

A Microanalysis of Trade Finance: German bank entry and coffee exports in Brazil, 1880-1913

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ABSTRACT

The trade-finance nexus has enjoyed increasing interest in recent economic studies, but empirical evidence is scarce and studies from a historical perspective seem missing. This study analyses the effect of German bank entry on Brazilian coffee exports between 1880 and 1913 using firm-level data. I create an original data set on the yearly quantities of exported coffee and the credit received from the German *Brasilianische Bank für Deutschland* by export houses in Brazil. Using a difference-in-difference approach, I find that *Brasilianische* eased previously existing credit constraints, and that companies financed by *Brasilianische* exported significantly more than those that were not.

INTRODUCTION

The role of finance in the development of foreign trade has attracted growing attention among scholars. Until recently, the common approach to the subject was based on the idea that companies must cover additional expenses, associated with, inter alia, transport costs, to access foreign markets (Bernard et al, 1995, 2004; Melitz, 2003; Campa, 2004). Although size and productivity are the most frequently acknowledged variables defining a company's export potential—exporting firms are usually larger and more productive (see. e.g. Clerides et al, 1998; Girma et al, 2004)—studies have focused on other characteristics, such as wage structures (Davidson et al, 2005), entrepreneurial capabilities (Manasse and Turrini, 2001), and the types of employees working and technologies used in a company (Yeaple, 2005). The new wave of empirical literature on the impact of financial conditions on exports, triggered by the theoretical framework

developed by Chaney (2005), tenuously agrees with the previous literature. Greenway et al. (2007) affirms a positive correlation between liquidity and export participation in late twentieth-century Great Britain, and the cross-country study carried out by Beck (2001) even finds a causal relation between financial development and trade in manufactures. Utilizing a cross-country firm-level analysis Berman and Héricourt (2012) show 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. Studies by Manova (2008, 2013) and Muuls (2015) confirm that the availability of external finance not only defines a company's potential to enter foreign markets, but also defines the level and growth of its exports, in both, its extensive and intensive margin. The negative effect of credit frictions on a company's potential to export seems particularly high in financially less developed countries (Fauceglia, 2015), and companies with few and only short-established relationships with creditors especially suffer from those negative effects (Minetti and Zhu, 2011). Moreover, according to Manova (2013), 22 per cent of the increase in global trade activity between 1985 and 1995 can be attributed to a reduction of credit constraints due to the improvement of financial institutions. Minetti and Zhu (2011) arrive at a similar conclusion for Italy in the 1990s, estimating that credit constraints decreased the probability of exporting by 39 per cent. Further, Paravisini et al (2014) used firm-level bank credit and export data in 21st-century Peru to show that a 10 per cent drop in credit supply in one year caused a reduction of exports by 1.95 per cent in the following year.

Limitations in the availability of micro-data necessary to establish a direct link between credit supply and export developments create challenges to undertaking similar research using a more historical perspective. This paper aims to fill this gap by providing the first quantitative study of the link between credit and exports from a historical perspective, creating a novel firm-level dataset on coffee exports and German credit supply in Brazil during the late 19th and early 20th centuries.

From the early 1870s Germany experienced a period of accelerated economic growth. Soon the German economy was able to expand beyond its national frontiers. Emerging economies in Latin America became a principal trade destination for Germany. At that time Brazil was the world's leading producer and exporter of coffee,¹ and Germany the second most important export market behind the US, with Hamburg being the European hub for coffee imports (Krause, 2004, p. 144ff; and Rischbieter, 2011, p. 42ff). For coffee exporters, one of the key factors in securing a competitive edge was their ability to provide trade

finance to their importing partners, and the main sources of capital were foreign banks. In the late nineteenth and early twentieth centuries, practically the entire Brazilian export trade was financed through foreign banks operating in Rio and Santos and other commercial centres (Hurley, 1911; Sweigart, 1987). Banking credit directed to export houses, therefore, was of crucial importance in the dynamics of Brazilian coffee exports.

The German bank, *Brasilianische Bank für Deutschland*, was founded in 1887, opening its first branch in Rio de Janeiro one year later, with the primary aim of financing Brazilian coffee exports.² The successful expansion of German external commerce depended on independence from British trade finance. Contemporaneous analyses by Hauser (1901), *Frankfurter Zeitung* (1915), and Einzig (1931) document that 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 almost entirely on English intermediary banks. Riesser et al. (1911) and Strasser (1924), as well as a more recent work, Young (1991), argue that the creation of an independent, global network of German financial institutions—the German foreign banks (*Auslandsbanken*)—was seen as the solution to this dependence on English finance. Ahrens (1938) and Tilly (1991) illustrate that the *Auslandsbanken* followed two principal strategies of trade finance: the establishment of the German Mark as an international trade currency and the provision of credit to German exporters and importers so that “the German commercial may realize its business without the involvement of foreign banks.”³ While German banks were unsuccessful on the first front, their credit policies are commonly cited in literature as the preeminent feature of their successful financing of foreign trade (Tilly, 1992). Studies on the history of the *Auslandsbanken* (Hauser, 1901; Lange, 1926; Born, 1977; Neuburger and Stokes, 1979; Young, 1991) commonly argue that the banks were crucial to the successful expansion of German international trade during the first globalization, yet these studies fail to provide empirical evidence. At the same time, research investigating the impact of bank entry on the easing of credit constraints suggests that local firms benefit from foreign banking presence: specifically, large companies (Berger et al, 2001, 2004; Gianetti and Ogena, 2005; Clarke et al, 2005) and young companies (Gianetti and Ogena, 2009) in emerging markets benefit.

Newly created datasets for this paper allow for analysis of credit distribution by *Brasilianische Bank* to the coffee export houses in Rio and Santos between 1888 and 1913. Using linear probability and logit models, results show that while the size of an export house mattered—larger companies were more likely

to receive credit—the bank eventually financed newcomers as well. This fact provides strong evidence that *Brasilianische* contributed to the easing of credit constraints for new entrants. Furthermore, the results affirm the idea that the bank prioritised the extension of credit to export houses of German origin and companies exporting to Germany. The results hold for regressions (OLS) for continuous measures of credit as well. A difference-in-difference model then estimates the impact of the establishment of *Brasilianische* on the performance of the coffee export houses in Rio between 1880 and 1913. The results confirm a significant, positive correlation between credit provision and the amount of exports; after the bank's entry into the market, companies financed by *Brasilianische* exported significantly more than companies not financed by the bank. The findings are robust to pre-treatment tests and verified by an event study based on the specifications of the difference-in-difference model. Thus, my findings contribute to the ongoing literature on the link between finance and trade, confirming a positive relationship between external credit and the performance of export companies. It widens the perspective by providing quantitative historical evidence on the impact of European banking penetration on the export sector in an emerging country and by providing the first empirical support to the qualitative studies suggesting that the *Auslandsbanken* fostered Germany's international trade relations.

The remainder of this article is structured as follows. The next section describes the development of Brazilian coffee exports and the history of German banks in Brazil during the first wave of globalization. Section three presents the newly created dataset. Descriptive analysis is summarized in section four. Econometric analyses and results are presented in section five, and the final section concludes.

HISTORICAL BACKGROUND

“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* (Hurley, 1911). The latter was the first foreign bank established in Brazil, opening its first branch in 1863 in Rio de Janeiro (Orbell and Turton, 2001). The driving forces of British banking engagement in Brazil in the second half of the nineteenth century were the increasing investment possibilities in capital markets and infrastructure projects (Hurley, 1911, pp. 14ff). The integration of the Brazilian economy into global markets made large-scale infrastructure work necessary. Mainly driven by coffee, the export boom triggered the construction of harbour and, more importantly, railway systems. *Rothschild & Sons*, the most prominent investment bank operating in Brazil, started to issue loans at the “request of the Brazilian government” immediately after Brazilian independence (1822). In 1855, the *Rothschilds* were appointed as the Brazilian government’s financial agent in London. The firm went on to run the government’s needs on the London capital market and remained “close” to Brazil’s financial policies for a long time afterwards. It would be the *Rothschilds* that raised loans for some of the most important railway companies from 1858 on (Shaw, 2005, pp. 171-178).

The *Brasilianische Bank für Deutschland* was founded in 1887 as a joint venture of *Diskonto-Gesellschaft* in Berlin and *Norddeutsche Bank* in Hamburg.⁴ It opened its first branch in 1888 in Rio de Janeiro, followed by branches in Sao Paulo (1893) and Santos (1894). While *Diskonto* was interested in entering the infrastructure and railway construction business in Brazil, *Norddeutsche Bank* had already been an important player in the exporting and importing relations with Brazil in previous decades (*Brasilianische Bank für Deutschland*, 1912, p. 4). A *Diskonto-Gesellschaft* memorandum stated: “Hamburg takes in the European coffee import, which mainly comes from Brazil, the first place. Diskontogesellschaft shows high interest in the Brazilian railway companies and the resulting bond issues [...] (both) makes a direct representation in the local landing desirable.”⁵ Interestingly, it was the coffee exporter Theodor Wille who revived the idea in the beginning of the 1880s to establish a bank in Rio de Janeiro (Miller, 2012, pp. 139ff). Wille led in the

foundation of one of the biggest German financial institutions of the nineteenth century, *Commerz- und Disconto Bank*. In his role as a 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 to ensure the successful future development of German export companies. The reasons why the idea did not come into immediate effect are debatable (Albers, 1978, p. 611; Krause, 2004, pp. 144ff). On one hand, *Commerzbank* was clearly more limited in its resources than the other leading German banks, such as *Deutsche Bank* or *Disconto-Gesellschaft*. The estimated costs for the establishment of a bank in Brazil were 10 million Marks, which corresponded to one-third of the capital of *Commerzbank*, but only one-sixth of the capital of *Deutsche Bank* or *Disconto-Gesellschaft*. On the other hand, perhaps *Commerz- und Disconto Bank*'s competitors simply were faster in the race for financial influence in Brazil.

The *Brasilianische Bank* was the only German bank operating in Brazil until 1911, when *Deutsche Überseeische Bank* and *Deutsch-Südamerikanische Bank* were established in Rio de Janeiro. In 1913, these three banks possessed ten 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, comprising twenty-two branches, were operating in Brazil: *London and Brazilian Bank*, *London and River Plate Bank*, and *British Bank of South America* (see Appendix-Sources, and also Hurley, 1911, pp. 12-22, 36ff, Hauser 1906, pp. 54ff; Lough, 1915). 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, but by 1913 this figure had decreased to 31%. Besides British and German banks, the Spanish *Banco Español del Río de la Plata*, founded in 1887, and the French-Italian *Banco Francés e Italiano para la América del Sud*, established in 1910, were operating in Brazil between 1875 and 1913. Yet, the largest financial institutions were *London and Brazilian Bank*, *London and River Plate Bank*, and *Brasilianische Bank für Deutschland* (Hurley, 1911, pp. 23-27, 36). 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, pp. 5-6).

Great Britain was Brazil's main trading partner in the nineteenth and early twentieth centuries. In 1870, 42 per cent of Brazilian exports and more than 58 per cent of its imports went to and came from Great Britain. German exports and imports accounted only for a bit more than 4 and 6 per cent respectively.

However, 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 third most important exporting and importing partner, behind the USA and Great Britain, respectively (see Table 1).

[Table 1 here]

Brazilian exports during the *Belle Époque* essentially consisted of two products, coffee and rubber with a clear dominance of the former. 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 2 and Figure 1). During the next decades Brazil kept strengthening its position, and by 1913, its share in world production rose to 80 per cent (Topik, 2004; Krieger, 2011). 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 per cent, exports to Germany for 15 per cent, and exports to the Netherlands for 10 per cent of total coffee exports.⁶ Looking at the exports only from Santos, the gap between the USA and Germany was notably smaller, with shares in total exports in the same year of 19 and 38 per cent, respectively (sources see Appendix-Sources). In the 1870s, coffee started to gain popularity in Germany, and within a few years 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. Another explanation is that it was 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, 2013).

[Table 2 and 3 here]

The principal export harbour for coffee from the 1820s until the end of the 1880s was Rio, and from the 1890s onwards, Santos (see Figure 1 and Table 3). 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 (Sweigart, 1987, pp. 5-6). Moreover, 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, Santos overtook Rio as the principal port for coffee exports (Greenhill, 1977, pp. 198-99; Pereira de Melo, 2003, p. 78 and pp. 363-65).

[Figure 1 here]

The commodity chain of Brazilian coffee from its production to its export in the nineteenth century is as follows. First, producers (*fazendeiros*) brought their coffee to the nearest harbour, or train station, from which the coffee was sent to the country's principal export harbours: Rio de Janeiro and Santos. Once arrived, a factor (*commisario*), a representative of the producer who was responsible for the storage of coffee in the harbor, received the coffee. 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 markets. The packer then blended and grouped coffee 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 on the role of financiers, providing producers with the credit that the producers needed to meet their increasing need for labour—that is, buying slaves—and to bridge the producers' income gap between harvests. The situation changed in the 1870s and 1880s with the advancement of the railway, which connected the interior with the coast.⁷ 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 producers' financiers by public institutions and banks. This work does not study this aspect of finance in the production of coffee, as it is concerned with the role of banks in financing exports. It, thus, focuses on the relation between banks and export houses. Although the selling chain had

shortened, the export houses continued to be the intermediary between the Brazilian producer and the international coffee markets.⁸ Hence, their need for capital derived from several factors. First, to finance the acquisition of coffee. Second, to compensate for exchange rate risk as they bought the coffee in national and sold it in international currencies. Finally, to finance shipping abroad (see Pereira de Melo, 2003, pp. 371-73 and Sweigart, 1987, pp. 29-31).

The main sources of capital were foreign banks. In the late nineteenth and early twentieth century, practically the entire export trade of Brazil was financed through foreign banks operating in Rio, Santos, and other commercial centres (Hurley, 1911, p. 46). In previous decades, European trade and its financing was managed by the merchant and the export houses themselves, maintaining offices in Europe and in Brazil. With European trade accelerating intensively from the 1860s, banks became indispensable to manage the increasing amount of financial transactions. Moreover, banks released the trade houses from the necessity of maintaining expensive representation abroad, and, thus, enabled smaller firms to enter into foreign trade business (Young, 1991, pp. 82-85). Foreign banks additionally benefited from the relatively less-developed domestic financial sector (Hurley, 1911) and from the fact that export houses were not listed on the stock market⁹.

THE DATA

To analyse the credit distribution of *Brasilianische Bank für Deutschland* and to test for the hypothesis that export companies that were financed by the bank exported more than companies that were not, I construct two novel data sets.

The first set contains information on the monthly credit lines provided to companies by *Brasilianische Bank* from 1888, the year when the bank started operating, until 1913. The data have been obtained from the official reports of *Brasilianische Bank*'s supervisory board (*Aufsichtsratsberichte*) (see Appendix-Sources). The supervisory board's meetings were held three or four times a year at *Brasilianische Bank*'s headquarters in Hamburg, Germany. During these meetings, the supervisory board defined for all its subsidiaries the monthly credit lines granted to each company for the period until the next meeting would take place. The minimum duration of one credit line was three months, which was the minimum time between two supervisory board meetings. In the reports, financing was differentiated into: (i) lines of direct credit and (ii)

the maximum value for the discount of bills of exchange. 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 (a person or company), who was in debt to a third party (beneficiary). Such was the case when the bank financed European export companies that sold goods to Brazil.

The reports include information on 741 different credit lines—lines of direct credit and of “*Wechsel von*” and “*Wechsel auf*”—to 679 different companies in Brazil and Europe. This study concentrates on the analysis of the effect of bank entry on the performance of coffee exports from Brazil to Germany and other countries and, therefore, focuses on the direct credit lines given to exporting companies located in Brazil and the amount of “*Wechsel von*” bills of exchange discounted.¹⁰ In Brazil, the bank granted 418 credit lines to 383 different companies, of which 83 were exporting houses in Rio de Janeiro (41) and Santos (42).

The second data set contains the annual quantity of coffee exported by exporting houses operating in Rio de Janeiro and Santos, the principal and most important hubs of Brazilian coffee exports at that time. The data for both cities have been obtained from several, contemporaneous newspapers, namely *Jornal do Comercio Retrospecto*, *O Commercio de Sao Paolo*, and the *The Brazilian Review*. These newspapers provide information on the coffee export quantities of each export house (yearly in the case of Rio, and weekly in the case of Santos).

For Rio de Janeiro, my data-set covers the period between 1880 and 1913, with the exception of the years 1885, 1889, and 1890, for which the newspaper issues are missing. It includes the exports of all 389 companies exporting during this period in Rio de Janeiro.

For Santos, the available sources are limited to the years 1893, 1894, and the years between 1898 and 1913. This however, seems to be only a minor drawback, as (i) *Brasilianische Bank* did not open branches in Sao Paolo and Santos before 1893 and 1894, and (ii) Santos gained importance as a coffee export harbour only around the turn of the century (see previous discussion in historical background). 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 *Brasilianische Bank's* possible bias in financing companies of German origin or that exported to Germany.

My data-set for Santos includes the exports of 152 companies to 88 different cities in 26 different countries during the first fourteen days of October. This limitation has been imposed due to the amount of data involved, as the available information for Santos is provided on a weekly basis.¹¹ The month of October has been chosen because it marks the peak season for yearly coffee exports. As previously shown, the export houses acted as intermediaries between Brazilian producers and the international coffee markets, financing the shipping abroad and the hedging of exchange rate risks. Therefore, their need for capital increased with growing exports. Appendix Figures 1 and 2 show the monthly share of the total annual coffee export quantities for Rio de Janeiro for the benchmark years 1881, 1891, 1901, and 1911, and for Santos for the years 1894, 1901, and 1911, respectively. Further, the data indicates that the relative distribution of exports between companies and destinations remained constant over the year. Appendix Table 1 shows the monthly share on total annual coffee exports in Santos in 1900 by destination.

DESCRIPTIVE ANALYSIS

In the years from 1880 to 1913, a total number of 389 different exporting houses operated in Rio de Janeiro. The trade of coffee in Santos between 1893 and 1913¹² was managed by 152 different companies. However, the markets showed an increasing concentration over the years, particularly by the turn of the century. Figure 2 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 can be partly explained by the rising competition from Santos. Yet, the share 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 half of the total exports from Rio. In Santos, the ten largest houses contributed 63 per cent of the coffee exports from 1893 to 1913 (see Table 3). The majority were foreign companies. Out of the twenty largest companies in Rio, one-third came from the USA, a quarter from the UK, and another quarter were of 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 British companies, one-quarter, and US companies, one-fifth.

[Figure 2 here]

Brasilianische Bank financed companies both in Brazil and in Europe. Initially, the bank directed the lion's share—some 72 per cent in 1889/90—of its finance to the latter. However, with the bank adapting to market conditions and expanding its business in Brazil, capital provided to companies in Brazil increased constantly in subsequent years and by the turn of the century equalled the share of finance received by companies in Europe (see Figure 4a). The bank's principal financial instrument was the discounting of bills of exchange. The discounting of bills accounted for more than 92 per cent of the total credit provided by the bank to companies in Europe and Brazil from 1888 to 1913. Yet, direct credit constantly gained in importance in the finance of companies in Brazil. Having the advantage that it was given solely in the Brazilian national currency, Milreis, direct credit minimized exchange rate risks. Between 1889 and 1912, the share of direct credit in the total credit provided to companies in Brazil grew from 13 to 40.7 per cent. The British Pound, on the other hand, was the principal currency for bills of exchange. From 1888 to 1913, 81 per cent of all bills discounted were noted in pounds.¹³

Among the Brazilian companies financed by *Brasilianische Bank*, 41 were coffee exporting houses in Rio and 42 coffee exporters in Santos. Together these coffee exporters received 38.6 per cent of the total credit provided by *Brasilianische Bank* to companies in Brazil between 1888 and 1913. Figure 3 shows the number of companies financed in Rio and Santos. It indicates a shift in the distribution of credit towards Santos by the turn of the century, as from 1900 the number of financed companies decreased in Rio and increased in Santos. This dynamic also can be observed in the monthly average credit provided to exporters in Rio and in Santos. Figure 4b illustrates the development of the monthly average credit provided to coffee exporting houses in Rio and Santos between 1888 and 1913 by *Brasilianische*. From 1888 to 1913, on average, companies in Rio received more credit than companies in Santos (£210,762 per month compared to £169,266 per month) (sources see Appendix-Sources). Yet, after a spike in 1898, credit supplied by

Brasilianische to companies in Rio constantly decreased, while in contrast, companies in Santos received an increasing amount of credit before surpassing that received by Rio companies in 1905.

[Figure 3, and 4 here]

The majority—89%—of the exporting houses financed by *Brasilianische* were foreign companies, with German, US, and British companies dominating, accounting for 41%, 26%, and 10% respectively.¹⁴ The largest share of credit was directed to companies with German origins. They received 32% of the total credit provided to coffee exporters in Rio and Santos between 1888 and 1913, followed by US and British companies (25% and 20% respectively). Also, it seems that the large export houses in particular benefited from the financial support of the bank. Nineteen per cent of the companies financed in Rio were among the twenty leading export houses at the time of the bank's entry in 1888. Yet, at the same time, the bank supported newcomers, as 48% of the export houses financed in Rio did not export before 1888.

ECONOMETRIC ANALYSIS

This section empirically analyzes (i) the factors that determined the distribution of credit provided by *Brasilianische* to the exporting houses in Rio de Janeiro and Santos and (ii) the effect of the bank's provision of credit on the performance of coffee export houses in Rio de Janeiro from 1880 to 1913. In particular, this section examines whether one can observe a divergence in the exports of companies that received credit (financed) and those companies that did not receive credit (not-financed) from *Brasilianische Bank* after its entry into the market.

I use a logit estimation to identify the variables that defined *Brasilianische Bank's* credit distribution. For Rio, the panel data include 9336 observations on 389 export companies operating between the years 1888 and 1913. For Santos, 2584 observations on 152 companies between 1894 and 1913.¹⁵ The logit regression for Rio de Janeiro in the form of an equation is expressed as follows:

$$R_{ct} = a_0 + \beta Siz_{ct-1} + \mu Exp_Before_c + \lambda Ger_Comp_c + \psi_{ct} + \theta_t + \epsilon_{ct} \quad (1)$$

Where R_{ct} is a variable that takes the value one if an exporting company in Rio de Janeiro received credit for at least three months in year t and the value zero in the opposite case; a_0 is a constant. The variable Siz_{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 bank's information of a company's size in year t is based on a company's relative export performance in the previous year. The variable Exp_Before_c is a dummy equal to one in case a company c existed and exported before the German bank's entry in $t=1888$.¹⁶ The dummy variable Ger_comp_c considers the possible bias of *Brasilianische* in favor of German companies, becoming one if a company c is of German origin and zero in the opposite case. The variable ψ_{ct} is a set of interactions, including the interaction between a company's size and companies exporting before 1888 ($Siz_c * Exp_Before$), German companies and companies exporting before 1888 ($Ger_Comp * Exp_Before$), and German companies and the size of a company ($Ger_Comp * Siz_c$). The estimated model also includes time fixed effects (θ_t),¹⁷ and ϵ_{ct} is an error term, representing the myriad of other influences on the distribution of credit.

For Santos, there is no information on companies that were active before 1888, as the available sources only start with the year 1893. However, the data includes the destination of exports (see Data). This allows one to test for the additional assumption that *Brasilianische* financed those companies that exported to Germany. The equivalent equation for the logit estimation for Santos is:

$$S_{ct} = a_0 + \beta Siz_{ct-1} + \lambda Ger_Comp_c + \chi Exp_Ger_{ct} + \psi_{ct} + \theta_t + \epsilon_{ct} \quad (2)$$

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. Exp_Ger_{ct} is a dummy variable that has the value one or zero in case a company c exported or did not export to Germany in year t , respectively. The variable ψ_{ct} is a set of interactions, including between (i) a company's size and German companies ($Ger_Comp * Siz_c$), (ii) a company's size and companies exporting to Germany ($Exp_Ger * Siz_c$), and (iii) German companies and companies exporting to Germany ($Ger_Comp * Exp_Ger$).

The results of the estimations of equations 1 and 2 are presented in Table 4.¹⁸ The coefficients—columns (1), (2), (3) and (4)—indicate whether or not an independent variable had a significant positive or negative influence on the probability that an export house i received finance in year t . The marginal effects¹⁹—columns (5), (6), (7) and (8)—quantify the influence. The coefficient of the share of a company on the total exports (*Size*) is positively significant suggesting that larger, less constrained companies were more likely to receive credit. Size also seems to be the most important variable of influence, as it shows the highest marginal effects in both, Rio and Santos. Younger companies likewise had a higher probability to be financed by the bank. The negative significant coefficient on companies active before 1888 (*Exp_Before*) indicates that incumbent companies that exported before 1888 had less chances to receive credit than those that entered the market after 1888. This strongly indicates that *Brasilianische* contributed to the easing of new entrants' credit constraints. This dynamic seems to be independent from a company's size, as the interaction between a company being active before 1888 and a company's size (*Size*Exp_Before*) is not significant. The results also confirm the idea that the bank directed credit to German companies in particular. The second most important factor in determining a company's probability of receiving credit in Rio, after the company's size, was whether or not a company was of German origin. This provides suggestive evidence that German companies might have suffered from credit constraints prior to *Brasilianische's* entry. Moreover, it seems that small German companies were favoured, independently of their time being in the market, as the interaction of German companies and the size of a company (*Ger_Comp*Size*) is negatively significant and the interaction of German companies and exporters active before 1888 (*Ger_Comp*Exp_Before*) positively significant. Interestingly, this effect disappears if the amount of credit is the dependent variable (see App. Table 2). This suggests that small German companies have a higher likelihood to be supported, albeit not with particular large credits.

The findings for Santos suggest that the probability of a German company receiving credit did not increase with the company's exports to Germany, as the interaction between the two variables (*Ger_Comp*Exp_Ger*) shows no significance. However, independently of a company's nationality, *Brasilianische* especially financed companies that exported to Germany, with the coefficient of houses exporting to Germany (χ) being positively significant, and its marginal effects being the second highest after a company's size. This especially seems to be the case for small companies exporting to Germany, as the

interaction of companies exporting to Germany and the exporter's size ($Exp_Ger*Size$) is negative and significant.

[Table 4 here]

I use a difference-in-difference model to measure the effect of the establishment of *Brasiliense* on the performance of financed and non-financed coffee export companies in Rio de Janeiro between 1880 and 1913. I define four models. The base model, 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. In the form of an equation, it is expressed as follows:

$$X_{ct} = \alpha YEAR_t + \gamma FIN_c + \delta INTERV_{ct} + \Phi_c + \epsilon_{ct} \quad (3)$$

The outcome of interest is X_{ct} the quantities exported by company c in year t ($N=389$). The variable FIN_c is a dummy that takes the value one for financed companies, and the value zero in the opposite case. It identifies the treated group and captures differences between the treatment and control groups prior to the bank's entry. $INTERV_{ct}$ is the intervention dummy that is equal to one for the treated group after the event of bank entry. Φ_c is a full set of company specific variables and their interaction with linear trends, including a dummy that takes the value one if a company is of German origin (Ger_Comp) and its interaction with time ($Ger_Comp*Year$), and a dummy that is equal to one if a company exported prior to the year 1888 (Exp_Before) and its interaction with time ($Exp_Before*Year$). The variable $YEAR_t$ is a year fixed effect that controls for common shocks influencing all companies equally in year t . ϵ_{ct} and ϵ_{bt} are error terms, representing the myriad other influences on exports.

Defining a company as being treated if, after the bank's entry into the market, the company received credit from the bank at least for three months has its limitations, as this definition does not account for differences in the amount of credit received by export companies, and it assumes that a one-time credit can

have a considerable long-term impact on a company's export performance. Model-II and III account for these limitations. Model-II is identical to Model-I, but accounts for the monthly average credit that a company received in each year. In the form of an equation, it is expressed as follows:

$$X_{ct} = \alpha YEAR_t + \lambda CREDIT_{ct} + \gamma FIN_c + \delta INTERV_{ct} + \Phi_c + \varepsilon_{ct} \quad (4)$$

Where $CREDIT_{ct}$ is a continuous variable with the amount of monthly average credit, in thousand pounds, a company c received in year t .

Model-III is identical to Model-I, but distinguishes the treated group between export houses that received at least three months and up to 25 per cent (*occasionally*), between 25 and 75 per cent (*frequently*), and more than 75 per cent of the time credit (*continuously*).²⁰ In the form of an equation, it is expressed as follows:

$$X_{ct} = \alpha YEAR_t + FIN_c \gamma + INTERV_{ct} \delta + \varepsilon_{ct} \quad (5)$$

The variable FIN_c and the variable $INTERV_{ct}$ represent a full set of treatment and intervention dummies, respectively, differentiating between companies receiving credit *occasionally*, *frequently*, and *continuously*.

Model-IV is a combination of Model-II and III, accounting for both, the intensity and frequency of credit. In the form of an equation, it is expressed as follows:

$$X_{ct} = \alpha YEAR_t + \lambda CREDIT_{ct} + FIN_c \gamma + INTERV_{ct} \delta + \varepsilon_{ct} \quad (6)$$

Finally, I test all the models for the possible bias that a change in the dependent variable—exports—is driven by companies starting to export only after the bank's entry. For that I restrict the sample to companies that were active before the bank's entry in 1888, with a remaining number of 245 companies. 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 continuously export or receive credit throughout the whole period of observation.²¹

Figure 5 compares the exports of financed and non-financed companies before and after the bank's entry in 1888—for the period between 1880 and 1913. Figure 6 does the same, but omits the exports of companies that did not exist before 1888.

The results of the difference-in-difference estimations are presented in Tables 5 to 6. The coefficient δ of the intervention dummy (INTERV) is positively significant in each Model I to IV (columns 1 to 8), confirming the principal assumption of this study that the provision of credit by *Brasilianische Bank* had a positive impact on the performance of coffee export houses.²² After the bank's entry, financed companies exported on average 2.2 times more (based on the estimation results of equation 3, presented in Table 5, column 3)²³ than non-financed companies. Companies of German origin and companies that were active before 1888 equally exported more, with the coefficients of both variables (*Ger_Comp* and *Exp_Before*) being positively significant in all models. The results are robust, when controlling for company fixed effects and interacting both variables with linear trends (*Ger_Comp*Year*, and *Exp_Before*Year*, see columns 4, 8 in Tables 5 and 6). The interactions are positively significant, yet show a very small coefficient across all models. This indicates that the importance of a company's being German and having exported before 1888 varies only marginal over time.

Furthermore, the results indicate that companies that received more credit or credit with more frequency performed better. For every 1.000 pounds of monthly credit a company received, its exports increased on average by 1.82 per cent per year (based on the estimation results of equation 4, presented in Table 5, column 7).²⁴ Companies that received credit up to 25% of the time (*occasionally*) exported on average 0.75 times more than non-financed companies, companies receiving up to 75% of the time credit (*frequently*) 4.1 times more, and companies receiving more than 75% of the time credit (*continuously*) 3.3 times more.²⁵ This suggests that the divergence between financed and non-financed companies is mainly driven by companies that frequently received credit. The slightly smaller effect of continuous credit might be due to the fact that companies in need of receiving constant external finance were not among the high performing companies.

[Figures 5 and 6 here]

[Tables 5, and 6 here]

Finally, Tables 7 and 8 present the results of the difference-in-difference estimation when looking only at companies that exported before 1888. The data confirm the positive effect of *Brasilianische Bank*'s establishment. Financed companies exhibit a greater increase in exports relative to non-financed houses after the bank's 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. The effect of bank entry in the base model (Model I) seems to be slightly smaller, with the coefficient of the intervention dummy (δ_{INTERV}) being smaller, than when considering all companies. This is in line with the previous findings of this article. *Brasilianische* directed credit to new entrants in particular, and the number of financed companies that were active before the banks' entry is comparatively small. Appendix Figure 4 compares the exports of companies receiving credit *occasionally*, *frequently*, and *continuously* for all companies, and for only those companies that exported before 1888.

[Tables 7 and 8 here]

I use a pre-treatment test to provide evidence of the validity of my results. The principal idea of the test is to verify that the observed effect of bank entry is time sensitive; the divergence of performance dynamics of treated and control group first occurs with start of treatment. It includes a difference-in-difference model that is identical to Base Model-I, with the exception that it covers only the exports by company for the pre-treatment period (1880-87), and assumes that German banks were already established in 1884. The year 1884 has been chosen as it allows having the same amount of observations before and after treatment. The results, presented in Appendix Table 3, 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 1888.

As additional robustness check, I perform an event study to analyse the effect of the German bank entry on the performance of export companies. I define three specifications. Specification I looks at the

exports of all 389 companies in Rio de Janeiro between 1880 and 1913. In form of an equation, it is expressed as follows.

$$\text{Ln}X_{ct} = a_0 + \alpha \text{Post_Event}_{ct} + \psi_c + \theta_t + \varepsilon_{ct} \quad (7)$$

Where $\text{Ln}X_{ct}$ are the log values of the quantities exported by company c in year t ($N=389$). a_0 is a constant. The outcome of interest is α , the coefficient on the dummy variable, Post_Event . Post_Event takes the value one for company c in all years t it receives credit, inclusive of the year the company first received credit. The estimated model also includes time (θ_t) and company fixed effects (ψ_c), and ε_{ct} is an error term, representing the myriad of other influences on the distribution of credit. Specification II is identical to specification I, but only includes companies that received credit for at least three months during the period between 1880 and 1913 ($N=41$). Specification III is identical to specification II, however it excludes observations for a company when they stop receiving credit, if applicable.

The results, presented in Appendix Table 4, confirm the idea that the provision of credit by the *Brasilianische Bank* had a positive effect on exports. The coefficient of interest α is positively significant across all the specifications. Companies that received credit exported on average 1.9 times more (based on the estimation results presented in column 1) than non-financed companies. The credit effect is even more pronounced when looking only at financed companies and considering the period of credit supply. Specification II indicates that a company exported on average 3.1 times more (column 4) since the moment of receiving credit for the first time, and specification III shows that during periods of receiving credit companies exported 3.9 times more (column 7) than in years without German credit supply. Due to the potential for observations to be correlated over time, Newey-West standard errors are utilized. Columns 2-3, 5-6, and 8-9 show the results for the estimation model with a lag of 5 and 10 years for specifications I, II and III, respectively.

CONCLUDING REMARKS

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

I created a unique data set on the annual quantity of coffee exported and the amount of credit provided by *Brasilianische Bank* to the export houses in Rio de Janeiro and Santos. Using a logistic regression, I first empirically analysed the credit distribution of *Brasilianische Bank*. The results showed that larger export houses were more likely to receive finance. Yet, the bank eventually financed newcomers. This gives strong evidence that *Brasilianische Bank* contributed to the easing of credit constraints for 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. This fact, on one hand, suggests that prior to the bank's entry, German companies had suffered from credit constraints. On the other hand, it confirms the bank's significant role in promoting trade between Brazil and Germany. The findings hold for regressions for continuous measures of credit as well. I then tested the influence of *Brasilianische's* provision of credit on the performance of coffee export houses in Rio de Janeiro using a difference-in-difference model. The results confirmed a positive, significant correlation; companies financed by *Brasilianische* exported significantly more after its entry than companies not financed by the bank. In particular, companies that received more credit or received credit with more frequency performed better. The results are robust to pre-treatment tests and are confirmed by the findings of an event study based on the specifications of the difference-in-difference model.

This study contributes to the ongoing discussion on the role of finance in trade, expanding those studies that confirm a positive relationship between the availability of external credit and the performance of export companies. It widens the perspective by providing, for the first time, historical, 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 affirms a central role of the *Auslandsbanken* in fostering trade by providing credit in the international markets, especially to German companies.

Future research would benefit from the improvement of the measurements of the determinants of exports, such as using the year of foundation of the companies as an indicator of established and newcomer companies (instead of the distinguishing between companies exporting before and after bank entry), and the definition and inclusion of additional factors that might have influenced the performance of Brazilian coffee export houses. Furthermore, the analysis on the link between credit supply and exports presented in this paper excludes the possible influence of financial institutions other than *Brasilianische Bank*, whether local or of a nationality other than German. One cannot be absolutely sure that companies not financed by *Brasilianische* did not receive financial support from alternative sources. Most prominent among these alternative sources were British banks, as trade finance was dominated by foreign banks, disposing over the necessary resources, and export houses were not listed on the stock market. This point, however, also applies to export houses financed by *Brasilianische Bank*, as they had access to British banks as well. Hence, the objective of the study is not to show the effects of finance on the performance of Brazilian export houses, but rather the effect of German credit supply. Nevertheless, future studies would profit from including information on financial support from other institutions. Consideration of British banks could be a good start.

FOOTNOTES

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- 1 Between 1870 and 1913, Brazilian coffee production accounted for around 57 per cent of Brazilian exports and some 75 per cent of total world production (see Table 2 and Figure 1).
- 2 Brasilianische Bank, 1912
- 3 Denkschrift Deutsche Bank (Hauser, 1901, p. 18)
- 4 The establishment of *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 *International Bank*, *Berenberg Gosslar & Co*, and *Norddeutsche Bank* as the main shareholders. Burhop documents (2004, pp.193-194) that 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.
- 5 Denkschrift der Diskontogesellschaft (Hauser, 1906, p. 53, translated from German.)
- 6 Author's own calculations based on: Anuario Estatístico do Brazil, 1908-1912, pp. 120-121
- 7 The Brazilian railway mainly evolved between the coffee-producing provinces and the main harbours. In 1873, Rio de Janeiro and Sao Paulo possessed 45 and 22 per cent of Brazil's railroad network, respectively (Pereira de Melo, 2003, p. 367).
- 8 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 "Theodor Wille and Co.", founded in 1844, was the largest export house in Santos, with branches in Rio de Janeiro and Sao Paulo. 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, p. 611; Krause, 2004, pp. 144ff; Fenner, 2013).
- 9 *The Brazilian Review*, *Jornal do Commercio Retrospecto Commercial*, and *O Commercio de Sao Paulo* provide the companies listed in the Rio and Sao Paulo stock exchange markets. For Rio, see e.g. Table 25 of the 1879 issue of *Jornal do Commercio: Retrospecto Commercial*.
- 10 Additionally, in most "*Wechsel auf*" cases, *Brasilianische Bank* bought credits and/or discounted bills from banks that acted in the name of European exporters. Hence, it is not feasible to define the distribution of credits among the different export sectors.
- 11 Which leads to 5472 data entries for the period of investigation: 152 companies * 2 weeks * 18 years = 5472
- 12 The years with information on export firms in Santos are limited according to the available data. See data description.
- 13 The rest were noted in the German Mark (7 per cent), the French Franc or Milreis (both 6 per cent).
- 14 The share of companies of a certain nationality is the number of companies of the respective nationality relative to the total number of 83 companies that have been financed by *Brasilianische Bank* in Rio and Santos between 1888 and 1913 adjusted by the companies which nationality could not be identified.
- 15 For Rio, the years 1889 and 1890, and for Santos the years 1895, 1896, and 1897 are missing due to a lack of available

data. In addition, for Santos the year 1893 is not included, as in the regression a company's size in year t is measured as the company's share on exports in the previous year $t-1$ and data on exports in Santos previous to the year 1893 are not available.

16 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 Brazilian market.

17 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).

18 To test for robustness and confirm the results, I apply an OLS regression with the same specifications of the Logit regression but the dependent variable being the monthly average credit provided to a company c in year t . In form of equation it is expressed as: $\ln CREDIT_{ct} = \alpha_0 + \beta \ln Size_{ct-1} + \mu Exp_Before_c + \lambda Ger_Comp_c + \psi_{ct} + \theta_t + \epsilon_{ct}$ for Rio de Janeiro and as: $\ln CREDIT_{ct} = \alpha_0 + \beta \ln Size_{ct-1} + \chi Exp_Ger_{ct} + \lambda Ger_Comp_c + \psi_{ct} + \theta_t + \epsilon_{ct}$ for Santos. Where $\ln CREDIT_{ct}$ is the log value of the amount of average monthly credit received by company c in year t . The independent variables are identical to the ones in Equation (1) in the case of Rio de Janeiro, and Equation (2) in the case of Santos. The results are presented in Appendix Table 2. Large companies, companies that exported before 1888, German companies, and companies exporting to Germany were more likely to receive credit. The interactions show the same signs of their correlation, positive or negative, as in the logit, but are not statistically significant.

19 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.

20 The majority of the companies received credit occasionally, 57% and 68% in the case of specification one and two, respectively. One third of the companies received credit frequently, 36% and 27%, respectively. The share of companies that received credit continuously was rather small, with 7% and 5%. There seems to be no bias in frequency of credit explained by a company's size (see Appendix Figure 3).

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

22 The coefficient $\delta = [(\alpha + \mu + \gamma + \delta) - (\alpha + \mu + \gamma)]$ 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.

23 Since $1 - e^{-1.150} = 2.158$, see Wooldridge, Jeffrey (2002), *Introductory Econometrics: A Modern Approach*, ITPS Thomson Learning; 2nd Revised edition

24 Since $1 - e^{-0.018} = 1.0182$, see Wooldridge, Jeffrey (2002), *Introductory Econometrics: A Modern Approach*, ITPS Thomson Learning; 2nd Revised edition

25 See column 3 of Model-III presented in Table 6, which considers the frequency of credit, with $1 - e^{-0.559} = 0.749$ (*occasionally*), $1 - e^{-1.634} = 4.124$ (*frequently*), and $1 - e^{-1.458} = 3.297$ (*continuously*).

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TABLES AND FIGURES

Table 1: Great Britain, Germany and the USA – Share on Brazilian total imports and exports (% of total) – 1870, 1902, 1913

	Great Britain		Germany		USA	
	<i>Import</i>	<i>Export</i>	<i>Import</i>	<i>Export</i>	<i>Import</i>	<i>Export</i>
<i>1870</i>	58.0	42.0	6.0	4.0	5.0	29.0
<i>1902</i>	28.1	17.4	11.4	15.8	12.3	37.0
<i>1913</i>	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

Table 2: Commodity export shares in Brazil (% of total) – 1870-1919

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

Source: Abreu and Bevilaqua, 1996, p. 9

Table 3: The 20 largest coffee exporting companies in Rio de Janeiro – 1880-1913, and Santos – 1893-1913 – Share on exports (% of total)

Rio			Santos		
<i>Company</i>	<i>Share on exports (*)</i>	<i>Nationality</i>	<i>Company</i>	<i>Share on exports (*)</i>	<i>Nationality</i>
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	Brazil
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	Michaelson 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	Brazil	Baldwin & C	2.46	UK
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
<i>Total</i>	<i>72.58</i>			<i>80.05</i>	

Sources: See Appendix-Sources

(*) Note: The share on 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.

Table 4: Logit estimation - Determinants of an export company receiving credit – Rio de Janeiro (Eq. 1) and Santos (Eq. 2)

	Logit				Marginal Effects			
	Rio (1)	Rio (2)	Santos (3)	Santos (4)	Rio (5)	Rio (6)	Santos (7)	Santos (8)
Company`s Size ($\beta Size$)	25.67*** (3.303)	41.75*** (7.383)	18.05*** (2.882)	31.32*** (6.289)	0.651*** (0.085)	1.053*** (0.195)	0.867*** (0.135)	1.501*** (0.315)
Active before 1888 (μExp_Before)	-0.535*** (0.121)	-0.834*** (0.125)			-0.014*** (0.003)	-0.021*** (0.003)		
German company (λGer_Comp)	1.597*** (0.163)	1.698*** (0.186)	0.797*** (0.235)	1.142*** (0.457)	0.041*** (0.004)	0.043*** (0.005)	0.038*** (0.012)	0.055*** (0.018)
Export to Germany (χExp_Ger)			2.453*** (0.217)	2.628*** (0.267)			0.118*** (0.011)	0.126*** (0.014)
Company`s Size*Active before 1888 ($Size*Exp_Before$)		-2.609 (9.313)				-0.066 (0.235)		
German company*Active before 1888 ($Ger_Comp*Exp_Before$)		0.886*** (0.261)				0.022*** (0.007)		
German company*Company`s Size ($Ger_Comp*Size$)		29.624*** (8.773)		-12.791** (6.461)		-0.747*** (0.223)		-0.615** (0.313)
Export to Germany*Company`s Size ($Exp_Ger*Size$)				-16.621** (5.097)				-0.655** (0.258)
German Company*Exporting to Germany ($Ger_Comp*Exp_Ger$)				-0.051 (0.471)				-0.024 (0.023)
<i>Year effects (0t)</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Number of observations</i>	9.336	9.336	2.584	2.584	9.336	9.336	2.584	2.584
<i>R2</i>	0.1510	0.1733	0.3338	0.3433				
<i>Method of estimation</i>	Logit	Logit	Logit	Logit	Logit - Marginal	Logit - Marginal	Logit - Marginal	Logit - Marginal

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

Note: Dependent variable is a dummy that takes the value one if an exporting company i in Rio de Janeiro or Santos, respectively, received credit for at least three months in the year t , and the value zero in the opposite case. The coefficients of the regression – columns (1), (2), (3), and (4) – indicate whether or not an independent variable had a significant positive or negative influence on the probability that an export house i received finance in year t . The marginal effects – columns (5), (6), (7), and (8) – quantify the influence. The marginal effects are the average marginal effects based on the Delta-method. Rio de Janeiro includes observations on 389 export companies for the years from 1888 to 1913. With the exception of 1889 and 1890 where no data is available. 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 could be used to measure a company's size are available. Robust standard errors are clustered by company and year and are indicated in brackets.

Table 5: Difference-in-Difference estimation for coffee export houses in Rio – 1880-1913 – Model-I (Base Model) and Model-II (Intensity of treatment)

	Model-I (Base Model)				Model-II (Intensity of treatment)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment - Receiving credit (γ_{FIN})	1.365*** (0.191)	1.160*** (0.197)	7.695*** (0.758)	7.887*** (0.740)	1.365*** (0.191)	1.223*** (0.196)	7.563*** (0.761)	7.911*** (0.741)
Intervention - Receiving credit after bank entry (δ_{INTERV})	1.149*** (0.227)	1.149*** (0.221)	1.150*** (0.190)	1.059*** (0.169)	0.793*** (0.244)	0.841*** (0.240)	1.038*** (0.195)	0.923*** (0.179)
Monthly average credit received by company (λ_{CREDIT})					0.037*** (0.004)	0.030*** (0.005)	0.018*** (0.003)	0.009*** (0.002)
German company (Ger_Comp)		1.113*** (0.131)				0.813*** (0.129)		
Company exporting before 1888 (Exp_Before)		0.594*** (0.093)				0.411*** (0.105)		
German company *Year ($Ger_Comp*Year$)				0.028** (0.011)				0.026** (0.011)
Exporting before 1888 *Year ($Exp_Before*Year$)				-0.171*** (0.011)				-0.165*** (0.011)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company effects	No	No	Yes	Yes	No	No	Yes	Yes
Number of observations	12.059	12.059	12.059	12.059	12.059	12.059	12.059	12.059
Method of estimation	PPML	PPML	PPML	PPML	PPML	PPML	PPML	PPML

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

Note: Dependent variable is the quantity of coffee exported by company and year between 1880 and 1913 in Rio de Janeiro, considering all 389 export companies operating during that time in Rio de Janeiro. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data in the original sources. Robust standard errors are clustered by company and year and are indicated in brackets.

Table 6: Difference-in-Difference estimation for coffee export houses in Rio – 1880-1913 – Model-III (Frequency of treatment) and Model-IV (Intensity & Frequency of treatment)

	Model-III (Frequency of treatment)				Model-IV (Intensity & Frequency of treatment)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment - Receiving credit <i>Occasionally</i> (FINγ)	1.338*** (0.197)	1.171*** (0.186)	6.921*** (0.854)	7.028*** (0.806)	1.338*** (0.197)	1.158*** (0.187)	6.917*** (0.847)	7.048*** (0.804)
Treatment - Receiving credit <i>Frequently</i> (FINγ)	1.470*** (0.305)	1.342*** (0.320)	7.271*** (0.780)	7.515*** (0.749)	1.470*** (0.305)	1.295*** (0.321)	7.16*** (0.710)	7.562*** (0.754)
Treatment - Receiving credit <i>Continuously</i> (FINγ)	0.993** (0.491)	0.544 (0.407)	5.270*** (0.968)	-317.8*** (20.230)	0.993** (0.491)	0.531 (0.407)	5.478*** (0.963)	-304.4*** (20.078)
Intervention - Receiving credit <i>Occasionally</i> (INTERVδ)	0.559*** (0.260)	0.558** (0.242)	0.559*** (0.197)	0.496*** (0.161)	0.492** (0.258)	0.508** (0.237)	0.563*** (0.194)	0.453*** (0.163)
Intervention - Receiving credit <i>Frequently</i> (INTERVδ)	1.634*** (0.328)	1.633*** (0.332)	1.634*** (0.285)	1.529*** (0.244)	1.111*** (0.346)	1.201*** (0.345)	1.501*** (0.307)	1.379*** (0.264)
Intervention - Receiving credit <i>Continuously</i> (INTERVδ)	1.458*** (0.520)	1.458*** (0.413)	1.458*** (0.395)	1.335*** (0.394)	-0.039 (0.597)	-0.415 (0.123)	0.845** (0.448)	0.881** (0.429)
Monthly average credit received by company (λ CREDIT)					0.041*** (0.005)	0.039*** (0.004)	0.0175*** (0.003)	0.009*** (0.002)
German company (<i>Ger_Comp</i>)		1.123*** (0.135)				1.139*** (0.123)		
Company exporting before 1888 (<i>Exp_Before</i>)		0.770*** (0.093)				0.654*** (0.086)		
German company *Year (<i>Ger_Comp*Year</i>)				0.030** (0.011)				0.030** (0.011)
Exporting before 1888 *Year (<i>Exp_Before*Year</i>)				-0.170*** (0.011)				-0.163*** (0.011)
<i>Year effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Company effects</i>	No	No	Yes	Yes	No	No	Yes	Yes
<i>Number of observations</i>	12.059	12.059	12.059	12.059	12.059	12.059	12.059	12.059
<i>Method of estimation</i>	PPML	PPML	PPML	PPML	PPML	PPML	PPML	PPML

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

Note: Dependent variable is the quantity of coffee exported by company and year between 1880 and 1913 in Rio de Janeiro, considering all 389 export companies operating during that time in Rio de Janeiro. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data in the original sources. Robust standard errors are clustered by company and year and are indicated in brackets.

Table 7: Difference-in-Difference estimation for coffee export houses in Rio operating before 1888 – 1880-1913 – Model-I (Base Model) and Model-II (Intensity of treatment)

	Model-I (Base Model)				Model-II (Intensity of treatment)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment - Receiving credit (γ_{FIN})	1.542*** (0.182)	1.506*** (0.183)	7.848*** (0.738)	7.841*** (0.739)	1.542*** (0.182)	1.538*** (0.183)	7.849*** (0.738)	7.842*** (0.739)
Intervention - Receiving credit after bank entry (δ_{INTERV})	1.126*** (0.170)	1.126*** (0.234)	1.126*** (0.170)	1.135*** (0.175)	0.926*** (0.238)	0.929*** (0.239)	1.123*** (0.180)	1.132*** (0.184)
Monthly average credit received by company (λ_{CREDIT})					0.020*** (0.002)	0.019*** (0.003)	0.0002 (0.003)	0.0002 (0.003)
German company (Ger_Comp)		0.439*** (0.117)				0.054 (0.181)		
German company *Year ($Ger_Comp*Year$)				-0.004 (0.015)				-0.004 (0.015)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Company effects	No	No	Yes	Yes	No	No	Yes	Yes
Number of observations	7.595	7.595	7.595	7.595	7.595	7.595	7.595	7.595
Method of estimation	PPML	PPML	PPML	PPML	PPML	PPML	PPML	PPML

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

Note: Dependent variable is the quantity of coffee exported by company and year between 1880 and 1913 in Rio de Janeiro, considering only the 245 companies that already exported before the banks' entry in 1888. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data in the original sources. Robust standard errors are clustered by company and year and are indicated in brackets.

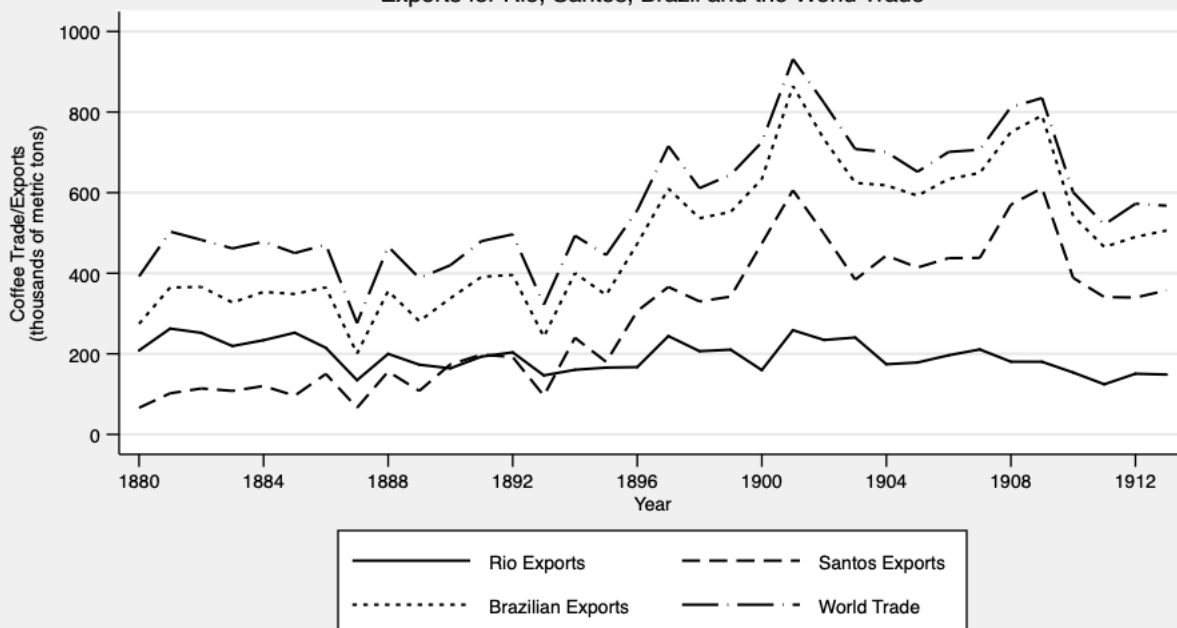
Table 8: Difference-in-Difference estimation for coffee export houses in Rio operating before 1888 – 1880-1913 – Model-III (Frequency of treatment) and Model-IV (Intensity & Frequency of treatment)

	Model-III (Frequency of treatment)				Model-IV (Intensity & Frequency of treatment)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment - Receiving credit <i>Occasionally</i> (FINγ)	1.363*** (0.203)	1.333*** (0.201)	6.989*** (0.803)	6.975*** (0.805)	1.363*** (0.203)	1.333*** (0.201)	6.979*** (0.803)	6.960*** (0.806)
Treatment - Receiving credit <i>Frequently</i> (FINγ)	1.873*** (0.280)	1.888*** (0.280)	7.522*** (0.748)	7.524*** (0.747)	1.873*** (0.280)	1.888*** (0.280)	7.503*** (0.747)	7.502*** (0.747)
Treatment - Receiving credit <i>Continously</i> (FINγ)	1.647** (0.383)	1.130*** (0.433)	7.895*** (0.808)	24.829 (27.728)	1.647** (0.383)	1.134*** (0.432)	7.895*** (0.808)	31.200 (27.728)
Intervention - Receiving credit <i>Occasionally</i> (INTERVδ)	0.567*** (0.267)	0.567** (0.264)	0.567*** (0.162)	0.587*** (0.163)	0.550** (0.267)	0.549** (0.264)	0.584*** (0.163)	0.614*** (0.164)
Intervention - Receiving credit <i>Frequently</i> (INTERVδ)	1.538*** (0.330)	1.538*** (0.330)	1.537*** (0.246)	1.535*** (0.246)	1.401*** (0.339)	1.403*** (0.339)	1.596*** (0.241)	1.600*** (0.241)
Intervention - Receiving credit <i>Continously</i> (INTERVδ)	1.826*** (0.415)	1.826*** (0.415)	1.826*** (0.403)	1.961*** (0.437)	1.281*** (0.477)	1.285*** (0.476)	1.987*** (0.429)	2.193*** (0.488)
Monthly average credit received by company (λCREDIT)					0.010*** (0.003)	0.010*** (0.003)	-0.003 (0.003)	-0.004 (0.003)
German company (Ger_Comp)		0.533*** (0.205)				0.528*** (0.203)		
German company *Year (Ger_Comp*Year)				-0.009 (0.015)				-0.012 (0.015)
<i>Year effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Company effects</i>	No	No	Yes	Yes	No	No	Yes	Yes
<i>Number of observations</i>	7.595	7.595	7.595	7.595	7.595	7.595	7.595	7.595
<i>Method of estimation</i>	PPML	PPML	PPML	PPML	PPML	PPML	PPML	PPML

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

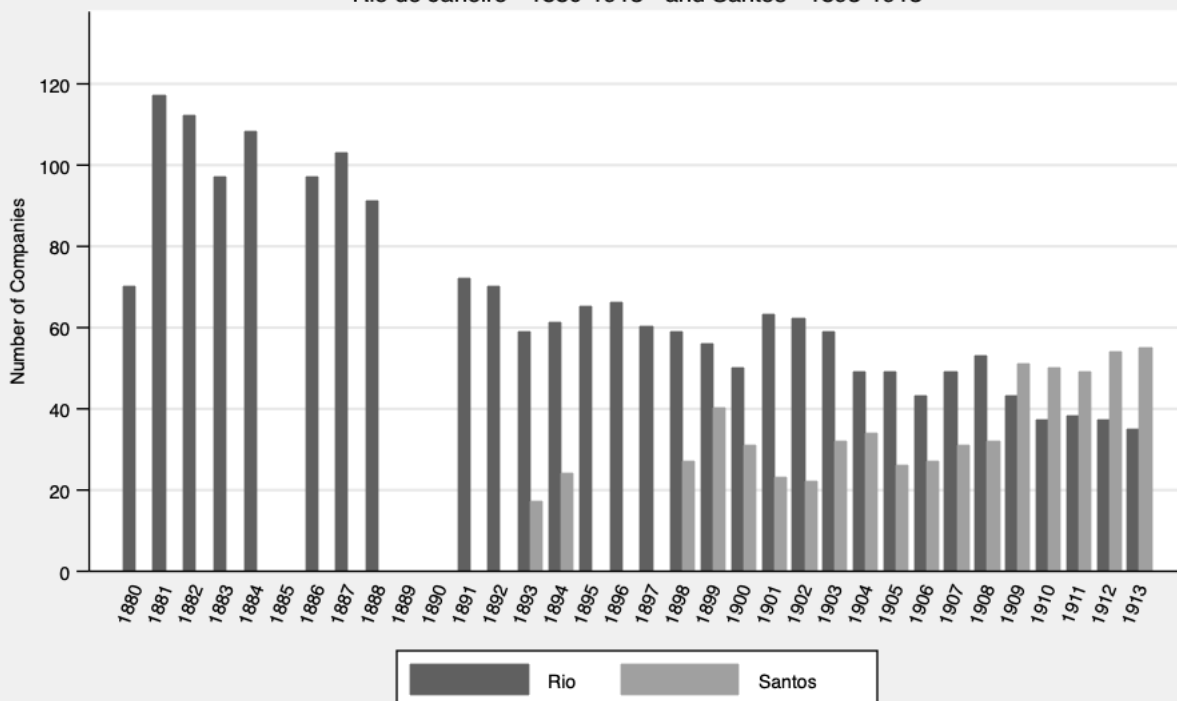
Note: Dependent variable is the quantity of coffee exported by company and year between 1880 and 1913 in Rio de Janeiro, considering only the 245 companies that already exported before the banks' entry in 1888. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data in the original sources. Robust standard errors are clustered by company and year and are indicated in brackets.

Figure 1: Coffee Trade
Exports for Rio, Santos, Brazil and the World Trade



Sources: The quantities for Rio are from the authors data set, see Appendix - Sources. The information for Santos is from Greenhill (1977, p. 199). 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: Samper, Mario and Radin Fernando 'Appendix: Historical statistics of coffee production and trade from 1700 to 1960' In The Global Coffee Economy in Africa, Asia, and Latin America, 1500-1989, edited by William Gervase Clarence-Smith and Steven Topik, Cambridge: Cambridge University Press, 2003, pp.441-462.

Figure 2: Number of export companies
Rio de Janeiro - 1880-1913 - and Santos - 1893-1913



Sources: See Appendix - Sources
For Rio de Janeiro observations for the years 1885, 1889, and 1890 are missing due to the lack of available data in the original sources. For Santos for the years 1895, 1896, and 1897.

Figure 3: Number of Companies that received and did not receive credit

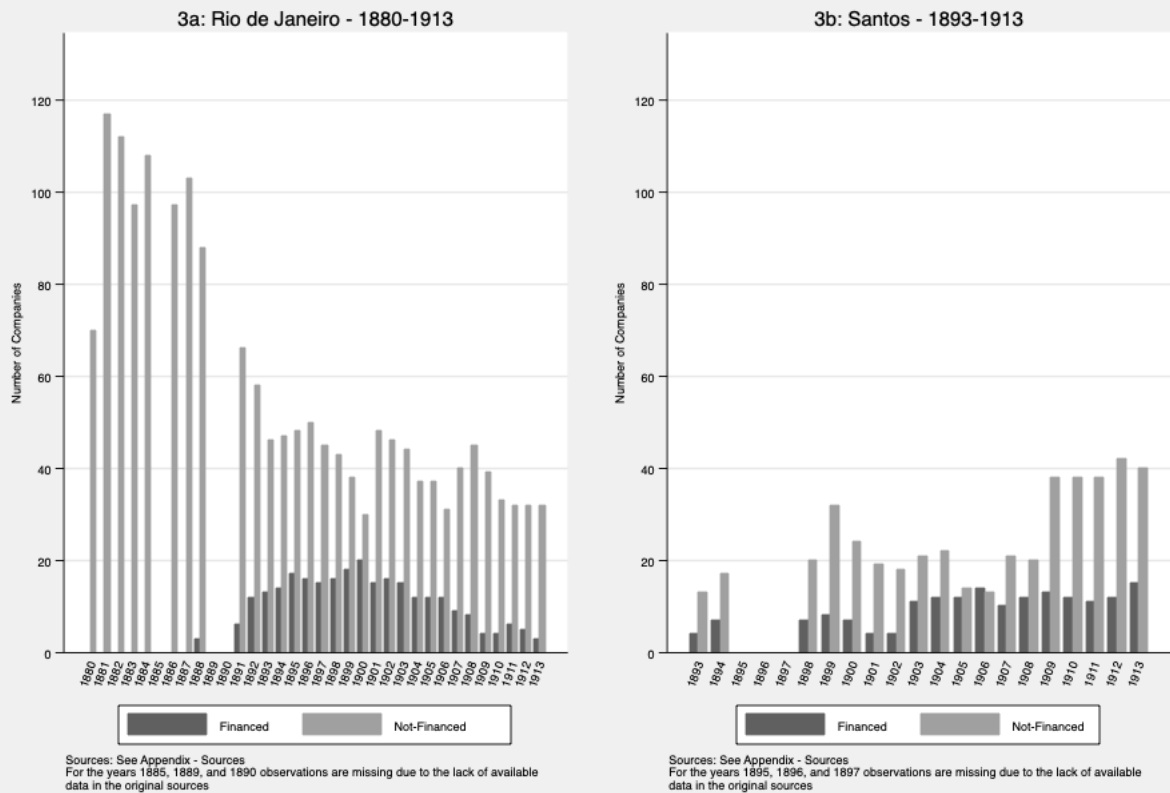


Figure 4: Monthly average credit provided by Brasilianische Bank - (in Thousand Pounds)

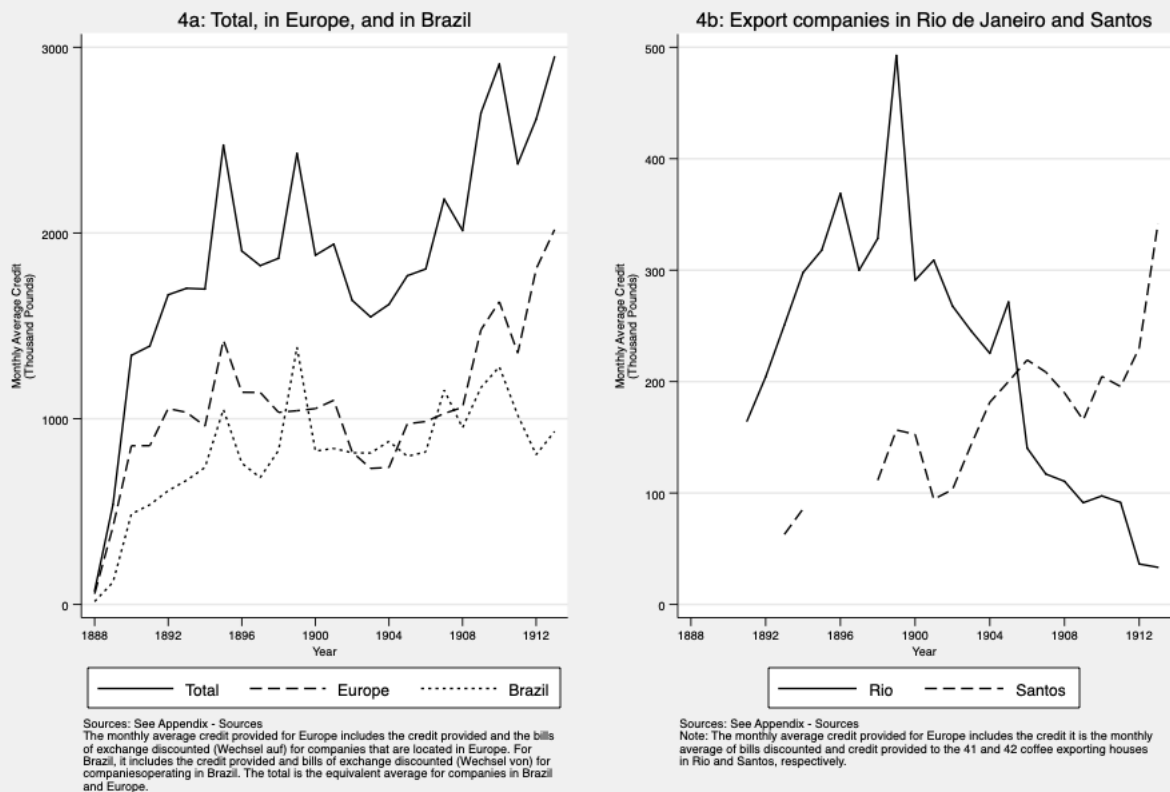
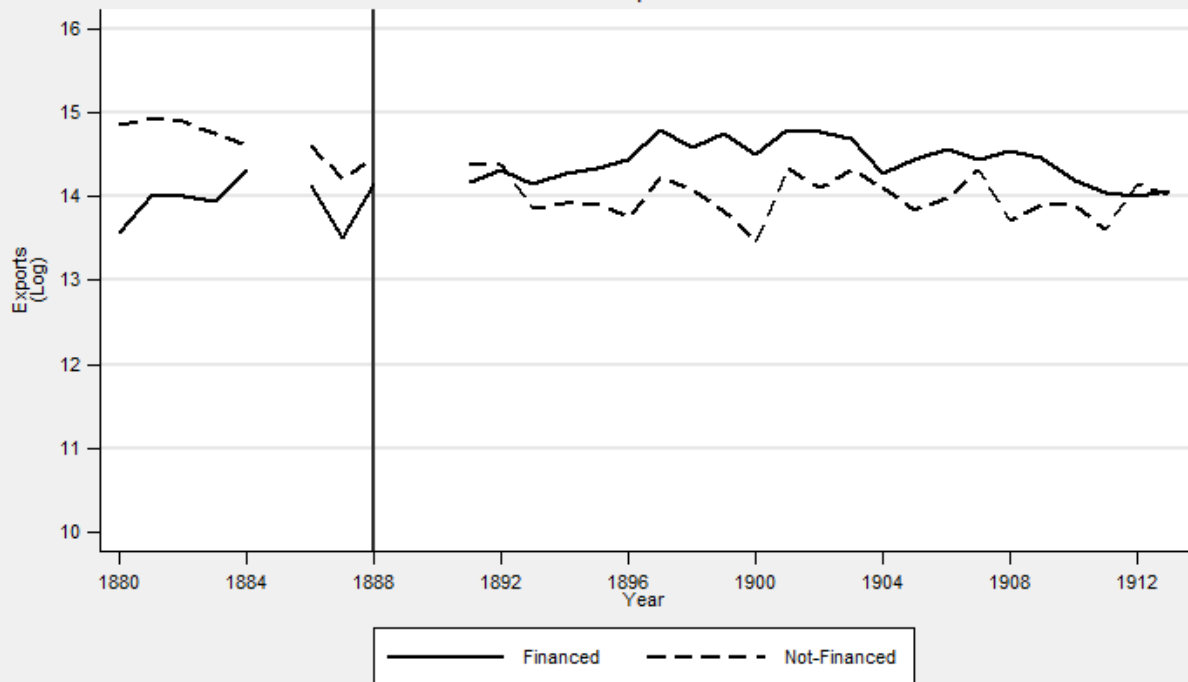


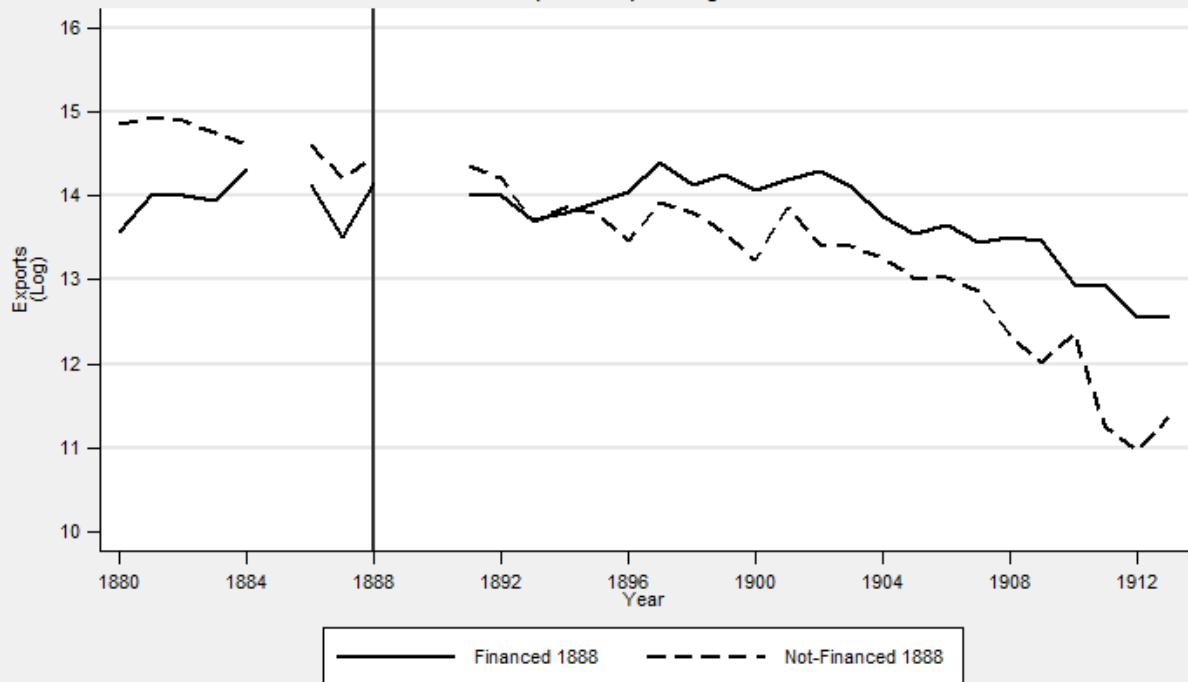
Figure 5: Financed vs Not-Financed exports before and after bank entry
Rio - All export houses



Sources: See Appendix - Sources.

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

Figure 6: Financed vs Not-Financed exports before and after bank entry
Rio - Companies operating before 1888



Sources: See Appendix - Sources.

Note: The exports of (245) companies that were already exporting before 1888 are considered. A company is defined as financed if it received at least three months' credit from Brasilianische Bank between 1880 and 1913. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data.

APPENDIX - SOURCES

The data on German and British imports and exports to and from Brazil are taken from the official Brazilian statistics *Mappas estatísticos do commercio e navegação do Porto do Rio de Janeiro. Exercício de 1880-81, 1885-86, 1890; Estatística Importação Brasil 1898; Anuario Estatístico do Brasil, 1903; Anuario Estatístico do Brasil, 1909-12*, with the exception of the data for the year 1870, for which I consulted 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*, Vol. 50, no. 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 *Jornal do Comercio Retrospecto*, *O Commercio de Sao Paolo*, and *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 exportação cafeeira em Santos no século XIX”, *América Latina en la historia económica*, Vol. 22 no.3, 213-246; Rischbieter, Julia Laura (2011). *Mikro-Ökonomie der Globalisierung. Kaffee, Kaufleute und Konsumenten im Kaiserreich, 1870-1914*. Köln: Böhlau-Verlag, pp. 130-131; and Dejung, Christof (2018). *Commodity Trading, Globalization and the Colonial World: Spinning the Web of the Global Market*. Abingdon: Routledge, Chapter 13.

The data on monthly credits provided by *Brasilianische Bank für Deutschland* between 1888 and 1913 have been compiled from the official reports of the advisory board meetings (*Aufsichtsratsberichte*) 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 Denzel, Markus A (2010). *Handbook of World Exchange Rates, 1590-1914*. New York: Ashgate.

APPENDIX – TABLES AND FIGURES

App. Table 1: Monthly quantities of coffee exported in Santos (Saccas) by destination – Share (%) on total monthly exports – 1900.

	USA	Germany	Nether- lands	France	Italy	Europe Rest	Latin America	Others
<i>January</i>	41.53	17.89	13.88	5.29	17.27	4.13	0.00	0.00
<i>February</i>	46.24	19.17	14.99	1.98	5.93	11.47	0.22	0.00
<i>March</i>	53.13	18.70	6.87	1.30	16.38	2.47	0.44	0.71
<i>April</i>	37.80	25.03	18.97	4.71	12.03	1.46	0.00	0.00
<i>May</i>	28.57	36.98	23.04	1.02	0.04	10.36	0.00	0.00
<i>June</i>	32.37	34.07	16.22	1.14	12.49	2.85	0.22	1.30
<i>July</i>	23.80	26.25	19.72	5.98	16.22	7.45	0.43	0.16
<i>August</i>	16.40	31.75	19.96	3.58	17.34	10.49	0.04	0.45
<i>September</i>	24.88	33.59	9.92	7.15	18.34	5.60	0.01	0.50
<i>October</i>	38.46	26.20	12.74	8.34	5.85	7.88	0.09	0.46
<i>November</i>	45.82	18.52	9.41	7.68	9.56	8.59	0.18	0.25
<i>December</i>	33.67	19.09	17.98	13.22	8.21	7.60	0.12	0.09

Source: See Sources - Appendix

App. Table 2: Robustness check – OLS Estimation for amount of credit received by export companies – Rio de Janeiro and Santos

	Rio de Janeiro		Santos	
	(1)	(2)	(3)	(4)
Company's Size (β_{Size})	40.11*** (4.080)	46.82*** (3.434)	33.78*** (4.499)	34.34*** (10.343)
Active before 1888 (μ_{Exp_Before})	-0.159*** (0.033)	-0.149*** (0.034)		
German company (λ_{Ger_Comp})	1.034*** (0.135)	0.952** (0.099)	0.463** (0.211)	0.350** (0.182)
Export to Germany (χ_{Exp_Ger})			2.374*** (0.326)	1.970*** (0.393)
Company's Size*Active before 1888 ($Size*Exp_Before$)		-8.949 (3.498)		
German company*Active before 1888 ($Ger_Comp*Exp_Before$)		0.187 (0.153)		
German company*Company's Size ($Ger_Comp*Size$)		-3.890 (3.459)		-13.154 (9.981)
Export to Germany*Company's Size ($Exp_Ger*Size$)				-4.801 (9.971)
German Company*Exporting to Germany ($Ger_Comp*Exp_Ger$)				1.082 (0.697)
<i>Year effects</i>	Yes	Yes	Yes	Yes
<i>Number of observations</i>	9.336	9.336	2.584	2.584
<i>R2</i>	0.1490	0.1510	0.3171	0.3207
<i>Method of estimation</i>	OLS	OLS	OLS	OLS

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

Note: Dependent variable is the monthly average credit provided to an export company i in year t in Rio de Janeiro or Santos, respectively. Rio de Janeiro includes observations on 389 export companies in the years from 1888 to 1913. With the exception of 1889 and 1890 where no data is available. 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.

App. Table 3: Robustness check – Pre-Treatment test for the Difference-in-Difference Model-I

	Pre- Treatment Model-I (Base Model)			
	(1)	(2)	(3)	(4)
Treatment - Receiving credit (γ_{FIN})	1.299*** (0.233)	1.349*** (0.251)	5.489*** (0.911)	5.483*** (0.907)
Intervention - Receiving credit after bank entry (δ_{INTERV})	0.275 (0.394)	0.278 (0.395)	0.288 (0.208)	0.311 (0.211)
German company (Ger_Comp)		-0.296 (0.302)		
German company *Year ($Ger_Comp*Year$)				-0.049 (0.067)
<i>Year effects</i>	Yes	Yes	Yes	Yes
<i>Company effects</i>	No	No	Yes	Yes
<i>Number of observations</i>	2.723	2.723	2.723	2.723
<i>Method of estimation</i>	PPML	PPML	PPML	PPML

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

Note: The dependent variable is the quantity of coffee exported by company and year in Rio de Janeiro. The sample includes the years from 1880 to 1887. The observations for the year 1885 are missing due to the lack of available data. The assumed year of entry is 1884. Robust standard errors are clustered by company and year and are indicated in brackets.

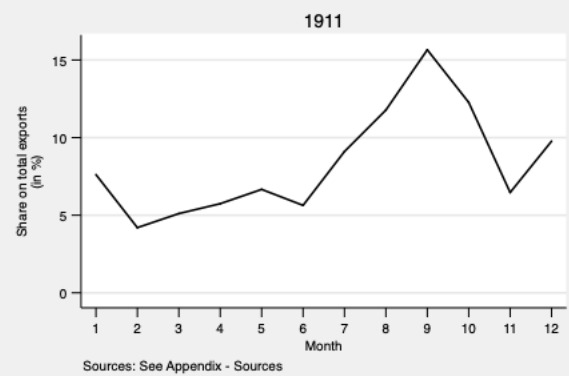
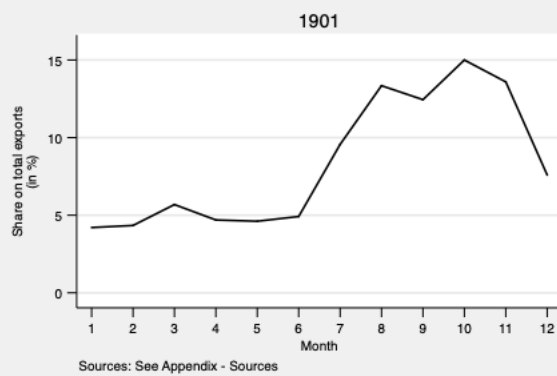
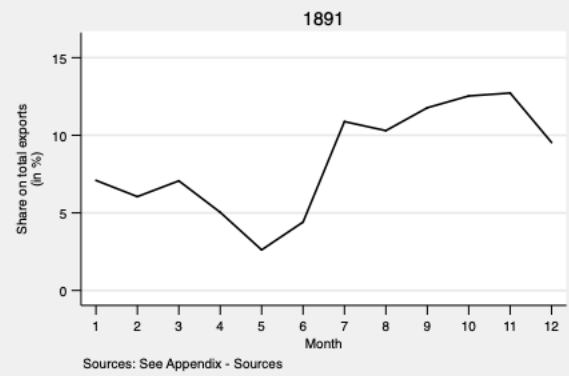
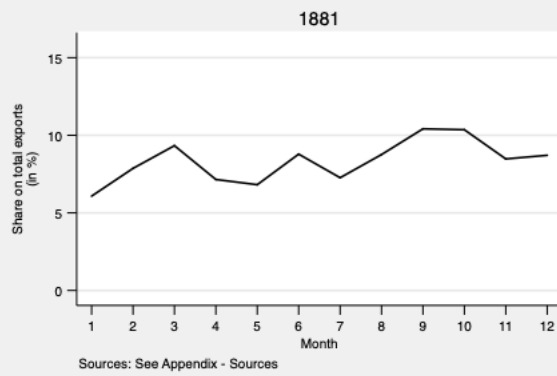
App. Table 4: Robustness check - Results event study

	Specification I (All companies)			Specification II (Financed companies)			Specification III (Period of credit)		
	Lag 5		Lag 10	Lag 5		Lag 10	Lag 5		Lag 10
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Event of credit supply (a_{Post_Event})	1.921*** (0.877)	1.921*** (0.494)	1.921*** (0.571)	3.123*** (1.050)	3.123*** (0.727)	3.123*** (0.800)	3.942** (0.896)	3.942*** (0.663)	3.123*** (0.723)
<i>Year effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Company effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Number of observations</i>	12.059	12.059	12.059	1.271	1.271	1.271	811	811	811
<i>R2</i>	0.393			0.435			0.646		
<i>Method of estimation</i>	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS

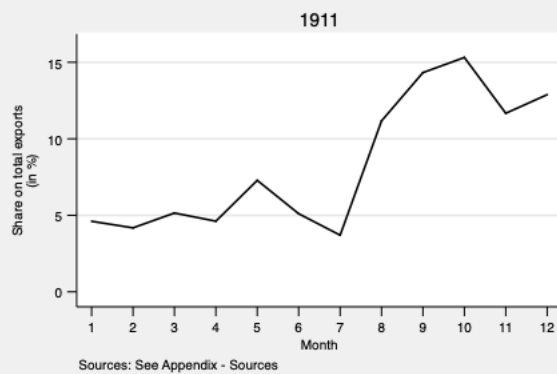
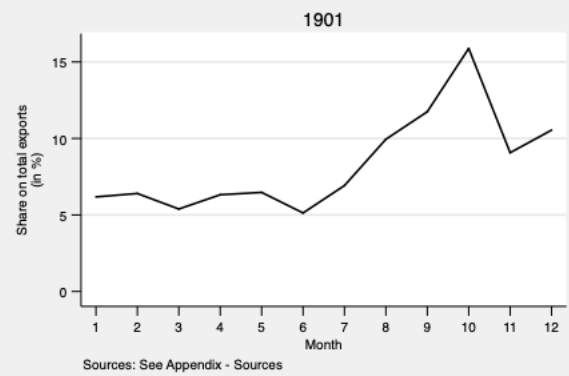
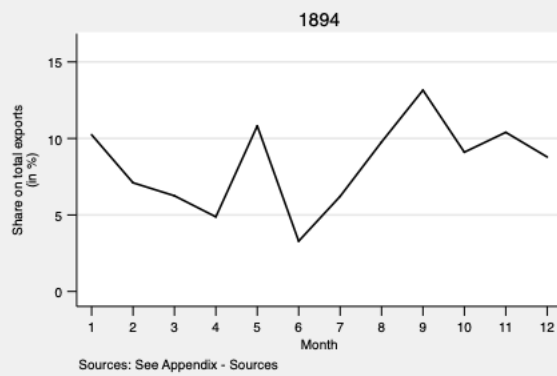
*** p<0.01, ** p<0.05, * p<0.1

Note: Dependent variable is the quantity of coffee exported by company and year between 1880 and 1913 in Rio de Janeiro. Columns 1 to 3 consider all 389 export companies operating during that time in Rio de Janeiro, columns 4 to 6 only companies that received credit for at least 3 months during the period between 1880 and 1913 ($N=41$). Columns 7 to 9 only include companies that received credit, however exclude observations for a company when they stop receiving credit, if applicable. For the years 1885, 1889, and 1890 observations are missing due to the lack of available data in the original sources. Robust standard errors are clustered by company and are indicated in brackets.

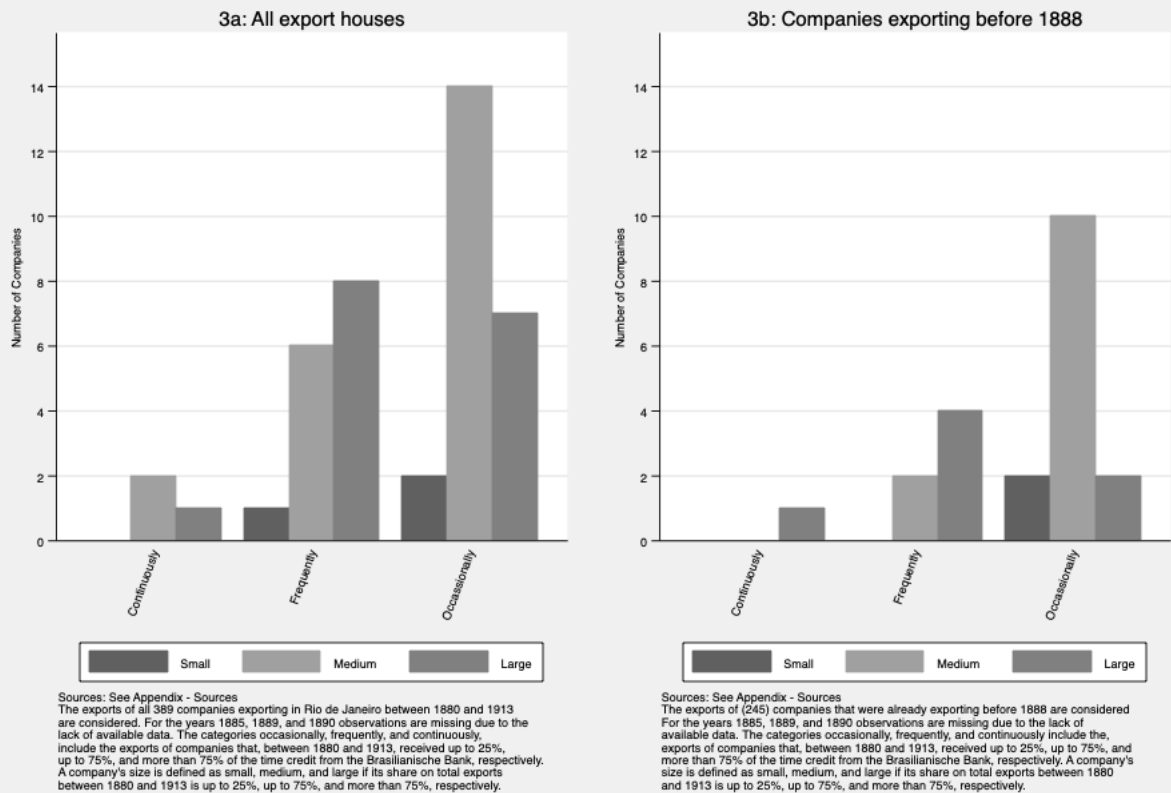
App. Figure 1: Monthly share on total annual exports (%) - Rio de Janeiro



App. Figure 2: Monthly share on total annual exports (%) - Santos



App. Figure 3: Frequency of credit and size of company - Rio de Janeiro



App. Figure 4: Export Index (1888=100) - Companies receiving credit occasionally, frequently, and continuously

