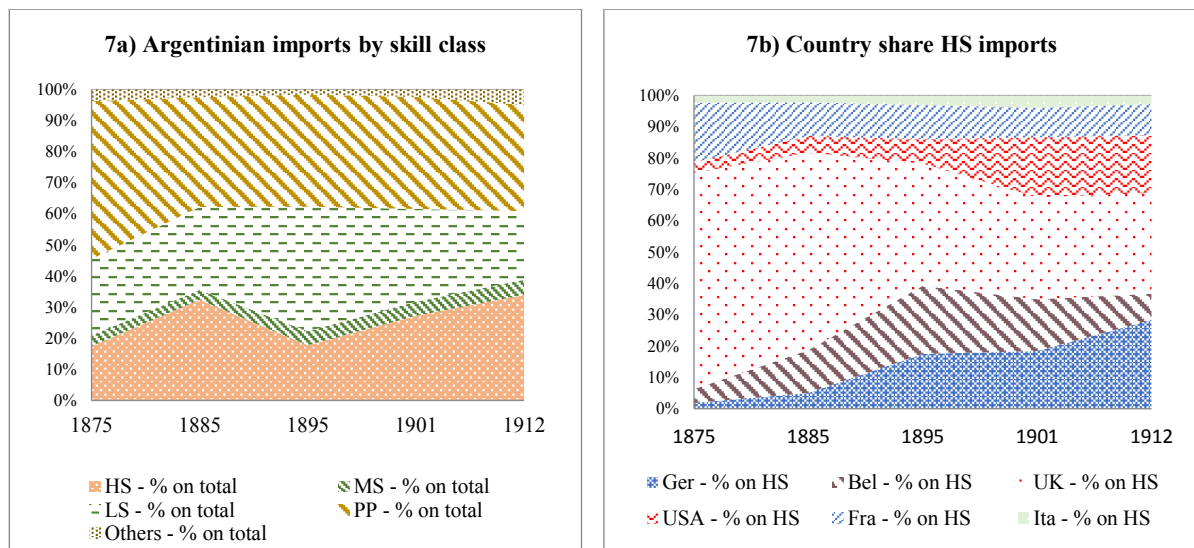
Sources: See Appendix B - Sources

What explains this success of German exports? Did Germany export larger quantities of each product (the intensive margin), or a wider set of goods (the extensive margin) in comparison to other countries exporting to Argentina? I calculate the extensive and intensive margin of exports following Hummels and Klenow (2005 710ff). In the form of an equation the extensive margin is expressed as:

$$\text{EMc}= \frac{\sum_{i \in I_c} x_{ri}}{\sum_{i \in I} x_{ri}}$$

Where x is the nominal value of imports and I_c is the set of observable categories (products) in which Argentina has positive imports from country c, with $x_{ci} > 0$. Argentina has positive imports from reference country r in all I categories (products). In this model r is defined as all other countries from which Argentina imported but country c. EMc equals the Argentine imports from country r in all I_c relative to the imports from country r in all I categories (products). The extensive margin hence can be understood as a weighted count of the categories (products) from country c relative to the categories from all other countries r. An advantage of this approach is that it prevents that a certain category (product) appears to be important just because country c and no other country exports a lot of this category (product) to Argentina[31]. The corresponding intensive margin is defined as:

$$\text{IMc}= \frac{\sum_{i \in I_c} x_{ri}}{\sum_{i \in I_c} x_{ri}}$$

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31   The following example illustrates the idea. In 1912, German exports to Argentina were 1.97 times larger than Italian exports (intensive margin, value of exports). This confirms the theory that larger economies tend to export more. However, part of this advantage may have derived from exporting a greater number of products (extensive margin) - Germany exported 88.38 per cent of the 1145 products, Italy 62.45 per cent. If all products were of equal importance, the extensive margin of Germany would be 1.42 times larger than Italy´s. This difference may derive from the fact that Germany was the sole exporter of certain products that in total exports to Argentina were of marginal importance. Yet, when including the weight count according to Hummels and Klenow, it becomes clear that Germany exported products that are a larger share of the rest-of-the-world exports to Argentina (the numerator in the EMc equation). The extensive margin of Germany is 1.45 times greater than Italy´s, and its intensive margin is 1.53 times larger.

With IMc equaling the nominal Argentine imports from country c relative to the nominal imports from all other countries r in those categories in which Argentina imports from country c (Ic).

Figure 8 shows the extensive (8a) and intensive (8b) margins of imports from Argentina´s main trading partners. The respective margins of HS and LS products are depicted in Figures 9 and 10. Figure 8a shows a slight but constant increase in the degree of diversification of imports from all six countries, with the exception of Italy. Yet, the changes are rather small. The extensive margin of Germany increased only slightly from 0.87 in 1875 to 0.93 in 1912. Similar, British margins increased from 0.84 to 0.92 respectively. The same dynamics exist in the imports of HS and LS products (9a and 10a). Eventually, the competition between the leading exporters took place in the intensification of exports, in particular of HS goods. Figure 3b illustrates that Great Britain always exported more than any other country, but from the Baring crisis in the 1890s its intensive margins constantly decreased, while German and US margins show the opposite trend. It appears that the financial distress caused a constant decrease in the intensive margins of HS products in general and of British margins in particular (9b). While the British seemed to substitute their loss with an intensification of LS exports (10b), Germany caught up in the HS sector. In 1875, the intensive margins of British HS imports exceeded those of Germany by an impressive 104 times. In 1912, the advantage had shrunk to British margins being only 1.2 times higher than German margins.

Figure 8: Imports Top 6 trade partners – Extensive and intensive margin – 1875, 1885, 1895, 1901, and 1912
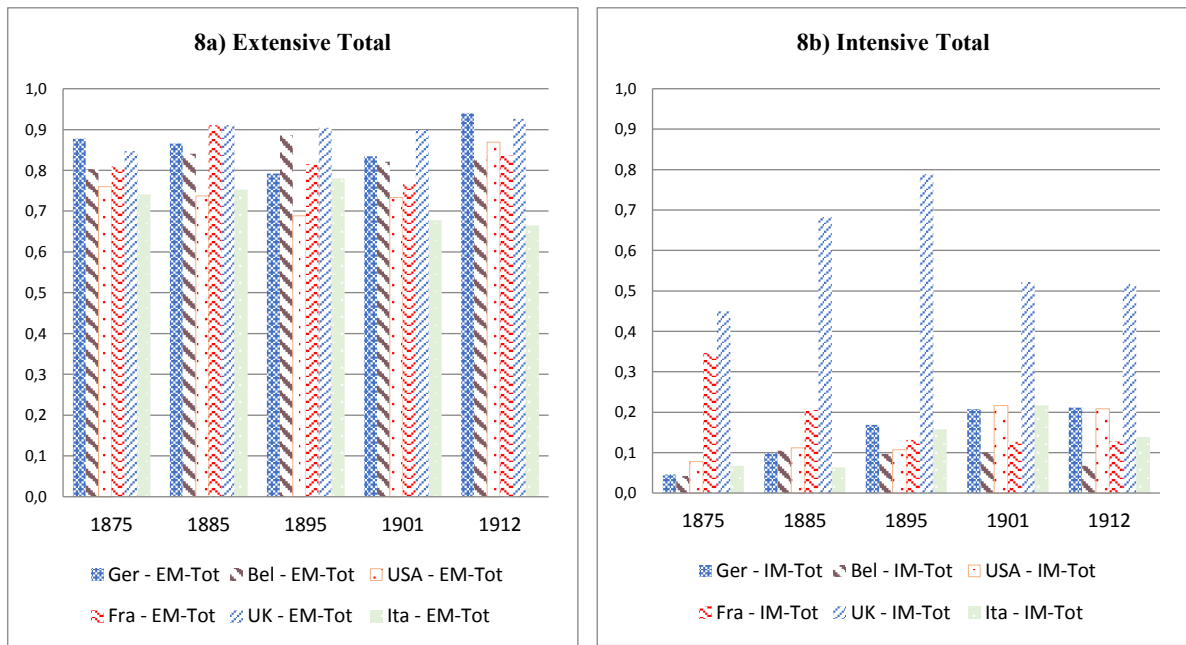
Sources: See Appendix B - Sources

Figure 9: HS imports Top 6 trade partners – Extensive and intensive Margin– 1875, 1885, 1895, 1901, and 1912
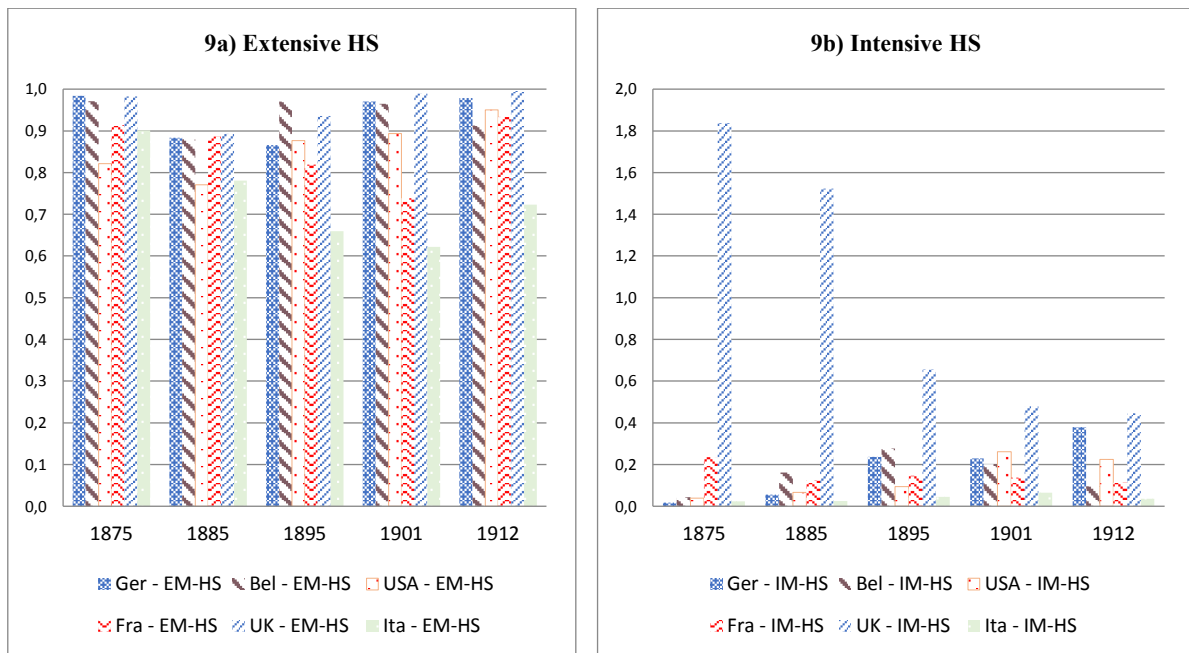
Sources: See Appendix B - Sources

Figure 10: LS imports Top 6 trade partners – Extensive and intensive Margin – 1875, 1885, 1895, 1901, and 1912
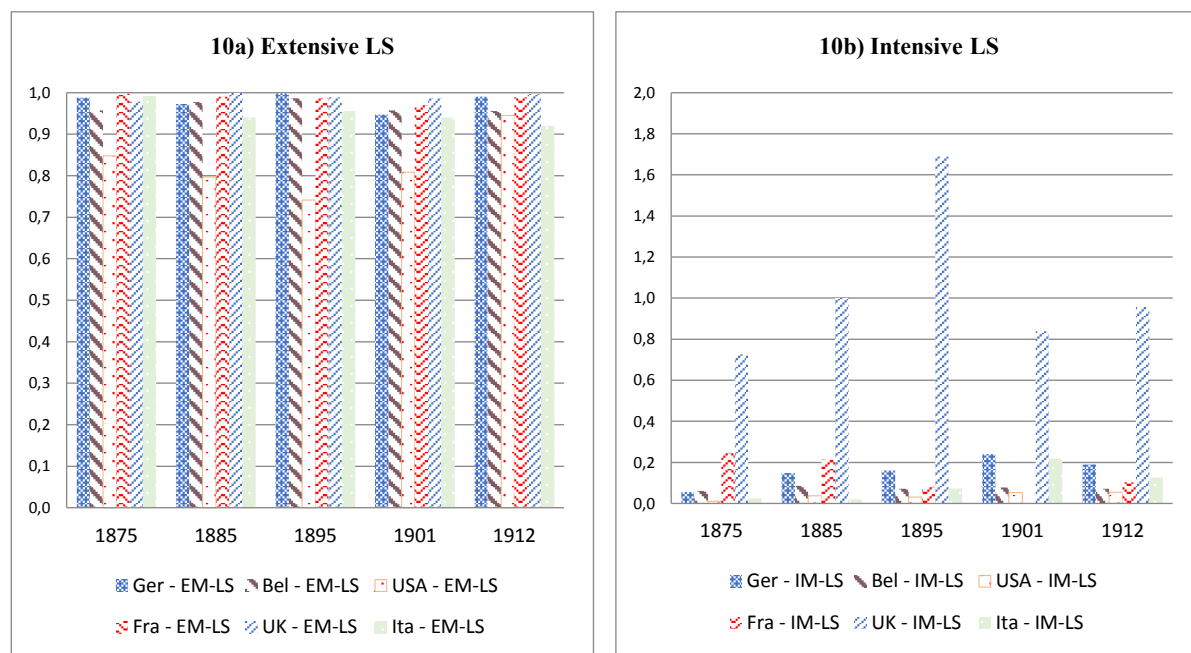
Sources: See Appendix B - Sources

3.5.   German banks in Argentina and their link to the German export sector

The first bank in Argentina with German participation was founded in 1872, when the *Disconto – Gesellschaft* together with banking institutions from Belgium founded the *La Plata Bank*. The bank was partially taken over by the *Deutsche Bank* in 1874. This first endeavor, however, was not particularly successful and the life span of the bank was rather short. The bank had invested a large part of its capital in Uruguayan government bonds and when in 1874 a revolution changed political powers in Uruguay, the new government refused to pay its debts. The situation further worsened with a massive depreciation of silver in the late 1870s, diminishing the invested capital. Since then, the bank never really recovered, and after continuous complications and losses in the following years the *Deutsche Bank* finally managed to liquidate it in 1884/5 (Riesser and Jacobs, 1911 423 433 443, Jones, 1991 103, Young, 1991 89, and Gall et al, 1995 59). The first German foreign bank in Argentina founded exclusively by German institutions was the Banco Aleman Transatlántico (*Deutsche Überseeische Bank*), established in Buenos Aires in 1887. The *Deutsche Überseeische* (DÜB) was the most important German financial institution in Argentina and continued to be the only one until 1906, when the

Deutsche Südamerikanische Bank (SÜD) was established. In comparative perspective, Germany was late. At the time of German entry in Latin America, British banks had already been present for more than twenty years. The British were the first to enter, driven by the primary motive to participate in the growing trade business between Latin America and Europe Triner, 2006). In 1862 the *London and River Plate bank* was founded, followed one year later by the *British Bank of South America*. Until the second half of the nineteenth century, British trade and its financing was managed by the merchant houses, maintaining offices in England and in Latin America. With British trade and investment in Latin America accelerating intensively since the 1860s, Banks became indispensable to manage the increasing amount of financial transactions.[32] Besides the British and the German banks, the French-Italian *Banco Francés e Italiano para la America del Sud*, and the *Swiss Banco Suizo-Sud Americano* were operating in Argentina between 1875 and 1913. Yet, the largest financial institutions were the *Deutsche Überseeische Bank* and the *London and River Plate Bank* (Hurley, 1914 25).

Table 5: Expansion of British and German banks in Argentina

	1881	*1900*	*1913*
Nº British Bank Branches in South America	29	60	84
Nº German Bank Branches in South America	2	14	47
Nº British Bank Branches in Argentina	5	12	26
Nº German Bank Branches in Argentina	1	2	9

Sources: See Appendix B - Sources

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32   Besides being better suited to managing the increasing capital movements, banks also released the merchant houses from the necessity of maintaining expensive representation abroad, and thus, enabled smaller firms to enter into foreign trade business (Young, 1991, 82-85). In addition, some studies suggest that the British were attracted by the high interest rates prevailing in deposit and current account transactions in Latin America at this time (Young, 1991, 82-85). Argentina was a very profitable market for foreign banks after its unification and with the prospects of an economic takeoff in the 1870's and 1880's. Foreign investments were high, and so were profit expectations. There were many splendid opportunities, especially for the British. Railway systems were constructed, connecting the large plains and the harbor cities. Industrial enterprises were interesting, too, and the ever-indebted government was desperately in need of foreign money. British investment was especially directed to the capital-intensive construction of the railways. The London and River Plate Bank for example, was the first to enter into the railway business in Argentina, and by 1914 it was holder of nearly all British-owned railroads in the country (Hurley, 1911 14). In the beginning of the second half of the nineteenth century, foreign banks additionally benefited from the relatively less developed Argentine financial sector. Besides some tentative first bank projects, such as the Banco de Buenos Aires (1822-26) and the Banco Nacional (1826-36), neither exchange nor depositary nor issuing banks existed until the second half of the 19th century. Commerce was largely financed by foreign trade companies, especially from Spain. While credits were administrated by the holding companies situated in the country of origin, their local representatives and wholesalers were responsible for the direct assignment in Argentina. Bills of exchange were applied, but specialized financial institutions did not exist until 1860 (Cortes, 1997 114-115). Thus, when the economy gained momentum in the late 1860s, there were no adequate, national financial institutions available.

The DÜB and the SÜD were founded by some of the largest and leading *Grossbanken;* the *Deutsche Bank,* the *Dresdner Bank,* the *Schaffhausen´scher Bankverein*, and the *Nationalbank für Deutschland*. These banks maintained a close link to German industrial companies. This link – an indirect connection – is illustrated in Table 6. In 1913, together the four banks were represented by 441 seats in 371 different firms. This bank-industry nexus was maintained in the foreign markets via the *Auslandsbanken.* The establishment of the direct connection between the DÜB and SÜD and German industrial companies was possible because (i) the headquarters with the supervisory boards of the DÜB and SÜD were located in Germany, Berlin, (ii) and moreover due to the simple fact that the members of the management *(Aufsichtsrat or Vorstand)* of the mother institutions in many cases were the same people that formed the members of the supervisory boards of the *Auslandsbanken*. In 1887, for example, all members of the supervisory board of the *Deutsche Überseeische* bank in Argentina were also members of the supervisory board of the *Deutsche Bank*, with Georg Siemens being the chairman of both boards. In 1913, 6 out of 19 and 2 out of 11 members of the supervisory board of the DÜB and the SÜD were still represented in the management of their mother institutions. The direct connection is presented in Table 7. Together, the DÜB and the SÜD were represented by 141 seats in a total number of 117 companies, of which 31 were (identified as) exporting companies. One fourth of the representatives took a leading position in the management of the export companies, inhering either the seat of the chair or vice-chairman of the company's board. It seems that the banks did not exclusively focus on the largest companies, even though they were represented in 14 of the top 100 and in three of the top ten largest firms.[33]

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33 Measured in terms of employees, see Fiedler et al (2010)

Table 6: Indirect connection - Representation of mother institutions in companies by number and character – 1913

	Seats total	of which Chairman	of which Vice-Chairman	No. of Companies
Deutsche Bank	*134*	*25*	*22*	*116*
Dresdner Bank	*102*	*19*	*13*	*87*
Nationalbank	*95*	*3*	*3*	*95*
Schaafhausenscher	*110*	*26*	*16*	*92*
Total	*441*	*73*	*54*	*371*

Sources: See Appendix B - Sources

Table 7: Direct connection – Total representation and representation of DÜB and SÜD in export companies by number and character – 1913

	Seats total	of which Chairman	of which Vice-Chairman	No. of Companies	Seats Exporting Companies	of which Chairman	of which Vice-Chairman	No. of Companies
Deutsche Überseeische Bank	83	24	6	74	27	9	1	16
Deutsche Südam. Bank	58	5	4	49	17	0	1	15
Total	*141*	*29*	*10*	*117*	*44*	*9*	*2*	*31*

Sources: See Appendix B - Sources

The sectorial composition of the export firms connected to the DÜB and the SÜD is rather diversified. The goods exported by the companies range from coal and petroleum products, to textile manufactures, paper, and metal manufacturing goods (see also Table 33 Appendix B). However, there is a certain tendency of concentration towards the HS sector. Figure 11 illustrates the sectorial distribution of the companies that were connected to the DÜB and SÜD, and the structure of their exports. It shows (11a) the number of companies and the respective number of seats in the supervisory board by the different skill classes (HS, MS, LS, PP). More than 68 per cent of the companies came from the HS sector, accounting for more than 57 per cent of the banks' overall seats in supervisor boards. Moreover, the figure illustrates (11b) the distribution of the total exported products of bank-connected companies and the share of the number of products exported by bank-connected companies on the total number of products

imported by Argentina by skill class. Of all the goods exported by bank-connected companies, 45 per cent were HS products, covering 36 per cent of the variety of total Argentine HS imports. The companies that exported HS products were from the metal manufacturing industry such as the *Mannesmannröhren Werke,* the *Phönix AG für Bergbau und Hüttenbetrieb* -that mainly exported iron ore, metal tubes, steel- and the large electrical enterprises such as the *Allgemeine Elektrizitäts-Gesellschaft (AEG)* or *Siemens & Halske* - exporting electrical wires, electrical motors and dynamos, amongst other products.

Figure 11: The DÜB and SÜD and the German export companies in 1913
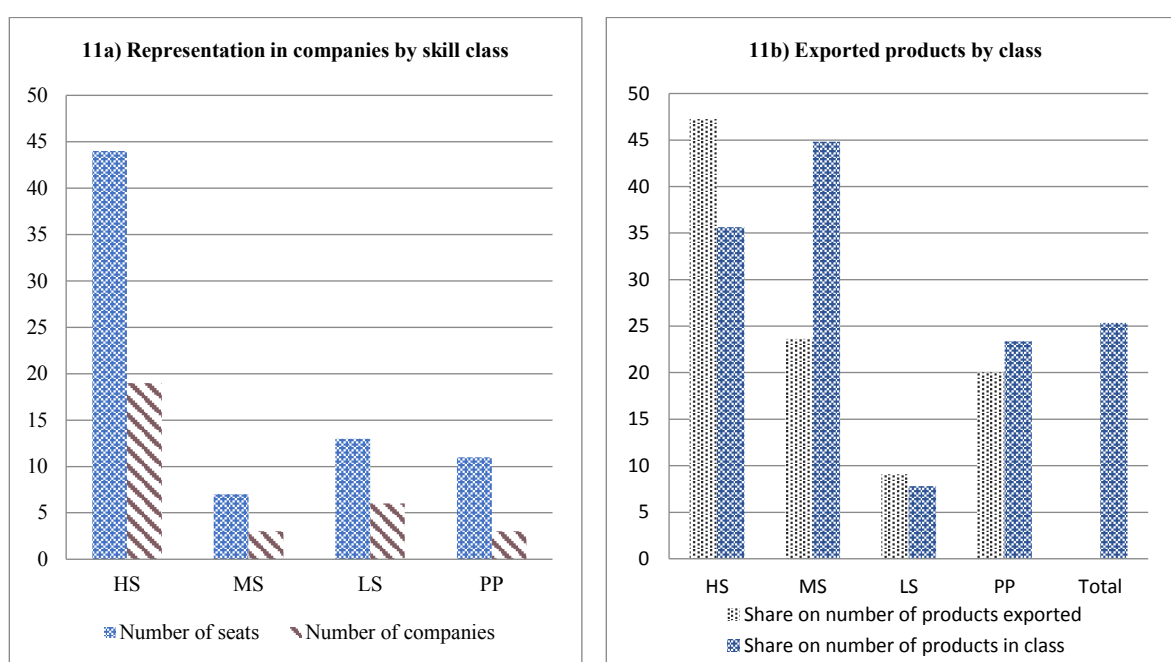
Sources: See Appendix B - Sources

Note: The *share of number of products exported* is the per cent share of the number of products exported by the companies in each class of the total number of products exported by the companies. The *share of number of products in class* is the per cent share of the number of products exported by the companies in the total number of products that exists in each class.

A first review of the quantitative evidence seems to confirm that the performance of bank-connected exports benefited, although with a time lag, from the bank´s entry into the market. Table 8 compares the share and growth of bank-connected exports with the rest of German exports. In the years 1875 and 1885, the bank-connected exports accounted for one fourth of total German exports. The situation did not change in the first year of observation after bank

entry, 1895. However, in the following years the bank-connected exports increased significantly more than the rest of German exports, doubling between 1895 and 1901, and reaching a share of 56 per cent of total exports in 1913. This increase of bank-connected exports after 1895 may to some extent have been driven by a general increase in the Argentine demand of these products at that time, given the high share of HS products in German bank-connected exports. The financial constraints that Argentina faced as result of the sovereign-debt crisis in 1890 (Baring crisis) caused a sudden drop in the import of capital-intensive products, followed by a recovery and increasing imports in the second half of the 1890s. However, as discussed and illustrated in section 3.4 of this paper, whereas Argentina's increasing demand did not lead to an equal increase in the exports of HS goods of all countries, Germany's exports and market share increased. The idea that the increase of German bank-connected exports is not exclusively the result of demand effects is additionally strengthened by the following test. If one looks at the British exports, assuming a hypothetical differentiation between bank-connected and the rest of exports based on the exact same classification as in case of the German exports, one can observe that bank-connected exports only grew by 2.8 per cent and their share of total exports only marginally varied from 1895 to 1901 (See Table 34 Appendix B). This clearly highlights the dynamics of German bank-connected exports.

Table 8: German bank-connected and not bank-connected exports – Share of total exports (%) and growth respective to the previous year (%)

Year	Share – Bank-connected	Share - Not connected	Growth – Bank-connected	Growth - Not connected
1875	21,9	78,1		
1885	25,8	74,2	73,9	67,6
1895	24,4	75,6	32,6	37,5
1901	33,0	67,0	50,8	25,0
1912	56,1	43,9	84,6	60,0

Sources: See Appendix B - Sources

3.6. First stage analysis – The determinants of exports and their margins

Using an augmented gravity model, based on the theoretical assumptions of Head and Mayer (2013), this section empirically identifies and analyzes the determinants of the exports of the major trading partners of Argentina between 1875 and 1912. It focuses on the comparison between total exports and the exports of different skill classes, answering three main questions: (i) Which factors, and to what degree, determined the development of exports? (ii) Did the same factors have an impact on the diversification and/or intensification of exports? If so, to what degree? (iii) And finally, can we observe a difference in their influence on exports of different skill classes? The previous analysis of the development and structure of the exports of the main trading partners of Argentina has shown that the success of Germany, in relative and total terms, essentially derived from its advancement in the HS-Skill sector. One of the principal concerns of this section hence is to answer the question: what determined the export, and its intensive and extensive margins, of HS-Skill products?

I distinguish between two types of models. The "Standard Models", examining the factors that shaped the development of total imports (2.1) and High-Skill (2.2) and Low-Skill (2.3) imports, and the "Advanced Models" that analyse the extensive and intensive margin of the total imports (2.4), (2.5), and the different skill classes (2.6), (2.7), (2.8), (2.9). Seen from the supply side, I test for the influence of the relative productivity and the size of the economy of the exporting countries – measured as relative wages and real GDP[34] respectively. Relative productivity, however, is the productivity of each country in comparison to other countries, and not the productivity of different export sectors. The possible effects of demand on exports are considered by the use of data on Argentine imports instead of the individual exports statistics of each trading partner. In addition, I account for the possible influence of transport costs, proxied by geographical distance in the absence of freight costs, and tariff frictions – measured as product specific tariffs. The number of banks of each country operating in Argentina in each year are used as an indicator of the presumable influence of finance. The models include observations from fourteen countries[35] for the years 1875, 1885, 1895, 1901 and 1912. The

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34   Alternatively, population has been used as a measure of the size of an economy, which did not change the results of the estimation significantly, showing the same patterns as GDP.

35   The countries are; Great Britain, Belgium, Germany, France, Spain, Austria-Hungary, Denmark, Italy, the Netherlands, Portugal, Sweden-Norway, Brazil, the United States of America, and Canada.

number of trading partners was determined by the availability of data on respective GDP and real wages. Together, these countries account on average for more than 89 per cent of total imports, which I believe is a representative share. Expressed in the form of an equation, the "Standard Model" for total imports is designed as followed:

$$X_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 AdvW_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.1)$$

Where X_{ct} is the nominal value of imports of Argentina from country c in year t, β_0 is a constant, Y_{ct} the nominal national income of each country (GDP) in each year, and W_{ct} are the real wages of c in year t (100 = Great Britain real wages in 1905). D_c is the great circle distance between the capital cities of c and Argentina in kilometres. The variable $AdvW_{ct}$ represents the ad valorem equivalent of the tariff of Argentina weighted by the imports (by product) from country c to Argentina in t (weighted ad valorem tariff).[36] B_{ct} is a numeric variable, representing the number of banks of country c present in Argentina at time t. The estimated model also includes time fixed effects (β_t) and ε_{ij} is an error term, representing the myriad other influences on exports. The "Standard Models" for the HS and LS imports are correspondingly specified as:

$$HSX_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 AdvWHS_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.2)$$

and

$$LSX_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_1 \ln W_{ct} + \beta_2 \ln D_c + \beta_3 AdvWLS_{ct} + \beta_4 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.3)$$

Where HSX_{ct} and LSX_{ct} is the nominal value of imports of High-Skill and Low-Skill products from country c in year t, respectively. AdvWHS and AdvWLS represent the weighted ad valorem tariff of HS and LS imports. The "Advanced Models" with the extensive and intensive margins of total imports are defined as:

$$EM_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 AdvW_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.4)$$

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36   With $AdvWct = \frac{\sum adv_{pt}*imp_{pct}}{imp_{ct}}$, where advpt is the tariff of product p in year t, imppct is the value of imports of product p from country c in t, and impct the value of imports of country c in t. See also Appendix B - Sources.

$$IM_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 Adv W_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \qquad (2.5)$$

The "Advanced Models" with the extensive and intensive margins of HS and LS imports are accordingly specified as:

$$EMHS_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 Adv WHS_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.6)$$

$$IMHS_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 Adv WHS_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.7)$$

$$EMLS_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 Adv WLS_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.8)$$

$$IMLS_{ct} = \beta_0 + \beta_1 \ln Y_{ct} + \beta_2 \ln W_{ct} + \beta_3 \ln D_c + \beta_4 Adv WLS_{ct} + \beta_5 B_{ct} + \beta_t + \varepsilon_{ij} \quad (2.9)$$

EM_{ct} and IM_{ct} represent the extensive and intensive margin of Argentine imports from country c in t, and $EMHS_{ct}$, $IMHS_{ct}$, $EMLS_{ct}$, and $IMLS_{ct}$ are accordingly the extensive and intensive margin of Argentine imports of High-Skill and Low-Skill products from country c in t. Technically, panel data is used to estimate equation (2.1) to (2.9) with Poisson-maximum likelihood (PPML). The use of PPML allows for including zero observations in the dependent variable, which must be excluded or treated improperly under log-linear OLS estimates (Lampe, 2009, Huberman et al, 2015) Additionally, Santos Silva and Tenreyro (2006) have shown that Least Square estimates of log-linear models are inefficient, biased, and/or even inconsistent and propose the PPML with robust standard errors as a superior alternative.

The results are presented in Table 9 and 10. They confirm the classical assumptions of a gravity model of trade, with a positive impact of economic size and a negative influence of distance on the trade between two countries. The variable GDP is always positive and, with the small exception of the intensive margins of total imports (2.5), statistically significant, and the variable distance, although not statistically significant in all cases, always shows negative values. The positive and significant effect of GDP on total imports (2.1) is 0.135, implying that the level of exports increases by 14.45 per cent[37] if GDP increases by one per cent. The same increase in wages would lead to 1.57 times more exports. Especially in the HS (2.2) sector

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37 Since $1-e\ 0.135 = 0.1445$. See Wooldridge, Jeffrey (2002), "Introductory Econometrics: A Modern Approach", Itps Thomson Learning; 2nd Revised edition

wages contribute significantly to the total value of exports, with a one per cent increase yielding a 7.75 times increase in exports. Moreover, it appears that productivity played a more important role in the intensification of exports of existing HS products (2.7), rather than exporting a wider set of goods (2.6). This may lead to the conclusion that the previously described advantage of Germany in the export of HS products, in particular in its intensive margins, derives from the higher productivity of the German economy in comparison to its competitors. The results for the weighted ad valorem tariffs are somehow puzzling, not showing any robust pattern that confirms an influence on Argentine imports. They seem to have a positive and significant impact on total imports (2.1), but show no effect on their extensive and intensive margins (2.4), (2.5). For LS imports I detect no effect at all, and in the case of HS imports, I observe a positive effect on the extensive (2.6) margins and a negative effect on the intensive (2.7) margins. One interpretation is that an increase in tariffs led to a reduction in the total values of imports but did not affect the variety of goods imported. Finally, I find a positive and significant impact of the presence of banks on the level of exports, confirming the assumption of a positive correlation between the existence of financial networks of the exporting country in the market of the importing country and the value of exports. The effect of banks on total exports is 0.512, implying that the level of exports increases by 67 per cent (since $1 - e^{0.402} = 0.668$) with each additional number of bank. This effect is more pronounced in the case of LS exports (2.3), which is mainly driven by the correlation between British banks and British LS exports. When looking at the margins of imports, it seems that banks fostered the intensification of exports (2.5), (2.7), (2.9).

Table 9: The Standard Models - Determinants of Argentinian imports by "Skill Class" - 1875-1912

	(2.1) Total	(2.2) HS	(2.3) LS
ln(wages)	0.943**	2.169***	0.761**
	(0.382)	(0.815)	(0.344)
ln(gdp)	0.135***	0.201***	0.183***
	(0.028)	(0.057)	(0.037)
ln(distance)	-0.0840	-0.382	-0.474**
	(0.184)	(0.264)	(0.225)
ln(AdvW)	4.775**		
	(0.232)		
ln(AdvW- HS)		4.254	
		(0.391)	
ln(AdvW- LS)			3.387
			(0.262)
Number of Banks	0.512***	0.394***	0.603***
	(0.086)	(0.117)	(0.084)
Time fe (βt)	YES	YES	YES
No. Obs.	56	56	56
Method of est,	PPML	PPML	PPML

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

Note: Dependent variable in column (2.1) is the total value of Argentine imports from country c, in column (2.2) and (2.3) the total value of HS- and LS-Skill imports, respectively. For the classification of imports according to different skill classes see Table 32 Appendix B. Sample includes 1875, 1885, 1895, 1901, and 1912. The number of observations is reduced to 56 from original 70 (5 years*14 countries = 70 observations) as in the case of non-existing imports from country c in year t, it is not possible to determine the weighted ad valorem tariff of this country. For the definition of weighted ad valorem tariff see Appendix B - Sources. Robust standard errors are clustered by country and product and are indicated in brackets. Sources: See Appendix B - Sources

Table 10: The Advanced Models - Determinants of extensive and entensive margin of Argentinian imports by "Skill Class" - 1875-1912

	(2.4) Total-EM	(2.5) Total-IM	(2.6) HS-EM	(2.7) HS-IM	(2.8) LS-EM	(2.9) LS-IM
ln(wages)	0.500**	0.431	0.902***	14.68***	9.661*	11.69***
	(0.232)	(0.431)	(0.267)	(2.984)	(0.443)	(2.067)
ln(gdp)	0.069***	0.033	0.092***	0.903***	0.386*	0.625***
	(0.015)	(0.052)	(0.015)	(0.311)	(0.228)	(0.192)
ln(distance)	-0.190	-0.0575	-0.189	-5.958***	-3.142***	-5.030***
	(0.123)	(0.203)	(0.165)	(0.751)	(0.885)	(0.655)
ln(AdvW)	2.410	-0.853				
	(0.163)	(0.240)				
ln(AdvW- HS)			4.310***	-29.12***		
			(1.525)	(9.376)		
ln(AdvW- LS)					6.644	-5.126
					(1.552)	(4.755)
Number of Banks	0.078	0.455***	0.075	1.314**	1.584*	2.318***
	(0.058)	(0.087)	(0.080)	(0.594)	(0.890)	(0.306)
Time fe (β_t)	YES	YES	YES	YES	YES	YES
No. Obs.	56	56	56	56	56	56
Method of est.	PPML	PPML	PPML	PPML	PPML	PPML

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

Note: Dependent variable in column (2.4) and (2.5) is the extensive and intensive margin of the total Argentine imports from country c, in column (2.6), (2.7), (2.8), and (2.9) the extensive and intensive margin of HS-Skill and LS-Skill imports, respectively. The extensive and intensive margin are defined according to Hummels and Klenow. For the definition and the classification of imports according to different skill classes see Table 32 Appendix B. Sample includes 1875, 1885, 1895, 1901, and 1912. The number of observations is reduced to 56 from original 70 (5 years*14 countries = 70 observations) as in case of non-existing imports from country c in year t, it is not possible to determine the weighted ad valorem of this country. For the definition of weighted ad valorem see Appendix B - Sources. Robust standard errors are clustered by country and product and are indicated in brackets. *Sources:* See Appendix B - Sources.

3.7. Second stage analysis – Measuring the effect of the bank-trade-nexus on exports

This study investigates the effect of German bank entry on German exports to Argentina between 1880 and 1913. The major hypothesis is that German export companies connected to German banks operating in Argentina benefited from relatively easier access to financial support and privileged information in the Argentine market; in other words, a reduction of transaction costs and information asymmetry. Consequently, Germany exported more of those products that were exported by one or more companies connected to the banks after their entry. This assumption has its limitations. Presumably, companies that were not connected to the banks had alternative sources of finance and of gaining information about the Argentine market. We cannot totally be sure that companies not connected to the *Auslandsbanken* did not receive any financial and information support from these banks at all. This, however, also applies to the bank-connected companies, as they equally had access to all sources of finance. Therefore, the objective of this study is not to show any effect of German trade finance, but the effect of creating privileged access to financial and information support in the target market. This includes privileged access in comparison to those companies that did not, as well as to those that did possess the same and alternative sources of finance.

I use a difference-in-difference model to measure the effect of German bank entry into Argentina (treatment) on the bank-connected exports (treated group) in comparison to the rest of German exports (control group) to Argentina between 1880 and 1913. The model covers German exports by product – based on my product classification presented in section 3.3 – for the years 1875, 1885, 1895, 1901, and 1912. I differentiate between two specifications of the model. The first one considers a product to be treated (bank-connected) if it has been exported by at least one of the export companies that was connected to the DÜB in 1913. The DÜB was the first German bank in Argentina that was exclusively founded by German institutions, as well as the largest, and for the major part of the period of investigation (from 1887 until 1906) the only German bank operating in Argentina. The second specification includes the SÜD, and consequently defines a product to be treated if it was exported by at least one of the export companies connected with the DÜB and / or the SÜD. I furthermore test for the possible influence of demand effects (Argentine imports by product) and trade frictions (product specific

tariffs) on German exports to Argentina. In the form of an equation, the models are expressed as followed:[38]

$$X_{pt} = \alpha PRODUCT_p + \mu YEAR_t + \gamma CON1B_{pt} + \delta INTERV_{pt} + \lambda lnARGIMP_{pt} + \theta lnADV_{pt} + \varepsilon_{pt} \quad (2.10)$$

$$X_{pt} = \alpha PRODUCT_p + \mu YEAR_t + \gamma CON2B_{pt} + \delta INTERV_{pt} + \lambda lnARGIMP_{pt} + \theta lnADV_{pt} + \varepsilon_{pt} \quad (2.11)$$

The outcome of interest is X_{pt}, the nominal value of German exports of product p to Argentina in year t. The variable $PRODUCT_p$ is a fixed effect that controls for unobserved time-invariant characteristics of a product p. $YEAR_t$ is a year fixed effect that controls for common shocks influencing all products equally in year t. The variable $CON1B_{pt}$ included in the first specification of my model (Equation 2.10) is a dummy which takes the value one if a product p is exported in year t by at least one company connected to the DÜB, and the value zero in the opposite case. It identifies the treated group and captures differences between the treated and control group prior to the bank entry. I assume a time-invariant connection between bank and companies. The data for 1913 is used. This creates a homogenous treatment group over time. A change in the treatment group eventually could bias the effect of the treatment, as changes in exports of the treated group may be the simple result of a change in the number and/or character of the exporting companies linked to banks rather than the effect of the treatment. The variable $CON2B_{pt}$ included in the second specification (2.11) is identical to $CON1B_{pt}$ but also considers the connection of export companies with the SÜD. $INTERV_{pt}$ is the intervention dummy that is equal to one for the treated group after the event of bank entry (t > 1885). $lnARGIMP_{pt}$ is the natural logarithm of the nominal value of Argentine imports of product p in year t, capturing the possible influence of variations in the demand of a product p on the German exports of that product p in the year t. The variable Adv_{pt} represents the ad valorem equivalent of the tariff of each product imported from Argentina in each year. ε_{ij} is an error term, representing the myriad other influences on exports. Technically, panel data is used to estimate equation (2.10) and (2.11) with Poisson-maximum likelihood (PPML) to account for zero value observations in the dependent variable.

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[38] Imbens and Wooldridge (2007) give a comprehensive explanation and overview of the existing designs of difference-in-difference estimations. My model is based on their assumptions of a difference-in-difference analysis with multiple time periods (page 4).

The results are presented in Table 11. They indicate a positive and significant correlation between the Argentine demand for products and the respective German exports. Tariffs on the other hand seems to have a significant negative influence on the development of exports. The coefficient of interest is $\delta=[(\alpha+\mu+\gamma+\delta) - (\alpha+\mu+\gamma)]$, which is the difference-in-difference estimate, with $(\alpha+\mu+\gamma+\delta)$ being the expected outcome of the treated group with bank intervention, and $(\alpha+\mu+\gamma)$ the expected outcome of the treated group without the event of German bank entry. δ is positively significant in every specification of the model, confirming the principal assumption of this study that German bank entry had a positive impact on bank-connected exports.

Table 11: Difference in Difference estimation for German exports to Argentina - 1875-1912

	(2.10)	(2.11)
	DÜB	DÜB/SÜD
CON1B (γ)	9.042	
	(65.60)	
CON2B (γ)		9.071
		(55.42)
INTERV (δ)	0.668***	0.523**
	(0.219)	(0.232)
lnARGIMP (λ)	0.791***	0.799***
	(0.0843)	(0.0858)
lnADV (θ)	-1.534**	-1.506**
	(0.625)	(0.618)
PRODUCT (α)	YES	YES
YEAR (μ)	YES	YES
Number of observations	930	930
Method of estimation	PPML	PPML

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

Note: Dependent variable in each column is the total value of German exports by product to Argentina. The sample includes the years 1875, 1885, 1895, 1901, 1912 and a total number of 217 products in each year. For the classification of products see Table 32 Appendix B. The number of observations is reduced as for some products ad valorem year observations are missing. Robust standard errors are clustered by product and year and are indicated in brackets. *Sources:* See Appendix B - Sources

To assure the validity of my results, I perform two robustness checks. First, (i) I expand the control group by the exports of the main trading partners of Argentina; Great Britain, the USA, France, and Belgium. The assumption is that the export industries of these countries were not connected with German foreign banks in Argentina, and hence their exports were not affected by the German bank entry. The specifications of the model are identical to equations (2.10) and (2.11), with the exception that dependent variable X_{cpt} is the nominal value of German, British, US, French, and Belgian exports of product p to Argentina in year t. Moreover, I test for the influence of the geographical distance of each country to Argentina and include country fixed effects. The results are presented in Table 35 Appendix B. They confirm the findings of a positive impact of bank entry with the difference-in-difference estimator δ being positive and significant. Second, (ii) I perform a pre-treatment test. One principal issue may be that Germany in general exported high quantities of the treated products, even before the bank entry, and the results of the model hence reflect a time-invariant dynamic that is independent from German banking presence. Or, in other words, the difference-in-difference analysis assumes a parallel trend between the treated and control group before the treatment. To test for this assumption, I use a difference-in-difference model that is identical to the model described in equations (2.10) and (2.11), with the exception that it covers only the imports for the pre-treatment period (1875, 1885) and assumes that German banks were established already during that period. The results show no statistical significance of the difference-in-difference estimator, δ, confirming no difference between the trend in the export of treated and non-treated products before the actual bank entry in 1888. The results of this second robustness check are presented in Table 36 Appendix B.

3.8. Concluding remarks

The objective of this article has been to identify and analyze the determinants of the success of German exports in comparison with the exports of other leading industrial economies of the late nineteenth and early twentieth centuries to Argentina, one of the emerging markets at that time. In particular, it asks whether the establishment of the first German banks in Argentina, in their capability to provide financial and informational assistance in the target market, had a positive impact on German exports to Argentina. More precisely, I ask if Germany exported more products that were exported by one or more companies connected to the banks established in Argentina (bank-connected exports), as they benefited from privileged access to the banks' support.

For this purpose, I empirical examine the determinants of the exports, and their extensive and intensive margins, of Argentina's trading partners between 1875 and 1913, and test for the effect of bank entry on the exports of German industries linked and not linked to German banks in Argentina. The results show that a country's export success is mainly explained by a comparatively higher degree of productivity together with an increase in the intensive margins of export. This dynamic is especially pronounced in the export of what I define High-Skill products, that are mainly products of the second industrial revolution. I moreover find a consistent and significantly positive impact of German bank entry in Argentina on the expansion of German bank-connected exports.

The findings, on one hand, lend empirical support to the literature on international trade, expanding the pool of studies that defines the intensive margin as a decisive variable in explaining why some countries export more than others. On the other hand, they contribute to the literature on the role of finance in the development of foreign trade in general, and the role of German banks in the advancement of German trade in the late nineteenth century. My results give quantitative support to the positive correlation between the existence of financial networks of the exporting country in the target market and the countries respective exports to that market. Finally, I provide some first, empirical evidence that the link between banks and industry prevailing in nineteenth century Germany was transferred to the foreign markets via the *Auslandsbanken*. This confirms somewhat the wide literature on German banking that argues that due to this bank-industry nexus the German banks supported the German industrial

Konzerne in their process of internationalisation by establishing subsidiaries that provided them with financial and informational assistance abroad.

Future research might benefit from including more countries to strengthen, or reject, the principal finding of this study on the link between German foreign banks and export industries and its positive influence on German exports on a more global scale. On the other, the here proposed difference in difference approach would benefit from expanding the time frame of the study to pinpoint more precisely the effect of bank entry, and to study in more detail the behavior of the treated and control group before and after treatment.

4. Essay 3: A microanalysis of trade finance - The *Brasilianische Bank* für Deutschland and its role in financing coffee exports in Brazil, 1880-1913

4.1. Introduction

In 1887 the *Brasilianische Bank für Deutschland* was founded, opening its first branch in Rio de Janeiro one year later. One of the principal purposes of the bank was to get engaged in the financing of Brazilian coffee exports (Brasilianische Bank für Deutschland, 1912 4). Brazil was the world´s leading producer and exporter of coffee in the late nineteenth and early twentieth centuries. Between 1870 and 1913, Brazilian coffee production accounted for around 57 per cent of Brazilian exports and some 75 per cent of the total world production (see Table 13 and Figure 12 section 4.4). Germany was the second most important coffee importer at that time, behind the US, and Hamburg was the European hub for coffee imports (Krause, 2004 144ff, Rischbieter, 2011 42ff).

The Brazilian market for coffee exports was extremely competitive, with hundreds of export houses operating in Rio de Janeiro and Santos between 1880 and 1913. For exporters, one of the key factors in securing a competitive edge was their ability to provide trade finance to their importing partners, either directly or through their banks. Moreover, over time export houses became increasingly involved in upstream activities such as storage and packing. As a consequence, their demand for credit increased significantly over time. By combining microdata on credit granted by *Brasilianische Bank* to export houses and exports of companies in Rio and Santos, the aim of this paper is to empirically address two main issues: 1) Did the Brasilianische's entry contribute to ease firms' credit constraints in the coffee market? 2) How did its entry affect the export performance of financed coffee export houses?

With these questions in mind, I create two original and unique data sets. The first set contains the information on monthly credits granted by the bank between 1889 and 1913: 741 credits to 679 different companies in Brazil and Europe. The second data set contains the annual quantity of coffee exported by companies in Rio de Janeiro and Santos, the principal (coffee) export harbours of Brazil at that time. For Rio, the data includes the exports of 389 export houses between 1880 and 1913. For Santos, the available data is limited to the period between 1893 and 1913. Yet it has the advantage of providing not only the quantity but also the destination

of exports, including the information on exports of 152 companies to 88 different cities in 26 different countries.

Using a logistic regression, I first analyze the credit distribution of the *Brasilianische Bank* to the coffee export houses in Rio and Santos between 1889 and 1913. The results show that while on one hand the size of an export house matters - larger companies are more likely to receive credit - on the other hand the bank eventually financed new comers. This gives strong evidence that the *Brasilianische Bank* contributed to ease the credit constraints of new entrants. Most interestingly, the results affirm the idea that the bank channelled credit to export houses of German origin and companies exporting to Germany. On one hand this suggests that previous to the bank´s entry, German companies had suffered from credit constraints. On the other hand, it confirms the idea that the bank fostered the Brazilian trade to Germany. I then use a difference in difference model to measure the impact of the establishment of the *Brasilianische* on the performance of the coffee export houses in Rio between 1880 and 1913. The results affirm a positive, significant influence; companies financed by the *Brasilianische* exported significantly more after the bank`s entry than companies not-financed by the bank

The article is structured as follows. The next section discusses the literature on trade finance, with a focus on the firm level finance of exports. Section three presents the data. Section four illustrates the development of Brazilian (coffee) exports during the first globalization. The history of the *Brasilianische bank* in Brazil and the empirical analysis of its credit distribution is presented in sections five and six, respectively. The specifications and the results of the econometric analyses, the difference in difference model, are presented in section seven. The final section concludes.

4.2. Related literature – Credit and export performance

This research is based on three major strands of economic literature. One emphasizes the nexus between finance and trade by focusing on the impact of credit availability on firms' decision to engage in exporting business. The second explores the positive impact that the entry of foreign banks (especially in developing markets) has on the growth potential of firms due to the relaxation of credit constraints. The third approach highlights the key role of trade finance in determining the patterns and expansion of exporting activities.

The determinants of a company's decision to engage in trade with foreign markets has been attracting the attention of economists since the pioneering study by Bernard and Jensen (1995). The major approach to define them was to look at the companies' heterogeneity (see e.g. Benard& Jensen 2004, Campa 2004, Melitz 2003). The main argument is companies must cover additional costs to access foreign markets, associated with transport costs, e.g. due to the unfamiliarity with external markets, lack of preferential treatment in comparison to the local producers, etc. Empirical studies (see e.g. Clerides et al 1998, Girma et al 2004) have confirmed that indeed exporting firms are usually larger and tend to show higher productivity. Though size and productivity are most frequently acknowledged as variables defining a company's export potential, some studies focus on other characteristics. Yeaple (2005) looks at differentiation in types of employees working in a company as well as in used technologies; Davidson at al. (2005) focuses on wages and Manasse&Turrini (2001) on entrepreneurial capabilities. The theoretical framework developed by Chaney (2005) by adding liquidity constraints in the Melitz model (2003) triggered a new branch of literature focused on the impact of financial conditions on exports. The first work on the topic opened a debate, with Chaney (2005) arguing that financial constraints do influence a company's decision to export, while Van Biesebroeck (2005), who analyzes access to credit for companies in Sub-Saharan Africa, and Blalock and Roy (2005), who estimate the influence of financial crises on companies' exports in Indonesia, conclude the opposite. Further research testing the impact of both a country's general financial development (e.g. Manova 2008) and a company's credit constraints (e.g. Minetti & Zhu 2011 and Wang 2015) on export potential did not reach unambiguous conclusions either. Beginning with the contradictory company level, one-country studies, Greenaway et al (2007) finds a positive correlation between liquidity and export participation, especially in manufacturing companies that face financial constraints. Minetti &

Zhu (2011) arrive at a similar conclusion for Italy: after controlling for other companies' characteristics, they estimated that credit constraints decreased the probability of exporting by 39%. At the same time Stiebale (2011), looking at a panel of French manufactures over the years 1998-2005, claims that there is no evidence that financial constraints have a direct impact on company's exports. Wagner (2014) in his study on manufacturing industries in Germany claims not only that this link is weak for those companies who only plan to start their export activities, he also finds no difference in credit-rating scores between companies that stopped their export activities and those that continue exporting. On the other hand, cross-country research, evolving from testing the finance-export relation on an industry level (see e.g. Manova 2008, 2013) to a company level (see e.g. Fauceglia 2015, Wang 2015, Pietrovito&Pozzolo 2016), generally confirms the existence of negative effects of financial constraints on a company's potential to export.

The second strand of literature focuses on financial liberalization and the elimination of entry barriers, shifting the focus to the consequences of foreign banks' entry on the development of local financial systems, their resilience to shocks, and the relaxation of credit constraints for local firms. While studies on the impact of foreign banks' presence in developed countries show that the effect is not always positive since foreign banks suffer from cultural and linguistic barriers (see e.g. DeYoung and Nolle 1996, Chang et al 1998), similar research generally suggests that foreign banks perform more efficiently than local ones, triggering the improvement of the whole financial system (see e.g. Claessens et al 2000, Clarke et al 2005). Yeyati and Micco (2006) explain this phenomenon through a decreased level of competition in the industry, resulting in a more stable banking sector. Availability of more disaggregated data triggered studies aimed at determining the conditions and characteristics that influence foreign banks' impact on the domestic market. Similarities between foreign banks' countries of origin and destination seem to strengthen the positive effect of foreign banks on the efficiency of the local financial system (see e.g. Berger et al 2004). Poor general development in the host country as well as limiting entry barriers undermine efficiency (see e.g. Demirguc-Kunt et al 2004). Claessens and Van Horen (2014) conclude that foreign banks have a negative influence in low-income countries, when foreign banks obtain a limited market share, or when banks' countries of origin are significantly distant from recipient countries. The heterogeneity of foreign banks' clients appears to be an important factor in defining who was favored the most by their presence. Gianetti and Ongena (2009) conclude that young firms in emerging markets benefit the most

and companies connected to local banks or to the government suffer. Results on the impact of company size are rather contradictory even for one-country studies. For Argentina, Berger et al (2001) find that small companies have a lower chance of obtaining credit from foreign banks. At the same time Escude et al (2001) claim that despite small and medium-size companies indeed accounting for a smaller share of foreign banks' loan portfolio in comparison with local Argentinian banks, they received virtually half of all credit granted by foreign banks in 2000. Clarke et al (2005) study four Latin American countries and conclude that foreign banks would grant less credit to small companies only if the banks have a relatively insignificant presence in the country. Giannetti and Ongena (2005) conclude that, for the case of Eastern Europe, the presence of foreign banks has a positive impact on all companies in the domestic market, however the benefits to larger companies are more substantial.

The last stream of studies explores the relevance of trade finance for export performance. Specifically, most recent studies on the subject focus on the impact of negative shocks to trade credit availability on exports during the financial crises of 2008-09. Initial work was comprised mainly of anecdotal evidence and surveys that, although stating the responsibility of trade finance in trade decline, could not provide solid proof of causality (see e.g. Auboin 2009, Dorsey 2009). Causality is established in single country company-level research; Amiti and Weinstein (2011) in Japan in the financial crises of the 1990s, Bricongne et al (2009) in France, and Paravisini et al (2014) in Peru during the 2008-09 financial crisis. At the same time, Del Prete and Federico (2014) attribute the decrease of Italian exports during the Great Recession to the reduced supply of general loans and not specifically trade finance. Yet, Niepmann and Schmidt-Eisenlohr (2017) criticize the previous authors for the lack of export data by destinations which could shed more light on the trade finance-trade relation. They claim that reductions in the supply of trade finance have a negative impact on exports through the risk channel, which becomes even more important during crises and for exports destined to small and poor countries.

4.3.   The Data

This study constructs two original and unique data sets. The first one contains the information on the credit provided by the *Brasilianische Bank für Deutschland* from 1889, the first year of any record of credit information of the bank, until the outbreak of World War I. It includes the duration and character of the credit given to each company on a monthly basis from 1889 to 1913. The data have been obtained from the official reports of the supervisory board (*Aufsichtsratberichte*) of the *Brasilianische Bank für Deutschland* (see Appendix C – Sources). It contains data on 741 credits to 679 different companies in Brazil and Europe (the reports indicate the cities where the companies are located). The meetings of the supervisory board were held three or four times a year at the headquarters of the *Brasilianische Bank* in Hamburg, Germany. During these meetings, the supervisory board defined for all its subsidiaries the monthly credits granted to each company. In the reports, financing was differentiated into (i) direct credit lines and (ii) bills of exchange discounted. Moreover, the latter was further disaggregated into *Wechsel von* and *Wechsel auf*. In the case of the "*Wechsel von,*" the bank discounted a bill of exchange from the issuer, granting thereby a credit to the issuer, with the expectation of receiving the value of the bill of exchange in the future by the acceptor. Such was the case when the bank financed a Brazilian company that exported goods to Germany. In the case of the "*Wechsel auf,*" the bank discounted a bill in the name of an acceptor (person/company) who was in debt with a third party (beneficiary). Such was the case when the bank financed European export companies that sold goods to Brazil. This study concentrates on the analysis of the effect of bank entry on the performance of exports from Brazil to Germany and hence focuses on the direct credit given to companies located in Brazil and the "*Wechsel von*" bills of exchange.[39]

The second data set contains the annual quantity of coffee exported in Rio de Janeiro and Santos, the principal and most important hubs of Brazilian (coffee) exports at that time. For Rio de Janeiro it covers the period between 1880 and 1913 – with the exception of the years 1885, 1889 and 1890 for which no data is available - and includes the exports of all 389 companies exporting during this period. For Santos, the available data is limited to the years 1893, 1894

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[39]   Additionally, in most *"Wechsel auf"* cases, the Brasilianische Bank bought credits and/or discounted bills from banks that acted in the name of European exporters. It is hence not feasible to define the distribution of credits among the different export sectors.

and the years between 1898 and 1913. This however, seems to be only a minor drawback, as (i) it was not before 1893 and 1894 that the *Brasilianische Bank* opened branches in Sao Paolo and Santos, and (ii) Santos gained in importance as a coffee export harbour only by the turn of the centuries. More importantly, the information for Santos has the advantage of providing not only the quantity but also the destination of exports, which allows one to test for a possible bias of the *Brasilianische Bank* in financing companies that exported to Germany. The observations include the exports of 152 companies to 88 different cities in 26 different countries. The available information is provided on a weekly basis.[40] The sample includes the exports of the first fifteen days of October in each year, which I believe, is representative as the data indicates that the relative distribution of exports between companies and destinations remained constant over the year. The month of October has been chosen as it marks the peak season of yearly coffee exports (see Figure 26 Appendix C). The data for both Santos and Rio de Janeiro have been obtained from several, contemporaneous newspapers (see Appendix C - Sources).

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[40] To compile a data set that includes annual observations was beyond the (time) scope of this thesis and should be subject for future investigation.

4.4. The dynamics of Brazilian coffee exports

Great Britain was the main trading partner of Brazil in the nineteenth century, followed by the USA. In 1870, 42 per cent of the Brazilian exports and more than 58 per cent of its imports went to and came from Great Britian. German exports and imports accounted only for a bit more than 4 and 6 per cent respectivley. Yet, German trade with Brazil increased constantly while the British share, in the case of imports, declined. By the turn of the century, Germany had become Brazil´s second most important exporting and importing partner behind the USA and Great Britain, respectively (see Table 12).

Table 12: Great Britain, Germany and the USA – Share on Brazilian total imports and exports (% of total) – 1870, 1902, 1913

	Great Britain		Germany		USA	
	Import	*Export*	*Import*	*Export*	*Import*	*Export*
1870	58,0	42,0	6,0	4,0	5,0	29,0
1902	28,1	17,4	11,4	15,8	12,3	37,0
1913	24,5	13,2	17,5	14,0	15,7	32,2

Source: For the year 1870: Dedinger, Béatrice, et Paul Girard, 2017. For the rest: 50 Jahre Deutsche Überseeische Bank, 1936 pp. 114-15

Brazilian exports during the *Belle Époque* essentially consisted of two products, coffee and rubber. But without doubt, coffee was the most important one. In the 1880s, Brazilian coffee production accounted for around 60 per cent of Brazilian exports and about 72 per cent of the total world production (see Table 13 and Figure 12). Around the turn of the century coffee exports experienced a sudden decline when prices dropped sharply due to overproduction in the previous decades and the resulting saturation of the international coffee market. Although prices already had started their downfall around 1898, the coffee tree produces with a lag of around 5 to 6 years, so that coffee producers needed some time to adapt to the changes in demand. Consequently the decrease in production began a few years later between 1901 and 1905 (see also Figure 25 Appendix C). The problems of the coffee sector were sharpened by a financial crisis that was inflicted by the deflationary monetary policy of the Brazilian government. 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.[41] The fall in coffee prices did not stop until the Brazilian government started to intervene in 1905/6 and act as a direct buyer from the coffee producers. From then exports recovered and in 1913 Brazil was the sole supplier of 80 per cent of the world coffee demand (Hutchinson, 1909, Strasser, 1924 148, Krieger, 2011 220, Topik, 2004 20).[42]

Table 13: Commodity export shares in 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 9

The principal export harbour of coffee from the 1820s until the end of the 1880s was Rio, and from the 1890s onwards Santos. Until the establishment of the Republic and the abolition of slavery in 1888 the state of Rio de Janeiro was the largest coffee producing region. However, with abolition, the planters in Rio de Janeiro lost immense capital investments, and although the producers of Santos did so too, the comparatively higher quality of their soil gave them an advantage in compensating the losses during the transition to free labour. The land in Rio had suffered from intensive cultivation in the previous decades and the space for plantation was more limited and fragmented than in Santos, allowing the latter to produce more and on larger scales. Consequently, Rio got equally substituted by Santos as the principal port for coffee

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41   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 Brazilian trade, but also gave incentive to foreign investors to sell their Brazilian bonds and securities on a large scale. The consequent money outflow together with the increasing foreign debt of Brazil ultimately ended up in a financial crisis (Strasser, 1924 148).

42   During the coffee crisis, rubber temporarily gained in importance, increasing its share of total exports to 25.6 per cent in comparison to 14.2 per cent in the previous decade. This substitution effect, however, ended with the recovery of coffee exports and with Southeast Asian producers entering heavily into the world rubber market in the beginning of the twentieth century. In 1919, rubber exports accounted for only 5 per cent of total Brazilian exports (Abreu and Bevilaqua, 1996 6-8, Bértola and Ocampo, 2010 99, see also Absell and Tena Junguito, 2016 19, 27). The principal destinations for rubber exports were the United States with more than 50 per cent of all exports in 1912, followed by Great Britain and France with 35 and 11 per cent respectively. Germany only received 4 per cent of all rubber exports (own calculations based on: Anuario Estatistico do Brazil, 1908-1912 120-121).

exports (see e.g. Greenhill, 1977 198-99, Pereira de Melo, 2003 78 363-65, Sweigart, 1987 5-6).

Figure 12: World and Brazilian coffee trade and quantities of coffee exported in Rio and Santos (thousands of metric tons) – 1880-1913
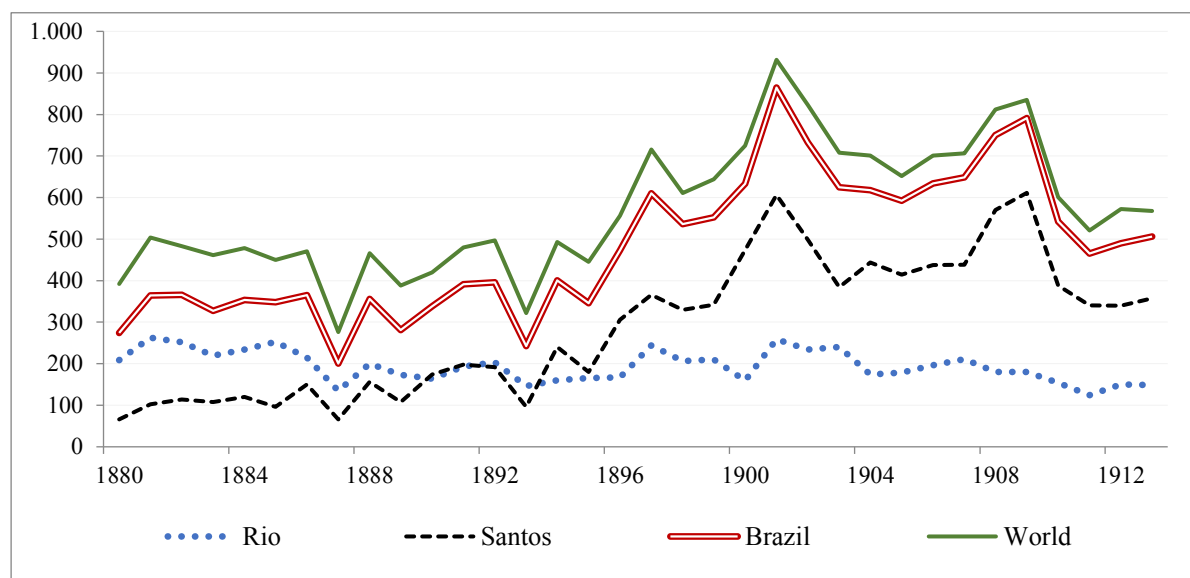
Source: The quantities for Rio and Santos are from the authors data set – see Appendix C - Sources. The Brazilian total exports are the sum of the exports of Rio and Santos. The World coffee trade includes the production and trade from Cuba, Guadeloupe, Haiti, Jamaica, Martinique, Brazil, Surinam, and Indonesia (Java). The data for all countries other than Brazil are from: Mario Samper and Radin Fernando. 2004. Appendix: Historical statistics of coffee production and trade from 1700 to 1960. In William Gervase Clarence-Smith and Steven Topik (eds.), *The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989*. Cambridge: Cambridge University Press, pp. 411-462.

The commodity chain of Brazilian coffee from its production to its export in the XIX century can be summarized as follows. First, producers (*fazendeiros)* brought their coffee to the nearest harbor, or train station, from where it was sent to the countries principal export harbors: Rio de Janeiro and Santos. Once arrived, the coffee was received by a factor (*commisario)*, a representative of the producer who was responsible for the storage of coffee in the harbor. At the third stage a packer (or sacker), a middle man between factors and export companies, bought and sold coffee in the Rio and/or Santos market. The packer than blended and grouped coffee according to its quality to comply with the international market standards. Finally, exporters, acting as agents of the importing houses abroad, purchased coffee and organized shipping abroad. In the first half of the nineteenth century, factors additionally took the role of financiers, providing producers with the credit they needed to meet their increasing need of labor - that was, buying slaves - and to bridge their income gap between the harvests. The situation changed

with the advancement of the railway in the 1870s and 1880s that connected the hinterland with the coast.[43] The resulting integration and concentration of markets initially increased the competition between factors and packers, and finally led to the substitution of both by export houses by the turn of the century. At the same time factors were replaced in their function as financiers of producers by public institutions and banks. This work does not study this aspect of finance in the production of coffee, as it is interested in the role of banks in financing exports. It thus focuses on the relation between banks and export houses. The function of the latter, although the selling chain had shortened, continued to be intermediary between the Brazilian producer and the international coffee markets.[44] Their need for capital, hence, derived from several factors. First, (i) to finance the acquisition of coffee. Second, (ii) to compensate the exchange rate risk, as they bought the coffee in national and sold it in international currencies, and finally, (iii) to finance shipping abroad (see Pereira de Melo, 2003 371-73 and Sweigart, 1987 29-31).

In the years from 1880 to 1913, a total number of 389 different exporting houses operated in Rio de Janeiro. The coffee export in Santos in the years between 1893 and 1913[45] was managed by 152 different companies. Yet, the markets showed an increasing concentration over the years, in particular by the turn of the century. Figure 13 shows the number of export houses operating in each year in Rio and Santos. In 1881, 117 houses operated in Rio. In 1900, there were only 48 houses. This drop may partly be explained by the rising competition from Santos, yet, the share in number of exporters in Rio and Santos in the years after 1900 stayed more or less the same. The concentration becomes even more evident when looking at the relative contribution of each company in total exports. Eventually, exports were dominated by only a few houses. Between 1880 and 1913, the ten largest houses accounted for more than a half of the total exports from Rio. In Santos, they contributed 63 per cent of the coffee exports from 1893 to 1913 (see Table 14). The majority were foreign companies. Out of the twenty largest

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43   The Brazilian railway mainly evolved along the coffee-producing provinces and the main harbours. In 1873, Rio de Janeiro and Sao Paolo possessed 45 and 22 per cent of Brazil´s railroad network, respectively (Pereira de Melo, 2003 367)

44   In some minor cases, the export houses also acquired their own plantations. The German merchant Theodor Wille was the leading coffee exporter in Brazil before the outbreak of World War I. His company the "Thedor Wille and Co", founded in 1844, was the largest export house in Santos, with branches in Rio de Janeiro and Sao Paolo. The company not only had its own plantations but also its own sailing ships and was bondholder in several navigation lines such as Deutsch-Südamerikanische Dampfschiffahrtsgesellschaft, Kosmos and Hapag (Albers, 1978 611, Krause, 2004 144ff, Fenner, 2013).

45   The years with information on export firms in Santos are limited according to the available data. See section 4.3.

companies in Rio, one third came from the USA, one fourth from the UK, and another one fourth were of the German origin. The rest were Brazilian, French and Austrian firms. The relative distribution in Santos is nearly the same, with one third of the companies being German houses, followed by the British, one fourth, and the US companies, one fifth.

Figure 13: Number of export companies in Rio - 1880-1913 - and Santos - 1893-1913
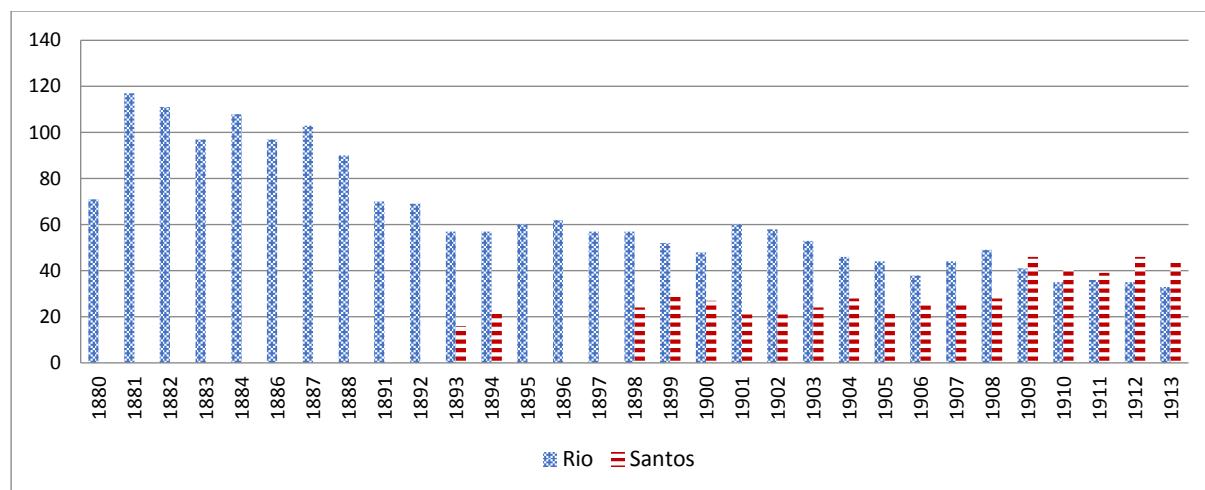
Sources: See Appendix C - Sources

Note: Rio de Janeiro includes observations for the years from 1880 to 1913. For Santos the years 1893, 1894, and 1898 to 1913. See also section 4.3.

The principal destinations of Brazilian coffee exports in the nineteenth and early twentieth centuries were the USA, Germany and the Netherlands. In 1912, exports to the USA accounted for 52, exports to Germany for 15, and exports to the Netherlands for 10 per cent of total coffee exports[46]. If looking only at the exports from Santos, see Table 40 Appendix C, the gap between Germany and the USA was even smaller, with shares in total exports in the same year of 19 and 38 per cent, respectively. In the 1870s, coffee started to gain popularity in Germany and within a few years the German coffee consumption became the highest in Europe. Studies provide several reasons for this increase in demand. Most frequently it is argued that it was the result of the rise in overall individual income level after 1871, together with some sort of imitation effect of upper-class habits by the growing German middle class. On the other hand, it was

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46   Own calculations based on: Anuario Estatistico do Brazil, 1908-1912 120-121

triggered by the qualities of coffee itself; its stimulating effect and its capacity to dampen hunger. This last characteristic of coffee explains the intensive increase of coffee consumption by the working class during the industrialization of Germany (Fenner, 2012).

Table 14: The 20 largest coffee exporting companies in Rio de Janeiro - 1880-1913, and Santos - 1893-1913 – Share on exports (% of total)

Company	Share of exports (*)	Nationality	Company	Share of exports (*)	Nationality
Arbuckle Irmaos & C	9,89	USA	Naumann, Gepp & C	12,69	UK
Ornstein & C	7,30	Austria	Theodor Wille	12,65	Germany
Theodor Wille	6,62	Germany	Prado Chaves	8,87	-
Ed. Johnston & C	6,02	UK	Ed. Johnston & C	7,01	UK
Hard Rand & C	5,88	USA	Hard Rand & C	4,77	USA
J.W. Doane	5,03	USA	Michaelsen Wright & C	4,58	USA
Norton Megaw & C	3,31	USA	Arbuckle Irmaos & C	3,37	USA
Gustavo Trinks & C	2,97	Germany	Societe F. Bresilienne	3,28	Swiss (?)
Eugen Urban	2,88	Germany	Carl Hellwig	3,09	Germany
W.F. Mac Laughlin & C	2,72	USA	Nossack & C	2,61	Germany
Phipps Irmaos & C	2,66	UK	Cia. Krische	2,52	Germany
Pinto & C	2,63	-	Baldwin & C	2,46	-
John Bradshaw & C	2,24	USA	Zerrenner Bulow & C	2,32	Germany
Karl Valais & C	2,23	France	J.W. Doane	1,73	USA
Levering & C	2,16	USA	Barbosa & C	1,68	-
Wille Schmilinsky &C	2,11	Germany	A. Trommel	1,57	Germany
Zenha Ramos & C	1,61	Brazil	Holworthy, Ellis & C	1,34	UK
Carlos Pareto	1,49	Brazil	Roxo & C	1,23	-
Mac Kinnell & C	1,45	UK	Schmidt Trost & C	1,16	Germany
E. Pecher & C	1,38	UK	Rose & Knowles	1,10	UK
Total	*72,58*			*80,05*	

Sources: See Appendix C - Sources

(*) Note: The share of exports is a company´s average share in the nominal value of the total exports of (i) 389 export companies in Rio de Janeiro between 1880 and 1913, and (ii) 152 companies in Santos between 1893 and 1913, respectively.

4.5. The *Brasilianische Bank* and the Brazilian coffee export sector

"The progress of Brazilian commerce shows
that those nations enjoying the preponderance of its trade
are the two great maritime and over-seas banking powers,
Great Britain and Germany"
Edward N. Hurley, 1911

The two largest and most influential financial institutions in late nineteenth century Brazil were the German *Brasilianische Bank für Deutschland* and the British *London and Brazilian Bank*. The latter was the first foreign bank to be established in Brazil, opening its first branch in 1863 in Rio de Janeiro (Orbel and Turton, 2001 342ff). The driving forces of British banking engagement in the second half of the nineteenth century in Brazil were the increasing investment possibilities in the capital markets and infrastructure projects (Hurley, 1911 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 harbour and, most important, railway systems. Rothschild & Sons, the most prominent of all, started after Brazilian independence (1822) to issue loans at the "request of the Brazilian government". In 1855, the Rothschilds managed to be appointed as the Brazilian government's financial agent in London. It went on to run the government's needs on the London capital market and remained "close" to Brazil's financial policies for a long while afterwards[47,] and it was the Rothschilds that raised loans for some of the most important railway companies from 1858 on (Shaw, 2005 171-178).

The *Brasilianische Bank für Deutschland* was founded in 1887 as a joint venture of the *Diskonto-Gesellschaft* in Berlin and the *Norddeutsche Bank* in Hamburg. It opened its first branch in 1888 in Rio de Janeiro, followed by branches in Sao Paulo, 1893, and Santos, 1894. While the *Diskonto* was interested in entering the infrastructure and railway construction

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[47] The overthrow of emperor Pedro II and the declaration of the First Republic 1889 took the Rothschilds by surprise, but they were quick to adapt to the new situation. "Since everyone, even the Emperor, is satisfied in Brazil, we don't see why we should be more royalist than the King." (Alphonse de Rothschild in a letter to English cousins. See Shae, 2005, and also http://www.rothschildarchive.org/ib/?doc=/ib/articles/previewbusiness) All the more so since the following governments needed help in their construction of a centralized national bank system. It was again the Rothschilds who gave advice and assistance to the Banco da Republica do Brazil (1893) and the Banco do Brazil (1905). Their confidence in Brazilian governments in general and those of the republic in particular was well founded: "We are glad to learn that Brazil continues to make you remittances. This country must be rich indeed to be able to pay for its civil war and at the same time repay its debts." (A. Rothschild, ibid).

business in Brazil, the *Norddeutsche* already had been an important player in the exporting and importing relations with Brazil in previous decades (Brasilianische Bank für Deutschland, 1912 4). In its memorandum the *Diskontogesellschaft* stated: [48]

> *"Hamburg takes in the European coffee import, which mainly comes from Brazil, the first place. The Diskontogesellschaft shows high interest in the Brazilian railway companies and the resulting bond issues [...] (both) makes a direct representation in the local landing desirable."*

The establishment of the *Brasilianische* followed a first, unsuccessful attempt of positioning a German bank in Brazil in the 1870s. In 1872, the *Deutsch-Brasilianische Bank* was founded in Hamburg, with the *International Bank*, the *Beremberg Gosslar & Co*, and the *Norddeutsche Bank* being the main shareholders. The bank had to close only three years later, due to mismanagement, the provision of huge credits of the bank's branch in Rio de Janeiro caused liquidity constraints, and heavy losses during the financial crisis in Brazil in 1875 (Burhop, 2004 193-194). Interestingly, it was the coffee exporter Theodor Wille who first raised again the idea to establish a bank in Rio de Janeiro in 1884.Wille was leading in the foundation of one of the biggest German financial institutes of the nineteenth century, the *Commerz- und Disconto Bank*. In his function as the Director of the bank, and as the biggest coffee exporter operating in Brazil, he expressed the need for the establishment of financial support in Brazil in order to assure a successful future development of German export companies in Brazil (Miller, M, 2012 139ff). The reasons why the idea did not come into immediate effect are debatable. On one hand, the *Commerzbank* was clearly more limited in its resources than the other leading German banks, such as the *Deutsche Bank* or the *Discontogesellschaft*. The estimated costs for the establishment of a bank in Brazil were 10 Mio *Marks*, which corresponded to one third of the capital of the *Commerzbank*, but only one sixth of the capital from the *Deutsche* and the *Disconto* bank. On the other hand, eventually the competing institutions were simply faster in the race for financial influence in Brazil (Albers, 1978 611, Krause, 2004 144ff).

48   (Denkschrift der Diskontogesellschaft, Hauser, 1906 53, translated from German.)

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, these three banks jointly possessed over nine branches in Brazil. The *Brasilianische,* however, was the only institution that exclusively concentrated its business in the Brazilian market, having branches in Rio, Santos, Sao Paolo, Porto Alegre, and Bahia. 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 Appendix C - Sources, and also Hurley, 1911 12-22 36ff, Hauser 1906 54ff). Yet, the increasing competition from German banks had its impact. In 1906, British banks held about 77% of the foreign deposits in the major financial centres, in 1930 this figure decreased 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, 2006, 5-6). Table 39 in the Appendix C shows the German and British Banks and their branches in Brazil in 1913.

The *Brasilianische Bank* in Brazil financed both companies in Brazil and in Europe. Initially the bank directed major parts, some 72 per cent in 1889/90, of its finance to the latter. However, with the bank adapting to the market conditions and expanding business in Brazil, the capital provided to companies in Brazil increased constantly in subsequent years and by the turn of the century equalled the share of the finance received by companies in Europe. The bank´s principal financial instrument was the discounting of bills of exchange. More than 92 per cent of the bank´s total provision of credit to companies in Europe and Brazil from 1889 to 1913 was done via the discounting of bills. Yet, the direct credit gained constantly in importance in the finance of companies in Brazil, increasing its share in the total credit provided to companies in Brazil from 13 per cent in 1889 to 40.7 per cent in 1912. The main advantage of direct credit was that it was solely given in the national Brazilian currency, Milreis, and hence minimized the exchange rate risks. The principal currency of the bills of exchange was the British Pound. From 1889 to 1913, 81 per cent of all bills discounted were noted in pounds (see section 4.3 – Data and Appendix C - Sources).[49]

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49   The rest were noted in the German Mark, 7 per cent, the French Franc and Milreis, both 6 per cent.

Among the Brazilian companies financed by the *Brasilianische*, 42 were coffee exporting houses in Rio and 42 coffee exporters in Santos. Together they received 20.1 per cent of the total credit provided by the *Brasilianische Bank* to companies in Brazil between 1889 and 1913. Figure 14 shows the number of companies financed in Rio and Santos. It indicates a shift in the distribution of credit towards Santos by turn of the century, as from 1900 the number of financed companies decreased in Rio and increased in Santos. Yet, the shares of Rio and Santos in the monthly average credit provided to coffee exporters are quite similar. Figure 15 illustrates the development of the monthly average credit provided to coffee exporting houses in Rio and Santos between 1889 and 1913 by the *Brasilianische*. From 1889 to 1913, companies in Rio received on average 18.337 pounds per month and companies from Santos 17.494 pounds per month (sources see Appendix C - Sources).

Figure 14: Number of export companies that received and did not receive credit in Rio - 1880-1913 - and Santos - 1893-1913
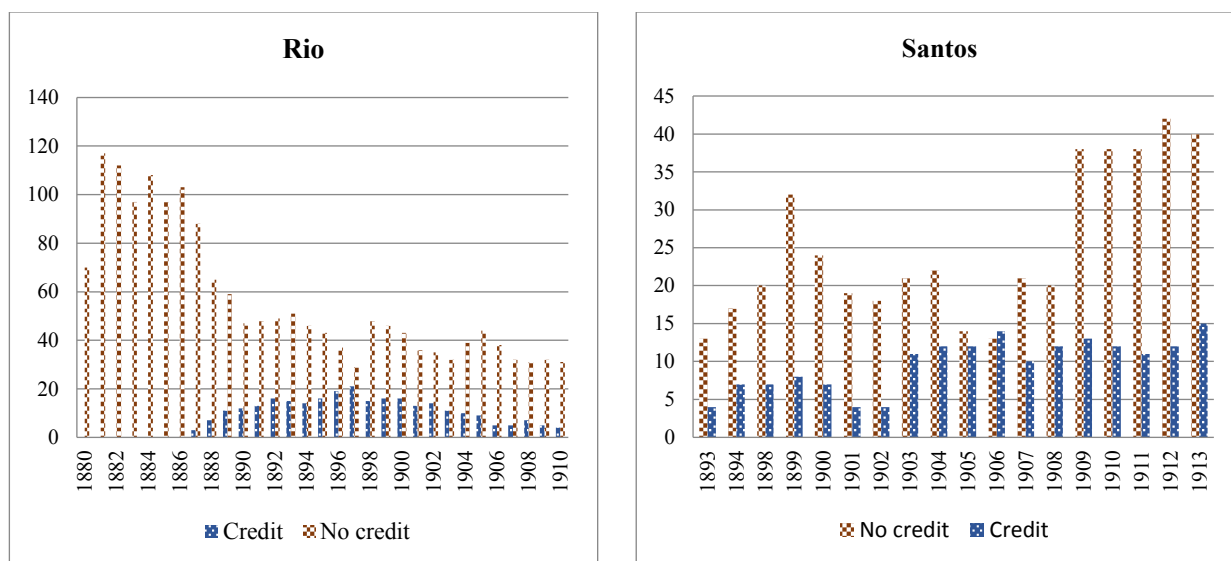
Sources: See Appendix C - Sources

Figure 15: Monthly average credit provided by the Brasilianische (in Pounds) –Total, in Brazil, in Europe, and to the coffee exporting companies in Rio and Santos – 1889-1913
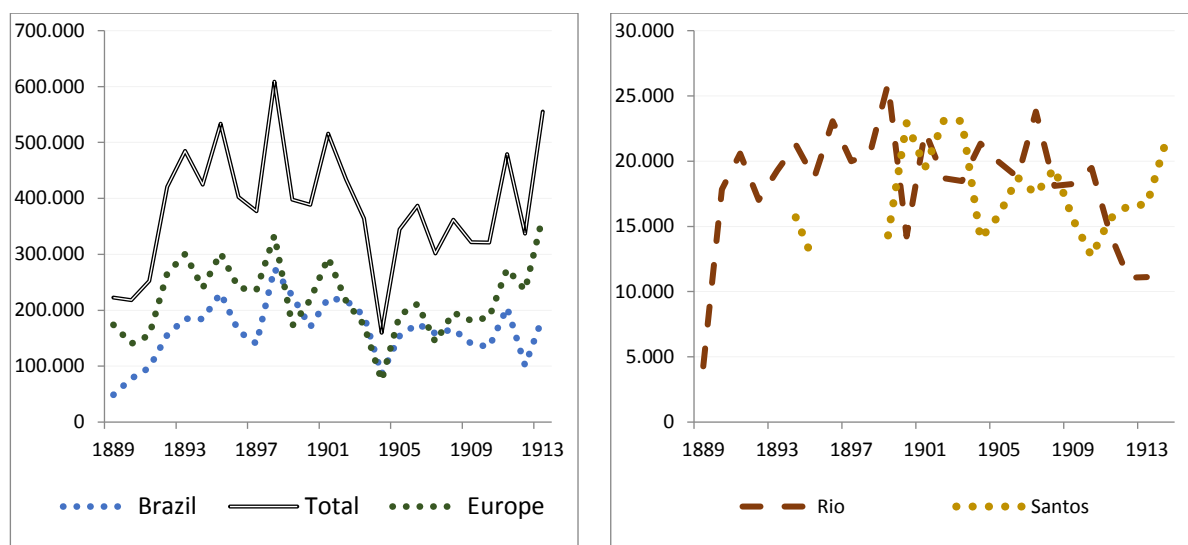
Sources: See Appendix C - Sources

Note: The monthly average of credit provided for Europe includes the credit provided and the bills of exchange discounted (Wechsel auf) for companies that are located in Europe. For Brazil, it includes the credit provided and bills of exchange discounted (Wechsel von) for companies operating in Brazil. The total is the equivalent average for companies in Brazil and Europe. For Rio and Santos, it is the monthly average of the bills discounted and credit provided to the 42 coffee exporting houses in Rio and Santos.

The majority of the exporting houses were foreign companies, 89 per cent, with German, US American, and British companies dominating, accounting for 41, 26, and 10 per cent respectively. [50] Most of the credit was directed to companies with German origins, 32 per cent of the total credit provided to coffee exporters in Rio and Santos between 1889 and 1913, followed by US American, 25 per cent, and British, 20 per cent, companies. Also, it seems that in particular the large export houses benefited from the financial support of the bank. 19 per cent of the companies financed in Rio were among the twenty leading export houses at the time of the bank´s entry in 1889. Yet, at the same time, the bank supported new comers, as 48 per cent of the financed export houses in Rio did not export before 1889 (see Tables 41 and 42 Appendix C).

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[50]   The share of companies of a certain nationality is the number of companies of the respective nationality relative to the total number of 82 companies that have been financed by the Brasilianische Bank in Rio and Santos between 1889 and 1913 adjusted by the companies which nationality could not be identified.

4.6. The business strategy of *Brasilianische Bank* and its impact on credit constraints

Microdata on *Brasilianische's* credit allocation across firms provide interesting insights into the business strategy followed by the bank and may help clarify to what extent it contributed to relieve credit constraints in the coffee export market. The empirical literature suggests that some firms' characteristics are usually correlated with constrained access to credit: 1) size: small- and medium-size firms have less assets to pledge as collateral, are less transparent and more costly to monitor; 2) age: younger, less-established firms might be unable to finance their activities on the basis of their current cash-flow, which increases their dependence on external finance; at the same time, they carry higher default risk as they might be tempted to compete by pursuing riskier strategies. Additionally, in the specific historical circumstances of late 19th-early 20th century Brazil, a firm's nationality could be another possible source of difficult access to credit – e.g. incumbent British banks might have incentives to discriminate against German exporters in order to protect the market share of British firms.

I use a logit estimation to empirically investigate the factors that determined the distribution of credit provided by the *Brasilianische* to the exporting houses in Rio de Janeiro and Santos. For Rio, the panel data include the information on the credit provided to 389 export companies between the years 1891 and 1913.[51] For Santos the credit information on 152 companies between 1893 and 1913. The logit estimation for Rio de Janeiro in the form of an equation is expressed as follows:

$$R_{ct} = \alpha_0 + \beta SIZE_{ct-1} + \mu Act\_89_c + \lambda Ger\_Comp_c + \mathbf{INTER_{ct}\,\psi} + \theta_t + \varepsilon_{ct} \quad (3.1 - Rio)$$

Where R_{ct} is a variable that takes the value one if an exporting company in Rio de Janeiro received credit in year t and the value zero in the opposite case. α_0 is a constant. The variable $SIZE_{ct-1}$ is the share of a company c on the total exports in t-1. It proxies the size of a company, assuming that the banks` information of a company´s size in year t is based on a company´s relative export performance in the previous year. The variable Act_89_c is a dummy equal to one

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[51] The years 1889 and 1890 are missing due to a lack of available data. See data description in section 4.3.

in case a company c existed before the German bank entry in t=1889.[52] The dummy variable Ger_comp_c considers the possible bias of the *Brasilianische* in favor of German companies, becoming one if a company c is of German origin and zero in the opposite case. The variable **INTER$_{ct}\psi$** is a set of interactions, including the interaction between SIZE*Act_89, Ger_Comp*Act_89, and Ger_Comp*SIZE. The estimated model also includes time fixed effects (θ_t),[53] and ε_{ct} is an error term, representing the myriad of other influences on the distribution of credit. The equivalent equation for the logit estimation for Santos is:

$$S_{ct}= \alpha_0 + \beta SIZE_{ct-1} + \lambda Ger\_Comp_c + \chi Exp\_Ger_{ct} + \textbf{INTER}_{ct}\boldsymbol{\psi} + \theta_t + \varepsilon_{ct} \quad (3.2 - Santos)$$

Where S_{ct} is a categorical variable that takes the value one if an exporting company in Santos received credit in year t and the value zero in the opposite case. The specifications for the independent variables are the same as for Rio (Equation 3.1), with the exception that there is no information on the companies before 1889 (Act_89$_{ct-1}$), but the data allows one to additionally test for the assumption that the *Brasilianische* financed those companies that exported to Germany. The effect is captured by the dummy variable Exp_Ger_{ct} that has the value one or zero in case a company c exported or did not export do Germany in t, respectively. The variable **INTER$_{ct}\psi$** is a set of interactions, including Ger_Comp*SIZE and Exp_Ger*SIZE.

The results of the estimations of equations 3.1 and 3.2 are presented in Table 15. The coefficients - columns (3.1) and (3.2) - indicate whether or not an independent variable had a significant positive or negative influence on the probability that an export house c received finance in year t. The marginal effects[54] – columns (3.1a) and (3.2a) - quantify the influence. The coefficient of the variable $SIZE_c$ is positively significant suggesting that larger, less constrained companies were more likely to receive credit. Size seems also to be the most important variable of influence, as it shows in both, Rio and Santos, the highest marginal effects. Younger companies likewise have a higher probability to be financed by the bank. The

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52   This proxy for a company´s age is used in the absence of information on the date of establishment of exporting firms or their period of activity in the Brasilian market.

53   Company fixed effects have not been included as they are collinear with the company specific variables included in the estimations (size, German company, and company exporting to Germany).

54   The marginal effects are the average marginal effects representing the expected difference in outcome probability associated with a one unit increase in the predictor variable, adjusted to the sample distributions of all the variables in the model.

negative significant coefficient on Act_89 indicates that incumbent companies that exported before 1889 had less chances to receive a credit than those that entered the market after 1889. This strongly indicates that the *Brasilianische* contributed to ease the credit constraints of new entrants. This dynamic seems to be independent from a company´s size, as the interaction between SIZE*Act_89 is not significant. Most interestingly, the results confirm the idea that the bank in particular directed credit to German companies. Whether or not a company was of a German origin was after size the second most important factor in determining a company´s probability of receiving a credit in Rio. This provides suggestive evidence that German companies might have suffered from credit constraints prior to the *Brasilianische's* entry. Moreover, it seems that small German companies were favoured, independently from their time being in the market, as the interaction Ger_Comp*SIZE is negatively and the interaction Ger_Comp*Act_89 positively significant. Finally, the findings for Santos suggest that the *Brasilianische* especially financed companies that exported to Germany, with the coefficient χ being positively significant, and its marginal effects being the second highest after a company`s size. This seems to be especially the case for small companies Germany, as the interaction Exp_ger*SIZE is negative and significant.

Table 15: Estimation results Logit and marginal effects - Rio de Janeiro (Equation 3.1) and Santos (Equation 3.2)

	(3.1)	(3.1)	(3.1a)	(3.1a)	(3.2)	(3.2)	(3.2a)	(3.2a)
	Rio	Rio	Rio	Rio	Santos	Santos	Santos	Santos
Company`s Size (β)	33.96***	45.99***	0.869***	1.185***	18.05***	31.32***	0.867***	1.505***
	(4.432)	(7.379)	(0.1115)	(0.1974)	(2.882)	(6.289)	(0.1348)	(0.307)
Active before 1889 (μ)	-0.665***	-0.838***	-0.0170***	-0.0216***	-	-	-	-
	(0.1246)	(0.129)	(0.0034)	(0.0034)	-	-	-	-
German company (λ)	1.704***	1.679***	0.0436***	0. 0433***	0. 797***	1.117***	0.038***	0.054***
	(0.1542)	(0.186)	(0.0042)	(0.0053)	(0.235)	(0.265)	(0.0115)	(0.0153)
Export to Germany (χ)	-	-	-	-	2.453***	2.612***	0.118***	0.126***
	-	-	-	-	(0.217)	(0.0.233)	(0.0105)	(0.011)
SIZE*Act_89 (ψ_1)	-	-6.203	-	-0.1598	-	-	-	-
	-	(9.469)	-	(0.2445)	-	-	-	-
Ger_Comp*Act_89 (ψ_2)	-	0.797***	-	0.0205***	-	-	-	-
	-	(0. 266)	-	(0.0067)	-	-	-	-
Ger_Comp*SIZE (ψ_3)	-	- 21.130***	-	-0.5443***	-	-13.819***	-	-0.664***
	-	(8.124)	-	(0.2145)	-	(6.476)	-	(0.248)
Exp_Ger*SIZE (ψ_4)	-	-	-	-	-	-12.792**	-	-0.615**
	-	-	-	-	-	(5.097)	-	(0.314)
No. Obs.	8947	8947	8947	8947	2584	2584	2584	2584
Pseudo R2	0.1978	0.2055	-	-	0.3338	-	-	-
Method of est.	Logit	Logit	Logit - Marginal	Logit - Marginal	Logit	Logit - Marginal	Logit - Marginal	Logit - Marginal

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

Note: Rio de Janeiro includes observations on 389 export companies in the years from 1891 to 1913. For Santos 152 companies in the years 1894, and 1898 to 1913. The year 1893 is missing as no observations on the exports of the companies in the previous year that are used to measure a company's size are available. Robust standard errors are clustered by company and year and are indicated in brackets. Time dummies are included but not reported. The marginal effects are the average marginal effects based on the Delta-method.

4.7. Exports better with credit? – Financing the export of coffee

The results of the previous section suggest that the *Brasilianische Bank* allocated its credit to export houses that, for their characteristics (German nationality, new entrants), were more exposed to the risk of being credit constrained in the Rio and Santos markets. This section empirically analyzes the effect of the banks´ provision of credit on the performance of coffee export houses in Rio de Janeiro from 1880 to 1913. In particular, it examines whether we can observe a divergence in the exports of companies that received credit (financed) and did not receive credit (not-financed) from the *Brasilianische Bank* after the entry. I make two specifications. Specification one, shown in Figure 16, compares the export of financed with non-financed companies, considering all the 389 export houses operating in Rio de Janeiro from 1880 to 1913. Specification two, shown in Figure 17, omits companies that did not exist before 1889, with a remaining number of 246 companies. In contrast to Figure 16, Figure 17 shows an overall decline in exports over time, indicating that growing exports are connected to new entrants. Yet, both figures exhibit a greater increase in exports of financed relative to non-financed houses after entry. Hence, it does not appear that the difference in the export of financed and non-financed companies is driven by the arrival of new entrants in the market. In specification one and two a company is included in the *Brasilianische's* group of export houses if it received credit from the bank at least in three months after the bank's entry. This definition has its limitations, as it assumes that even the event of a one-time credit can have a considerable long-term impact on a company´s export performance. I therefore additionally consider the frequency of credit, differentiating between export houses that received up to 25 per cent (occasionally), between 25 and 75 per cent (frequently), and more than 75 per cent of the time credit (continuously). The majority of the companies received occasionally credit, 57 and 68 per cent in the case of specification one and two, respectively. One third of the companies received credit frequently, 36 and 27 per cent, respectively. The share of companies that received credit continuously was rather small, with 7 and 5 per cent. There seems to be no bias in frequency of credit explained by a company`s size (see Figure 18). Figure 19 compares the exports of companies receiving occasionally, frequently and continuously credit for specification one and two. It suggests that the divergence between financed and non-financed companies is mainly driven by companies that frequently received credits.

Figure 16: Coffee exports Rio – All export houses - Total exports, exports of companies financed vs. non-financed (in Saccas) - 1880-1913
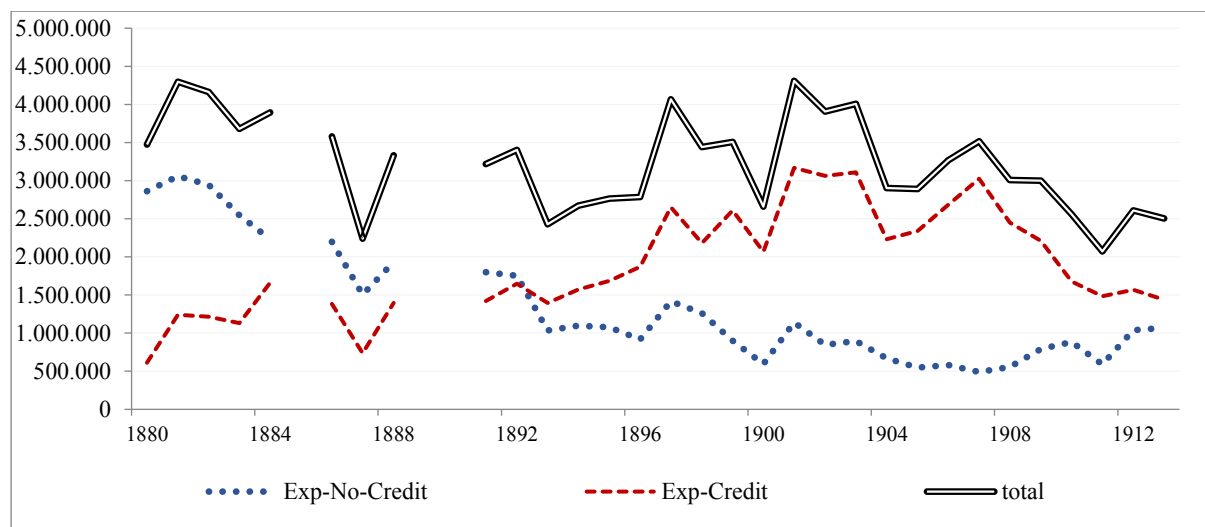

Sources: See Appendix C - Sources

Note: The exports of all 389 companies exporting in Rio de Janeiro between 1880 and 1913 are considered. A company is defined to be financed if it received at least three months' credit from the *Brasilianische Bank* between 1880 and 1913. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data. One "sacca" equals 60 Kg of coffee.

Figure 17: Coffee exports Rio - Companies exporting before 1889 – Total exports, exports of companies financed vs. non-financed (in Saccas) - 1880-1913
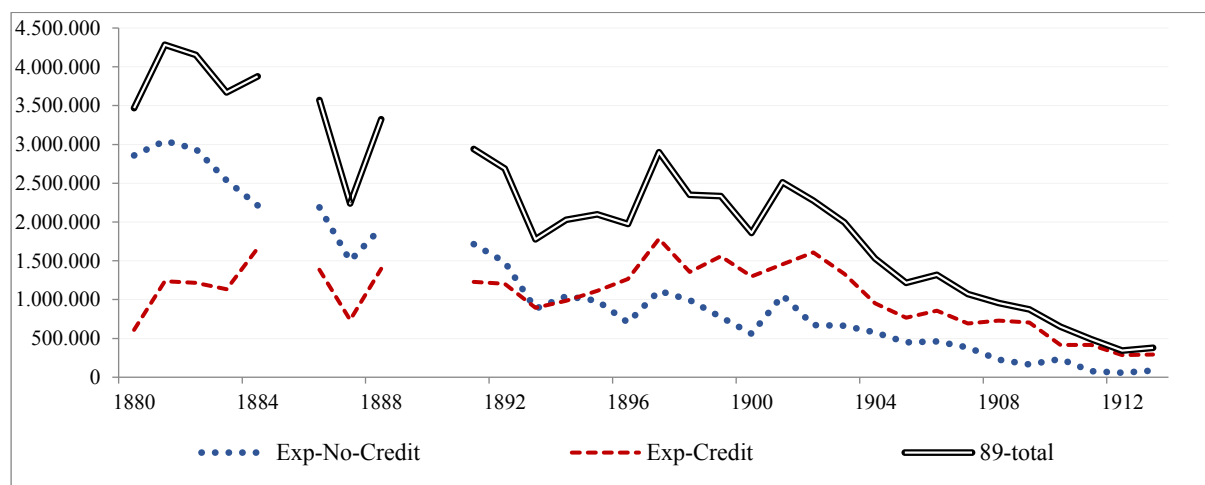
Sources: See Appendix C - Sources

Note: The exports of (246) companies that already exported before 1889 are considered. A company is defined to be financed if it received at least three months credit from the *Brasilianische Bank* between 1880 and 1913. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data. One "sacca" equals 60 Kg of coffee.

Figure 18: Frequency of credit and size of company - All export houses and companies exporting before 1889
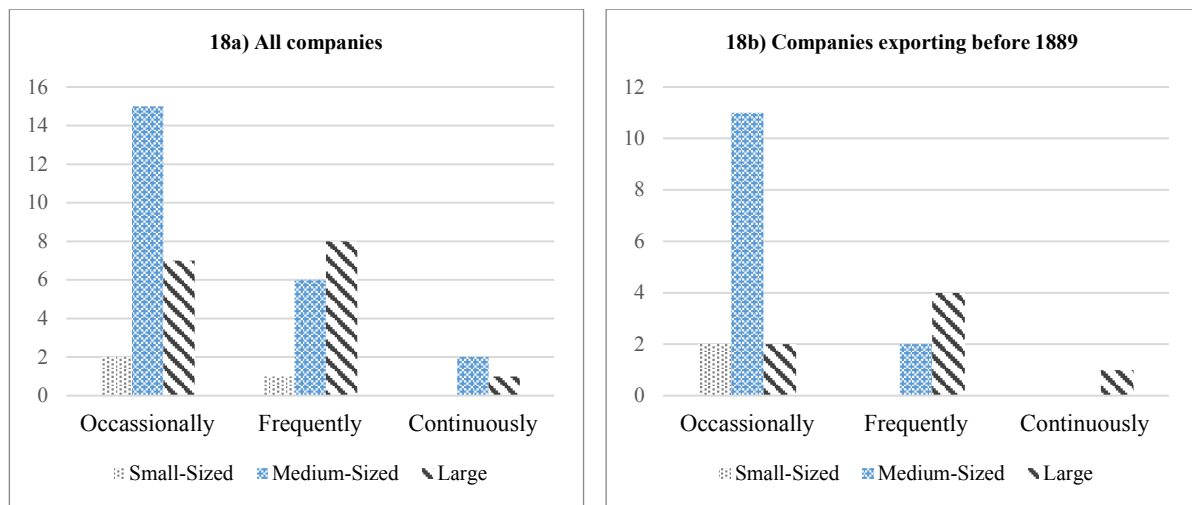
Sources: See Appendix C - Sources

Note: Figure 18a) shows the number of companies receiving occasionally, frequently, and continuously credit in the period between 1889 and 1913. Figure 18b) does the same, omitting export houses that did not export before 1889.

Figure 19: Export Index (1888=100) - Companies receiving occasionally-, frequently- and continuously credit – 1880-1913
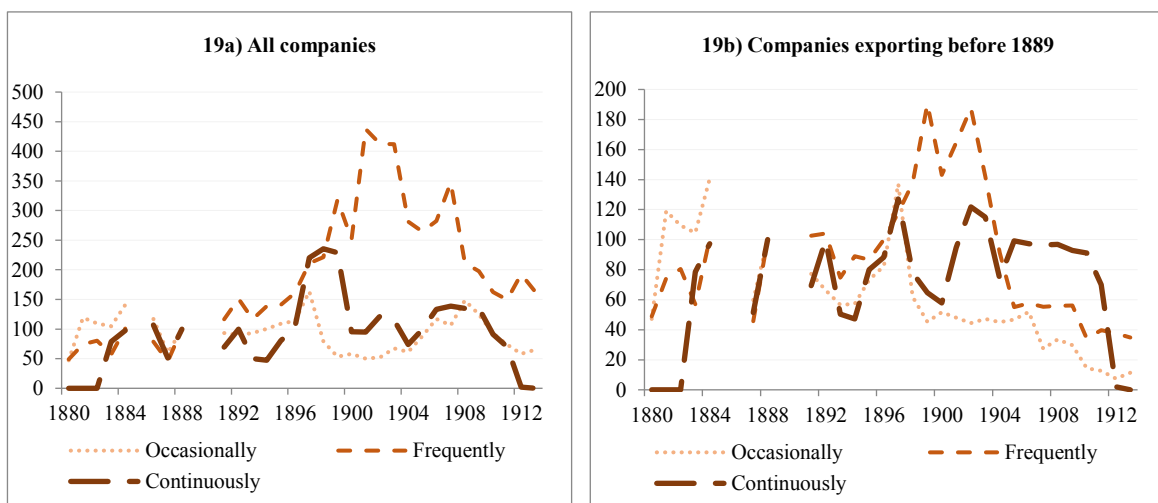
Sources: See Appendix C - Sources

Note: Figure 19a) shows the export index (1888=100) of all 389 export companies operating in Rio between 1880 and 1913. Figure 19b) the index for the 246 companies that already exported before 1889. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data. Occasionally, includes the exports of companies that received up to 25 per cent, frequently the exports of companies that received between 25 and 75 per cent, and continuously the exports of companies that received more than 75 per cent of the time between 1889 and 1913 credit from the *Brasilianische Bank*. One "sacca" equals 60 Kg of coffee.

I use a difference in difference model to measure the effect of the establishment of the *Brasilianische* on the performance of financed and non-financed coffee export companies in Rio de Janeiro between 1880 and 1913. Based on specifications one and two and the differentiation of credit duration, I distinguish between four models. (i) Model-I covers observations on the quantities of coffee exported and the monthly average credit received of all 389 export houses operating in Rio de Janeiro from 1880 to 1913. A company is defined to be treated if it received at least three months' credit. (ii) Model-II is identical to Model-I, but only considers export companies that already exported before bank entry in 1889. (iii) Model-III is identical to Model-I, but distinguishes the treated group between companies that received short-, long-, and continuous credit during 1889 until 1913. (iv) Model-IV differentiates between the duration of credit for Model-II. In the form of an equation, the models are expressed as follows:

$$X_{ct} = \alpha COMP_c + \mu YEAR_t + \gamma FIN_{ct} + \delta INTERV_{ct} + \varepsilon_{ct} \quad \text{(3.3 - Model-I)}$$

$$X_{bt} = \alpha COMP_b + \mu YEAR_t + \gamma FIN_{bt} + \delta INTERV_{bt} + \varepsilon_{bt} \quad \text{(3.4 - Model-II)}$$

$$X_{ct} = \alpha COMP_c + \mu YEAR_t + \mathbf{FIN_{ct}}\gamma + \mathbf{INTERV_{ct}}\,\delta + \varepsilon_{ct} \quad \text{(3.5 - Model-III)}$$

$$X_{bt} = \alpha COMP_b + \mu YEAR_t + \mathbf{FIN_{bt}}\gamma + \mathbf{INTERV_{bt}}\,\delta + \varepsilon_{bt} \quad \text{(3.6 - Model-IV)}$$

The outcomes of interest are X_{ct} and X_{bt}, the quantities exported by a company in year t, with c (N=389) including all export companies and b (N=246) only considering companies that exported before 1889. The variables $COMP_c$ and $COMP_b$ are fixed effects that control for unobserved time-invariant characteristics of companies. $YEAR_t$ is a year fixed effect that controls for common shocks influencing all companies equally in year t. The variables FIN_{ct} and FIN_{bt} are dummies that take the value one for financed companies, and the value zero in the opposite case. They identify the treated group and capture differences between the treatment and control group prior to the bank entry. The variables $\mathbf{FIN_{ct}}$ and $\mathbf{FIN_{bt}}$ represent a full set of treatment dummies, differentiating between companies receiving credit occasionally, frequently, and continuously. $INTER_{ct}$, $INTERV_{bt}$, $\mathbf{INTERV_{ct}}$, and $\mathbf{INTERV_{bt}}$ are the intervention dummies that are equal to one for the respective treated groups after the event of bank entry. ε_{ct} and ε_{bt} are error terms, representing the myriad other influences on exports. Technically, panel data is used to estimate the equations of Model I to IV with Poisson-

maximum likelihood (PPML). Using PPML allows one to include zero observations, as many of the export houses did not export throughout the whole period of observation.

The results are presented in Table 16. The coefficient of interest is $\delta=[(\alpha+\mu+\gamma+\delta) - (\alpha+\mu+\gamma)]$, which is the difference-in-difference estimate, with $(\alpha+\mu+\gamma+\delta)$ being the expected outcome of the treated group with bank intervention, and $(\alpha+\mu+\gamma)$ the expected outcome of the treated group without the event of German bank entry. δ is positively significant in each Model I to IV, confirming the principal assumption of this study that the provision of credit by the *Brasilianische Bank* had a positive impact on the performance of coffee export houses. In Model-I, after the banks´ entry, financed companies exported on average 3.7 times more (based on the estimation results of equation 3.3 since $1\text{-e}^{1.522} = 3.721$)[55] more than non-financed companies. Moreover, the results suggest that companies that received credit with more frequency performed better. Companies that received credit occasionally exported on average 1.2 times more than non-financed companies, and companies receiving credit frequently 6.8 times more.[56]

I use a pre-treatment test to confirm the validity of my results. The test includes two difference-in-difference models that are identical to the Models I and II, with the exception that they cover only the exports by company for the pre-treatment period (1880 - 1888) and assume that German banks were already established during that period in 1885. The results, presented in Table 45 Appendix C, show no statistical significance of the difference-in-difference estimator, δ, confirming no difference between the trend in the export of treated and non-treated companies before actual bank entry in 1889.

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55   See Wooldridge, Jeffrey (2002), "Introductory Econometrics: A Modern Approach", Itps Thomson Learning; 2nd Revised edition

56   Based on Model-III with 1-e 0.803 = 1.232 (occasionally) and 1-e 2.066 = 6.893 (frequently).

Table 16: Difference-in-Difference estimation for coffee export houses in Rio - 1880-1913

	(3.3) Model-I	(3.4) Model-II	(3.5) Model-III	(3.6) Model-IV
FIN (γ)	7.490***	6.690***		
	(0.749)	(0.856)		
FIN – occasionally (γ1)			6.804***	7.038***
			(0.838)	(0.845)
FIN – frequently (γ2)			7.015***	8.979***
			(0.769)	(0.799)
FIN – continuously (γ3)			5.282***	5.434***
			(0.941)	(0.949)
INTERV (δ)	1.522***	0.888***		
	(0.178)	(0.198)		
INTERV – occasionally (δ1)			0.803***	0.420***
			(0.180)	(0.199)
INTERV – frequently (δ2)			2.066***	1.348***
			(0.267)	(0.317)
INTERV – continuously (δ3)			1.582***	1.315***
			(0.337)	(0.324)
YEAR (μ)	Yes	Yes	Yes	Yes
COMP (α)	Yes	Yes	Yes	Yes
Number of observations	12,059	7,626	12,059	7,626
Method of estimation	PPML	PPML	PPML	PPML

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

Note: Dependent variable in columns (3.3) and (3.5) is the quantity of coffee exported by company and year considering all 389 export companies operating between 1880 and 1913 in Rio de Janeiro.The dependent variable in columns (3.4) and (3.6) is the quantity of coffee exported by company and year considering only the 246 companies that already exported before 1889. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data. Robust standard errors are clustered by company and year and are indicated in brackets.

4.8.   Concluding remarks

In 1888 the *Brasilianische Bank für Deutschland* established itself in Brazil. One of the principal purposes of the bank was to engage in the finance of Brazilian coffee exports. The objective of this article has been to analyze the impact of German bank entry on the performance of export houses in Brazil during the period 1880 to 1913.

For this purpose, I created two original and unique data sets on the annual quantity of coffee exported and the amount of credit received from the *Brasilianische Bank* by the export houses in Rio de Janeiro and Santos from 1880 and 1893 respectively, to 1913. Using a logistic regression, the study first analyzes the credit distribution of the bank between its establishment until 1913. The results show that larger export houses were more likely to receive finance, yet at the same time the bank eventually financed new comers. This gives strong evidence that the *Brasilianische Bank* contributed to ease the credit constraints of new entrants. Most interestingly, the results affirm the idea that the bank channelled credit to export houses of German origin and / or companies exporting to Germany. This, on one hand, suggests that previous to the bank´s entry, German companies had suffered from credit constraints. On the other hand, it confirms the idea on the significant role of the bank in promoting trade between Brazil and Germany. I than test, using a difference in difference model, the influence of the provision of credit of the *Brasilianische* on the performance of coffee export houses in Rio de Janeiro. The results confirm a positive, significant influence; companies financed by the *Brasilianische* exported significantly more after its entry than companies not financed by the bank. In particular, companies that received with more frequency credit performed better.

This study contributes to the ongoing discussion on the role of finance in trade, expanding those studies that confirm a positive relation between the availability of external credit and the performance of export companies. It widens the perspective by providing first, quantitative evidence on the impact of foreign banking penetration on the development of a country´s exports in general, and the role of European bank entry on the development of the export sector in emerging countries in particular. Finally, this work lends empirical support to the qualitative studies on the history of German foreign banking that affirm a central role of the *Auslandsbanken* in the fostering of trade by providing financial assistance in the international markets, especially to German companies.

This work has some limitations. The empirical analysis on the determinants of the Brazilian coffee exports tests additional to the influence of finance for assumption that companies already established in the market bear a certain advantage in experience and size over companies that were only recently established at the time of bank entry. However, the limitations in the available data on one hand only allow for the use of a rough measure for the latter (the distinction between companies exporting before and after bank entry), and exclude the possibility of considering further factors of influence. Hence, future research should focus on the improvement of the measurement, such as using the year of foundation of the companies as an indicator of established and new comer companies, and the definition and inclusion of further factors that might have influenced the performance of Brazilian coffee export houses.

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6. Appendix

6.1. Appendix A

6.1.1. Sources

The data on trade includes observations for the periods from 1880 to 1884, 1898 to 1902, and 1909 to 1913. The number of countries presented in the data set varies over time in accordance with the official trade statistics, with 66 countries for the years 1880-1884, 92 for the years 1898-1902, and 102 for the years 1909-1913. The bank data cover the years 1881, 1900, and 1913, for the same number of countries as trade in the respective years. In the case of the Gravity Model, the original numbers of observations had to be adjusted to 52 countries in 1881 and 59 countries in 1900 and 1913, respectively, due to limitations in the available GDP data.

The data for trade were obtained from the official German and British statistics on foreign trade. For Germany: *Statistik des Deutsche Reiches - Auswärtiger Handel des deutschen Zollgebietes nach Herkunfts- und Bestimmungsländern in den Jahren 1880 bis 1896 - Kaiserliches Statistisches Amt*; *Statistisches Jahrbuch für das Deutsche Reich – Spezialhandel nach Erdteilen und nach Ländern – Kaiserliches Statistisches Amt,* Jahrgang 1906, 1908, 1913, 1916.; and for Great Britian: *David Jacks – Taken from the Statistical Abstract for the United Kingdom, London, various years.*

The information for bank data was extracted from *the Almanac Directory, Year Book and Diary. A Parliamentary Directory and Complete Banking Directory* published by Sir Inglis Palgrave in London,* which provides detailed information on the number and location of branches of German and British banks in the world for the years 1881, 1900 and 1913. In some cases it was possible to locate the original banking reports *(Geschäftsberichte)* of the *Auslandsbanken,* such as the *Deutsche Überseeische Bank,* and *the Deutsche Asiatische Bank.* Furthermore, the data from the *Almana*c has been verified and, if necessary, supplemented with the information provided by the quantitative works of Hauser, R. *Die deutschen Banken im Ausland* (1906), Riesser and Jacobs *Die deutschen Grossbanken und ihre Konzentration* (1914), Hurely, Edward N. (1911), "Banking and Credit in Argentina, Brazil, Chile and Peru", *U.S. Department of Commerce. Special Agents Series No. 90. Washington D.C* , Strasser, K.

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Real GDP data was obtained from *Bolt, J. and J.L van Zanden (2013) The First Update of the Maddison Project; Re-Estimating Growth Before 1820*, Maddison Project Paper 4. In case of South and Central America, Africa and Asia, the data provided do not cover the entire years of observation 1881, 1900 and 1913, and missing years are estimated by geometric interpolation. The real GDP of Austria-Hungary is estimated as weighted sum of GDP of Austria and Hungary. The GDP for Korea is likewise calculated as the weighted sum of North and South Korean GDP. The same method is applied for the data of Australia in 1881, including the GDP of Uruguay, and Australasia in 1900 and 1913, including the GDP of Australia and New Zealand, as equally statistics on trade combine these countries in the respective years.

The calculations on great circle distance in kilometers are based on the data on the geographic coordinates of the countries capitals (longitude and latitude) provided by the internet source *http://www.fallingrain.com/world/index.html*. Common language and land lock status has been assigned on the base of the information provided by the *CEPII Geodesic Distance data From the Centre d'Etudes Prospectives et d'Informations Internationales.* The information on colonial links was extracted from *Correlates of War 2 Project. Colonial/Dependency Contiguity Data, 1816-2002, Version 3.0* in combination with the data provided by the sources *http://www.britishempire.co.uk/timeline/colonies.htm* and *http://www.worldstatesmen.org/COLONIES.html#German*. The data on shared borders is based on common knowledge of the author. The information on the adherence to the Gold Standard was obtained from the EH.net database *http://eh.net/encyclopedia/gold-standard/*.

6.1.2. Tables and Graphs

Table 17: The chronology of German foreign banks in the world and their mother institutions – 1869–1913

Auslandsbanken	Founded,	Operating in	Mother Institution	Located	Founded	Type of involvement
Ungarische Escompte und Wechselbank	1869	Hungary	Darmstädter Bank	Darmstadt	1853	Silend Partnership (Kommandite)
Deutsche Bank London	1870	Great Britain	Deutsche Bank	Berlin	1870	Branch
Deutsche Bank Istambul	1870	Turkey	Deutsche Bank	Berlin	1870	Branch
London Hanseatic Bank	1870	Great Britain	Commerz Bank	Hamburg	1870	Subsidiary
			Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	
Amsterdamsche Bank	1871	Netherlands	Darmstädter Bank	Darmstadt	1853	Subsidiary
La Plata Bank	1872	Argentina	Deutsche Diskonto Gesellschaft	Berlin	1851	Subsidiary (Liquidated in 1885)
			Deutsche Bank	Berlin	1870	
Deutsche Überseeische Bank	1886	Argentina	Deutsche Bank	Berlin	1870	Subsidiary
		Bolivia				
		Brazil				
		Chile				
		Peru				
		Spain				
		Uruguay				
Brasilianische Bank für Deutschland	1887	Brazil	Norddeutsche Bank	Hamburg	1851	Subsidiary
			Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	
Deutsch Asiatische Bank	1889	China	Deutsche Bank	Berlin	1870	Subsidiary
		India	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	
		Japan	Darmstädter Bank	Darmstadt	1853	
		Singapore	Berliner Handelsgesellschaft	Berlin	1856	
			A Schaafhausen`scher Bankverein	Cologne	1848	
			Nationalbank für Deutschland	Berlin	1881	
			Dresdner Bank	Dresden	1872	

Bank für Orientalische Eisenbahn	1890	Switzerland	Deutsche Bank	Berlin	1870	Subsidiary
Ungarische Bank und Handels-Aktiengesellschaft	1890	Austria				
		Bosnia				
		Bulgaria				
		Croatia				
		France				
		Hungary				
		Rumania				
		Serbia				
		Turkey				
		Ukraine				
Banca Commerciale Italiana	1894	Brazil	Deutsche Bank	Berlin	1870	Subsidiary
		Italy	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	
		Turkey	Dresdner Bank	Berlin	1872	
			Berliner Handelsgesellschaft	Berlin	1856	
			A Schaafhausen`scher Bankverein	Cologne	1848	
			Darmstädter Bank	Darmstadt	1853	
Banca Commerciale Tunisina	1894	France	Banca Commerciale Italiana	Milan	1894	Subsidiary
Bank für Chile und Deutschland	1895	Bolivia	Norddeutsche Bank	Hamburg	1851	Subsidiary
		Chile	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	
Norddeutsche Creditanstalt	1897	Poland				Branch
Banca Generala Romana	1879	Romania	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	Subsidiary
			S. Bleichröder	Berlin		
Banque Internationale de Bruxelles	1898	Belgium	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	Subsidiary
			Darmstädter Bank	Darmstadt	1853	
			Berliner Handelsgesellschaft	Berlin	1856	
			A Schaafhausen`scher Bankverein	Cologne	1848	

Deutsche Palästina Bank	1898	Israel				Subsidiary
		Lebanon				
		Syria				
		Syria				
Diskonto Gesellschaft London	1900	Great Britain	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	Branch
Dresdner Bank London	1901	Great Britain	Dresdner Bank	Berlin	1872	Branch
Wechselstube Aktiengesellschaft	1902	Austria	Darmstädter Bank	Darmstadt	1853	Silend Partnership (Kommandite)
Banque d`Orient	1904	Greece	Nationalbank für Deutschland	Berlin	1881	Subsidiary
		Turkey				
Deutsche Westafrikanische Bank	1904	Cameroon	Dresdener Bank	Berlin	1872	Subsidiary
		Togo				
Deutsch Südamerikanische Bank	1905	Argentina	Dresdener Bank	Berlin	1872	Subsidiary
		Brazil	Schaffhausen`scher Bankverein	Cologne	1848	
		Chile	Nationalbank für Deutschland	Berlin	1881	
		Mexico				
Deutsche Afrika Bank	1905	South Africa	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	Subsidiary
			C. Woermann			
German East African Bank	1905	Kenia	Deutsche Bank	Berlin	1870	Subsidiary
		Tanzania	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	
			Deutsch-Ostafrikanische Handelsgesellschaft	Berlin	1884	
Banque Crédit (Kreditna Banka)	1906	Bulgaria	Deutsche Diskonto-Gesellschaft/Disconto Bank	Berlin	1851	Subsidiary
			S. Bleichröder			
			Norddeutsche Bank	Hamburg	1851	
Deutsche Orientbank	1906	Egypt	Dresdner Bank	Berlin	1872	Subsidiary
		Greece	A. Schaaffhausen`sche Bankverein	Cologne	1848	
		Italy	Nationalbank für Deutschland	Berlin	1881	
		Lebanon				

		Morocco				
		Syria				
		Turkey				
Mexikanische Bank für Handel und Industrie	1906	Mexico	Deutsche Bank	Berlin	1870	Subsidiary
		USA				
Deutsche Antiquoquia Bank	1912	Colombia	German Merchants from Bremen	Bremen		Subsidiary
Bankers Trading Syndicate of London		Great Britain	Darmstädter Bank	Darmstadt	1853	Subsidiary
			Nordwestdeutsche Bank of Bremen	Bremen		
Deutsch Afrika-Bank Aktiengesellschaft		Namibia	Deutsche Bank	Berlin	1870	Subsidiary

Source: See Appendix A - Sources

Table 18: German exports, imports and total trade by continent (in Mio USD) – 1880-84, 1898-1902, 1900 - 1913

year	*Continent*	*Imports*	*Exports*	*Total*
1880	Africa	4.07	1.29	*5.35*
1880	America Central	0.56	0.52	*1.08*
1880	America North	41.48	46.11	*87.58*
1880	America South	14.02	5.03	*19.05*
1880	Asia	15.68	4.97	*20.65*
1880	Australia	1.85	0.42	*2.28*
1880	Europe	477.94	490.33	*968.28*
1880	Oceania	0.00	0.00	*0.00*
1880	**Total**	**555.60**	**548.67**	***1,104.27***
1881	Africa	3.04	1.35	*4.39*
1881	America Central	0.32	0.73	*1.06*
1881	America North	36.37	47.57	*83.94*
1881	America South	12.39	6.38	*18.77*
1881	Asia	6.89	5.04	*11.93*
1881	Australia	1.34	0.75	*2.09*
1881	Europe	510.71	517.95	*1,028.67*
1881	Oceania	0.00	0.00	*0.00*
1881	**Total**	**571.07**	**579.77**	***1,150.84***
1882	Africa	3.49	1.21	*4.70*
1882	America Central	0.25	0.82	*1.06*

1882	America North	28.02	47.45	*75.47*
1882	America South	13.34	7.50	*20.83*
1882	Asia	8.97	5.41	*14.38*
1882	Australia	0.85	1.62	*2.47*
1882	Europe	561.65	553.01	*1,114.66*
1882	Oceania	0.00	0.00	*0.00*
1882	**Total**	**616.57**	**617.01**	***1,233.58***
1883	Africa	2.62	1.54	*4.16*
1883	America Central	0.34	0.75	*1.08*
1883	America North	32.88	43.08	*75.95*
1883	America South	14.74	8.35	*23.09*
1883	Asia	9.30	6.03	*15.33*
1883	Australia	1.18	1.26	*2.44*
1883	Europe	581.16	554.59	*1,135.75*
1883	Oceania	0.00	0.00	*0.00*
1883	**Total**	**642.22**	**615.59**	***1,257.81***
1884	Africa	3.19	1.72	*4.90*
1884	America Central	0.55	0.76	*1.31*
1884	America North	30.63	41.77	*72.40*
1884	America South	17.31	9.42	*26.73*
1884	Asia	7.90	8.03	*15.94*
1884	Australia	1.38	1.41	*2.79*
1884	Europe	584.15	524.90	*1,109.05*
1884	Oceania	0.00	0.00	*0.00*
1884	**Total**	**645.11**	**588.01**	***1,233.12***
1898	Africa	24.02	15.19	*39.21*
1898	America Central	7.77	6.73	*14.50*
1898	America North	235.38	92.54	*327.91*
1898	America South	72.44	27.12	*99.56*
1898	Asia	81.99	40.39	*122.38*
1898	Australia	20.96	8.24	*29.20*
1898	Europe	849.50	761.88	*1,611.38*
1898	Oceania	0.00	0.00	*0.00*
1898	**Total**	**1,292.06**	**1,031.51**	***2,323.57***
1900	Africa	30.45	14.75	*45.20*
1900	America Central	9.52	10.47	*19.99*
1900	America North	242.92	109.92	*352.84*
1900	America South	120.63	44.73	*165.36*
1900	Asia	84.46	54.96	*139.42*
1900	Australia	28.55	15.71	*44.26*
1900	Europe	844.16	839.40	*1,683.56*
1900	Oceania	0.00	0.00	*0.00*
1900	**Total**	**1,360.69**	**1,089.94**	***2,450.63***
1901	Africa	29.14	15.29	*44.42*
1901	America Central	8.60	9.55	*18.15*

1901	America North	238.83	98.88	*337.71*
1901	America South	116.79	38.69	*155.48*
1901	Asia	87.89	50.16	*138.05*
1901	Australia	26.51	13.14	*39.65*
1901	Europe	775.26	820.64	*1,595.89*
1901	Oceania	0.00	0.00	*0.00*
1901	**Total**	**1,283.02**	**1,046.34**	***2,329.35***
1902	Africa	37.92	20.27	*58.19*
1902	America Central	9.30	11.69	*20.99*
1902	America North	217.03	117.10	*334.13*
1902	America South	114.24	37.20	*151.44*
1902	Asia	93.49	48.41	*141.90*
1902	Australia	28.61	11.21	*39.82*
1902	Europe	828.76	856.43	*1,685.19*
1902	Oceania	0.00	0.00	*0.00*
1902	**Total**	**1,291.43**	**1,102.31**	***2,393.74***
1909	Africa	86.33	34.34	*120.67*
1909	America Central	10.97	15.98	*26.95*
1909	America North	306.21	151.20	*457.41*
1909	America South	227.75	92.53	*320.28*
1909	Asia	158.59	67.97	*226.56*
1909	Australia	58.19	14.79	*72.98*
1909	Europe	1,169.75	1,171.66	*2,341.41*
1909	Oceania	0.48	1.19	*1.67*
1909	**Total**	**2,018.27**	**1,549.65**	***3,567.92***
1910	Africa	99.30	43.10	*142.40*
1910	America Central	11.19	19.05	*30.24*
1910	America North	288.61	160.26	*448.87*
1910	America South	222.17	119.54	*341.72*
1910	Asia	197.41	79.06	*276.47*
1910	Australia	68.58	15.72	*84.30*
1910	Europe	1,078.49	1,314.47	*2,392.96*
1910	Oceania	1.19	1.43	*2.62*
1910	**Total**	**1,966.95**	**1,752.63**	***3,719.58***
1911	Africa	99.20	44.72	*143.92*
1911	America Central	13.56	20.22	*33.78*
1911	America North	329.23	163.42	*492.65*
1911	America South	243.11	140.35	*383.46*
1911	Asia	203.15	91.11	*294.26*
1911	Australia	63.04	19.74	*82.78*
1911	Europe	1,337.36	1,417.05	*2,754.41*
1911	Oceania	1.67	2.14	*3.81*
1911	**Total**	**2,290.31**	**1,898.76**	***4,189.07***
1912	Africa	114.22	44.02	*158.24*
1912	America Central	14.99	20.94	*35.93*

1912	America North	394.77	179.89	*574.66*
1912	America South	276.26	155.15	*431.41*
1912	Asia	239.38	99.94	*339.32*
1912	Australia	70.20	21.65	*91.85*
1912	Europe	1,430.10	1,605.23	*3,035.34*
1912	Oceania	2.14	2.14	*4.28*
1912	**Total**	**2,542.05**	**2,128.97**	***4,671.03***
1913	Africa	118.34	49.29	*167.62*
1913	America Central	14.05	22.62	*36.67*
1913	America North	426.91	199.76	*626.67*
1913	America South	272.15	160.48	*432.63*
1913	Asia	250.01	130.96	*380.96*
1913	Australia	75.72	22.14	*97.86*
1913	Europe	1,193.36	1,485.99	*2,679.35*
1913	Oceania	2.38	2.62	*5.00*
1913	**Total**	**2,352.90**	**2,071.95**	***4,424.85***

Source: See Appendix A - Sources

Table 19: German exports, emports and total trade by continent as % of total trade – 1880-84, 1898-1902, 1900 -1913

year	*Continent*	*Imports*	*Exports*	*Total*
1880	Africa	0.73	0.23	0.48
1880	America Central	0.10	0.09	0.10
1880	America North	7.47	8.40	7.93
1880	America South	2.52	0.92	1.73
1880	Asia	2.82	0.91	1.87
1880	Australia	0.33	0.08	0.21
1880	Europe	86.02	89.37	87.68
1880	Oceania	0.00	0.00	0.00
1881	Africa	0.73	0.23	0.48
1881	America Central	0.10	0.09	0.10
1881	America North	7.47	8.40	7.93
1881	America South	2.52	0.92	1.73
1881	Asia	2.82	0.91	1.87
1881	Australia	0.33	0.08	0.21
1881	Europe	86.02	89.37	87.68
1881	Oceania	0.00	0.00	0.00
1882	Africa	0.53	0.23	0.38
1882	America Central	0.06	0.13	0.09
1882	America North	6.37	8.21	7.29

1882	America South	2.17	1.10	1.63
1882	Asia	1.21	0.87	1.04
1882	Australia	0.24	0.13	0.18
1882	Europe	89.43	89.34	89.38
1882	Oceania	0.00	0.00	0.00
1883	Africa	0.57	0.20	0.38
1883	America Central	0.04	0.13	0.09
1883	America North	4.54	7.69	6.12
1883	America South	2.16	1.21	1.69
1883	Asia	1.46	0.88	1.17
1883	Australia	0.14	0.26	0.20
1883	Europe	91.09	89.63	90.36
1883	Oceania	0.00	0.00	0.00
1884	Africa	0.41	0.25	0.33
1884	America Central	0.05	0.12	0.09
1884	America North	5.12	7.00	6.04
1884	America South	2.30	1.36	1.84
1884	Asia	1.45	0.98	1.22
1884	Australia	0.18	0.20	0.19
1884	Europe	90.49	90.09	90.30
1884	Oceania	0.00	0.00	0.00
1898	Africa	0.49	0.29	0.40
1898	America Central	0.08	0.13	0.11
1898	America North	4.75	7.10	5.87
1898	America South	2.68	1.60	2.17
1898	Asia	1.23	1.37	1.29
1898	Australia	0.21	0.24	0.23
1898	Europe	90.55	89.27	89.94
1898	Oceania	0.00	0.00	0.00
1900	Africa	1.86	1.47	1.69
1900	America Central	0.60	0.65	0.62
1900	America North	18.22	8.97	14.11
1900	America South	5.61	2.63	4.28
1900	Asia	6.35	3.92	5.27
1900	Australia	1.62	0.80	1.26
1900	Europe	65.75	73.86	69.35
1900	Oceania	0.00	0.00	0.00
1901	Africa	2.24	1.35	1.84
1901	America Central	0.70	0.96	0.82
1901	America North	17.85	10.09	14.40
1901	America South	8.87	4.10	6.75
1901	Asia	6.21	5.04	5.69
1901	Australia	2.10	1.44	1.81
1901	Europe	62.04	77.01	68.70
1901	Oceania	0.00	0.00	0.00

1902	Africa	2.27	1.46	1.91
1902	America Central	0.67	0.91	0.78
1902	America North	18.62	9.45	14.50
1902	America South	9.10	3.70	6.67
1902	Asia	6.85	4.79	5.93
1902	Australia	2.07	1.26	1.70
1902	Europe	60.42	78.43	68.51
1902	Oceania	0.00	0.00	0.00
1909	Africa	2.94	1.84	2.43
1909	America Central	0.72	1.06	0.88
1909	America North	16.81	10.62	13.96
1909	America South	8.85	3.38	6.33
1909	Asia	7.24	4.39	5.93
1909	Australia	2.22	1.02	1.66
1909	Europe	64.17	77.69	70.40
1909	Oceania	0.00	0.00	0.00
1910	Africa	4.28	2.22	3.38
1910	America Central	0.54	1.03	0.76
1910	America North	15.17	9.76	12.82
1910	America South	11.28	5.97	8.98
1910	Asia	7.86	4.39	6.35
1910	Australia	2.88	0.95	2.05
1910	Europe	57.96	75.61	65.62
1910	Oceania	0.02	0.08	0.05
1911	Africa	5.05	2.46	3.83
1911	America Central	0.57	1.09	0.81
1911	America North	14.67	9.14	12.07
1911	America South	11.30	6.82	9.19
1911	Asia	10.04	4.51	7.43
1911	Australia	3.49	0.90	2.27
1911	Europe	54.83	75.00	64.33
1911	Oceania	0.06	0.08	0.07
1912	Africa	4.33	2.36	3.44
1912	America Central	0.59	1.06	0.81
1912	America North	14.37	8.61	11.76
1912	America South	10.61	7.39	9.15
1912	Asia	8.87	4.80	7.02
1912	Australia	2.75	1.04	1.98
1912	Europe	58.39	74.63	65.75
1912	Oceania	0.07	0.11	0.09
1913	Africa	4.49	2.07	3.39
1913	America Central	0.59	0.98	0.77
1913	America North	15.53	8.45	12.30
1913	America South	10.87	7.29	9.24
1913	Asia	9.42	4.69	7.26

1913	Australia	2.76	1.02	1.97
1913	Europe	56.26	75.40	64.98
1913	Oceania	0.08	0.10	0.09

Source: See Appendix A - Sources

Table 20: German exports, imports and total trade by continent growth rates (%) – 1880-84, 1898-1902, 1900 -1913

1880-1884	Exports in %	Imports in %	Total in %
Africa	-8.14	9.64	-2.92
America Central	-1.06	12.72	6.27
America North	-10.10	-3.30	-6.35
America South	7.03	20.89	11.29
Asia	-22.84	16.03	-8.63
Australia	-9.78	40.19	6.82
Europe	6.69	2.27	4.52
Oceania	0.00	0.00	0.00
Total	**4.98**	**2.31**	**3.68**

1898-1902			
Africa	15.22	9.61	13.16
America Central	5.98	18.40	12.32
America North	-2.71	7.85	0.63
America South	15.19	10.54	13.98
Asia	4.37	6.04	4.93
Australia	10.37	10.27	10.34
Europe	-0.82	3.90	1.49
Oceania	0.00	0.00	0.00
Total	**-0.02**	**2.21**	**0.99**

1909-1913			
Africa	10.51	12.04	10.95
America Central	8.24	11.59	10.27
America North	11.08	9.28	10.49
America South	5.94	18.35	10.02
Asia	15.17	21.86	17.32
Australia	8.78	13.46	9.78
Europe	0.67	7.92	4.49
Oceania	53.59	26.24	36.57
Total	**5.11**	**9.68**	**7.18**

Source: See Appendix A - Sources

Table 21: British exports, imports and total trade by continent (in Mio USD) – 1880-84, 1898-1902, 1900 - 1913

year	Continent	Imports	Exports	Total
1880	Africa	4.07	1.29	5.35
1880	America Central	0.56	0.52	1.08
1880	America North	41.48	46.11	87.58
1880	America South	14.02	5.03	19.05
1880	Asia	15.68	4.97	20.65
1880	Australia	1.85	0.42	2.28
1880	Europe	477.94	490.33	968.28
1880	Oceania	0.00	0.00	0.00
1880	*Total*	*555.60*	*548.67*	*1,104.27*
1881	Africa	92.58	79.78	172.36
1881	America Central	52.15	48.84	100.99
1881	America North	553.02	222.59	775.61
1881	America South	61.87	77.89	139.77
1881	Asia	272.73	249.53	522.27
1881	Australia	130.28	115.82	246.10
1881	Europe	752.87	628.23	1,381.10
1881	Oceania	0.00	0.00	0.00
1881	**Total**	**1,822.92**	**1,342.92**	**3,338.19**
1882	Africa	91.32	81.86	173.18
1882	America Central	57.74	52.59	110.32
1882	America North	480.90	240.53	721.43
1882	America South	73.85	88.24	162.09
1882	Asia	319.21	235.21	554.41
1882	Australia	122.60	138.55	261.14
1882	Europe	862.29	641.96	1,504.25
1882	Oceania	0.00	0.00	0.00
1882	**Total**	**1,916.58**	**1,397.07**	**3,486.83**
1883	Africa	101.69	73.42	175.11
1883	America Central	43.48	53.41	96.89
1883	America North	540.77	227.14	767.91
1883	America South	67.84	83.86	151.69
1883	Asia	310.66	249.18	559.84
1883	Australia	125.76	130.14	255.91
1883	Europe	872.95	648.50	1,521.45
1883	Oceania	0.00	0.00	0.00
1883	**Total**	**1,961.46**	**1,392.23**	**3,528.79**
1884	Africa	99.84	70.33	170.17
1884	America Central	42.35	45.71	88.06
1884	America North	472.36	205.92	678.29
1884	America South	56.66	91.31	147.97

1884	Asia	282.26	243.86	526.12
1884	Australia	137.41	130.10	267.52
1884	Europe	797.93	636.68	1,434.61
1884	Oceania	0.00	0.00	0.00
1884	**Total**	**1,788.99**	**1,353.59**	**3,312.75**
1898	Africa	144.36	177.68	322.04
1898	America Central	20.78	34.68	55.46
1898	America North	711.72	174.88	886.61
1898	America South	89.26	84.81	174.07
1898	Asia	220.28	263.05	483.34
1898	Australia	96.15	91.85	188.00
1898	Europe	1,018.08	649.91	1,667.98
1898	Oceania	43.70	21.65	65.35
1898	**Total**	**2,344.34**	**1,498.51**	**3,842.84**
1899	Africa	153.45	175.75	329.19
1899	America Central	19.16	43.38	62.54
1899	America North	684.88	212.77	897.65
1899	America South	104.05	88.38	192.43
1899	Asia	235.19	301.50	536.68
1899	Australia	114.89	96.32	211.21
1899	Europe	1,062.81	729.54	1,792.35
1899	Oceania	47.18	24.01	71.19
1899	**Total**	**2,421.61**	**1,671.64**	**4,093.25**
1900	Africa	140.48	202.10	342.58
1900	America Central	19.50	43.00	62.50
1900	America North	783.44	228.68	1,012.12
1900	America South	128.10	103.56	231.66
1900	Asia	233.85	312.37	546.22
1900	Australia	115.80	114.55	230.35
1900	Europe	1,112.37	777.86	1,890.22
1900	Oceania	56.51	28.70	85.21
1900	**Total**	**2,590.05**	**1,810.82**	**4,400.86**
1901	Africa	153.17	234.86	388.03
1901	America Central	21.01	42.65	63.66
1901	America North	786.47	230.67	1,017.14
1901	America South	120.06	92.29	212.35
1901	Asia	238.51	351.56	590.07
1901	Australia	118.01	114.58	232.58
1901	Europe	1,166.07	749.43	1,915.50
1901	Oceania	51.62	29.57	81.19
1901	**Total**	**2,654.92**	**1,845.60**	**4,500.52**
1902	Africa	172.08	298.56	470.64
1902	America Central	20.90	42.91	63.81
1902	America North	733.56	270.50	1,004.06
1902	America South	133.58	91.94	225.52

1902	Asia	246.40	331.41	577.81
1902	Australia	96.14	104.89	201.03
1902	Europe	1,256.21	712.76	1,968.98
1902	Oceania	53.02	30.01	83.03
1902	**Total**	**2,711.90**	**1,882.98**	**4,594.88**
1909	Africa	252.05	233.45	485.49
1909	America Central	36.02	58.61	94.63
1909	America North	711.17	380.11	1,091.28
1909	America South	272.18	101.80	373.97
1909	Asia	331.48	422.00	753.47
1909	Australia	159.13	132.58	291.71
1909	Europe	1,317.96	942.38	2,260.34
1909	Oceania	86.40	39.38	125.78
1909	**Total**	**3,166.38**	**2,310.30**	**5,476.69**
1910	Africa	279.75	293.03	572.78
1910	America Central	46.76	65.27	112.03
1910	America North	714.61	417.38	1,131.99
1910	America South	291.29	152.75	444.04
1910	Asia	411.91	468.31	880.23
1910	Australia	187.60	151.11	338.70
1910	Europe	1,338.92	1,052.34	2,391.26
1910	Oceania	101.84	45.72	147.57
1910	**Total**	**3,372.69**	**2,645.91**	**6,018.60**
1911	Africa	278.90	310.45	589.35
1911	America Central	36.76	72.57	109.33
1911	America North	732.17	386.56	1,118.74
1911	America South	243.90	219.11	463.01
1911	Asia	431.49	533.34	964.82
1911	Australia	190.14	167.95	358.09
1911	Europe	1,423.48	1,100.56	2,524.04
1911	Oceania	86.79	51.54	138.33
1911	**Total**	**3,423.63**	**2,842.07**	**6,265.71**
1912	Africa	318.14	329.79	647.92
1912	America Central	44.78	76.82	121.60
1912	America North	803.65	451.52	1,255.16
1912	America South	309.82	232.50	542.32
1912	Asia	506.83	572.74	1,079.58
1912	Australia	175.75	186.27	362.02
1912	Europe	1,500.37	1,156.71	2,657.08
1912	Oceania	98.79	54.43	153.22
1912	**Total**	**3,758.13**	**3,060.77**	**6,818.90**
1913	Africa	322.01	344.14	666.14
1913	America Central	48.88	76.32	125.20
1913	America North	852.79	426.82	1,279.61
1913	America South	327.21	240.64	567.84

1913	Asia	489.63	686.63	1,176.26
1913	Australia	185.19	183.99	369.18
1913	Europe	1,570.23	1,226.19	2,796.42
1913	Oceania	98.92	57.34	156.26
1913	**Total**	**3,894.84**	**3,242.07**	**7,136.90**

Source: See Appendix A – Sources

Table 22: British exports, imports and total trade by continent as % of total trade – 1880-84, 1898-1902, 1900 -1913

year	*Continent*	*Imports*	*Exports*	*Total*
1880	Africa	5.02	5.74	5.04
1880	America Central	2.94	3.43	2.98
1880	America North	30.80	17.30	24.03
1880	America South	3.53	5.29	4.03
1880	Asia	14.22	19.56	15.57
1880	Australia	6.56	6.98	6.39
1880	Europe	41.94	47.45	41.95
1880	Oceania	0.00	0.00	0.00
1881	Africa	5.08	5.94	5.16
1881	America Central	2.86	3.64	3.03
1881	America North	30.34	16.58	23.23
1881	America South	3.39	5.80	4.19
1881	Asia	14.96	18.58	15.65
1881	Australia	7.15	8.62	7.37
1881	Europe	41.30	46.78	41.37
1881	Oceania	0.00	0.00	0.00
1882	Africa	4.76	5.86	4.97
1882	America Central	3.01	3.76	3.16
1882	America North	25.09	17.22	20.69
1882	America South	3.85	6.32	4.65
1882	Asia	16.65	16.84	15.90
1882	Australia	6.40	9.92	7.49
1882	Europe	44.99	45.95	43.14
1882	Oceania	0.00	0.00	0.00
1883	Africa	5.18	5.27	4.96
1883	America Central	2.22	3.84	2.75
1883	America North	27.57	16.31	21.76
1883	America South	3.46	6.02	4.30
1883	Asia	15.84	17.90	15.86
1883	Australia	6.41	9.35	7.25
1883	Europe	44.51	46.58	43.12
1883	Oceania	0.00	0.00	0.00

1884	Africa	5.58	5.20	5.14
1884	America Central	2.37	3.38	2.66
1884	America North	26.40	15.21	20.48
1884	America South	3.17	6.75	4.47
1884	Asia	15.78	18.02	15.88
1884	Australia	7.68	9.61	8.08
1884	Europe	44.60	47.04	43.31
1884	Oceania	0.00	0.00	0.00
1898	Africa	6.16	11.86	492.77
1898	America Central	0.89	2.31	84.86
1898	America North	30.36	11.67	1356.65
1898	America South	3.81	5.66	266.36
1898	Asia	9.40	17.55	739.58
1898	Australia	4.10	6.13	287.67
1898	Europe	43.43	43.37	2552.28
1898	Oceania	1.86	1.44	100.00
1899	Africa	6.34	10.51	8.04
1899	America Central	0.79	2.59	1.53
1899	America North	28.28	12.73	21.93
1899	America South	4.30	5.29	4.70
1899	Asia	9.71	18.04	13.11
1899	Australia	4.74	5.76	5.16
1899	Europe	43.89	43.64	43.79
1899	Oceania	1.95	1.44	1.70
1900	Africa	5.42	11.16	7.78
1900	America Central	0.75	2.37	1.42
1900	America North	30.25	12.63	23.00
1900	America South	4.95	5.72	5.26
1900	Asia	9.03	17.25	12.41
1900	Australia	4.47	6.33	5.23
1900	Europe	42.95	42.96	42.95
1900	Oceania	2.18	1.58	1.94
1901	Africa	5.77	12.73	8.62
1901	America Central	0.79	2.31	1.41
1901	America North	29.62	12.50	22.60
1901	America South	4.52	5.00	4.72
1901	Asia	8.98	19.05	13.11
1901	Australia	4.44	6.21	5.17
1901	Europe	43.92	40.61	42.56
1901	Oceania	1.94	1.60	1.80
1902	Africa	6.35	15.86	10.24
1902	America Central	0.77	2.28	1.39
1902	America North	27.05	14.37	21.85
1902	America South	4.93	4.88	4.91
1902	Asia	9.09	17.60	12.58

1902	Australia	3.55	5.57	4.38
1902	Europe	46.32	37.85	42.85
1902	Oceania	1.96	1.59	1.81
1909	Africa	7.96	10.10	8.86
1909	America Central	1.14	2.54	1.73
1909	America North	22.46	16.45	19.93
1909	America South	8.60	4.41	6.83
1909	Asia	10.47	18.27	13.76
1909	Australia	5.03	5.74	5.33
1909	Europe	41.62	40.79	41.27
1909	Oceania	2.73	1.70	2.30
1910	Africa	8.29	11.07	9.52
1910	America Central	1.39	2.47	1.86
1910	America North	21.19	15.77	18.81
1910	America South	8.64	5.77	7.38
1910	Asia	12.21	17.70	14.63
1910	Australia	5.56	5.71	5.63
1910	Europe	39.70	39.77	39.73
1910	Oceania	3.02	1.73	2.45
1911	Africa	8.15	10.92	9.41
1911	America Central	1.07	2.55	1.74
1911	America North	21.39	13.60	17.85
1911	America South	7.12	7.71	7.39
1911	Asia	12.60	18.77	15.40
1911	Australia	5.55	5.91	5.71
1911	Europe	41.58	38.72	40.28
1911	Oceania	2.54	1.81	2.21
1912	Africa	8.47	10.77	9.50
1912	America Central	1.19	4.02	1.78
1912	America North	21.38	23.61	18.41
1912	America South	8.24	12.16	7.95
1912	Asia	13.49	29.96	15.83
1912	Australia	4.68	9.74	5.31
1912	Europe	39.92	60.50	38.97
1912	Oceania	2.63	2.85	2.25
1913	Africa	8.27	10.61	9.33
1913	America Central	1.25	2.35	1.75
1913	America North	21.90	13.16	17.93
1913	America South	8.40	7.42	7.96
1913	Asia	12.57	21.18	16.48
1913	Australia	4.75	5.68	5.17
1913	Europe	40.32	37.82	39.18
1913	Oceania	2.54	1.77	2.19

Source: See Appendix A - Sources

Table 23: British exports, imports and total trade by continent growth rates (i%) – 1880-84, 1898-1902, 1900 -1913

1880-1884	Exports in %	Imports in %	Total in %
Africa	-1.99	1.61	0.07
America Central	0.80	-9.16	-4.36
America North	-2.97	-7.05	-5.86
America South	9.39	-5.51	2.88
Asia	-1.43	1.54	0.13
Australia	11.98	3.34	7.26
Europe	1.01	0.14	0.53
Oceania	0.00	0.00	0.00
Total	**1.30**	**-1.91**	**-0.53**

1898-1902			
Africa	17.30	5.86	12.65
America Central	7.10	0.20	4.67
America North	14.54	1.01	4.15
America South	2.69	13.44	8.63
Asia	7.70	3.74	5.95
Australia	4.43	0.00	2.23
Europe	3.08	7.01	5.53
Oceania	10.88	6.44	7.98
Total	**7.61**	**4.85**	**5.96**

1909-1913			
Africa	12.94	8.17	5.03
America Central	8.80	10.17	3.70
America North	3.86	6.05	4.09
America South	28.68	6.14	8.20
Asia	16.23	13.00	9.66
Australia	10.92	5.06	2.87
Europe	8.78	5.84	5.22
Oceania	12.53	4.51	1.91
Total	**11.29**	**6.90**	**8.83**

Source: See Appendix A - Sources

Table 24: German banks in the world – Number of banks and branches – 1881, 1900, 1913

	1881		1900		1913	
Continent	Banks	Branches	Banks	Branches	Banks	Branches
Africa	0	0	0	0	8	20
America Central	0	0	0	0	2	5
America North	1	1	3	3	3	3
America South	2	2	5	14	14	47
Asia	0	0	2	9	13	27
Australia	0	0	0	0	0	0
Europe	16	18	18	30	34	133
Oceania	0	0	0	0	0	0
Total	*19*	*21*	*28*	*56*	*74*	*235*

Source: See Appendix A - Sources

Table 25: British banks in the world – Number of banks and branches – 1881, 1900, 1913

	1881		1900		1913	
Continent	Banks	Branches	Banks	Branches	Banks	Branches
Africa	14	66	17	162	17	284
America Central	8	28	7	27	8	22
America North	8	13	11	128	9	183
America South	13	29	17	60	18	84
Asia	38	99	43	148	38	204
Australia	11	148	8	273	11	602
Europe	40	55	15	25	24	62
Oceania	5	18	2	40	2	80
Total	*137*	*456*	*120*	*863*	*127*	*1521*

Source: See Appendix A - Sources

Table 26: Geographical distribution of German banks and branches (% of total) – 1881, 1900, 1913

Continent	1881 Banks	1881 Branches	1900 Banks	1900 Branches	1913 Banks	1913 Branches
Africa	0	0	0	0	10.81	8.51
America Central	0	0	0	0	2.7	2.13
America North	5.26	4.76	10.71	5.36	4.05	1.28
America South	10.53	9.52	17.86	25	18.92	20
Asia	0	0	7.14	16.07	17.57	11.49
Australia	0	0	0	0	0	0
Europe	84.21	85.71	64.29	53.57	45.95	56.6
Oceania	0	0	0	0	0	0

Source: See Appendix A - Sources

Table 27: Geographical distribution of German banks and branches (% of total) – 1881, 1900, 1913

Continent	1881 Banks	1881 Branches	1900 Banks	1900 Branches	1913 Banks	1913 Branches
Africa	10.22	14.47	14.17	18.77	13.39	18.67
America Central	5.84	6.14	5.83	3.13	6.3	1.45
America North	5.84	2.85	9.17	14.83	7.09	12.03
America South	9.49	6.36	14.17	6.95	14.17	5.52
Asia	27.74	21.71	35.83	17.5	29.92	13.41
Australia	8.03	32.46	6.67	31.63	8.66	39.58
Europe	29.2	12.03	12.5	2.9	18.9	4.08
Oceania	3.65	3.95	1.67	4.63	1.57	5.26

Source: See Appendix A - Sources

Table 28: German and British foreign banks by relative geographical distribution – 1881, 1900, 1913

Continent	*1881*			*1900*			*1913*		
	Total Banks	*Of which German (%)*	*Of which British (%)*	*Total Banks*	*Of which German (%)*	*Of which British (%)*	*Total Banks*	*Of which German (%)*	*Of which British (%)*
Africa	14	0	100	17	0	100	25	32	68
America Central	8	0	100	7	0	100	10	20	80
America North	9	11.11	88.89	14	0	100	12	25	75
America South	15	13.33	86.67	22	22.73	77.27	32	43.75	56.25
Asia	38	0	100	45	4.44	95.56	51	25.49	74.51
Australia	11	0	100	8	0	100	11	0	100
Europe	56	28.57	71.43	33	54.55	45.45	58	58.62	41.38
Oceania	5	0	100	2	0	100	2	0	100
Total	*156*	**12.18**	**87.82**	*148*	**18.92**	**81.08**	*201*	**36.82**	**63.18**

Source: See Appendix A - Sources

Table 29: German and British branches by relative regional distribution – 1881, 1900, 1913

Continent	*1881*			*1900*			*1913*		
	Total Branches	*Of which German (%)*	*Of which British (%)*	*Total Branches*	*Of which German (%)*	*Of which British (%)*	*Total Branches*	*Of which German (%)*	*Of which British (%)*
Africa	66	0	100	162	0	100	304	6.58	93.42
America Central	28	0	100	27	0	100	27	18.52	81.48
America North	14	7.14	92.86	131	0	100	186	1.61	95.39
America South	31	6.45	93.55	74	18.93	81.01	131	35.88	64.12
Asia	99	0	100	157	5.73	94.27	231	11.69	88.31
Australia	148	0	100	273	0	100	602	0	100
Europe	73	24.66	75.34	55	54.55	45.45	195	68.21	31.79
Oceania	18	0	100	40	0	100	80	0	100
Total	*477*	**4.4**	**95.60**	*919*	**6.09**	**93.91**	*1756*	**13.38**	**86.62**

Source: See Appendix A - Sources

Table 30: Descriptive Statistics - Equation 1.2 (PPML)

	Obs	Mean	Std. Dev.	Min.	Max.
lnGDP	340	20.8382	1.82679	15.37174	25.47869
lnD	340	8.274309	1.038228	5.765348	9.842469
B-Ger	340	0.3205882	0.9313546	0	7
B-GB	340	0.9617647	2.009199	0	12
LandLock	340	0.0352941	0.1847942	0	1
SharedBord	340	0.0529412	0.2242461	0	1
ComLang	340	0.1235294	0.3295289	0	1
B-Ger_1881	340	0.0558824	0.4204866	0	6
B-Ger_1900	340	0.0794118	0.4305991	0	5
B-Ger_1913	340	0.1852941	0.7512555	0	7
B-GB_1881	340	0.3647059	1.464201	0	12
B-GB_1900	340	0.2882353	1.133758	0	12
B-GB_1913	340	0.3088235	1.105862	0	12
ColLink	340	0.1058824	0.3081405	0	1
GS	340	0.6176471	0.4866783	0	1

Table 31: Descriptive Statistics - Equation 1.3 (Probit)

	Obs	Mean	Std. Dev.	Min.	Max.
Banks	59	0.516129	0.5038194	0	1
Imports (LnImp)	56	1.794242	1.266509	0.0276896	5.397216
Import growth (LnGrowth)	56	0.0424038	0.0529925	-0.019254	0.3562781
Share Germany (LnShare)	32	0.045996	0.0695473	0	0. 2390169

6.2. Appendix B

6.2.1. Sources

If not otherwise indicated, the general data for German and British trade were obtained from the official German and British statistics on foreign trade. For Germany: *Statistik des Deutsche Reiches - Auswärtiger Handel des deutschen Zollgebietes nach Herkunfts- und Bestimmungsländern in den Jahren 1880 bis 1896 - Kaiserliches Statistisches Amt*; *Statistisches Jahrbuch für das Deutsche Reich – Spezialhandel nach Erdteilen und nach Ländern – Kaiserliches Statistisches Amt, Jahrgang 1906, 1908, 1913, 1916.; and for Great Britian: David Jacks – Taken from the Statistical Abstract for the United Kingdom, London, various years.*

The information for (the geographical distribution, including the number of banks per country in Argentina) bank data was extracted from the *Almanac Directory, Year Book and Diary. A Parliamentary Directory and Complete Banking Directory published by Sir Inglis Palgrave in London, various years.* In some cases it was possible to locate the original banking reports (*Geschäftsberichte*) of the *Auslandsbanken,* such as the *Deutsche Überseeische Bank.* Furthermore, the data from the Almanac has been verified and, if necessary, supplemented with the information provided by the quantitative works of *Hauser, R. Die deutschen Banken im Ausland (1906), Riesser and Jacobs Die deutschen Grossbanken und ihre Konzentration (1914), Strasser, K. Die deutschen Banken im Ausland (1924), Lough, W. Banking Opportunities in South America (1930)*, and *Whale, B. Joint Stock Banking in Germany (1930).*

The data for my data base on Argentine imports has been taken from the original trade statistics; *Cuadro General del Comercio Exterior Durante el Año de 1875, Buenos Aires, Anuario de la Dirección General de Estadisticas Correspondient al Año 1885, 1895, 1901, y 1912 - Resumen General del Comercio Especial Exterior por Procedencias y Destinos; Buenos Aires 1886, 1896, 1902, y 1913.* For the years 1885, 1895, 1901, and 1902 it also includes the specific tariff imposed on each product. For the year 1875, official statistics do not provide information about tariffs but only differentiate between products being or not being subject of import tariffs. The tariffs (ad valorem) for the year 1875 are from Tena-Junguito, A. & Lampe, M. & Tamega, F. (2012) "How much trade Liberalization was there in the World before and after Cobden-Chevalier" *Journal of Economic History* Vol. 72, issue 3, September 2012, pp. 708-740, with

special thanks to the authors for providing the data. The official Argentinian trade statistics indicate the tariff (*Derechos de importación*) applied on each product in per cent. In some cases, however, the tariffs are indicated as the value (in pesos fuertes) charged on each unit of a product. In this case, I calculate the ad valorem as a function of:

$$\text{Adv}_{pt} = \frac{VT_{pt} * Q_{pt}}{imp_{pt}}$$

where VT_{pt} is the tariff value charged on each unit of product p in year t, Q_{pt} the quantity of product p imported in t, and imp_{pt} is the value of imports of product p in t.

The ad valorem equivalent of the tariff of Argentina weighted by the imports (by product) from country c to Argentina in t (weighted ad valorem tariff) is calculated as follows:

$$\text{AdvW}_{ct} = \frac{\sum adv_{pt} * imp_{pct}}{imp_{ct}}$$

where adv_{pt} is the ad valorem tariff of product p in year t, imp_{pct} is the value of imports of product p from country c in t, and imp_{ct} the value of imports of country c in t.

The source for my classification of products of the Argentinian imports is *British Parliamentary Papers LXXXIV (1905), "The Comparative Incidence of Foreign and Colonial Import Tariffs on the principal Classses of Manufactures Exported from the United Kingdom", In continuation of Memorandum No. XVI. In Cd. 1761 of 1903*

For the Augmented Gravity Model as well as the Difference in Difference, the data for imports are from the presented (Section 3.3) panel data set on Argentine imports by country and by product for the years 1875, 1885, 1895, 1901, and 1912. The number of trading partners included in the gravity model was determined by the availability of data on respective GDP and real wages. The countries are; Great Britain, Belgium, Germany, France, Spain, Austria-Hungary, Denmark, Italy, the Netherlands, Portugal, Sweden-Norway, Brazil, the United States of America, and Canada.

Real GDP Data was obtained from Bolt, J. and J.L. van Zanden (2013) *The first update if the Maddison Project; Re-Estimating Growth Before 1820*, Maddison Project Paper 4. The real GDP for Austria-Hungary is estimated as the weighted sum of GDP of Austria and

Hungary. The same method is applied for the data of Norway and Sweden, as the official Argentine import statistics combine the imports of the two countries.

The wages are international real wages relative to the real wages from Great Britain in 1905 (1905=100) as provided by Williamson (1995), "*The Evolution of Global Labor Markets since 1830: Background Evidence and Hypotheses*", Explorations in Economic History 32, p. 178.

The calculations of great circle distance in kilometers are based on the data on the geographic coordinates of the countries capitals (longitude and latitude) provided by the internet source *http://www.fallingrain.com/world/index.html.*

6.2.2. Tables and Graphs

Figure 20: Argentine imports (value in pesos de oro) – 1874-1914
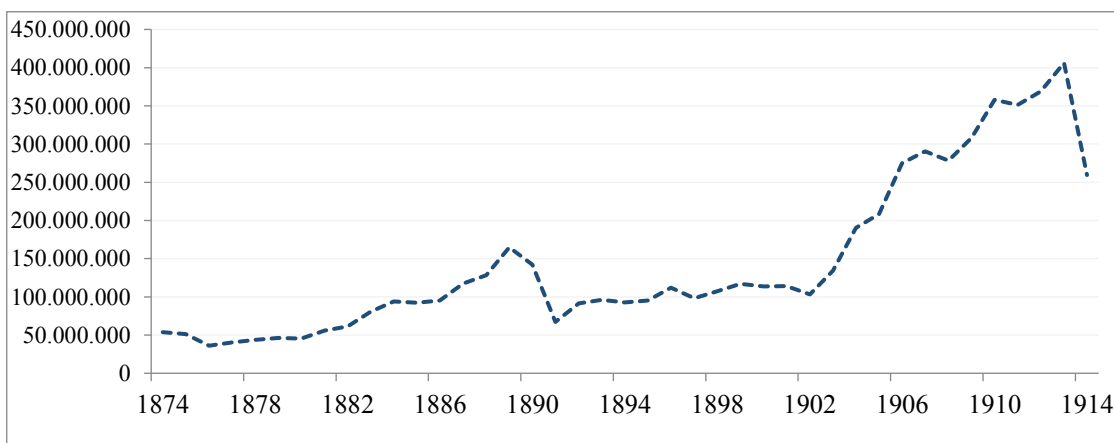
Source: See Appendix B - Sources

Figure 21: Argentine imports by skill class – Share of each class (%) on total imports – 1875, 1885, 1895, 1901, 1912
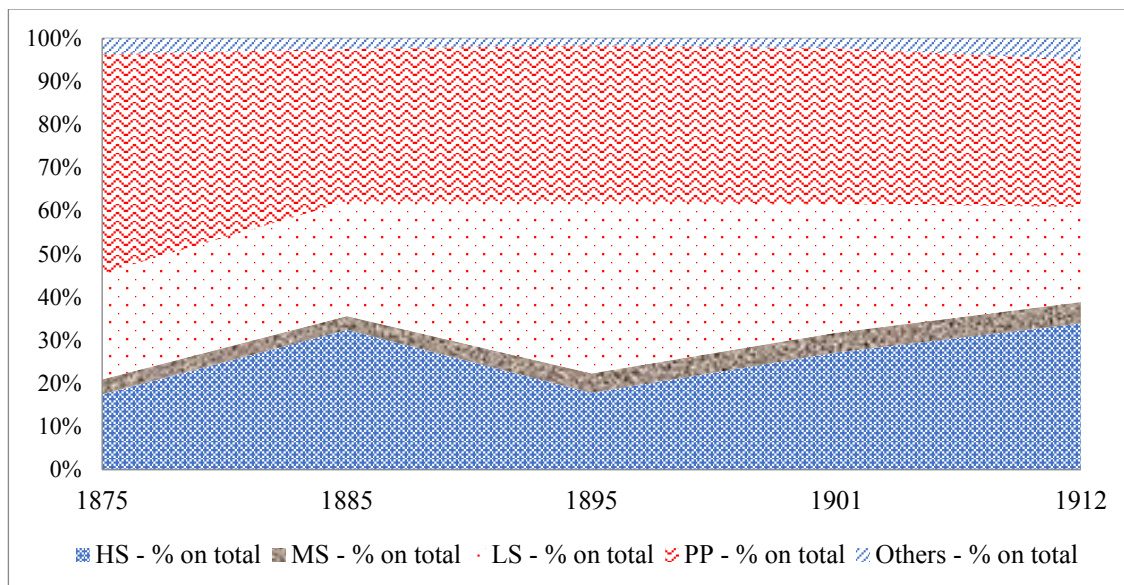
Source: See Appendix B - Sources

Table 32: Classification of products of Argentinian imports and skill intensity

No Class	Product		Skill intensity	
1	**Ships**		13,01	*High Skill*
	Sailing Iron			
	Boats			
		Irons		
		wood		
		others		
2	**Machinery hardware etc**		12,65	
	Machines			
		Textil		
		Spinning		
		Weaving		
	Motors & Cars			
		Motor cars		
		Cars		
		Motorbikes		
	Locomotive			
		Heavy Locomotives		
		Carriages (Locomotive)		
	Firearms			
	Electricity			
		Electric Wire and cable		

		Dynamos, Pumps & Electric Motors		
		Supporting Articles for electricity		
	Machinery Other			
3	**Paper manufactures**		**11,65**	
	Paper			
		Paper for writing		
		Paper for printing		
		Paper of other sorts		
		Paper for construcction		
	Carton			
	Books & Printings			
		Paper articles		
		Books and prints		
4	**Silk thrown**		**11,58**	
	Silk			
		Silk made		
		Silk manufactured		
		Silk yarns		
	Silk Mix			
		Silk mix made		
		Silk mix manufactured		
	Silk with Cotton			
		Silk with cotton		
		Silk with cotton made		
		Silk with cotton manufactured		
5	**Iron, steel, metals manufactures**		**11,29**	
	Iron			
		Iron bars, ingots, angles,shapes		
		Iron galvanised		
		Iron manufactured		
		Iron articles (manufactured)		
	Steel			
		Steel bars, ingots, angles,shapes		
		Steel galvanised		
		Steel manufactured		
	Iron & Steel			
		Iron and steel manufactured		
	Wire			
		Wire steel or iron		
		Wire steel or iron galvanised		
		Wire other classes		
	Tins			
		Tin bars, ingots etc		
		Tin manufactured		
	Railways			
		Rails		
		Railway Material		

	Other Metals			
		Other metals bars, ingots, angles		
		Other metals manufactured		
		Metal jewelry		
6	**Leather manufactures**		11,00	
	Calf			
		Calf Skins		
		Other skins		
	Leather			
		Leather made		
		Leather manufactured		
7	**Copper lingots, cakes, slabs**		10,01	*Mid Skill*
	Copper			
		Copper lingots, cakes, slabs		
		Copper manufactured		
8	**Alkali chemical products**		9,64	
	Acids & Salts			
		Acids		
		Salts		
	Sulphate			
		Sulphate of copper(s/cwt)		
		Sulphate others		
	Soda			
		Bicarbonate Soda		
		Crystals of Soda (Sodium carbonate)		
	Carbide			
	Belaching powder			
	Pitch			
	Ink & Colors			
	Others			
9	**Apparel**		9,27	
	Apparel General			
	Apparel Silk			
		Silk		
		Silk mix		
	Apparel Leather			
	Apparel Wool			
		Wool		
		Wool mix		
	Apparel Cotton			
		Cotton		
		Cotton mix		
	Apparel other fibers			
10	**Woollen & worsted manufacture**		7,90	*Low Skill*
	Wool			
		Wool made		

	Wool Mix	*Wool manufactured*		
		Wool mix made		
		Wool mix manufactured		
	Wool with Silk			
		Wool with silk made		
		Wool with silk manufactured		
11	**Cotton manufactures**		7,74	
	Cotton			
		Cotton made		
		Cotton made white		
		Cotton made colored		
		Cotton manufactured		
		Cotton manufactured raw		
		Cotton manufactured white		
		Cotton manufactured colored		
		Cotton manufactured printed		
		Cotton manufactured dyed		
	Cotton Mix			
		Cotton made mix		
		Cotton manufactured mix		
	Cotton with Silk			
		Cotton with silk made		
		Cotton with silk manufactured		
12	**Jute & Hemp manufactures, canvas and sacking**		7,04	
	Jute			
		Jute yarn		
		Jute made		
		Jute manufactured		
		Jute canvas and sacking		
	Hemp			
		Hemp Yarn		
		Hemp made		
		Hemp manufactured		
		Hemp canvas and sacking		
13	**Woollen yarns (stuffs all wooll)**		6,20	
	Woolen Yarn			
	Woolen Yarn Mix			
	Woolen Yarn with Silk			
14	**Linen yarn**		5,90	
	Linen			
		Linen yarns unbleached		
		linen yarns single		
		linen yarns double		
15	**Cotton yarns (undyed)**		5,80	
	Cotton thread			
		Cotton thread for sewing		

	Cotton Yarn			
		Cotton yarn Grey		
		Cotton yarn bleached or dyed		
		Cotton yarn colored		
		Cotton yarn painted		
	Cotton Yarn Mix			
	Cotton Yarn with Silk			
16	**Other Fibers**		*5*	
	Other Fibers			
		Made		
		Manufactured		
		Yarn		
17	**Crystal, Ceramics**		*5*	
	Crystal			
		Crystal		
		Crystal Artifacts / Articles		
	Ceramic			
		Ceramic		
		Ceramic Artifacts / Articles		
	Glass			
		Glass		
		Glass Artifacts / Articles		
18	**Food: grains**		*< 5*	*Primary Products*
	Corn			
		Wheat		
		Maize, or Indian Corn		
	Rice			
	Nuts, Fruits and Vegtables			
	Cereals and Cookies			
	Others			
19	**Food: animal products**		*< 5*	
	Meat and Fish			
	Bacon			
	Beef			
	Living Animals			
	Spice, Oils, and Sauces			
	Butter, Milk, and Cheese			
	Medical Oils			
	Others			
20	**Food: tropical**		*< 5*	
	Coffee			
		Coffee, Raw		
	Sugar			
		Sugar, unrefined, beetroot		
		Sugar, unrefined, cane		
		Sugar, refined		
		Sugar other classses		

	Cacoa, Chocolate, Tea etc		
	Others		
21	**Tabacco**	*< 5*	
	Tobacco		
		Tobacco, raw	
		Cigarrs	
22	**Beverages**	*< 5*	
	Beverages		
		Alcoholic	
		Non Alcoholic	
23	**Minerals**	*< 5*	
	Oils		
		Petroleum	
		Kerosine	
		Mineral Oils	
		Nafta (Petrolio)	
	Coal		
	Iron, ore of		
	Stones		
		Stones	
		Precious Stones	
		Stones for construcction	
	Others		
		Earths	
		Other Minerals and Stones	
24	**Wood**	*< 5*	
	Wood		
		Raw	
		Manufactured	
		For Paper	
25	**Other Articles**		*Others*
	Other Primary Products		
	Other Materials		
	Other Manufactured		
	Other		

Source: See Appendix B - Sources

Note: made = "confeccionados" in the original statistics

manufactured = "manufacturados" in the original statistics

Figure 22: MS imports main trade partners - Share per country (%) on total MS imports – 1875, 1885, 1895, 1901, and 1912
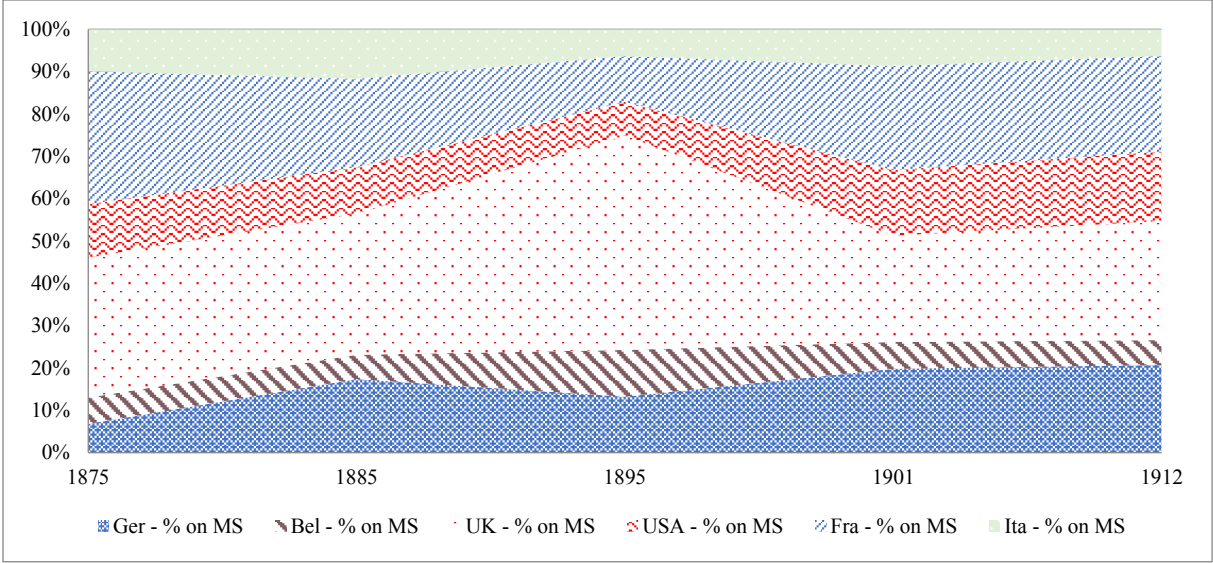
Source: See Appendix B - Sources

Figure 23: LS imports main trade partners - Share per country (%) on total LS imports – 1875, 1885, 1895, 1901, and 1912
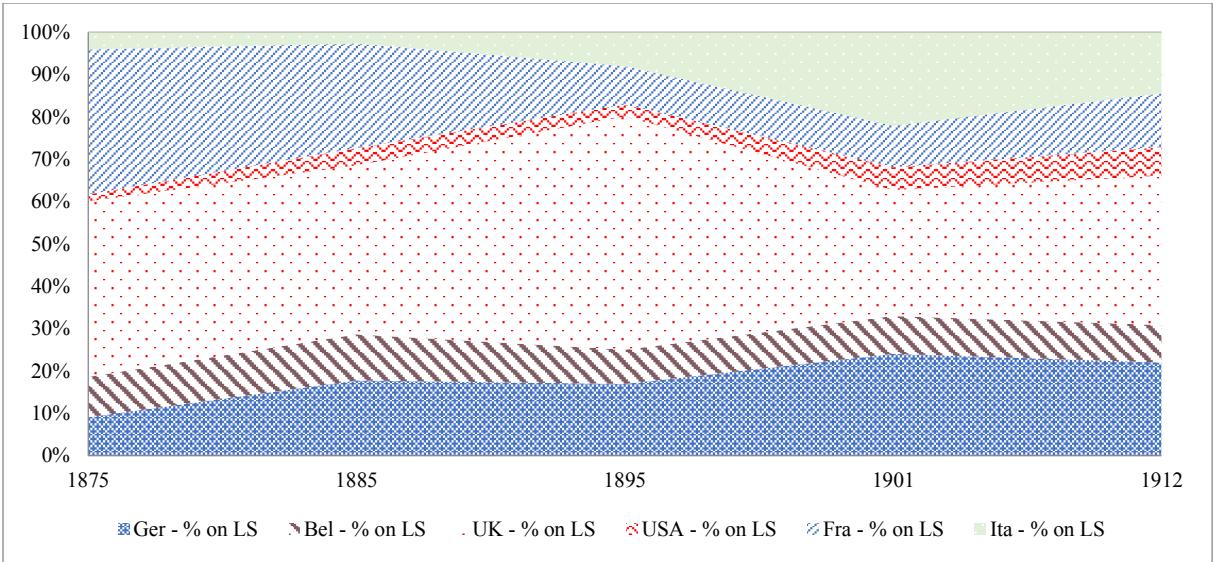
Source: See Appendix B - Sources

Figure 24: PP imports main trade partners - Share per country (%) on total PP imports – 1875, 1885, 1895, 1901, and 1912
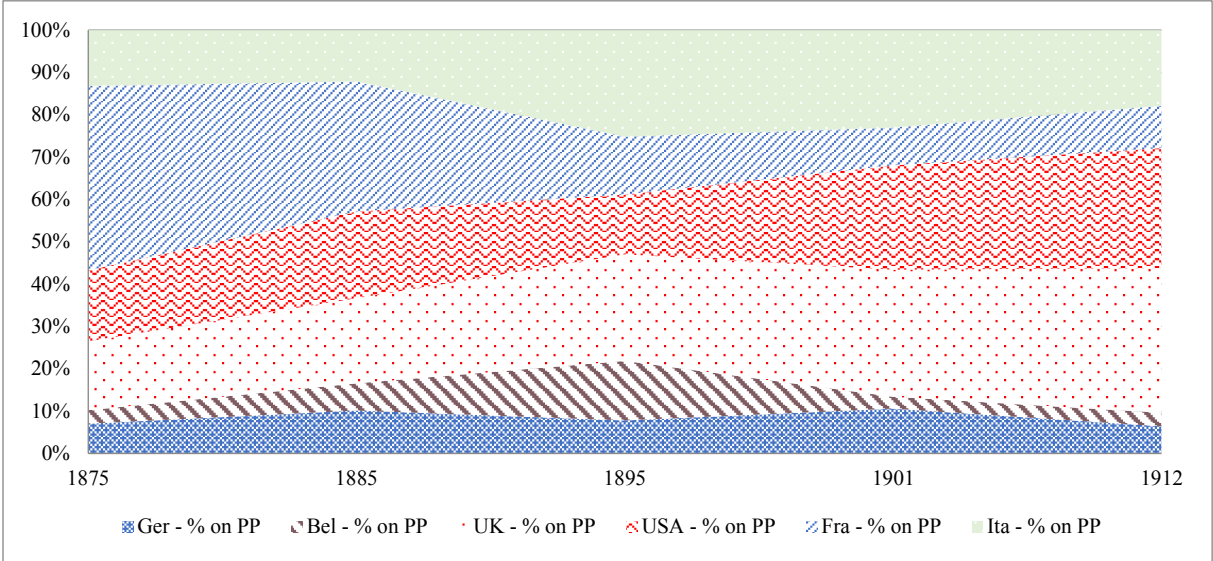
Source: See Appendix B - Sources

Table 33: Representation of the *Deutsche Überseeische* and the *Deutsche Südamerikanische Bank* in exporting German companies in 1913 – Sectorial composition

SIC	Industry	Deutsche Übers. Bank		Deutsche Südam. Bank		Total	
		Seats	No. Companies	Seats	No. Companies	Seats	No. Companies
1	Agriculture, forestry and fishing	0	0	0	0	0	*0*
2	Mining and quarrying	0	0	2	2	4	*2*
3	Food, drink and tobacco	0	0	1	1	2	*1*
4	Coal and petroleum products	3	2	1	1	7	*3*
5	Chemicals and allied trades	0	0	2	1	3	*1*
6	Metal manufacture	5	4	5	5	19	*9*
7	Mechanical engineering	0	0	1	1	2	*1*
8	Instrument engineering	0	0	0	0	0	*0*
9	Electrical engineering	2	2	0	0	4	*2*
10	Shipbuilding and marine engeering	0	0	0	0	0	*0*
11	Vehicles	0	0	0	0	0	*0*
12	Other metal	0	0	0	0	0	*0*
13	Textiles	2	2	0	0	4	*2*
14	Leather goods	0	0	0	0	0	*0*
15	Clothing and footwear	0	0	0	0	0	*0*
16	Brick, pottery, glass and cement	0	0	1	1	2	*1*
17	Timber, frunishing	0	0	0	0	0	*0*
18	Paper, printing and publishing	1	1	0	0	2	*1*
19	Other manufacturing	0	0	0	0	0	*0*
20	Construction	7	2	0	0	9	*2*
21	Gas, electricity and water	7	3	3	2	15	*5*
22	Transport and communication	0	0	1	1	2	*1*
	Total	*27*	*16*	*17*	*15*	*44*	*31*

Source: See Appendix B - Sources

Table 34: British hypothetical bank-connected and not bank-connected exports – Share on total exports (%) and growth respective to the previous year (%)

Year	Share – Bank-connected	Share - Not connected	Growth – Bank-connected	Growth - Not connected
1875	45,10	54,90		
1885	60,83	39,17	67,80	39,13
1895	42,04	57,96	-30,47	39,05
1901	46,96	53,04	2,82	-18,58
1912	56,64	43,36	75,95	64,51

Source: See Appendix B - Sources

Table 35: Robustness 1 – Difference-in-Difference estimation for German, British, US, French, and Belgian Exports to Argentina - 1875-1912

	DÜB	DÜB/SÜD
	(Equation 2.10)	(Equation 2.11)
CON1B (γ)	-1.234***	
	(0.464)	
CON2B (γ)		-1.122***
		(0.330)
INTERV (δ)	1.804***	1.501***
	(0.396)	(0.256)
lnARGIMP (λ)	0.936***	0.938***
	(0.0711)	(0.0711)
lnADV (θ)	-0.298	-0.266
	(0.257)	(0.261)
lnDIST(φ)	-12.22***	-11.66***
	(2.316)	(2.465)
COUNTRY (ϕ)	YES	YES
PRODUCT (α)	YES	YES
YEAR (μ)	YES	YES
Number of observations	4,650	4,650
Method of estimation	PPML	PPML

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

Note: Dependent variable in each column is the total value of German, British, US, French, and Belgian exports by product to Argentina. The sample includes the years 1875, 1885, 1895, 1901, 1912 and a total number of 217 products in each year. The number of observations is reduced as for some products ad valorem year observations are missing. For the classification of products see section 3.3 and Data and Appendix B - Sources. Robust standard errors are clustered by product and year and are indicated in brackets. *Sources:* See Appendix B - Sources

Table 36: Robustness 2 – Pre-Treatment-test for the Difference-in-difference estimations 2.10 and 2.11

	(1)	(2)	(3)	(4)
	DÜB	DÜB/SÜD	DÜB	DÜB/SÜD
CON1B (γ)	18.43		-0.689*	
	(22.21)		(0.366)	
CON2B (γ)		18.54		-0.962*
		(47.79)		(0.547)
INTERV (δ)	-0.126	-0.169	-0.00951	0.387
	(0.225)	(0.236)	(0.437)	(0.479)
lnARGIMP (λ)	0.792***	0.789***	1.045***	1.043***
	(0.196)	(0.193)	(0.109)	(0.108)
lnADV (θ)	-3.446*	-3.512*	-3.137**	-3.075**
	(1.931)	(1.942)	(1.366)	(1.367)
lnDIST(φ)			-22.02	-11.66***
				(2.465)
COUNTRY (ϕ)			YES	YES
PRODUCT (α)	YES	YES	YES	YES
YEAR (μ)	YES	YES	YES	YES
Number of observations	372	372	1,860	1,860
Method of estimation	PPML	PPML	PPML	PPML

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

Note: Dependent variable in the columns (1) and (2) is the total value of German exports to Argentina. The dependent variable in the columns (3) and (4) is the total value of German, British, US, French, and Belgian exports by product to Argentina. The variable lnDIST is the great circle distance between the respective capital cities of Germany, Great Britain, the USA, France, Belgium and Argentina in kilometres. The sample includes the years 1875, 1885 and a total number of 217 products in each year. The number of observations is reduced as for some products ad valorem year observations are missing. For the classification of products see section 3.3 and Data and Appendix B - Sources. The assumed pre-treatment period is year 1875, the assumed post-treatment period is year 1885. Robust standard errors are clustered by product and year and are indicated in brackets. *Sources:* See Appendix B - Sources

Table 37: Descriptive Statistics - Equations 2.1 to 2.9 (Gravity Models)

	Obs	Mean	Std. Dev.	Min.	Max.
Imports Total	165	4421324	1.34e+07	0	1.25e+08
Imports HS	165	1313951	4951872	0	4.01e+07
Imports LS	165	1162951	4283939	0	4.14e+07
Total-EM	165	250.5115	331.1374	0	991.6
Total-IM	165	60.08788	124.7085	0	788.6
HS-EM	165	237.1788	352.8287	0	995.8
HS-IM	165	203754.7	1852836	0	1.84e+07
LS-EM	165	60.88547	778.4772	0	10000
LS-IM	165	163.0331	1524.14	0	16889
Ln(AdvW)	96	0.4452532	2.111282	0.009475	20.89228
Ln(AdvW-HS)	96	0.1543823	0.0939575	0	0.4623242
Ln(AdvW-LS)	96	0. 1988251	0.098224	0	0.502166
Ln(wages)	70	4.334962	0.442622	3.332205	5.32301
Ln(gdp)	140	14.94687	5.535815	6.654152	22.97855
Ln(distance)	165	21.0262	1.21348	17.79252	22.98524
No. of Banks	165	0.1393939	0.5727232	0	4

Table 38: Descriptive Statistics - Equations 2.10 and 2.11 (Difference in Difference)

	Obs	Mean	Std. Dev.	Min.	Max.
CON1B	1085	.1889401	.3916415	0	1
CON2B	1085	.2304147	.4212925	0	1
INTERV (DÜB)	1085	.1133641	.3171835	0	1
INTERV (DÜB/SÜD)	1085	.1382488	.3453202	0	1
lnARGIMP	1085	8.446188	6.374236	0	17.40847
lnADV	930	.2270082	0.1119269	0	.8613707

6.1. Appendix C

6.1.1. Sources

The data on German and British imports and exports from and to Brazil are taken from the official Brazilian statistics *Mappas estatisticos do commercio e navegação do Porto do Rio de Janeiro. Exercicio de 1880-81, 1885-86, 1890; Estatistica Importacao Brasil 1898; Anuario Estatistico do Brasil, 1903; Anuario Estatistico do Brasil, 1909-12, with the exeption of the data for the year 1870,* which I consulted from *Dedinger, Béatrice, et Paul Girard. 2017. « Exploring trade globalization in the long run: The RICardo project ». Historical Methods: A Journal of Quantitative and Interdisciplinary History 50 (1): 30-48*

The data on yearly coffee exports by company from Rio de Janeiro and by company and destination from Santos were collected from the *Jornal do Comercio Retrospecto*, the *O Commercio de Sao Paolo* and the *The Brazilian Review*.

The information on the nationality of the exporting houses was collected from: Pereira da Silva, Gustavo (2015), *"O predomínio das casas estrangeiras sobre a exportacao cafeeira em Santos no século XIX",* America Latina en la historia económica, vol. 22 no.3, Mexico; Rischbieter, Julia Laura (2011), *"Mikro-Ökonomie der Globalisierung. Kaffee, Kaufleute und Konsumenten im Kaiserreich, 1870-1914"*, Böhlau-Verlag, Köln, p. 130-131.

The data on monthly credits provided by the *Brasilianische Bank für Deutschland* between 1888 and 1913 have been compiled from the official reports of the advisory board meetings (*Aufsichtsratberichte*) from 1888 to 1913, available at the *Historische Archiv der Deutschen Bank, Frankfurt am Main – Aktenzeichen KA/799 - Brasilianische Bank für Deutschland - Sitzung des Aufsichtsrats - Sitzungssaal Norddeutsche Bank Hamburg.*

Exchange rates were extracted from the Handbook of World Exchange Rates, 1590-*1914* (Markus A. Denzel, Ashgate, 2010)

6.1.2. Tables and Graphs

Figure 25: Brazilian coffee exports – Quantity (tonnes) and prices (fob prices, pound sterling) – 1880-1913
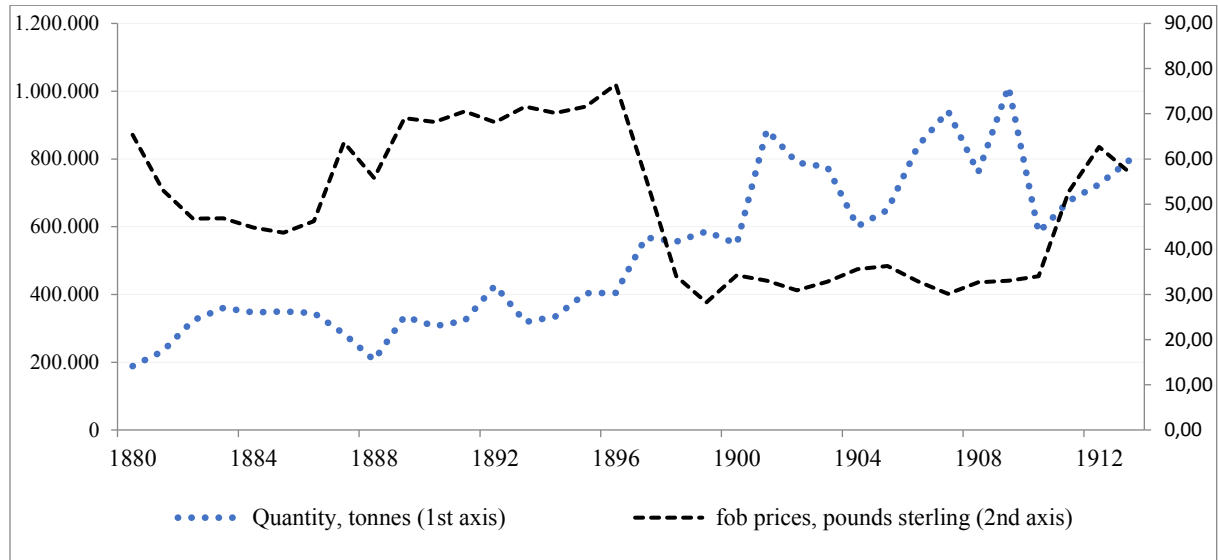
Source: Absell and Tena Junguito, 2016 Appendix 1, with special thanks to Christopher Absell for providing the data

Figure 26: Brazilian coffee exports – Share each month (%) on total quantity exported in year (saccas embarcadas) – 1881 and 1913
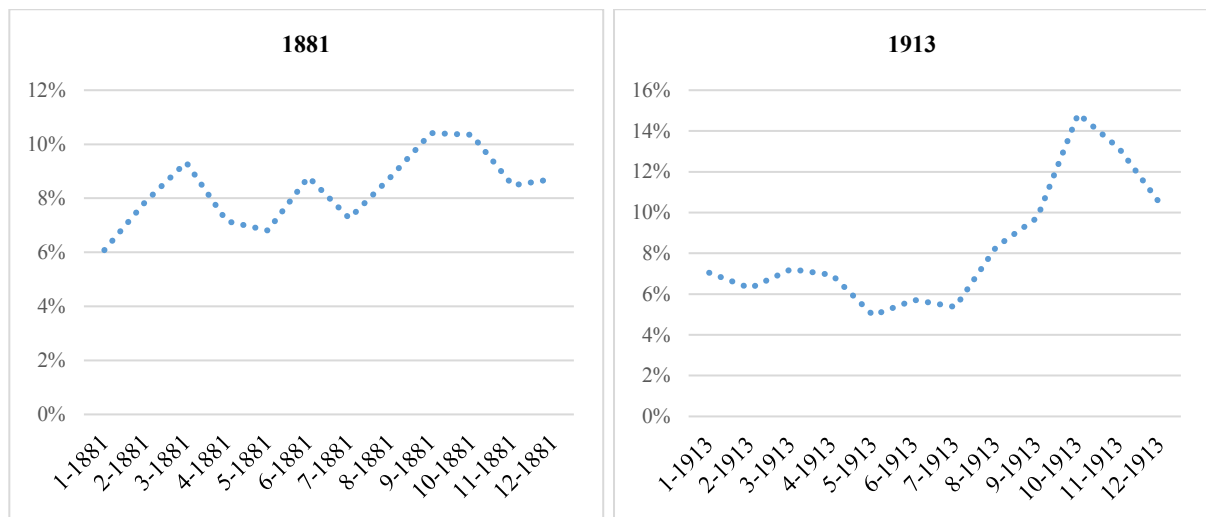
Source: See Appendix C – Sources

Note: One "sacca" equals 60 Kg of coffee.

Table 39: German and British banks and their branches in Brazil – 1913

Name of Bank	Branches in
German	
Brasilianische Bank für Deutschland	Bahia
Brasilianische Bank für Deutschland	Porto Alegre
Brasilianische Bank für Deutschland	Rio de Janeiro
Brasilianische Bank für Deutschland	Santos
Brasilianische Bank für Deutschland	Sao Paulo
Deutsch Südamerikanische Bank	Rio de Janeiro
Deutsche Überseeische Bank	Rio de Janeiro
Deutsche Überseeische Bank	Santos
Deutsche Überseeische Bank	Sao Paulo
British	
London and Brazilian Bank, Limited	Bahia
London and Brazilian Bank, Limited	Ceara
London and Brazilian Bank, Limited	Curityba
London and Brazilian Bank, Limited	Manaos
London and Brazilian Bank, Limited	Para
London and Brazilian Bank, Limited	Pernambuco
London and Brazilian Bank, Limited	Porto Alegre
London and Brazilian Bank, Limited	Rio de Janeiro
London and Brazilian Bank, Limited	Rio Grande do Sol
London and Brazilian Bank, Limited	Santos
London and Brazilian Bank, Limited	Sao Paulo
London and River Plate Bank, Limited	Bahia
London and River Plate Bank, Limited	Curityba
London and River Plate Bank, Limited	Para
London and River Plate Bank, Limited	Pernambuco
London and River Plate Bank, Limited	Rio de Janeiro
London and River Plate Bank, Limited	Santos
London and River Plate Bank, Limited	Sao Paulo
London and River Plate Bank, Limited	Victoria
British Bank of South America, Limited	Bahia
British Bank of South America, Limited	Monte Video
British Bank of South America, Limited	Rio de Janeiro
British Bank of South America, Limited	Sao Paulo

Source: See Appendix A – Sources

Table 40: Total exports from Santos - Share of exports by destination (% of total) – 1893-1913

Year	GER	NL	USA	UK	ESP	ITA	FRA	REST EU	REST LA	REST
1893	20,91	6,33	64,39	1,59	0,00	0,00	4,66	2,12	0,00	0,00
1894	13,87	6,58	50,97	0,00	0,00	13,76	10,19	4,63	0,00	0,00
1898	31,78	10,09	19,73	0,88	0,00	17,68	8,89	10,96	0,00	0,00
1899	8,81	16,27	23,07	0,00	0,00	13,73	31,43	4,29	0,00	2,39
1900	36,04	11,56	33,81	0,41	0,65	1,13	7,38	8,34	0,00	0,69
1901	39,10	3,12	21,79	0,82	0,58	9,96	14,91	8,21	0,00	1,52
1902	35,38	20,29	20,46	0,29	0,14	1,30	13,76	7,52	0,00	0,85
1903	30,87	13,72	9,35	3,34	0,00	18,55	17,45	6,56	0,16	0,00
1904	31,04	5,00	38,36	0,00	0,21	15,36	6,46	2,47	0,94	0,15
1905	36,57	5,18	37,87	0,00	2,46	13,75	0,53	3,25	0,31	0,08
1906	21,93	9,44	39,62	2,07	0,01	8,63	13,94	3,70	0,22	0,45
1907	39,85	9,75	33,10	2,44	3,12	0,87	5,02	4,00	1,84	0,00
1908	30,47	13,76	34,66	6,58	0,51	2,98	2,15	6,94	0,70	1,26
1909	16,97	13,99	35,93	2,32	0,80	10,91	9,89	8,62	0,55	0,01
1910	9,95	16,77	22,02	7,46	2,46	8,36	27,04	4,34	1,36	0,02
1911	19,19	33,31	20,14	4,80	1,53	2,61	12,29	6,05	0,09	0,00
1912	19,16	23,14	38,75	0,95	1,08	2,94	8,14	5,09	0,68	0,07
1913	23,34	18,10	22,67	0,04	0,96	8,26	20,81	5,13	0,55	0,14
Total	**25,85**	**13,13**	**31,48**	**1,89**	**0,81**	**8,38**	**11,94**	**5,68**	**0,41**	**0,42**

Source: See Appendix C – Sources

Table 41: Export companies financed by the Brasilianische Bank – Rio – 1889-1913

Company	Nationality	Share credit 1889-13 (%)	Active before 1889	Top 20 ranking 1880-88	Share exports 1880-88 (%)	Share exports 1889-13 (%)
Gustavo Trinks & C	Germany	16,43	Yes	15	1,82	3,34
E. Johnston & C	UK	13,34	Yes	1	8,21	5,07
Theodor Wille	Germany	10,89	No	-	0,00	8,64
Naumann, Gepp & C	UK	9,05	No	-	0,00	0,24
W.F. Mac Laughlin & C	USA	7,82	No	-	0,00	3,55
Zenha Ramos & C	-	5,83	Yes	-	0,50	1,99
Prado Chaves	-	4,62	No	-	0,00	0,12
Karl Valais & C	France	3,39	Yes	20	1,56	2,44
Hard Rand & C	USA	2,96	Yes	4	6,98	5,27

Company	Country	Share credit 1889-1913 (%)		Top 20 ranking 1880-88	Share exports 1880-88 (%)	1889-13
Rich. Riemer & C	Germany	2,55	No	-	0,00	1,27
Ornstein & C	Austria	2,45	No	-	0,00	9,53
Pinto & C	-	2,32	Yes	-	0,00	3,43
Pierre Pradez & C	-	1,92	No	-	0,00	0,71
Karl Krische & C	Germany	1,74	No	-	0,00	1,31
Aretz & C	USA	1,46	No	-	0,00	0,51
C.W. Gross & C	-	1,09	Yes	-	1,26	0,22
Wille Schmilinsky &C	Germany	0,95	Yes	10	3,15	1,75
Empreza Industrial Brazileira	Brazil	0,93	No	-	0,00	0,25
Eugen Urban	Germany	0,93	No	-	0,00	3,76
C. Dabelow	Germany	0,93	No	-	0,00	0,86
Dabelow & wilberg	Germany	0,91	No	-	0,00	0,54
J.W. Doane	USA	0,88	Yes	12	2,45	5,88
Carlos Pareto	-	0,76	No	-	0,00	1,95
E Pecher & C	UK	0,69	Yes	9	3,39	0,72
Companhia Geral Commercio e Industria	Brazil	0,65	No	-	0,00	0,23
Heinrik Volk & C	Germany	0,61	No	-	0,00	0,19
Athazde Mazrink	Brazil	0,50	Yes	-	0,00	0,00
Steinwender Stoffregen & C	USA	0,49	No	-	0,00	0,88
Matherson	-	0,45	No	-	0,00	0,24
Frank Norton & C	USA	0,43	No	-	0,00	0,55
August Leuba & C	France	0,41	Yes	-	0,89	0,44
William Ford & C	USA	0,38	Yes	19	1,56	0,00
John Moore & C	-	0,28	Yes	-	0,13	0,44
Okell Monrao & Wilson	-	0,20	Yes	-	0,12	0,31
Correo Leite	Brazil	0,19	Yes	-	0,01	0,00
Haupt, Biehn & C	Germany	0,17	No	-	0,00	0,06
Frias & Irmaos	Brazil	0,13	Yes	-	0,04	0,01
A.J. Freitas & C	Brazil	0,10	Yes	-	0,02	0,01
Monteiro Hime & C	-	0,07	Yes	-	0,11	0,01
Gustavo Gudgeon	French	0,06	Yes	-	0,03	0,11
A Martins Siqueira & Irmao	Brazil	0,04	Yes	-	0,34	1,43
Viuva Leonne Miranda & C	Brazil	0,03	Yes	-	0,10	0,00
Total		**100**			**32,68**	**68,25**

Source: See Appendix C – Sources

Note: The *share credit 1889-1913 (%)* is a company´s share of total credit, which includes direct credits and discounted bills of exchange (see section 4.3), provided by the *Brasilianische bank* between 1889 and 1913 to the here listed 42 coffee export houses in Rio. The *Top 20 ranking 1880-88* indicates a company´s rank among the twenty largest export companies between 1880 and 1888, measured as the share of the total quantity of coffee exported by the 389 export companies operating in Rio during that time. The *Share exports 1880-88 (%)* and *1889-13* is a company´s share of the total quantity of coffee exported in Rio between 1880 and 1888, and 1889 and 1913, respectively.

Table 42: Export companies financed by the Brasilianische Bank – Santos – 1893-1913

Company	Nationality	Share credit 1893-1913 (%)	Share exports (%) to each country in total export of the respective company 1893-1913									
			GER	NL	USA	UK	ESP	IT	FRA	REST OF EU	REST LA	REST
Arbuckle Irmaos & C	USA	18,71	0,00	0,00	100	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Theodor Wille	Germany	17,40	27,98	23,08	21,81	0,37	0,50	16,98	3,55	4,19	0,00	1,53
Naumann, Gepp & C	UK	12,61	31,36	17,08	20,73	1,30	1,16	8,41	12,35	6,43	0,03	1,14
Prado Chaves	USA	7,93	16,45	18,84	31,16	1,52	2,35	5,17	18,86	5,51	0,07	0,07
M. Wright & C	-	6,21	29,41	26,26	26,90	1,98	0,06	3,90	6,23	5,25	0,00	0,00
R. Alves Toledo & C	-	3,79	19,64	9,67	42,41	0,33	0,17	3,90	13,80	2,00	8,08	0,00
Hard Rand & C	USA	3,78	10,20	15,48	49,56	1,57	0,43	9,96	5,70	6,94	0,16	0,00
Ed. Johnston & C	UK	3,28	30,54	8,40	33,08	3,21	0,35	8,51	11,59	3,48	0,78	0,07
Cia. Krische	Germany	2,99	43,64	8,90	23,59	0,31	1,31	3,40	9,00	6,84	2,85	0,15
Diebold & C	-	2,51	28,46	27,76	11,69	0,00	0,00	0,35	19,44	11,45	0,85	0,00
Baldwin & C	USA	2,32	13,72	1,58	47,10	0,63	0,79	3,70	24,21	8,18	0,08	0,00
Levy & C	USA	2,27	28,83	22,61	1,90	0,00	0,86	17,51	13,40	14,05	0,83	0,00
Nossack & C	Germany	1,57	27,92	14,05	10,56	0,50	6,71	9,66	19,75	9,92	0,73	0,20
Zerrenner Bulow & C	Germany	1,55	35,52	10,26	25,33	1,52	0,34	8,01	4,04	14,98	0,00	0,00
Schmidt Trost & C	Germany	1,48	68,31	3,45	0,89	0,00	0,89	9,69	14,43	2,00	0,27	0,08
Henry Woltje & Co	-	1,35	44,43	18,65	5,14	0,00	0,00	4,94	0,00	26,84	0,00	0,00
J.W. Doane	USA	1,19	23,23	7,46	35,41	0,92	0,00	7,64	17,68	4,35	0,00	3,30
Goetz Hayn	USA	1,02	19,64	13,85	32,13	0,00	0,00	7,11	20,01	7,25	0,00	0,00
Barbosa & C	-	0,99	24,00	16,21	49,13	0,00	0,00	3,80	4,46	2,03	0,37	0,00
G. da Fonseca	-	0,91	15,84	0,00	21,23	0,00	0,88	0,88	60,59	0,59	0,00	0,00
Prado Lima	-	0,85	46,98	9,22	0,00	0,00	1,68	28,49	0,00	13,64	0,00	0,00
G. Trinks	Germany	0,74	21,45	0,00	57,63	0,00	0,00	4,52	6,32	6,49	3,59	0,00
Whitaker Brotero & C	-	0,58	29,98	10,18	9,05	1,13	0,00	2,83	45,70	1,13	0,00	0,00
Nathan & Co	-	0,46	17,55	1,11	68,52	0,00	0,00	4,46	5,57	2,79	0,00	0,00
S. Caldeira & C	-	0,44	10,37	2,59	87,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Holworthy, Ellis & C	UK	0,33	27,11	5,03	52,68	0,91	0,43	8,78	0,43	4,64	0,00	0,00
Julian Hangwitz	Germany	0,29	21,87	0,00	46,86	0,00	0,00	0,00	6,25	25,02	0,00	0,00
Diogenes Ferreira	-	0,26	22,19	13,87	0,00	0,00	2,08	27,18	0,00	34,67	0,00	0,00
Geo. Rosenheim	Germany	0,23	35,36	2,69	9,31	6,89	0,00	3,77	23,68	17,80	0,51	0,00
Rose & Knowles	-	0,22	36,63	2,60	55,76	0,00	0,00	4,30	0,73	0,00	0,00	0,00
Roxo & C	-	0,22	30,54	17,64	14,08	0,00	1,26	0,74	27,75	5,99	2,01	0,00
August Leuba	-	0,21	37,23	3,60	0,00	0,00	0,00	7,24	32,63	19,29	0,00	0,00

Albert Kussner	*Germany*	0,20	100	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Georg Frey	-	0,19	0,00	0,00	0,00	61,29	0,00	0,00	37,76	0,95	0,00	0,00
Ford	*USA*	0,17	0,00	0,00	0,00	0,00	0,00	0,00	0,00	100	0,00	0,00
L. Schweitzer	*Germany*	0,15	0,00	0,00	100	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Leite & Santos	*Brasil*	0,15	12,43	10,36	0,00	0,00	0,00	4,14	8,29	64,79	0,00	0,00
A.Schirmer	*Germany*	0,10	42,40	0,00	0,00	0,00	0,00	5,08	0,00	52,52	0,00	0,00
Heyer Orl	-	0,10	91,04	0,00	0,00	0,00	0,00	0,00	0,00	8,96	0,00	0,00
Muller & Co	*Germany*	0,10	66,17	0,00	0,00	0,00	0,00	14,50	0,00	19,33	0,00	0,00
Rombauer & C	*Germany*	0,10	0,00	0,00	0,00	0,00	0,00	100	0,00	0,00	0,00	0,00
Carl Hellwig	*Germany*	0,06	18,33	7,92	30,82	0,00	0,00	3,90	33,69	5,33	0,00	0,00
Total		**100**	**82,94**	**25,71**	**14,37**	**31,28**	**1,11**	**0,91**	**8,08**	**11,67**	**6,01**	**0,34**

Source: See Appendix C – Sources

Note: The *share credit 1893-13 (%)* is a company´s share of the total credit, which includes direct credits and discounted bills of exchange (see section ??), provided by the *Brasilianische bank* between 1893 and 1913 to the here listed 42 coffee export houses in Santos. The share of exports to a country (%) is the share of a company´s export to that country in the total quantity of coffee exported by the same company between 1893 and 1913.

Table 43: Descriptive Statistics - Equation 3.1 (Logit Rio)

	Obs	Mean	Std. Dev.	Min.	Max.
Rct	8947	.0316307	.1750247	0	1
Company´s Size	8947	.0024728	.0140564	0	0.3298309
Active before 1889 (Act_89)	8947	.6303789	.4827291	0	1
German company (Ger_Comp)	8947	.0482843	.2143784	0	1
*SIZE*Act_89*	8947	.001553	.0097336	0	0.2092386
*Ger_Comp*Act_89*	8947	.0179949	.1329399	0	1
*Ger_Comp*SIZE*	8947	.0008254	.0101391	0	0.3289309

Table 44: Descriptive Statistics - Equation 3.2 (Logit Santos)

	Obs	Mean	Std. Dev.	Min.	Max.
Sct	2584	.0734649	.2609458	0	1
Company´s Size	2584	.006506	.0236017	0	0.276608
German company (Ger_Comp)	2584	.1122076	.3156794	0	1
Export to Germany (Exp_Ger)	2584	.1140351	.317912	0	1
*Ger_Comp*SIZE*	2584	.0018549	.0125642	0	0.1694341
*Exp_Ger*SIZE*	2584	.0049327	.0214225	0	0.2766008

Table 45: Robustness - Pre-Treatment Test for the Difference-in-Difference estimations 3.3 and 3.4

	(1) Model-I+II
FIN (γ)	6.116***
	(0.844)
INTERV (δ)	0.305
	(0.195)
YEAR (μ)	Yes
COMP (α)	Yes
Number of observations	3.112
Method of estimation	PPML

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

Note: Dependent variable in each column is the quantity of coffee exported by company and year between 1880 and 1913 in Rio de Janeiro. Sample includes the years from 1880 to 1888. The observations for the year 1885 are missing due to the lack of available data. The assumed year of entry in 1885. Robust standard errors are clustered by company and year and are indicated in brackets. *Sources:* See Appendix C – Sources

Table 46: Descriptive Statistics - Equations 3.3 to 3.6 (Difference in Difference Model I - IV)

	Obs	Mean	Std. Dev.	Min.	Max.
Xct	12059	16671.74	916440.3	0	1.01e+08
FINct	12059	.1079692	.3103543	0	1
FINct – occasionally	12059	.0212202	.1441235	0	1
FINct – frequently	12059	.0230438	.1500487	0	1
FINct – continuously	12059	.0070458	.0836462	0	1
INTERVct	12059	.0801061	.2714687	0	1
INTERVct – occasionally	12059	.045756	.2089641	0	1
INTERVct – frequently	12059	.0285975	.1666792	0	1
INTERVct – continuously	12059	.0057195	.0754139	0	1
Xbt	7626	8670.751	46097.21	0	1159349
FINbt	7626	.1097561	.312606	0	1
FINbt – occasionally	7626	.0650407	.2466137	0	1
FINbt – frequently	7626	.0325203	.1773891	0	1
FINbt – continuously	7626	.0121951	.1097633	0	1
INTERVbt	7626	.0814319	.2735152	0	1
INTERVbt – occasionally	7626	.048256	.2143207	0	1
INTERVbt – frequently	7626	.024128	.1534565	0	1
INTERVbt – continuously	7626	.009048	.0946958	0	1