

The Spreading of Banks and the First Industrial Revolution in France, 1800–1870*

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Abstract

This paper studies the spread of banks during the first industrial revolution in France. We show that, starting in the 1820s, the banking sector expands quickly and, in the 1830s, locates significantly more in industrializing district, i.e. in districts with more steam engines and patents, than in less industrializing districts. This result is robust to the inclusion of geographical, institutional and other economic controls. This is consistent with the idea that banks seized the opportunity of financing the engines of growth of the French economy.

Keywords: key1, key2, key3

JEL Codes: G21, N23, O10, R12, N13

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”We need much more research on financial development: why does the financial structure change as countries grow?”, Levine (1997, p. 720)

1 Introduction

This paper studies the determinants of bank development in France between 1800 and 1870. We ask how banks emerged and grew on the French territory as the country experienced its first industrial revolution. As underlined by Levine (1997, p. 720) *supra*, we still know little on how financial structure changes as countries grow. This paper provides novel evidence. By exploiting variations in local bank density and the factors that triggered local economic development, we show that industrializing districts benefited from a higher bank density than less-industrializing districts and that banks were increasingly created in locations that were industrializing.

France during the early 19th century appears as an ideal case study to address this issue for three reasons. First, the period is one of structural changes in the supply of financial services to private companies, with the emergence of banks, i.e. agents specialized in the screening and monitoring of borrowers (Lévy-Leboyer, 1964). Second, entry and exit into banking was unregulated in France during that period, thus constituting an environment well suited to observe how banks reacted to industrialization.¹ Third, the economic history literature unanimously judges that, contrary to Germany or England, banks in France did not cause the first industrial revolution in France but that their development followed economic development.

19th century banks primarily supplied short-term credit by discounting supplier-client debts (Bergeron, 1989). They purchased commercial debt in exchange for more liquid assets, such as money, and provided payment services. To finance their discount operations, banks gathered term-deposits or equity from local financiers. The qualitative historical literature provides numerous examples of banks financing the production cycle of non-financial companies, see below. By contrast, medium and long-term investments were mostly intermediated by notaries, acting as matchmakers between savers and medium- to long-term borrowers (Hoffman et al., 2001, 2019).

Our contribution is quantitative. With the exception of Hoffman et al. (2019), previous histories of the role of banking in the French economy of the period insisted on the absence of banks before the 1860s. Yet numerous qualitative histories of individual banks in various regions underline the role of banks during the pre-1860s period (Thuillier, 1955; Lévy-Leboyer, 1964; Bergeron, 1978) or in the late 1860s (Plessis, 1999). Quantitative studies have been impeded by the lack of data, explained

¹The first national banking regulation was implemented during the Second World War. Andrieu (1991)

mostly by the absence of regulatory oversight during a period in which banks had an incentive to hide their performance, as their competitive advantage rested on their informational rents (Bignon et al., 2022). Hoffman et al. (2019) exploit a new source to document that France went from having virtually no bank in 1800 to a level that matched the one of England in the 1850s, and that banks mainly located in towns and urban areas. We use their data to show that the spread of banks follows economic determinants.

Our study uses data on more than 300 French *arrondissement* sub-districts from 1800 to 1870. We regress cross-sections of local bank densities at the sub-district level on local economic, geographic, institutional factors. Our dependant variable is the unweighted density per square kilometer, as no balance sheet data are available for banks during our period. We use two sets of independent variables. First we regress the local bank density on contemporary measures of local economic development. Second, to circumvent endogeneity concerns, we make use of the instruments for potential growth that have been shown to explain industrial output, see Franck and Galor (2019); Finley et al. (2021) and Squicciarini and Voigtländer (2015).

Our contribution is to the literature on the finance and growth nexus. With the exception of Suesse and Wolf (2020), most of the literature studying other countries or periods looks at the impact of banks on industrialization.² We follow the advice of Cull et al. (2006) in their survey on small and medium firm financing in the 19th century to study the other direction of the causality, i.e. the endogeneity of financial services to industrialization. Overall, our results support their view that "in this generally permissive regulatory environment, financial intermediaries emerged to serve SMEs [small and medium enterprises] wherever there was sufficient local demand".

We also contribute to the economic history of France. We present two results: one relating to the geography of banking and the second to the history of banking. We add to Hoffman et al. (2019) by showing that banks located in districts that industrialized. We identify that this phenomenon occurred as early as the 1820s. We know from the qualitative history literature that steam engines were already used in the Napoleonic period and that the full exploitation of their potential involved an adaptation of the production facilities, something that required innovations. Yet the lack of industrial census data before the 1840s complicates the dating. To circumvent this issue, we use the instrument for the adoption of the steam engine of Franck and Galor (2019) and

²The historical literature on the nexus between finance and growth focused on England or Germany. Hebllich and Trew (2019) show that the spread of banking in England and Wales was a causal factor in country economic takeoff between 1817 and 1881. Many discussed Gerschenkron's claim on the role of banking in Germany, see among others, Tilly (1986); Kindleberger (1993); Edwards and Olgivie (1996). Recently, Guinnane (2002), Fohlin (2006) and Lehmann-Hasemeyer and Wahl (2020) show that banks also causally spurs industrialization in the early stages of financial development.

the instrument for innovation of Squicciarini and Voigtländer (2015) to document that bank density was higher in industrializing districts starting in the 1810s. This paper is therefore the first to contradict with quantitative evidence Gerschenkron (1962)'s claim that banks played no role in the industrialization of France.

The paper is organized as follows. Section 2 presents the source, data and the role of banks. Section 3 presents the data on industrial revolution and summarize the literature on French economic development. Section 4 presents the empirical strategy. Section 5 discusses the main results and shows robustness tests. The last section concludes.

2 Banking during the first industrial revolution

Section 2.1 describes and presents the data source on banks. Section 2.2 document their spreading on the territory. Section 2.3 summarizes their role and functions in the financing of the economy.

2.1 Data on banks

Previous research on 19th century France encountered difficulties in finding a source to document the number of banks in business during a given year. This resulted in estimates by the literature that looked ridiculously low compared to England or Germany, see e.g. Cameron (1967); Goldsmith (1969) . Using the Bank of France archives, Plessis (1987) was the first to propose a number for 1870—at about 2,000 that appears more or less accurate in the light of the more recent literature. Hoffman et al. (2019) use various years of the commercial directories published by Jean de la Tynna and his successors *the Bottin* and *Didot* to construct about two cross-sections per decade of banks operated outside Paris, starting in 1801.³

Commercial directories published the name and address of any business in a city, classified by occupation, so that potential customers could locate them and use their services. Publishers worked with local correspondents who collected the businesses' names and addresses which were aggregated, usually at the city level. Those directories were, before 1870, the only source of information for uninformed customers on banks' locations. It is also the most representative source to research the role of banking during the period under study.⁴

³The database is available at: https://didomena.ehess.fr/concern/data_ets/zp38wd010?locale=en

⁴Plessis (1999) explains that the only directory specialized in finance was published in 1874 and 1875 only . He also mentioned that a fiscal source was sometimes used by the government in the

The number of banks derived from those directories could have been biased when one of local correspondents of the publishers failed to include a city or a bank. Moreover, the source counts the number of bankers and not necessarily the number of agents supplying bank-like services, as some other traders could have had offered bank-like services. As noticed by Hoffman et al. (2019), this would lead to directories underestimating the number of agents supplying short-term financing. Still, as long as this type of missing or errors concerned all banks and is randomly distributed, this will not impact the results of our quantitative analysis. More precisely, given our focus on studying whether banks spread in industrializing districts, the coefficients of our regressions will be biased only if bankers have less incentives to declare their activity in industrializing districts.

Yet, the source comes with its advantages, as well. Commercial directories identify self-declared bankers. Since neither bank regulation nor bank-license existed, it is very unlikely that the decision to appear in a commercial directory could have been distorted by legal constraints on banking. This implies that the number of bankers that appeared in them reflect each bank’s decision to signal their specialization in the supply of banking services. In a nutshell, assuming that agents were profit-maximizing when labelling their occupation, it follows that the source could be viewed as reflecting how many agents found it profitable to send the signal of their specialization in banking through the commercial directories.

Using the various cross-sections of banks for the period from 1801 to 1870 published by Hoffman et al. (2019), we manually checked for remaining typos or inconsistencies in the bankers’ name. The most usual are from variations around the labelling of the “& cie” (“...et cie” vs “...père, fils et cie”, etc. We harmonized the names across files in order to isolate the size of banks as measured by the number and geographic-span of branches.

The directory barely indicates if a bank office is a branch of another bank. To count the number of branches per bank, we do as follows. For each cross-section, we first identified and encoded all the branches of the national deposit banks, created first in the early 1860s.⁵ We then isolate the regional branch banks spotted in the business history literature, such as *Verley, Decroix, et cie* in the North region, see e.g. Pouchain (1986). In the other cases, we associated together all branches sharing the same name as one network of a multi-branch bank. For example, the *Caisse*

late 19th century to inform on the number of banks in France but that, because of fiscal evasion, it underestimates by a factor of two the number of banks.

⁵*Crédit Foncier de France*, created in 1852, was a mortgage bank that we exclude from our analysis. The *Crédit Lyonnais*, created in 1863, the *Société Générale*, created in 1864, and the *Comptoir d’escompte de Paris*, created in 1848 but who operated branches from 1860 onwards, mostly abroad except for two trading cities of France.

du crédit de Nice had a branch in Nice, in some neighboring cities (Grasse, Menton and Antibes), and in cities of a neighboring district (Fréjus and Saint Tropez). We therefore consider those branches as one bank.

In order to identify the entry or exit of banks at the level of the sub-district division *arrondissement*, we have merged the cross-sections to a panel data set using name and location to link banks over time. The panel data set helps to further clean the data by identifying occasional cases of underreporting by the directory’s correspondent or typos coming from the process of data collection and entry. Based on an assumption of continuity, missing observations can be imputed. For example, if the Caisse du crédit de Nice had a branch recorded in Saint Tropez in 1834 and in 1842 but not in 1840, we added the branch in 1840. We assumed continuity if the previous and next observation of a bank office of the same name in the same city were not further apart than 10 years. finally we exclude Corsica and the Seine district as they are two outliers in terms of the number of banks and would therefore bias the estimates.

2.2 The spreading of banks

From being largely unbanked in 1800, France –outside Paris– experienced a massive expansion of its banking sector, with a 25-fold increase of the number of banks during the period from the 1800s to 1860s, see table 2 in the appendix. The number of banks went from 73 in 1801 to 1868 in the year 1869. The average number of bank offices per sub-district increased from 0.26 in 1801 to 7 in 1869. Interestingly, despite the fact that France had no specific bank regulation, the French banking system very much resembled the US banking system of the time: most banks were unit banks which operated only one office. In 1869 the 1770 unit banks represented 87% of all bank offices. Created mostly in the early 1860s, the three national deposit banks operated only 29 branches in 1869 while the 95 regional branch banks operated on average 2.3 offices, representing 11% of all banks offices in operation outside Paris. It follows that, overall, the density of bank offices grew at a steady pace, see Figure 1.

The variance of the distribution of the density of banks at the sub-districts level was quite large. On average, a sub-district had 1 bank in 1810 but some had none–like the duck-growing sub-district of Mirande in the South-West–while one had 34, the Lyons sub-district. In 1869, the Bordeaux sub-district had 42 bank offices while, for example, there were none in the Argeles or the Ceret sub-districts in the Pyrenees mountains. Maps 3 and 4 plot the number of banks within the frontiers of each sub-district in 1842 and 1862. The distribution followed the geographic and urban pattern of France, in which the sub-districts hosting the largest cities like Lyons and Marseilles had a much higher density than, for example, the sub-districts of Brittany in the West or those of the center of France.

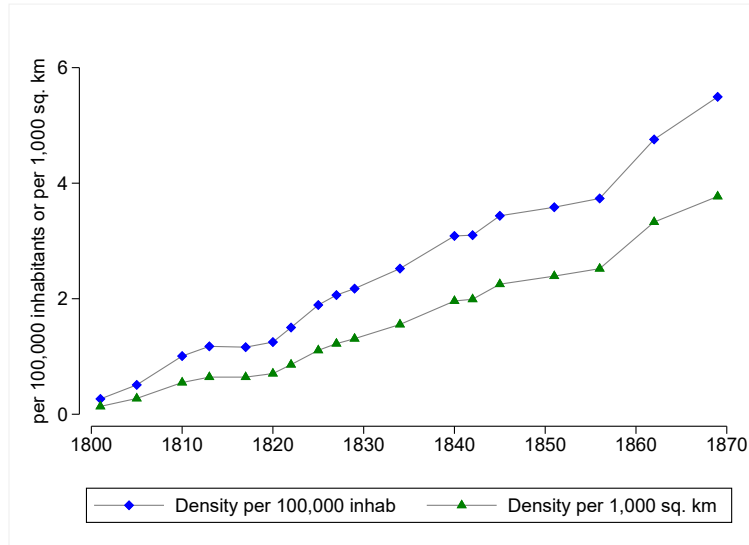


Figure 1: The density of banks offices in France, 1801-1870.

Note: The figure shows the density of branch offices either per square km or per 100,000 inhabitants. Bank offices in Paris are not counted.

Source: Authors using data from Hoffman et al. (2019)

As a criteria of the easiness with which one can use the service of a bank, the historical literature emphasized that the distance between the majority of French towns and geographically closest bank was fairly large. Charles Kindleberger (1984, p. 113) wrote that *"In 1863 (...) three-quarters of French towns lacked access to banking, access being defined as a bank within 30 km."* To update this statement, Figure 2 shows the average distance between a given town and a city⁶. It shows that already in 1810 half of the cities were less than 30 km away from a bank. By 1830, only 25% of towns were unbanked according to Kindleberger's distance criterion. Finally, only 5% of towns were unbanked in the early 1860s.

2.3 What did banks do?

So far, and even if some historians' works published in French had linked the appearance of banks with industrialization, e.g. Lévy-Leboyer (1964), Bergeron (1989) and Plessis (1991), the majority view is that France then lacked a proper financial system to finance investments, thus explaining why it did suffer from a late industrialisation

⁶A city is defined using the definition of the French National Statistical Agency INSEE as a place where more than 2,500 inhabitants live

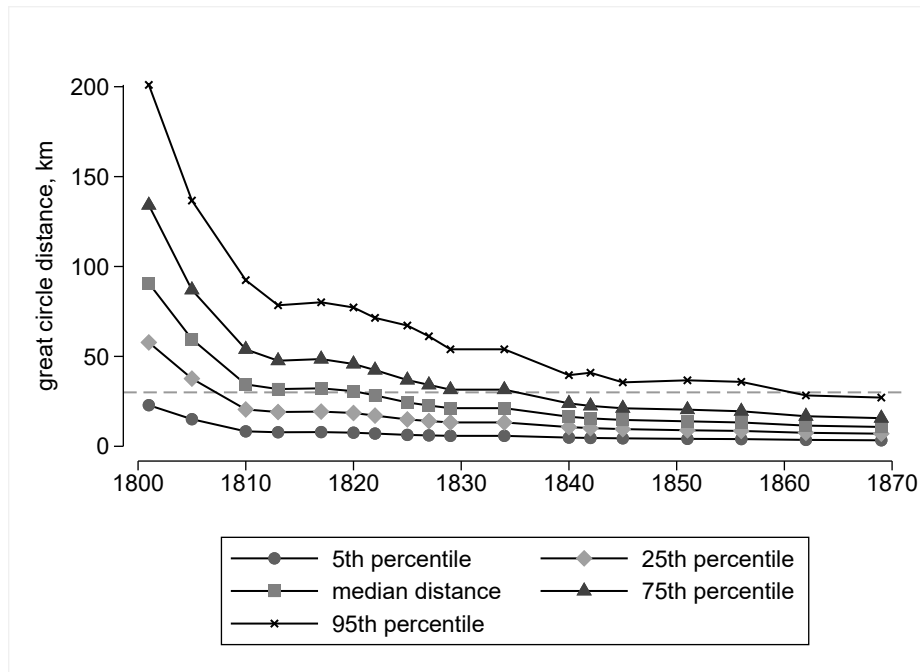


Figure 2: Distance to the closest bank in France, 1801-1870.

Note: The figure shows the distribution of the distance of each French city in km to the closest bank. It reads as follows: In 1801 5% of the cities were at more than 200 km from a bank. To compute this distance, we first attribute a distance of 0 for the cities in which a bank is located. For a city without bank, we measure the great circle distance between the GPS coordinates of that city and the closest city in which a bank was in operation. Source: Authors using data from Hoffman et al. (2019) and INSEE

compared to England; see among others Cameron (1967); Goldsmith (1969); Bouvier (1973) and Kindleberger (1984).⁷ This 'old-fashioned' view can be explained by the use of incomplete data, and by a focus on the role of the financial system in financing firms' medium and long-term investments. Hoffman et al. (2001, 2015) showed that this type of financing was in fact arranged mostly by notaries, who acted as match-makers between savers and entrepreneurs. Based on our more complete dataset, we can show another role for banks in the industrialization, namely the financing of the production cycle.

In the 18th century, some bank-like services—mainly discounting—were supplied by merchants in commodities alongside their main trading activity (Bergeron, 1989). In October 1789, a decree allowed agents to request the payment of interest on loans and the discussion of the 1807 law on usury led to a distinction between bankers and usurers Jolivet-Roche (2015). What commercial directories reveal is that, in the 19th century, there was a growing number of banks, i.e. of agents who specialized in the financing of the economy and complemented the activity of the notaries.

The business model of these early banks was slightly different from pure deposit banking *à la* Diamond and Dybvig (1983) which appeared in France in the 1860s and generalized in the 1900s (Nishimura and Yago, 2006). Still banks had deposits and equity on the liability side of their balance sheet and credit on the asset side. Moreover they match all four characteristics of banks emphasized by Freixas and Rochet (2008): (i) they offer liquidity and payment services; (ii) they transform assets; (iii) they manage credit and liquidity risks and (iv) they process information on borrowers to monitor them".

A common feature of banks' services was the financing of the production cycle, for example in the textile industry studied by Lévy-Leboyer (1964, 1976); Bergeron (1978) and Bouvier (1979).⁸ Thuillier (1955) shows that in the Nivernais region, banks grew out of the financing of the two main local industries, furnaces and livestock farming and they funded their activities with term-deposits of landowners, of their

⁷Gerschenkron (1962), using the example of Germany, had defended that relatively backward economies can more easily catch up to wealthier economies by setting-up financial intermediaries such as banks in order to channel savings to productive investments. He explicitly explains how France was a counter-example.

⁸As noted by (Lévy-Leboyer, 1976, p. 372), "it was the function of the bankers (and the reason for their specialization) to assume part of the commercial risk, since they practically replaced the interested parties: they facilitated their purchases by acceptance credits, sometimes granted over-draft, but more generally guaranteed by a mortgage or a pledge; they activated the collection of sales by discounting drafts, provided for current expenses, by transferring cash for the payment of salaries, and provided remittances of money."

families, friends or business relations or with their own wealth.⁹ Banks helped with the financing of the purchase of raw materials with overdraft facilities—collateralized on the borrower’s properties— and to bridge the gap between the selling of finished products and their payments by discounting bills of exchanges. Bills were used either as a pure credit instrument, or as a tool to finance internal or external trade, in which case the goods traded could have been used as collateral (Warburg, 1910).

Banks also provided payment services. In France, the discount activity left the purchasers of bills in charge of collecting payments (Daloz, 1830). To that end, bankers either directly collected the proceeds of the maturing debts at the payers’ doors or used a network of correspondents, notably court bailiffs or other law-related professions, see for example Thuillier (1955). In this period, banks were therefore also special because credit was associated with the provision of payment services, something that echoes the definition of banks proposed by Fama (1980) and Goodhart (1987).

Risk management consisted first in banks managing the potential mismatch of their liquidity position that could have occurred because of the de-synchronization induced between payment outflows created by the discount activity and payment inflows related to the collection of due payments on maturing bills. Second, risk management also may have involved managing the risk of rolling-over short-term credit, as the financing typically ran for a term of a couple of month, up to one year (Rouilleau, 1914). This was especially the case in cyclical industries, such as agriculture. Third, risk management may also have lead to the management of some maturity transformation risk, especially for the banks who held equity stakes or bonds of local companies.¹⁰ Fourth, risk management was also related to the need for banks to manage their off-balance-sheet exposures created by the guarantee they provided on the end-payment of bills (Bignon and Jobst, 2017). Indeed this guarantee exposed bankers to the risk of default of their clients, which banks sought to minimize by screening and monitoring their clients’ credit risk.

The discount activity required a comparative advantage in the screening and monitoring of the borrowers and the payers. To minimise the default risk, a banker had to collect information on his clients, notably on the efficiency of their production processes and on their clients’ collateral or capital. The banker also had to process these pieces of information to derive a judgement on its liquidity positions, see Avaro

⁹After 1815, in the Nivernais region, banks were created either by members of the families of the owners of furnaces or of glazed earthenware, or from trading families.

¹⁰See Bouvier (1973) and Crouzet, 2003: "(Lévy-Leboyer, 1964, chapter IV and V) also demolished some clichés, by proving that Parisian merchant bankers had supported industry. Notice however that Thuillier (1955) shows that the business of banking did not consist in purchasing and holding equity or bonds shares of local companies.

and Bignon (2019) for evidence. Cull et al. (2006) emphasize that "much of this short-term lending took the form of trade credit, where longstanding business relationships between upstream and downstream firms kept informational problems to a minimum."

These types of bank services may have contributed to French economic development, through a better financing of the production cycle, i.e. in financing the purchase of inputs and commodities and providing advances on receivables. This could have been especially worthy in a country that was not yet unified in terms of interest rates (Gille, 1970) or payment collection. An important role of banks was thus to organize the collecting of payments in due time. By doing so, they saved the time of entrepreneurs and allowed a higher division of labour. To provide those services, and using the concepts elaborated by banking theory, the business model of banks rested on a careful management of the asset-side of the balance sheet and therefore on a comparative advantage in screening and monitoring of their customers, as emphasized by Diamond (1984). Before the 1870s, the time had not come for banks to pool the deposits of many individuals in the vein of Diamond and Dybvig (1983) or to fully exploit the maturity-transformation as modern banks are doing in the vein of Diamond and Rajan (2001).

3 Data on growth factors of the industrial revolution

France took its own path to industrialization compared to England (Horn, 2006), but the inputs of this "quieter" revolution were similar (Woronoff, 1994). They consisted in mobilizing a new technology—the steam engine—that required the development and execution of process innovations to fully realize its benefits (Bergeron, 1989). In turn, new technologies allowed France to undergo a radical upward shift in its growth rate. Growth started during the Napoleonic Empire, accelerated with fits and starts during the period between 1815 to 1850 before reaching a plateau of high growth in the 1840s and 1850s and ultimately slowing down in the 1860s (Crouzet, 1974).¹¹

In line with Franck and Galor (2019), we use the number of steam engines found in each sub-district as reported in the two mid-century industrial surveys carried out by the French government between 1839 and 1847 and between 1860 and 1865, see Chanut et al. (2000) and Atelier du Centre de Recherches Historiques (2011a). The

¹¹In recent decades, the economic history literature underwent a radical revision on the speed and achievement of French economic growth during the first industrial revolution, see (Cameron and Freedeman, 1983; Toutain, 1987) and (Crouzet, 2003) for a survey.

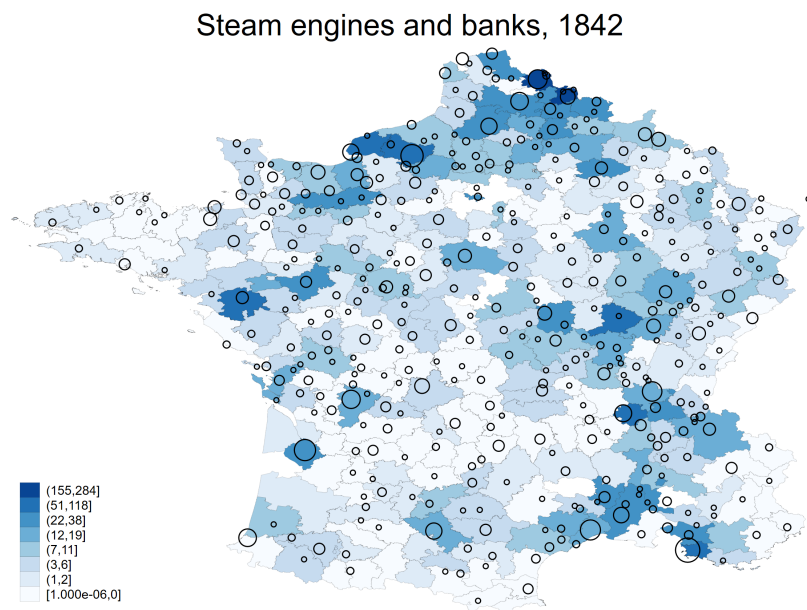


Figure 3: Banks and the number of steam engines operated in a sub-district in 1842

Note: The figure shows the number of banks at the city level (circles) and the number of steam engines operated in a sub-district (shades of blue) during the same year Source: Authors using data from Hoffman et al. (2019) and Chanut et al. (2000)

Steam engines and banks, 1862

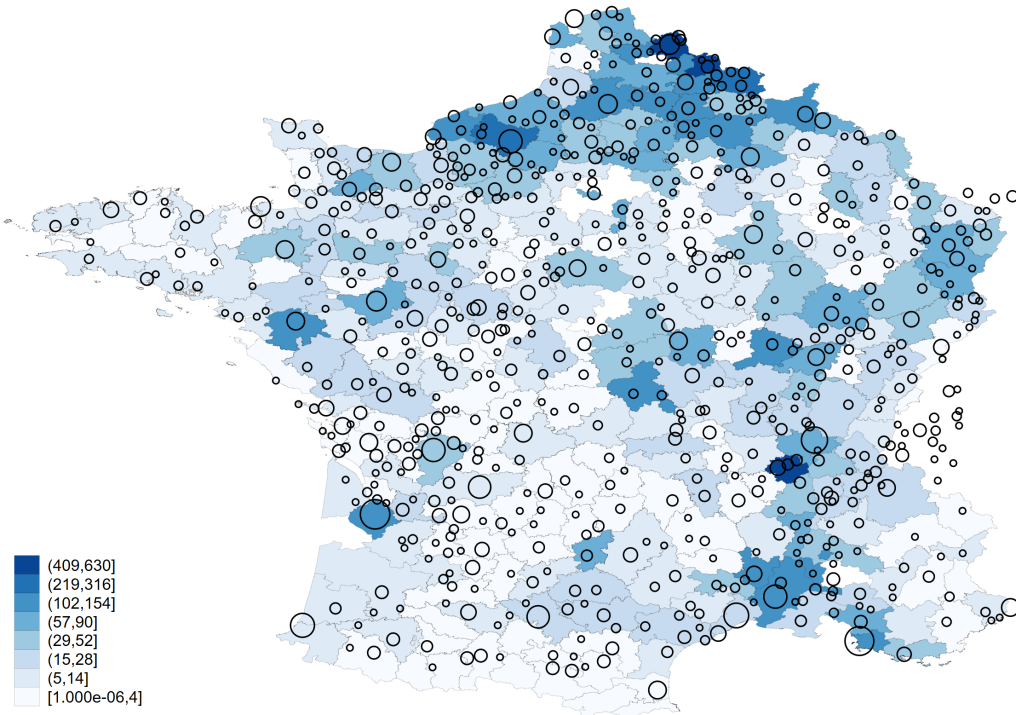


Figure 4: Banks and the number of steam engines operated in a sub-district in 1862

Note: The figure shows the number of banks at the city level (circles) and the number of steam engines operated in a sub-district (shades of blue) during the same year Source: Authors using data from Hoffman et al. (2019) and Chanut et al. (2000)

Table 1: Number of Steam Engines by sector

Number of Steam Engines	Total	Sub-district mean
All sectors	2473	8.6
Textile industries	989	3.4
Cotton industries	342	1.2

Sources: see text.

aerial distance to Fresnes-Sur-Escaut serves as exogenous proxy for the industrialization of the French sub-districts, see (Franck and Galor, 2019). The steam engines were a generic technology and became used in various sectors, from mines to textiles. A large portion of the steam engines were used in textile production, see table 1, for evidence in 1842. Indeed as Gabillard (1953, p. 569) writes, "technical progress is very rapid, particularly in the textile industry."

We include a measure of the local propensity to innovate that we proxy by the number of recorded patents in every sub-district.¹² We aggregated Bergeaud and Verluise (2022)'s city-level data to obtain the number of patents at the sub-district level, using modern sub-districts borders.¹³ We follow Squicciarini and Voigtländer (2015) who instrument for local innovation using the number of subscriptions to Quarto Encyclopédie in France, that was published between 1777-79. Darnton (1973) provides this data, which reports 7,081 subscriptions in France, across 118 cities. We aggregated this list at the sub-district level.¹⁴

We also investigate the role of the education of the local population. We measure the average literacy as Furet and Ozouf (1980), by using the share of groom and brides who could sign their wedding contracts. This data is available for 1786 and various years in the nineteenth century from Atelier du Centre de Recherches Historiques (2011b).

The analysis further accounts for the demand for banking services caused by a larger population or a higher level of market access. We first control for the size of the

¹²Despite some limitations, patents have been shown to be an accurate signal of innovation and R&D activities Ács and Audretsch (1991)

¹³We located the cities within 2018 sub-districts using the 2018 historical city dataset from INSEE.

¹⁴Darnton (1973) found the list in the archives of the Société Typographique de Neuchâtel (STN). One of the Encyclopédie publishers kept a list of subscriptions, which survived within in a form of a letter to Rudiger of Moscow, dated May 31, 1777.

population of each sub-district using the French population surveys.¹⁵ we also control for the possibility of increased specialization caused by the geographical expansion of markets.¹⁶ Daudin (2010) notably demonstrates that French supply centers had access to domestic markets that were larger than the whole of Britain already by the end of the eighteenth century. To capture the differences of demand for banking services caused by greater market access across sub-districts, we include a score of market access of each sub-districts in 1789, using the formula in Finley et al. (2021). Their score is capturing whether businesses in a district have both more potential customers and suppliers. They calculate it with the following equation:

$$MA_i = \sum_j^d N_j \tau_{ij}^{-\sigma} \quad (1)$$

where MA_i is market access for district i , the total number of districts (and non-French cities) is d , N_j is the population of district or city j , and τ_{ij} is the lowest cost for traveling between districts and cities i and j . The term σ in equation 1 is a trade elasticity measuring the responsiveness of trade to transport costs between locations. The value of σ to one. In our regressions, we follow the current literature and use the natural log of the expression in equation 1.

The spread of banks can be facilitated or slowed by local institutions influencing the possibility to enforce contracts. The judicial system affects the perceived costs of sanctions on defaulters and thus borrowers' future willingness to pay. Legal institutions impact *ex ante* the willingness of creditors to extend loans (Jappelli et al., 2005). We capture this effect by including the number of legal professionals in each district, such as bailiffs.¹⁷ Local infrastructures such as information technology also matter as bankers needs to gather information on their borrowers, monitor them over time and process payments across different territories (Merton, 1992). In nineteenth century France, the postal network was the central conduit for the circulation of financial information (Bigo, 1947) so we included the distance to the closest post office, averaged at sub-district level.¹⁸

Finally, we control for the potential effects of geographic characteristics for each of the French districts. As our work expands on the result of Franck and Galor (2019), we account—as they do—for climatic and soil specificity, (i.e. wheat suitability, average

¹⁵Atelier du Centre de Recherches Historiques (2011c)

¹⁶Daudin (2011), Kelly (1997).

¹⁷The French population surveys of 1851 and 1872 report the total number of legal professionals and public officials, which included lawyers, notaries, solicitors, bailiffs, business agents, and other public officials (Atelier du Centre de Recherches Historiques, 2011c).

¹⁸We retrieved the data from Marin and Marraud (2016).

temperature, average rainfall, latitude and the share of carboniferous area), location effects (latitude, being on the sea shore or along a border with Belgium, Luxembourg, Germany, Switzerland, Italy or Spain).¹⁹ Local institutional factors could also impact the spread of banks. France being a centralized country from the beginning of our period of study, we account for the declining effect of the proximity to Paris, the central economic and administrative center, by including the aerial distance between the administrative center of each department and Paris. As Hoffman et al. (2019) find that banks first appeared at the seat of the district administration (*prefecture*), diffusing then to the lower levels in the administrative hierarchy, we include a dummy variable coded one if a district headquarter is located in the sub-district and zero otherwise.

4 Empirical methodology

4.1 Empirical strategy

In the analysis of the spreading of banks, it is important to distinguish between the total supply of banking services and the emergence of agents specialized in supplying *only* bank-like services. What was new in the 19th century, therefore, is the specialization of agents in the supply of banks services but not the existence of banking services. which were already supplied in the 18th century by "merchant-bankers", i.e. traders whose main activity was not to sell banking services but the selling of any others goods or services. This distinction was also made in 1817 the Council of State—*Conseil d'État*—who stated in 1817 that supplying bank services was not enough for someone to be qualified a banker (Plessis, 1999, p. 204).

In this paper, we focus the analysis on banks, i.e. on agents who have decided to signal their specialization in the provision of banking services by labelling themselves "bank". This decision could have been influenced by the benefits of signaling their specialization to their potential customers and the cost, notably the fact that bankers had to pay a tax to the fiscal authority. Starting in the 1830s, the fiscal authority

¹⁹The sources of Franck and Galor (2019)'s variables for geographic characteristics are Fernihough and O'Rourke (2014), Luterbacher et al. (2004), and Pauling et al. (2006). We measure the suitability of a sub-district for cereal production using data taken from the FAO, see Nunn and Qian (2011), Galor and Ozak (2016), and Mayshar et al. (2018), Bignon and García-Peñalosa (2021). Data were retrieved from the FAO's Global AgroEcological Zones (GAEZ). The FAO identifies local resource limitations and opportunities for wheat production based on the requirements of the crops and it uses these to evaluate the local suitability and production potentials.

decided that for tax purposes all individuals were considered bankers who regularly practices trade credit, deals with bills of exchanges and hand over bills from place to place (Plessis, 1999, p. 204). Notice that if the only occupation of a person was being a banker, it has no interest in not appearing as a banker in a commercial directory, for if it will not be localisable by non-local persons.

Section 2 and table 2 show that the spreading of banks was mostly a post 1810s phenomena and occurred with the early spring of industrialization, suggesting that banks may have been a by-product of the first industrial revolution. (Bergeron, 1978, p. 213) writes that "In France, the industrial revolution developed not spontaneously, as in England in the second half of the 18th century, but by contagion and under the pressure of competition. (...) It is undoubtedly less capital that can cause it to fail or hamper it in its enterprises, than the lack of elasticity and safety of credit in the current course of business." Providing this elasticity and safety was exactly what banks provided as discussed in section 2. This justifies our empirical strategy to take the density of banks as the dependent variable that we relate to the factors of potential growth.

4.2 Empirical models

Our aim is to measure whether and when banks opened in districts that were industrializing, i.e. adopting the steam engine and patenting innovations. To show this association, we implement four types of empirical exercises. First we check if there is a positive correlation between the (log) number of steam engines, the (log of) patents and the density of banks during the same year. Second, we follow the strategy of Franck and Galor (2019) who instrument the number of steam engine using the distance to Fresnes-sur-Escault, the first city where a steam engine was successfully operated for commercial use in 1732. We follow Squicciarini and Voigtländer (2015) who use the number of subscribers to the encyclopedia of Diderot and d'Alembert in 1777-9 as a proxy for innovations in 19th century France, and instrument the number of patents in a sub-district with the number of encyclopedia subscribers. Third, and since there are only two industrial censuses during the period of our study and because we want to provide an estimated date for the association between banking and industrialization, we also estimate a reduced-form equation by regressing the local bank density on the the distance to Fresnes-sur-Escault and the number of subscribers to the encyclopedia, controlling for the impact of the Napoleonic blockade of the 1800s on the growth of the textile industry in the vein of Juhász (2018). Fourth, we check if the previous results hold using the number of entries or exits of new banks in a sub-district.

Bank density is computed as the ratio of the number of banks operated in a sub-

district i in year t by the surface of the sub-district in 100 km².²⁰ The number of entries or exits is computed for intervals of roughly 10 years by comparing the banks that are existing in a given edition of the Almanac with those of the edition 10 years earlier.²¹

We estimate the following equation:

$$\begin{aligned}
 Y_i = & \alpha + \beta \cdot \text{SteamEngines}_i + \gamma \cdot \text{Patents}_i + \kappa \cdot \text{SteamEngines}_i \times \text{Patents}_i \\
 & + \lambda \cdot \text{HumanCapital}_i + \eta \cdot \text{MarketAccess}_i \quad (2) \\
 & + \mu \cdot \text{Controls}_i + \epsilon
 \end{aligned}$$

where Y_i is either the density of all banks per hundred km² or the entry –alternatively the exit– of new –respectively existing– banks in sub-district i . Because the independent variables are time-invariant, we estimate the equation using OLS on the cross-section of sub-districts.

Results with contemporary covariates are shown for years 1842 and 1862. Results with the instrumented variables for industrialization are shown for years 1810, 1820, 1829, 1842, 1851, 1862 and 1869.²²

The independent variables include the potential for industrial development and innovation the human capital potential, the trade development potential, market access and the geographic advantages of the sub-district in terms of elevation range and access to the sea. In 19th century France, institutions did not change—most of them were set up during the French revolution and the general orientation of non-financial policies (a general “laissez-faire” policy) was also decided during the French revolution and little changed thereafter. The legal system (Roman law) was uniform across the territory and implemented by courts which were monitored by the ministry of Justice. We control for differences in the access to the communication infrastructure (distance to the closest post-office) and potential supply side constraints for financial services. Table 3 presents the descriptive statistics of the independent variables.

²⁰The reason being that Hoffman et al. (2019) indicate that the local correspondents of the directories sometimes had aggregated all banks operating in a sub-district at the main city of the arrondissement

²¹Entries are defined as the banks that appears between the two editions. Exits are banks that disappeared. Banks entering and exiting in between the two editions can not be counted and are thus not included.

²²The 1800s years are excluded as according to (Hoffman et al., 2019) the coverage of the source was not yet as complete as later on. There is also an issue with the numbers for 1864, which are far below those of 1862 and 1869 and hence excluded as well.

5 Explaining the spread of banks

We now document the results of the economic determinants of the evolution of the density of banks at the sub-district (*arrondissement*) level.

5.1 Main results

Tables 4 and 5 show the bivariate correlations of the bank densities in 1842 and 1862 with the explanatory variables. The number of steam engines and patents have the expected positive sign. The exogenous variables for the steam engines and patents, i.e. the distance to Fresnes and the number of Encyclopedia subscribers also have the expected sign. Tables 6 and 7 show that these bivariate correlations hold when we include geographic and institutional controls. This is consistent with the view that the spreading of banks accompanied the economic development of France during this period.

Those results holds when we include the full set of controls as in equation 2 and using contemporary variables, see tables 8 and 9. In 1842, the distribution of the density of banks is higher in sub-districts with a larger number of steam engines and more patents. For 1862, the results are more subtle as what mattered during this period is not only the number of patents but also the interacted variables between the number of patents and the number of steam engines. This suggests that at some point during the First industrial revolution, it was no longer the mere presence of steam power but the combination of innovation and investment in steam engines that correlated with the supply of bank services, an observation that is consistent with the historical literature.

Table 10 gives the results of the estimation of equation 2 using exogeneous variables for steam engines and patents across the 19th century. Interestingly, the proxy for the number of steam engines is significant already in the 1810s and again starting in the 1830s. The results of the estimation of equation 2 with the number of entries and exits of banks as the dependent variable are also consistent with those results, see tables 11 and 12. New banks offices were more likely to appear in sub-districts that, being closer to Fresnes, had higher chances to industrialize early, as well as in districts with higher numbers of subscribers to the Encyclopedia.

5.2 Robustness

We implement six robustness checks.

First, tables 13 and 14 show that the results are robust to the inclusion of a variable measuring the impact of the Napoleonic blockade on the development of the

cotton industry²³.

Second, table 15 show that the results of table 9 are robust to replacing the number of steam engines with the total horsepower of those engines as in Franck and Galor (2019). Horsepower is available for 1862 but not in the 1842 census.

Third, table 16 shows that the results for all steam engines also hold for the number of steam engines used only in the textile industry.

Fourth, in table 17 we implement a placebo test using the number of other engines in the sub-district (i.e. number of wind- or water-engines) rather than steam engines. The results are robust in that districts with more non-steam engines are not associated with a higher level of bank density while those with steam engines are.

Fifth, given that each industrial census counted steam engines over a period of 4 or 5 years, table 18 shows that the results of tables 8 and 9 also holds if we use other cross-sections of bank density (1845 rather than 1842 and 1869 rather than 1862).

Sixth, we show that the results of table 10 are qualitatively the same when we run the estimations for alternative years for which bank densities are available, see table 19 for 1813, 1817, 1820, 1825, 1827, 1834, 1840, 1845, 1856, 1875.

6 Conclusion

Our paper studies the association between the emergence of banks and French economic development between 1800 and 1870. It is the first to provide quantitative evidence that industrialization was associated with a growing bank density at the local level. Banks developed earlier in districts where the steam engine was more in use and in the most innovative districts.

Our results suggest that more agents found it profitable to specialize in banking in districts that industrialized. This is consistent with a Smithian view of labor specialization. The industrial revolution induced new needs of financing in some sectors, with a growing specialization between entrepreneurs, traders and financiers. It may be likely that, because industrialization requires a higher specialization and a higher level of technical proficiency to be able to operate steam engines and to innovate, entrepreneurs chose not to spend time on cash and financial management and preferred to delegate these tasks to a growing body of specialized financiers, the bankers. Banks then focussed on the financing of the production cycle, i.e. on financing the purchase of inputs and commodities and advances on receivables. Therefore banks could have been a key factor supporting the industrial revolution.

This raises a number of issues to consider in future research. First, whether historically it was merchant-bankers who decided to specialize in banking in the 19th

²³See (Juhász, 2018)

century and why they did so where the economy was industrializing, instead of in places specialized in the financing of long-distance or colonial trade, for example in the port cities.

Second, what were the factors in the process of industrialization that encouraged agents to specialize in banking, i.e. in the business of screening and monitoring debtors? Our results suggest that it may well be that it was the structural transformation of the economy associated with the First industrial revolution that increased the profitability of providing certain types of financial services. The historic evolution of banking in France may therefore be a consequence of the history of industrialization. Given that there was a supply of bank-like services before the industrial revolution, it may well be that the empirical literature on the finance and growth nexus has overemphasized the causality from bank financing to the industrialization. As Levine (1997) writes "we will not have a sufficient understanding of long-run economic growth until we understand the evolution and functioning of financial system."

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Table 3: Descriptive statistics

	count	mean	sd	min	max
Steam engines 1842	276	8.60	23.01	0.00	284.00
Steam engines 1842 (log)	276	1.34	1.24	0.00	5.65
Steam eng. cotton industry 1842	276	1.12	6.42	0.00	71.00
Steam eng. cotton industry 1842 (log)	276	0.23	0.64	0.00	4.28
Steam eng. textile industry 1842	276	3.38	13.75	0.00	190.00
Steam eng. textile industry 1842 (log)	276	0.69	0.96	0.00	5.25
Steam eng. other industries 1842	276	5.22	13.58	0.00	152.00
Steam eng. other industries 1842 (log)	276	0.99	1.13	0.00	5.03
Horse powered engines 1842	276	6.24	11.24	0.00	98.00
Horse powered engines 1842 (log)	276	1.27	1.14	0.00	4.60
Wind powered engines 1842	276	32.61	91.06	0.00	646.00
Wind powered engines 1842 (log)	276	1.31	1.88	0.00	6.47
Water powered engines 1842	276	127.78	161.47	0.00	1166.00
Water powered engines 1842 (log)	276	3.90	1.68	0.00	7.06
Steam engines 1862	281	30.50	65.15	0.00	630.00
Steam engines 1862 (log)	281	2.41	1.46	0.00	6.45
Steam horsepower	281	474.25	1404.44	0.00	16004.00
Steam horsepower (log)	281	4.33	2.20	0.00	9.68
Horse powered engines 1862	281	16.48	27.25	0.00	258.00
Horse powered engines 1862 (log)	281	2.02	1.36	0.00	5.56
Wind powered engines 1862	281	40.29	85.62	0.00	553.00
Wind powered engines 1862 (log)	281	1.86	2.00	0.00	6.32
Water powered engines 1862	281	173.17	156.46	0.00	1063.00
Water powered engines 1862 (log)	281	4.73	1.05	0.00	6.97
Distance to Fresnes	273	470.37	223.10	8.92	885.92
Trade cost shock	272	1.28	0.69	0.23	2.73
Distance to post office	279	6.97	1.39	1.40	12.44
Distance to post office (log)	279	1.92	0.23	0.34	2.52
Market potential 1801	322	14.46	0.22	13.83	15.15
Market potential 1841	322	14.76	0.20	14.13	15.59
Market potential 1861	322	14.83	0.23	14.20	15.91
Encyclopedie	291	1.23	2.88	0.00	21.67
Encyclopedie (log)	291	0.41	0.75	0.00	3.12
Patents 1842-5	272	2.55	7.10	0.00	90.50
Patents 1842-5 (log)	272	0.80	0.78	0.00	4.52
Patents 1862-5	272	5.50	16.24	0.00	204.00

Patents 1862-5 (log)	272	1.25	0.88	0.00	5.32
Literacy 1784	262	0.33	0.19	0.03	0.79
Literacy 1854	272	0.57	0.20	0.23	0.94
Literacy 1861	281	0.63	0.19	0.28	0.98
Population 1801 in 1000	275	92.84	44.63	17.50	317.62
Population 1801 (log)	275	11.32	0.49	9.77	12.67
Population 1841 in 1000	278	114.45	55.46	18.56	390.17
Population 1841 (log)	278	11.54	0.48	9.83	12.87
Population 1861 in 1000	286	119.46	64.34	16.74	492.87
Population 1861 (log)	286	11.56	0.51	9.73	13.11
Lawyers	272	214.34	173.35	15.47	1350.10
Latitude	322	46.91	2.13	42.47	51.03
Elevation range	273	619.27	676.83	58.00	3572.00
Sea access	273	0.21	0.40	0.00	1.00
Avg rainfall	281	868.32	153.13	642.90	1289.24
Avg temperature	281	10.48	1.61	4.42	13.73
Carboniferous area	284	0.09	0.14	0.00	0.71
Wheat yield 1841	271	12.40	3.48	6.42	22.31
Wheat suit.	271	3.81	1.11	1.45	8.00
Wheat yield 1841 (log)	271	2.48	0.27	1.86	3.10
Prefecture	291	0.30	0.46	0.00	1.00
Distance from Paris	281	347.76	177.60	17.40	687.37
Border 1840	273	0.11	0.32	0.00	1.00
Border 1860	273	0.09	0.29	0.00	1.00

Table 2: Descriptive Statistics: the French banking sector

Year	1801	1810	1822	1829	1842	1851	1856	1862	1869
All Banks									
#bank	73	290	453	689	1042	1233	1298	1657	1868
#bank office	73	295	461	702	1068	1283	1352	1785	2023
<u>#bank office/subdistrict</u>									
Mean	0.25	1.03	1.61	2.45	3.72	4.47	4.71	6.22	7.05
St. Dev.	1.36	2.89	3.38	3.68	4.00	4.05	3.98	4.62	5.76
Min	0	0	0	0	0	0	0	0	0
Max	14	34	28	31	27	23	25	23	42
National Banks									
#bank	0	0	0	0	0	0	0	0	3
#bank office	0	0	0	0	0	0	0	0	29
<u>#bank office/subdistrict</u>									
Mean	0	0	0	0	0	0	0	0	0.10
St. Dev.	0	0	0	0	0	0	0	0	0.35
Min	0	0	0	0	0	0	0	0	0
Max	0	0	0	0	0	0	0	0	3
Regional banks									
#bank	0	4	7	7	20	40	46	99	95
#bank office	0	9	15	20	46	90	100	227	224
<u>#bank office/subdistrict</u>									
Mean	0.00	0.03	0.05	0.07	0.16	0.31	0.35	0.79	0.78
St. Dev.	0	0.19	0.24	0.28	0.50	0.68	0.71	1.19	1.38
Min	0	0	0	0	0	0	0	0	0
Max	0	2	2	2	3	4	4	8	14
Unit Banks									
#bank	73	286	446	682	1022	1193	1252	1558	1770
<u>office/subdistrict</u>									
Mean	0.25	1.00	1.55	2.38	3.56	4.16	4.36	5.43	6.17
St. Dev.	1.36	2.82	3.33	3.60	3.86	3.76	3.69	4.19	4.96
Min	0	0	0	0	0	0	0	0	0
Max	14	33	28	30	27	22	24	21	37

Table 4: Correlations with bank density 1842 (simple bivariate)

	Coefficient	Std. error	p-value
Distance to Fresnes	-0.56***	0.21	0.01
Market access 1841	-0.26	0.19	0.16
Literacy 1784	0.48**	0.22	0.03
Literacy 1854	0.49**	0.21	0.02
Population 1801	0.92***	0.20	0.00
Population 1841	1.17***	0.20	0.00
Lawyers	1.65***	0.19	0.00
Post office	-0.21	0.21	0.31
Border 1840	0.68	0.67	0.32
Sea access	2.12***	0.51	0.00
Prefecture	1.41***	0.43	0.00
Trade cost shock	0.83***	0.31	0.01
Elevation range	-0.42**	0.21	0.05
Wheat suit.	-0.05	0.20	0.82
Carboniferous area	-0.26	0.21	0.22
Avg rainfall	-0.00**	0.00	0.02
Avg temperature	0.19	0.13	0.13
Distance from Paris	-0.00	0.00	0.20
Encyclopedia	0.89***	0.20	0.00
Patents 1842-5	1.89***	0.18	0.00
Steam engines 1842	1.58***	0.18	0.00
Non-steam engines 1842	0.20	0.20	0.33
in cotton textiles	0.93***	0.19	0.00
in textiles	1.11***	0.19	0.00
Market access 1801	-0.06	0.19	0.75

*** p<.01, ** p<.05, * p<.1, p<1

Notes: The table shows the coefficients of bivariate regressions of bank density, bkdens, on the above list of arrondissement characteristics.

Table 5: Correlations with bank density 1862 (simple bivariate)

	Coefficient	Std. error	p-value
Distance to Fresnes	-0.66***	0.22	0.00
Literacy 1861	0.49**	0.21	0.02
Population 1801	1.03***	0.20	0.00
Population 1861	1.44***	0.20	0.00
Lawyers	1.95***	0.19	0.00
Post office	-0.23	0.22	0.29
Border 1860	0.87	0.77	0.26
Sea access	2.47***	0.53	0.00
Prefecture	1.30***	0.46	0.00
Elevation range	-0.69***	0.22	0.00
Wheat suit.	-0.27	0.21	0.19
Trade cost shock	1.21***	0.31	0.00
Carboniferous area	-0.53**	0.21	0.01
Avg rainfall	-0.00**	0.00	0.01
Avg temperature	0.26*	0.13	0.06
Distance from Paris	-0.00*	0.00	0.08
Encyclopedia	0.99***	0.20	0.00
Patents 1862-5	1.99***	0.19	0.00
Steam engines 1862	1.50***	0.18	0.00
Non-steam engines 1862	0.26	0.20	0.20
Market access 1801	-0.01	0.20	0.97
Market access 1861	-0.35*	0.20	0.08
Literacy 1784	0.56**	0.23	0.01

*** p<.01, ** p<.05, * p<.1, p<1

Notes: The table shows the coefficients of bivariate regressions of bank density, bkdens, on the above list of arrondissement characteristics.

Table 6: Correlations with bank density 1842 (incl geo/inst controls)

	Coefficient	Std. error	p-value
Distance to Fresnes	-3.11***	0.87	0.00
Market access 1841	1.55***	0.53	0.00
Literacy 1784	0.42	0.29	0.15
Literacy 1854	0.73***	0.26	0.01
Population 1801	0.82***	0.24	0.00
Population 1841	1.06***	0.24	0.00
Lawyers	1.37***	0.20	0.00
Post office	-0.50*	0.30	0.09
Trade cost shock	-0.37	0.51	0.46
Encyclopedia	0.67***	0.20	0.00
Patents 1842-5	1.86***	0.20	0.00
Steam engines 1842	1.41***	0.19	0.00
Non-steam engines 1842	0.20	0.21	0.34
in cotton textiles	1.01***	0.20	0.00
in textiles	1.06***	0.20	0.00
Market access 1801	1.13**	0.52	0.03

*** p<.01, ** p<.05, * p<.1, p<1

Notes: The table shows the coefficients of regressions of bank density, bkdens, on the above list of arrondissement characteristics and geographic and institutional controls.

Table 7: Correlations with bank density 1862 (incl geo/inst controls)

	Coefficient	Std. error	p-value
Distance to Fresnes	-3.10***	0.89	0.00
Literacy 1861	0.63**	0.28	0.02
Population 1801	0.96***	0.25	0.00
Population 1861	1.42***	0.24	0.00
Lawyers	1.80***	0.19	0.00
Post office	-0.77**	0.30	0.01
Trade cost shock	0.08	0.52	0.88
Encyclopedia	0.80***	0.20	0.00
Patents 1862-5	2.07***	0.21	0.00
Steam engines 1862	1.32***	0.21	0.00
Non-steam engines 1862	-0.14	0.23	0.54
Market access 1801	1.71***	0.52	0.00
Market access 1861	2.25***	0.58	0.00
Literacy 1784	0.41	0.29	0.17

*** p<.01, ** p<.05, * p<.1, p<1

Notes: The table shows the coefficients of regressions of bank density, *bkdens*, on the above list of *arrondissement* characteristics and geographic and institutional controls.

Table 15: Banking density 1862, horsepower instead of numbers of engines

	(1)	(2)	(3)	(4)
	bkdens	bkdens	bkdens	bkdens
Steam horsepower	0.94***	0.39*	0.71***	0.18
	0.00	0.09	0.00	0.31
Encyclopedia	0.59***	0.41**	0.44**	0.29
	0.00	0.04	0.03	0.14
Market access 1861		1.18		-0.61
		0.15		0.56
Population 1861		1.01***		1.40***
		0.00		0.00
Literacy 1861		0.44*		0.33
		0.08		0.12
Lawyers			1.58***	1.84***
			0.00	0.00
Post office			-0.29	0.09
			0.29	0.71
Prefecture	0.82*	0.18	1.42***	0.41
	0.05	0.61	0.00	0.20
Sea access	1.64**	1.79**	1.54**	0.84
	0.03	0.01	0.02	0.31
Border 1860	2.24*	2.84***	1.06	1.32
	0.06	0.01	0.19	0.11
Constant	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes
Adjusted R2	0.256	0.309	0.420	0.485
Observations	267	267	264	264

Residuals clustered at district level, no region fixed effects

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

Table 8: Banking density 1842, patents

	(1)	(2)	(3)	(4)
	bkdens	bkdens	bkdens	bkdens
Steam engines 1842	0.52***	0.47***	0.40**	0.40**
	0.00	0.00	0.02	0.01
Patents 1842-5	0.63***	0.48**	0.57***	0.42**
	0.00	0.01	0.01	0.03
Steam*patents 1842	1.05***	1.10***	0.95***	0.96***
	0.00	0.00	0.00	0.00
Market access 1841		0.45		-0.59
		0.47		0.55
Population 1841		-0.02		0.26
		0.92		0.27
Literacy 1854		0.49*		0.38**
		0.06		0.05
Lawyers			1.10**	1.19**
			0.01	0.03
Post office			0.19	0.26
			0.40	0.21
Prefecture	0.09	0.26	0.56**	0.45*
	0.72	0.33	0.05	0.08
Sea access	1.00**	1.26**	1.04**	0.69
	0.05	0.03	0.03	0.30
Border 1840	0.81**	1.14***	0.41	0.50
	0.05	0.00	0.46	0.38
Constant	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes
Adjusted R2	0.498	0.505	0.558	0.562
Observations	251	250	249	249

Residuals clustered at district level, no region fixed effects

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

Table 9: Banking density 1862, patents

	(1)	(2)	(3)	(4)
	bkdens	bkdens	bkdens	bkdens
Steam engines 1862	0.47*	0.25	0.28	0.14
	0.05	0.37	0.21	0.58
Patents 1862-5	1.26***	1.20***	0.88***	0.68*
	0.00	0.00	0.01	0.06
Steam*patents 1862	0.62**	0.62**	0.52**	0.47*
	0.05	0.05	0.05	0.05
Market access 1861		1.17*		-0.65
		0.09		0.48
Population 1861		0.21		0.70***
		0.37		0.01
Literacy 1861		0.04		0.01
		0.89		0.96
Lawyers			1.65***	1.88***
			0.00	0.00
Post office			0.05	0.13
			0.82	0.50
Prefecture	-0.53	-0.51	0.47	0.13
	0.15	0.24	0.19	0.72
Sea access	1.64**	2.05***	1.53**	1.01
	0.02	0.01	0.02	0.23
Border 1860	1.49*	1.83**	0.90	0.86
	0.05	0.02	0.20	0.28
Constant	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes
Adjusted R2	0.429	0.434	0.556	0.566
Observations	251	251	249	249

Residuals clustered at district level, no region fixed effects

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

Table 10: Bank density on 18th century factors - evolution of coefficients

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1810	1822	1829	1842	1851	1856	1862	1869
Distance to Fresnes	-1.28***	-0.83	-1.67*	-2.10**	-2.91***	-1.73	-1.59	-2.96*
	0.00	0.19	0.06	0.05	0.01	0.11	0.24	0.09
Encyclopedia	0.31*	0.44***	0.48***	0.46**	0.44**	0.47**	0.54***	0.70**
	0.09	0.01	0.00	0.02	0.03	0.01	0.01	0.01
Market access 1801	-0.20	0.12	0.34	0.49	0.70	1.19*	1.21	1.06
	0.51	0.74	0.43	0.58	0.40	0.07	0.11	0.33
Population 1801	0.38**	0.43*	0.44**	0.65*	0.58*	0.52**	0.69**	1.01**
	0.02	0.05	0.02	0.05	0.06	0.04	0.02	0.03
Literacy 1784	0.04	0.13	0.11	0.26	0.14	0.21	0.42	0.50
	0.83	0.54	0.62	0.34	0.63	0.42	0.16	0.20
Prefecture	0.55**	0.72***	0.76**	1.02***	0.72*	0.65**	0.75*	1.12**
	0.01	0.01	0.03	0.01	0.08	0.04	0.07	0.02
Sea access	0.40	1.02**	1.24**	2.11***	2.25***	2.18***	2.16***	2.32**
	0.41	0.04	0.03	0.00	0.00	0.00	0.00	0.02
Border 1840	0.80*	1.22**	1.33**	1.87***	2.08***	2.01***	2.78***	3.27**
	0.06	0.02	0.03	0.00	0.00	0.00	0.01	0.01
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.177	0.224	0.239	0.221	0.227	0.282	0.275	0.265
Observations	256	256	256	256	256	256	256	256

Residuals clustered at district level, no region fixed effects

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

Table 11: Entries 1810-1869

	(1)	(2)	(3)	(4)	(5)	(6)
	1810-20	1820-29	1830-40	1841-51	1852-62	1863-69
Distance to Fresnes	-0.35	-1.35**	-1.18	-1.42*	0.18	-0.38
	0.55	0.03	0.16	0.06	0.86	0.68
Encyclopedia	0.35***	0.37**	0.37**	0.26	0.34	0.41**
	0.01	0.02	0.04	0.13	0.12	0.02
Market access 1801	-0.06	-0.22	0.63	0.54	0.08	0.79
	0.86	0.53	0.23	0.28	0.88	0.14
Population 1801	0.48***	0.81***	0.91***	1.15***	1.14***	1.12***
	0.01	0.00	0.00	0.00	0.00	0.00
Literacy 1784	0.28	0.08	0.14	0.18	0.32	0.48
	0.18	0.66	0.61	0.47	0.27	0.12
Prefecture	0.52*	0.66**	1.05***	0.60*	0.53	1.00***
	0.06	0.03	0.01	0.09	0.23	0.01
Sea access	0.61	1.00*	1.20*	1.43**	0.60	1.12*
	0.24	0.06	0.05	0.04	0.32	0.10
Border 1840	0.96*	0.75*	1.42***	1.38***	1.42	1.78***
	0.06	0.09	0.01	0.01	0.14	0.01
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.214	0.252	0.297	0.318	0.246	0.321
Observations	256	256	256	256	256	256

Residuals clustered at district level, no region fixed effects

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

Table 12: Exits 1810-1869

	(1)	(2)	(3)	(4)	(5)	(6)
	1810-20	1820-29	1830-40	1841-51	1852-62	1863-69
Distance to Fresnes	-1.14***	-0.34	-0.31	-1.45**	-2.03***	0.86
	0.00	0.35	0.52	0.02	0.00	0.18
Encyclopedia	0.26	0.21**	0.35**	0.39**	0.25*	0.13
	0.20	0.02	0.03	0.04	0.06	0.23
Market access 1801	-0.24	-0.15	-0.21	0.56	-0.13	0.78*
	0.40	0.49	0.46	0.23	0.76	0.05
Population 1801	0.48***	0.32***	0.59***	1.08***	0.60***	0.67***
	0.01	0.00	0.00	0.00	0.00	0.00
Literacy 1784	0.15	0.07	0.25	0.23	-0.18	0.17
	0.45	0.57	0.12	0.37	0.35	0.46
Prefecture	0.53**	0.29*	0.48	1.20***	0.53	0.42
	0.01	0.07	0.13	0.00	0.12	0.12
Sea access	0.29	0.25	0.35	1.18	1.04***	1.21**
	0.57	0.43	0.46	0.17	0.01	0.01
Border 1840	0.85**	0.59**	0.94*	0.90*	0.52	1.11**
	0.04	0.04	0.06	0.06	0.35	0.02
Constant	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.168	0.176	0.190	0.317	0.205	0.254
Observations	256	256	256	256	256	256

Residuals clustered at district level, no region fixed effects

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

Table 13: Bank density, evolution of effect of Blockade trade shock

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1810 ^{''}	1822	1829	1842	1851	1856	1862	1869
Trade cost shock	-0.38	0.00	-0.56	-0.64	-1.24***	-0.48	-0.32	-0.32
	0.22	1.00	0.19	0.16	0.00	0.25	0.52	0.60
Encyclopedia	0.35**	0.49***	0.54***	0.52**	0.51**	0.53***	0.61***	0.83***
	0.05	0.00	0.00	0.01	0.01	0.01	0.00	0.00
Market access 1801	0.13	0.25	0.80	1.05	1.60**	1.65***	1.60**	1.63*
	0.70	0.52	0.12	0.17	0.03	0.01	0.03	0.10
Population 1801	0.39**	0.43*	0.45**	0.66*	0.60*	0.52**	0.68**	1.00**
	0.03	0.05	0.02	0.06	0.05	0.04	0.02	0.03
Literacy 1784	0.14	0.21	0.24	0.43*	0.37	0.35*	0.56**	0.75**
	0.40	0.29	0.19	0.07	0.14	0.09	0.03	0.03
Prefecture	0.56**	0.72***	0.77**	1.03***	0.75*	0.67**	0.77*	1.13**
	0.01	0.01	0.02	0.01	0.07	0.03	0.06	0.02
Sea access	0.29	0.81	1.12*	1.92***	2.18***	1.98***	1.89**	1.74
	0.54	0.12	0.08	0.01	0.00	0.01	0.03	0.11
Border 1840	1.01**	1.37**	1.61**	2.21***	2.54***	2.31***	3.07***	3.79**
	0.03	0.01	0.03	0.00	0.00	0.00	0.01	0.01
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.167	0.221	0.229	0.212	0.217	0.276	0.272	0.253
Observations	254	254	254	254	254	254	254	254

Residuals clustered at district level, no region fixed effects

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

Table 14: Bank density, evolution of effect of Blockade trade shock incl. distance to Fresnes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1810 ^{''}	1822	1829	1842	1851	1856	1862	1869
Trade cost shock	0.03	0.36	-0.07	0.01	-0.49	0.07	0.23	0.84
	0.95	0.47	0.92	0.98	0.40	0.92	0.79	0.43
Distance to Fresnes	-1.29**	-1.14	-1.57	-2.07*	-2.40*	-1.76	-1.75	-3.70
	0.04	0.21	0.23	0.09	0.07	0.26	0.36	0.12
Encyclopedia	0.32*	0.47***	0.50***	0.48**	0.46**	0.49***	0.57***	0.75***
	0.08	0.01	0.00	0.02	0.02	0.01	0.01	0.00
Market access 1801	-0.20	-0.05	0.39	0.51	0.99	1.20	1.15	0.68
	0.62	0.92	0.41	0.60	0.27	0.10	0.19	0.57
Population 1801	0.38**	0.42*	0.45**	0.65*	0.59*	0.51**	0.67**	0.99**
	0.02	0.05	0.01	0.05	0.05	0.04	0.02	0.03
Literacy 1784	0.04	0.11	0.11	0.26	0.17	0.21	0.42	0.45
	0.84	0.62	0.62	0.34	0.55	0.44	0.20	0.29
Prefecture	0.56**	0.73***	0.78**	1.04***	0.76*	0.67**	0.78*	1.15**
	0.01	0.01	0.02	0.01	0.07	0.03	0.06	0.02
Sea access	0.37	0.88*	1.22**	2.06***	2.34***	2.09***	2.01**	1.98**
	0.41	0.07	0.04	0.00	0.00	0.00	0.01	0.05
Border 1840	0.81*	1.20**	1.37**	1.90***	2.18***	2.04***	2.81***	3.22***
	0.06	0.02	0.02	0.00	0.00	0.00	0.00	0.01
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.177	0.226	0.238	0.220	0.229	0.283	0.277	0.269
Observations	254	254	254	254	254	254	254	254

Residuals clustered at district level, no region fixed effects

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

Table 17: Placebo tests using other engines than steam engines, 1842 and 1862

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	bkdens	bkdens	bkdens	bkdens	bkdens	bkdens	bkdens	bkdens
Water engines 1842	0.10							
	0.64							
Wind engines 1842		-0.23						
		0.17						
Horse engines 1842			0.66***					
			0.00					
Non-steam engines 1842				0.12				
				0.57				
Water engines 1862					-0.49***			
					0.01			
Wind engines 1862						-0.42		
						0.10		
Horse engines 1862							-0.02	
							0.90	
Non-steam engines 1862								-0.5
								0
Encyclopedia	0.30**	0.29*	0.22	0.30*	0.27	0.30	0.31	0
	0.05	0.06	0.15	0.05	0.13	0.13	0.12	0
Market access 1841	-0.46	-0.52	-0.54	-0.46				
	0.69	0.64	0.63	0.68				
Population 1841	1.16***	1.20***	1.08***	1.14***				
	0.01	0.00	0.00	0.01				
Literacy 1854	0.48**	0.44**	0.43**	0.49**				
	0.03	0.04	0.03	0.03				
Market access 1861					-0.79	-0.45	-0.51	-0
					0.46	0.66	0.62	0
Population 1861					1.64***	1.52***	1.49***	1.6
					0.00	0.00	0.00	0
Literacy 1861					0.42**	0.29	0.38*	0
					0.05	0.16	0.09	0
Lawyers	1.46**	1.44**	1.43**	1.46**	1.90***	1.81***	1.86***	1.8
	0.03	0.02	0.02	0.03	0.00	0.00	0.00	0
Post office	0.30	0.27	0.25	0.30	0.14	0.11	0.15	0
	0.19	0.23	0.25	0.20	0.54	0.64	0.53	0
Prefecture	0.87**	0.89**	0.65*	0.87**	0.38	0.38	0.41	0

	0.01	0.01	0.06	0.01	0.22	0.23	0.20	0
Sea access	1.02	1.06	0.88	1.00	0.66	0.89	0.83	0
	0.15	0.11	0.18	0.15	0.42	0.29	0.32	0
Border 1840	1.15*	1.15**	0.94	1.13*				
	0.06	0.05	0.10	0.05				
Border 1860					1.28	1.39	1.38	1.
					0.12	0.10	0.10	0
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Y
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Y
Adjusted R2	0.344	0.347	0.378	0.344	0.499	0.492	0.483	0.
Observations	264	264	264	264	264	264	264	2

Residuals clustered at district level, no region fixed effects

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

Table 16: Banking density 1842, steam engines per sectors

	(1)	(2)	(3)
	bkdens	bkdens	bkdens
Steam engines 1842	0.95***		
	0.00		
in textiles		0.55**	
		0.05	
outside textiles			0.74***
			0.00
Encyclopedia	0.19	0.28*	0.21
	0.23	0.07	0.20
Market access 1841	-0.86	-0.67	-0.76
	0.45	0.53	0.51
Population 1841	0.72**	0.96**	0.87***
	0.04	0.04	0.01
Literacy 1854	0.35	0.41*	0.42*
	0.10	0.07	0.06
Lawyers	1.34**	1.38**	1.37**
	0.03	0.05	0.02
Post office	0.18	0.24	0.26
	0.38	0.28	0.23
Prefecture	0.82**	0.83**	0.80**
	0.01	0.02	0.01
Sea access	0.91	0.98	0.86
	0.15	0.12	0.20
Border 1840	0.79	1.00*	0.74
	0.15	0.06	0.22
Constant	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes
Adjusted R2	0.394	0.362	0.377
Observations	264	264	264

Residuals clustered at district level, no region fixed effects

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

Table 18: Banking density, alternative years to 1842 and 1862

	(1)	(2)	(3)	(4)
	1840	1845	1856	1869
Steam engines 1842	0.45**	0.46***		
	0.02	0.01		
Patents 1842-5	0.44**	0.61***		
	0.03	0.00		
Steam*patents 1842	0.83***	0.91***		
	0.00	0.00		
Market access 1841	-0.26	-0.61		
	0.70	0.57		
Population 1841	0.26	0.29		
	0.20	0.26		
Literacy 1854	0.24	0.45**		
	0.29	0.03		
Steam engines 1862			0.33	0.04
			0.11	0.88
Patents 1862-5			0.69**	0.85**
			0.01	0.04
Steam*patents 1862			0.38**	0.95**
			0.03	0.01
Market access 1861			-0.22	-0.77
			0.77	0.57
Population 1861			0.40	0.95**
			0.13	0.03
Literacy 1861			-0.20	0.43
			0.28	0.11
Lawyers	1.15***	1.37**	1.36***	2.28***
	0.00	0.03	0.00	0.00
Post office	0.15	0.29	-0.04	0.31
	0.46	0.17	0.86	0.20
Prefecture	0.71**	0.20	-0.10	0.24
	0.02	0.48	0.71	0.52
Sea access	0.51	0.94	1.27**	0.78
	0.39	0.20	0.04	0.46
Border 1840	0.55	0.73		
	0.21	0.22		
Border 1860			0.21	0.77
			0.72	0.49
Constant	Yes	Yes	Yes	Yes
Geographic controls	Yes ⁴³	Yes	Yes	Yes
Adjusted R2	0.598	0.567	0.551	0.582
Observations	249	249	249	249

Residuals clustered at district level, no region fixed effects

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

Table 19: Bank density on 18th century factors - additional years

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	1813	1817	1820	1825	1827	1834	1840	1845
Distance to Fresnes	-1.43**	-1.25**	-0.90	-1.40	-1.48	-2.55***	-2.62***	-2.27*
	0.03	0.04	0.20	0.15	0.12	0.01	0.01	0.06
Encyclopedia	0.36**	0.39***	0.37***	0.44**	0.48**	0.57***	0.54**	0.55**
	0.04	0.01	0.00	0.01	0.01	0.00	0.01	0.01
Market access 1801	-0.08	-0.22	-0.02	0.51	0.66	0.15	0.65	0.59
	0.81	0.60	0.95	0.22	0.11	0.82	0.34	0.55
Population 1801	0.41**	0.37**	0.36**	0.48**	0.47**	0.54**	0.62**	0.73**
	0.02	0.03	0.02	0.02	0.02	0.03	0.03	0.05
Literacy 1784	0.09	0.13	0.13	0.13	0.18	-0.05	0.11	0.42
	0.61	0.44	0.50	0.60	0.47	0.85	0.69	0.15
Prefecture	0.69**	0.48**	0.56**	0.88**	0.80**	0.81**	1.14***	0.78*
	0.01	0.03	0.02	0.01	0.02	0.02	0.01	0.06
Sea access	0.42	0.54	0.61	1.19**	1.23**	1.68***	1.91***	2.38***
	0.36	0.23	0.19	0.04	0.03	0.01	0.00	0.00
Border 1840	0.78	0.55	1.00**	1.53**	1.46**	1.53**	1.78**	2.24***
	0.11	0.23	0.03	0.02	0.02	0.01	0.02	0.00
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.199	0.190	0.209	0.229	0.236	0.267	0.286	0.224
Observations	256	256	256	256	256	256	256	256

Residuals clustered at district level, no region fixed effects

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