Financing Late Industrialization: Evidence from the State Bank of the Russian Empire

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Abstract

Gerschenkron (1962) argued that public institutions such as the State Bank of the Russian Empire spurred the country's industrialization. We test this assertion by exploiting plant-level variation in access to State Bank branches using a unique geocoded factory data set. Employing an identification strategy based on geographical distances between banks and factories, our results show improved access to public banking encouraged faster growth in factory-level revenue, mechanization, and labor productivity. In line with theories of late industrialization, we also find evidence that public credit mattered more in regions where commercial banks were fewer and markets were smaller.

JEL classification G28 · L52 · N23 · O14 · P41

Keywords industrialization · economic geography · banking · industrial policy

1 Introduction

The role of the state in fostering industrial development has been heavily contested. Studies of early industrializing countries, in particular Britain, underline how industrial production grew as a result of the unplanned interaction between entrepreneurs, inventors and financiers (Mokyr, 2010). Economists studying late industrializing countries, on the other hand, frequently emphasize the importance of the state in channeling finance to industrial enterprises. In classic work, Gerschenkron (1962, p. 123-126) argued that countries such as Germany or Russia were too scarce in capital to develop through a free interplay of market forces. He proposed that especially in Russia, the state had substituted for "missing" markets by directing investments through state institutions (the most important of which

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was the public banking system).[2] Murphy et al. (1989) famously generalized Gerschenkronian arguments in a formal model, which stressed the need for coordination between the investment decisions of individual enterprises through a government-initiated "Big Push". The importance of state-sponsored finance for industrial growth has since been used to explain the rapid development of East Asian economies such as South Korea after the second World War (Woo, 1991; Allen, 2011; Lane, 2024). More recent policy debates on the role of national development banks in the industrial policy of emerging economies such as Brazil tread similar ground (Musacchio et al., 2017).

Empirically, however, research into the role of states in financing industrialization often suffers from two limitations (Juhász and Steinwender, 2023; Juhász et al., 2023). On the one hand, it is hard to separate the causal impact of industrial policy from other country-specific factors (such as endowments, culture or technology). We circumvent this limitation in this paper by investigating the role of industrial policy in a single country: the Russian Empire. This choice is auspicious because the Russian Empire underwent an unprecedented industrial boom in the final decade of the nineteenth century. As shown in figure 1a, industrial production grew by 8-9% annually between 1890 and 1900, outperforming other prominent industrializing countries of the time, including Germany and Japan. Moreover, Russian policy in the 1890s promoted direct lending by the state to industrial enterprises. Figure 1b demonstrates that output in provinces receiving more credit from the state banking system indeed grew at a faster rate. Based on such patterns, older generations of economic historians have followed Gerschenkron in attributing Russia's industrialization to the provision of public funds (Crisp, 1976; Garvy, 1972). However, as more recent contributions have pointed out, there are limitations to drawing causal infer-

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[2]"Supply of capital for the needs of industrialization required the compulsory machinery of the government, which, through its taxation policies, succeeded in directing incomes from consumption to investment" (Gerschenkron, 1962, p. 20).

ence from highly aggregated data: Russian economic growth may have occurred despite, rather than because, of intervention by the Tsarist state.[3] This underscores the second challenge in the literature: country-specific studies of industrial policy frequently do not observe the counterfactual, that is the development of industry in the absence of government intervention.

This paper brings new micro-data to the debate on the financing of late industrialization. We focus on the ambitious policy by the reformist Russian Finance Minister Sergei Witte between 1892 and 1903 that used the State bank of the Russian Empire to extend credit to private industry. Before Witte's appointment, the ability of the State Bank to lend directly to private enterprises had been restricted. During Witte's tenure, these restrictions were rescinded and the State Bank lent heavily to industrial enterprises across the country. After Witte was removed from office, his credit policy was dismantled. Witte's credit expansion therefore presents a clearly delimited policy intervention. We evaluate the impact of this policy on revenue, labor productivity, and machine use at the factory level, leveraging newly geocoded data on manufacturing establishments in the Russian Empire between 1890 (before the start of the policy) and 1908 (after the policy had been ended).

This data allows us to exploit the geographical distance from each individual factory to the local bank branch as an exogenous determinant of its access to public credit. We can treat distance as exogenous in our context because the location of bank branches and factories was determined before the start of Witte's credit policy. Additionally, we show evidence suggesting that neither factories nor bank branches sorted geographically before the start of the policy in a way that affects later factory-level outcomes (see section 4.1 on our identifying assumptions). Accordingly, distance to province capitals housing a State

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[3]Both Gregory (2014) and Kahan (1989) make this point using largely descriptive evidence. Using multi-sector growth models calibrated with Russian data, Allen (2003) and Cheremukhin et al. (2017) are similarly skeptical regarding the capacity of Tsarist institutions to deliver long-run growth.
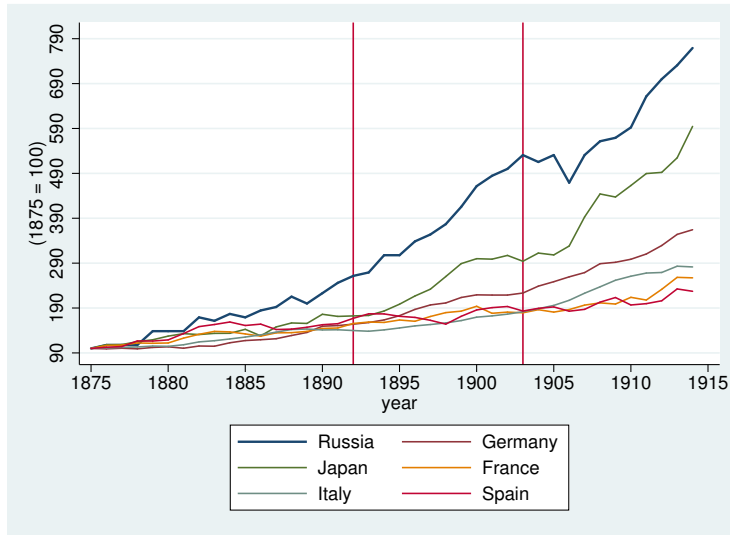
(a) Industrial output in the Russian Empire and selected late industrializers.
Sergei Witte's tenure marked in vertical lines. Source: Bénétrix et al. (2015)
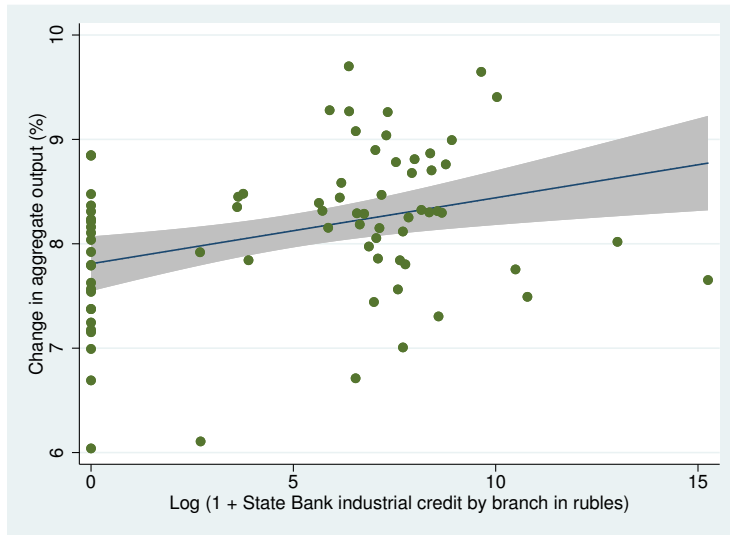
(b) State Bank credit and growth in total industrial output, provinces of the Russian Empire, 1890-1908.
Source: authors' calculations based on archival material.

Figure 1: **Industrial output and credit during late industrialization**.

Bank branch is a statistically significant predictor of a factory's outcomes in 1908, after Witte's credit policy had ended, but not in 1890, before the start of the policy. Moreover, as we use factory data over two periods, we can control for factory characteristics at baseline. Finally, our use of plant-level data allows us to control for fixed effects at the level of the

bank branch. In other words, our empirical strategy relies on variation between factories with *differing* levels of access to the *same* branch of the public banking system. Unlike much of the literature on the banking-growth nexus (King and Levine, 1993; Jayaratne and Strahan, 1996; Levine et al., 2000; Guiso et al., 2004; Burgess and Pande, 2005; Berkowitz et al., 2012; Pascali, 2016), our principal estimates do not rely on comparison between bank branches in different regions. Two recent papers from the literature on banking and growth in historical settings (Heblich and Trew, 2019; Lehmann-Hasemeyer and Wahl, 2021) rely on finding exogenous variation in regional financial development either through an instrumental variable strategy or through local policy shocks. In contrast, our study primarily exploits variation at the sub-regional level.

Our empirical results suggest that access to a State Bank branch did indeed lead to a higher growth rate of factory-level revenue, productivity and machinery use. This offers an explanation of the astounding pace of industrial change in Tsarist Russia. In a second step, we examine how the effect of access to public credit depended on factory and region characteristics. In line with Gerschenkron's argument, we find that the effect of the State Bank was more important for factories without access to private sources of finance, and for factories located in areas where input and output markets were weakly developed (section 5.2). This suggests the state substituted for private capital or weak fundamentals.

Our research therefore sheds new light on the determinants of Russian industrial growth before the Revolution. Markevich and Nafziger (2017) and Zhuravskaya et al. (2023) highlight the heterogeneity of institutional developments in Imperial Russia. Gregg (2020), using some of the same manufacturing censuses as this paper, shows how incorporation helped industrial enterprises to grow, despite the complicated concession system involved. Whereas Gregg (2020) focuses on incorporation as a way for the largest firms to secure

equity finance, our study focuses on the mass of industrial plants that relied on external credit. The role of the State Bank in this process has not been quantitatively tested, despite the centrality of the Bank to Imperial economic policies.[4]

It is important to note, however, that we do not argue that lending by the government was an optimal allocation of resources in Russia. We show that access to public banking spurred industrial revenue and productivity, especially in poorer regions. We cannot formally assess the full welfare implications of state banking, as we observe neither the opportunity cost of public funds, nor the deadweight loss incurred in raising them. It is likely that Witte's policy redistributed income from the bottom to the top in a society where incomes at the bottom were already meager. This is because Witte's policies involved a redistribution from taxpayers to recipients of industrial loans. Taxes were largely indirect, and thus regressive (Ananich, 2006; Lindert and Nafziger, 2014).[5] Witte's policy pursued one goal – industrialization to maintain Russian geopolitical pre-eminence – at steep trade-offs.

Moreover, the Russian state was no impartial social planner. Political patronage networks among industrialists, bankers, and bureaucrats significantly influenced the allocation of credit across the provinces (Lychakov, 2018). These networks facilitated preferential access to financial resources for those within close proximity to key decision-makers. The Russian case therefore contributes to a broader literature emphasizing the role of social networks in entrepreneurship and credit allocation (Lamoreaux, 1996; Gupta, 2014; Colvin et al., 2020). We capture personal distance to state bankers using geographical distance between factory and bank as a proxy for loan access, thus exploiting the tendency

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[4]Salomatina (2014b) offers historical evidence suggesting that the State Bank played a role in the emergence of Russia's commercial banking system. Bugrov (2012) provides a rich narrative history of the State Bank in Russian, while Frenkel (2017) analyzes descriptive statistics on the Bank's branch network.

[5]In addition to taxes, Witte's policy was financed by floating government loans abroad. Their repayment, of course, would eventually have landed on the Russian taxpayer had it not been for the repudiation of these debts by the Bolsheviks after the Revolution (Malik, 2018).

of business networks to decrease with distance (see section 2 for historical evidence on networks and section 4.1 for the operationalization).

The rest of the paper proceeds as follows. Section 2 provides the historical background of reforms in Witte's Russia. Section 3 describes the data collected, and 4 sets up our identification strategy. In section 5 we first estimate the effect of the State Bank on factory-level outcomes, before examining the importance of regional characteristics. The last section concludes.

2 Historical Background

2.1 Establishment of State Bank branches

The State Bank of the Russian Empire was founded in 1860 as part of a reform package sponsored by Tsar Alexander II. Anxious to retain Russia's vaunted status as a great power after its defeat in the Crimean War, the Tsar sought to modernize the Russian economy, including its financial system. Upon its founding, the State Bank was effectively incorporated as an agent of the Ministry of Finance. The Bank's Charter placed tight limits on its ability to issue credit to commercial enterprises, although the Bank did sometimes advance short-term working capital on the basis of discounting promissory notes in the ensuing decades (See figure 2c). Nonetheless, the bank's principal functions during the first decades of its existence revolved around the coordination of public finances, in particular the placing of government bonds, managing the Imperial gold reserve, and collecting and transferring tax payments. This last function mandated the build-up of an Empire-wide system of deposit accounts and a payment mechanism, which led to the establishment of branches outside of the Empire's principal cities of St. Petersburg and Moscow (Gindin, 1960; Bugrov, 2012; Garvy, 1972; Ananich, 2006). Between 1860 and 1866, 33 branches

were set up (see figure 2a). As the objective was to maximize the collection of deposits from the regions, Tsarist authorities allocated branches to the commercially most important towns, that is those with a high density of tax payers and savers. Through these branches, the State Bank effectively acted as a giant "pump" funneling resources from Russia's provinces to St. Petersburg for use by the Imperial government (Bugrov, 2012; Frenkel, 2017, p. 180, 183).

Further expansion of the branch network proceeded slowly for about a decade. This was due to the difficulty in attracting skilled staff to remote locations, and the low level of capitalization of the Bank itself. Deposits also grew slowly in the first decades (figure 2b). Many branches had difficulty breaking even, partly because the high level of central control written into the Bank's Charter limited the ability of branches to adjust their assets flexibly to local conditions. Central control, in turn, was perceived necessary given the low levels of human capital of banking staff employed in the regional branches. This further reduced the appetite for expansion, until resources for a second wave of expansion were again available in the 1880s (see figure 2a). In expanding, authorities followed the rule "every town a bank", meaning that a new branch was allocated to the administrative capital of a province. The principal reason behind this decision was that the State Bank was a bureaucratic institution, which followed the general hierarchy of the Empire's administrative divisions.[6] By the start of Witte's tenure in 1892, most provincial capitals had received a local branch (Bugrov, 2012; Frenkel, 2017, p. 184).

The Bank's early history has important implications for our empirical setup. Firstly, the timing of branch establishment was clearly endogenous to local economic conditions. This precludes a straightforward comparison between branches. Instead, our empirical

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[6]This approach was modeled on the "federal" system pursued by the German Reichsbank at the time. Note that in some provinces, one or two secondary branches were established outside of the capital, for which we control in the empirical analysis.

strategy exploits within-branch variation provided by distance. Secondly, while the timing of branch placement was endogenous, the *location* of placement was determined by administrative criteria (namely the location of the provincial capital). Thirdly, the purpose of the early public banking system was not to support local industry. Quite reversely, it was used to "pump" taxable surplus out of the regions. Being geographically close to a branch was therefore not necessarily advantageous for industrialists before the start of Witte's policy.[7]

(a) Founding year of first State Bank branch in province

(b) Deposits in State Bank and private banks

(c) Industrial loan and promissory note issues, State Bank

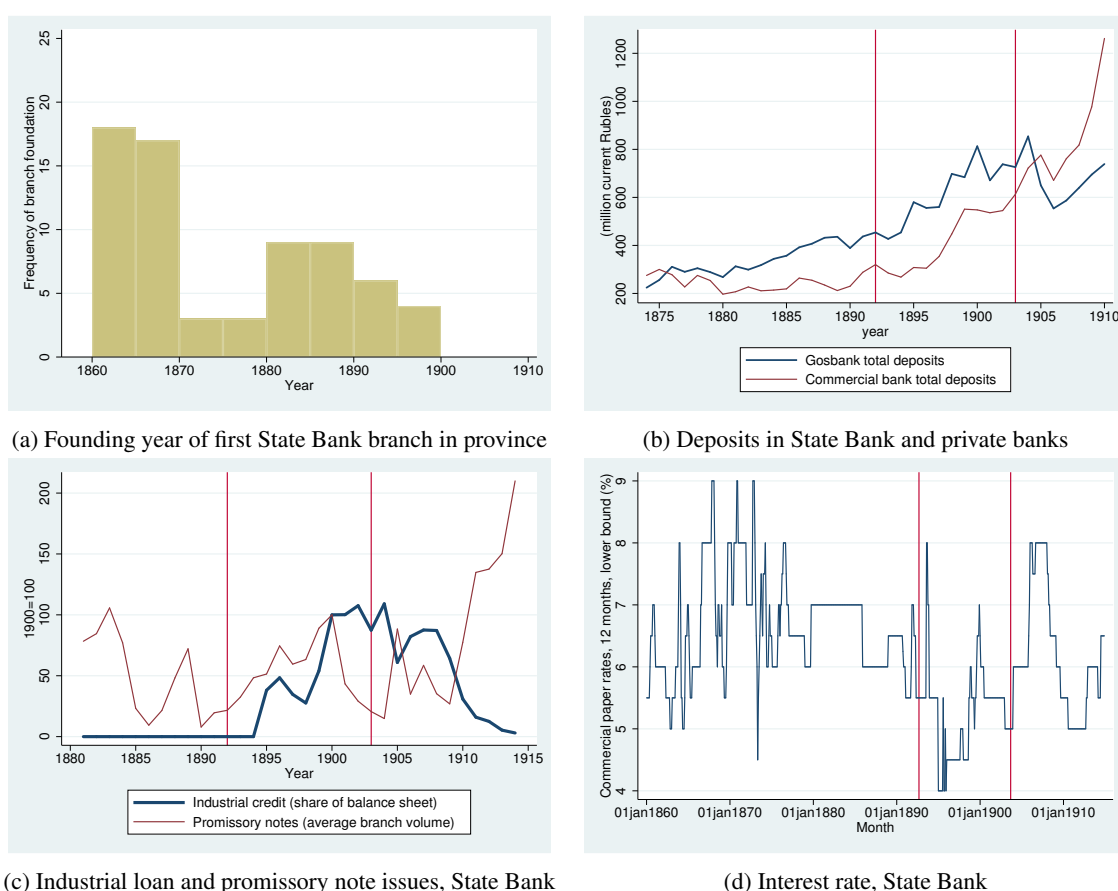(d) Interest rate, State Bank

Figure 2: **Evolution of State Bank of Russian Empire, 1860-1913**. Vertical (red) lines indicate tenure of Sergei Witte as Minister of Finance. Source: Crisp (1976); Bugrov (2012); Salomatina (2018) and authors' calculations based on Russian State Archives.

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[7]In the empirical analysis we control for the potential benefits of being close to other provincial services.

2.2 Witte's policy experiment

The role of the State Bank changed dramatically after the reformer Sergei Witte took over the Ministry of Finance and hence authority over the State Bank in 1892. Witte was a follower of Friedrich List, the German economist whose writings on development strategies for late industrializing countries dissented from the tenets of classical economics. From List's writings, Witte distilled two policy recommendations. Firstly, protective tariffs were to insulate Russian industries from more advanced Western competition (Suesse, 2023). Secondly, the government was to dispense credit to domestic industry in order to aid its expansion and technological upgrading. This would make Russian factories productive enough to export, first to less competitive markets in Asia, and eventually to Europe. In order to mobilise the public funds for this ambitious scheme, Witte did not only rely on domestic tax revenues, but also increased the issuance of Russian government bonds abroad. Finally, in order to increase Russia's attractiveness for foreign investors, Witte formalized the ruble's link to gold in 1897 (Drummond, 1976; Ananich, 2006; Wcislo, 2011).[8]

The State Bank was a key institution for the implementation of Witte's new policy framework. Macroeconomically, it received the right to issue currency backed by gold and would act as Russia's guarantor of gold convertibility. Most importantly for our purposes, the State Bank would support the provision of industrial credit. In order to carry out these new functions, Witte rescinded the Bank's restrictive rule book by sponsoring a new Charter in 1894. This provided Witte with several policy levers. Firstly, the new Charter abolished previous restrictions on commercial lending, and additionally made provisions for granting loans to smaller borrowers, which could include individually owned factories or small craft workshops. It also extended the term structure of existing financial instru-

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[8]There was a potential contradiction between Witte's aim of credit expansion and his commitment to maintaining the ruble's parity to gold. The Russian government was able to overcome this tension by maintaining a larger gold stock than would have been necessary merely for backing the currency, thus providing it with a margin of flexibility for credit operations.

ments, making it possible for entrepreneurs to finance a broader range of capital needs on the basis of promissory notes. Secondly, Witte created a new set of financial instruments specifically designated as "industrial credit" for longer-term investment purposes, which were attractive for capital-investment projects. As figure 2c shows, the volume of credit under this heading expanded massively once the new Charter took effect. Thirdly, the State Bank not only expanded the volume and structure of lending, but also made credit cheaper (figure 2d). Interest rates on State Bank loans during Witte's tenure were lower than in other periods, and were typically lower than those demanded by commercial banks (Ishkinina, 2010; Von Laue, 1968; Crisp, 1976).[9] Fourthly, Witte delegated the authority to approve loans to local branches.

During Witte's tenure, the amount of funds allocated to each regional branch were often decided centrally. This gave precedence to poorer regions, as the center's aim was "to fill the gap left unattended by other credit institutions" (Crisp, 1976, pp. 134, 155). Conditional on these regional allocations, however, the decision on which borrower was to receive credit came ultimately down to the management of local State Bank branches and was not fixed in the Charter. This is crucial for our analysis: local branches enjoyed a large degree of discretion in determining the individual recipient of credit. In utilizing this discretion in loan allocation, they tended to rely on local elite networks which were often centered around the province capital (Gindin, 1960). There were a number of reasons for this. First, webs of kinship, social relations or religious affiliation were well-established ways of dispensing credit in Russia, even for commercial banks (Crisp, 1976; Rieber, 1991; Raskov and Kufenko, 2017). The geographically limited nature of such ties is quantitatively corroborated by Hillmann and Aven (2011) who show how business op-

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[9]From the perspective of the factory owner, State Bank credit was thus easier to obtain, had a longer repayment horizon and was cheaper than most commercial offerings. For example, loan and discount rates demanded by the State Bank in 1897 were about 1%-point lower than those of commercial competitors, as evidenced by comparing data from Salomatina (2015) and Bugrov (2012).

portunities depended crucially on local network strength in the provinces. Secondly, the exhaustive study on the State Bank by Bugrov (2012, p.180-93) narrates how, after the start of Witte's policy, business owners had an incentive to cultivate access to bankers and officials, often managing to obtain a seat on the board of their local State Bank branch. Political capture of local branches by business interests were facilitated by the low rate of turnover of branch managers (due to the difficulties of attracting qualified banking staff) (Bugrov, 2012). Finally, in a pain-staking quantitative study of archival records on the linkages between bankers and industrialists, Lychakov (2018) details the "personal connections, or more formally interlocks, between members at banking boards, government officials, and company board members." As a result, those factory owners who managed to become close to bankers were at an advantage when it came to obtaining coveted funds.[10]

2.3 Abrogation of Witte's policy

Witte faced a high degree of resistance against his policies, both by the rural poor who paid taxes and by the landed nobility who feared industrialization might undermine their rural power base. However, the eventual end of the experiment was not related to the policy itself. The cause for Witte's dismissal in 1903 were disagreements over Russian imperial expansion into the Korean peninsula, which he opposed. Witte lost the argument and Russian expansion went ahead. The resulting war with Japan (1904-05) wrecked disaster on the Russian economy (Wcislo, 2011). Facing mounting fiscal pressures, Witte's successors rapidly dismantled the State Bank's expensive credit drive. Industrial loans were once again curtailed (figure 2c). Instead, the Bank increasingly acted as an orthodox central bank attempting to defend the stability of the ruble by raising interest rates (Ananich, 2006).

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[10]Appendix G and H provide further evidence on the functioning of the State Bank under the new Charter.

Industrial growth returned after 1907, with larger participation by the now rapidly expanding commercial banking sector. Joint-stock commercial banks had developed sluggishly until the late 1890s (figure 2b). The slow growth of private banking had partly been due to government restrictions, and partly due to the fact that many banking houses were linked to established enterprises, therefore having little incentive to invest in new ventures. Nonetheless, even after private banks had become important actors in industrial finance after Witte's exit, the State Bank did not entirely abandon its commercial interventions. The Bank continued to act as a lender of last resort to commercial banks and large strategic enterprises in times of crisis (Crisp, 1976; Boiko, 2011; Salomatina, 2014b). However, the purpose was now to effect emergency bail-outs, rather than foster industrialization.

3   Data

Our data set consists of three key components. The Russian manufacturing census of 1908, conducted four years after Witte left office and his credit policies were terminated, provides the endline data. Secondly, we use a similar census from 1890, two years before Witte's tenure, as a baseline. Thirdly, we employ data on the branching and financing activities of the State Bank from its foundation in 1860.

3.1   Geocoded 1908 enterprise data

The "List of Plants and Factories in the Russian Empire" (Varzar, 1912) provides the universe of factories in the Russian Empire in 1908.[11] The unit of observation is the physical

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[11] The list contains 19,939 factories, excluding those in the autonomous Grand Duchy of Finland. We also omit some Central Asian provinces lacking the same civilian administrative divisions as the rest of the Empire, leaving 19,472 plants.

plant or factory, rather than the legal entity owning it.[12] For each factory, the census provides three types of variables.

Firstly, there is data on revenue (in rubles), workforce size (headcount), and installed machinery (by propulsion type and horsepower). These factory-level outcomes serve as dependent variables in later analysis. We calculate labor productivity as revenue per person, including this as an outcome variable due to Witte's focus on improving industrial productivity.

Secondly, the census details several control variables for analysis, including the owner's name and social status (noble, merchant, townsmen), type of establishment (workshop, factory), corporate form (none, publicly owned, partnership, share-issuing corporation, cooperative), and industry classification.[13] We also approximate the owner's ethnicity from their name (Russian or non-Russian). For many establishments, there is additional data on proximity to railway, riverine, postal, and telegraph stations. We code these factory-level controls as indicator variables.

Thirdly, each factory has a precise address, including its first-level administrative subdivision (province or *governorate*) and second-level subdivision (district or *uezd*). The third level, comprising the municipal area (*volost* in rural areas or *gorod* in urban regions), is where geocoding occurs.[14] To geocode, we consult a broad array of sources on local Russian history to match historic town and village names to modern ones, enabling geocoding of factory locations at the municipal level. We geocode 88% of factories to this level. Maps B.2 and B.2 in the appendix plot these factories.

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[12]Incorporation in the Russian Empire was expensive and rare, so most establishments were owned by sole proprietors or partnerships (Gregg, 2020). This benefits our empirical strategy, as physical and legal locations generally coincided.

[13]We use "single-digit" industry codes, yielding 15 industries. Although the census provides additional information for finer classification, it is not consistently categorizable.

[14]While towns have a center that can be precisely geocoded, all factories in a rural *volost* are assigned to the *volost*'s principal village, which may introduce some measurement error, though likely minimal. The Russian Empire contained over 13,000 *volosts*, providing a fine-grained observation unit. See appendix A.1 for administrative divisions.

3.2 1890 baseline census and matching

The 1890 manufacturing census (Orlov and Budagov, 1894; Orlov, 1895) provides a baseline for our analysis. Similar in structure to its 1908 successor, it includes many of the same variables.[15]

We match the factories of the 1908 census to those in the 1890 census in three steps. First, we use a learning algorithm that matches factories by province and the owner's last name, adjusting for different spellings in each iteration. Second, we manually verify the algorithm's matches, utilizing the factory's economic sector and size. Third, we exclude multiple matches (cases where one 1890 factory matches several 1908 factories or vice versa), which can occur due to factory splits or mergers during this period.[16] This leaves us with 2,677 conservative matches.[17] The high rate of factory establishment and dissolution implied by the matching quotient is unsurprising in a dynamic economy. The period 1890-1908 also includes several economic downturns, leading to many industrial bankruptcies (Gregg and Nafziger, 2024). Importantly, our matched factories are drawn from most districts and nearly all provinces of the Russian Empire (table A.1), suggesting broad geographical representation.

We compare the characteristics of the 1908 census factories matched to the 1890 census with those that remain unmatched (table 1). One concern is that our hand-matching might favor larger establishments, as they may be better documented. Yet, there is no statistically significant difference between the means of the matched and unmatched groups for revenues, workforce, urbanization, and distance to the provincial capital. However,

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[15]The census differs in structure from its 1908 successor. It includes the founding year for each factory. Most importantly, it consists of two lists published separately, one for European Russia and one for the Empire's border regions. Factories on the first list were enumerated in 1890, the latter in 1893 and 1894.

[16]Although we exclude multiple matches from our baseline analysis, we show in appendix C.9 that our results are robust to their inclusion.

[17]This is comparable to the 3,271 matches Gregg (2015) obtained across all census years using a "rough" match that allows multiple matches.

Table 1: Matching 1908 factories to the 1890 census: **Balance**

	1908 *not* matched to 1890 census			1908 matched to 1890 census			
Variable	Observations	Mean	Standard Error	Observations	Mean	Standard Error	p-value of difference of means
Revenue (rub.) in 1908	11,933	258660	16613	2,678	217990	12990	0.253
Machinery (hp) in 1908	11,933	111.6	6.80	2,678	69.9	4.48	0.041**
Workers in 1908	11,890	111.2	4.48	2,675	114.6	6.37	0.730
Distance to capital (km)	11,933	82.3	1.03	2,678	79.1	1.70	0.190
Urban population ('000)	11,933	162.3	3.02	2,678	164.1	6.67	0.799

Non-geocoded factories excluded from both groups. Factories with multiple matches are excluded from both groups.
* p<0.10, ** p<0.05, *** p<0.01

unmatched 1908 enterprises use more machinery. This does not necessarily suggest an oversampling of unmechanized factories in the matched group, given that the unmatched group contains many new factories established after 1890. In an era of rapid technological progress, these newer establishments may be more capital-intensive—a phenomenon noted for late Imperial Russia as early as Gerschenkron (1962).

3.3 Financial data

We take the founding year and location of each State Bank branch from Bugrov (2012). Most provinces received only one branch, located in the capital. By 1908, 11 provinces had not received a branch of the State Bank in the capital.[18] In order to control for the presence of private commercial banks, we employ data from Salomatina (2014a). She provides data on the location, foundation date, and capitalization of private commercial banks and their branches across the Empire. For the analysis, we simply employ a dummy variable taking the value of 1 if a municipal area (*volost*) is home to a private bank.

As a supplementary measure of our banking treatment, we have also collected financial data for all 120 branches of the State Bank in the Russian State Historical Archive in St. Petersburg for the period 1881-1913 (RGIA, 2018). This information consists of the

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[18]These 11 provinces were located around the Empire: Caucasus (Dagestan, Elizavetopol, Kutaissi), South Russia (Don, Taurida), Baltics (Kurland), Poland (Kielce, Suvalki, Siedlce), North Russia (Olonets) and Siberia (Yakutia).

branches' balance sheets at the end of each financial year, as well as their annual turnover of deposits and advances. Annual turnover is further subdivided by the type of financial instrument (promissory notes (*vekselia*) and industrial loans). Industrial credit only includes longer-term loans. Promissory notes, a shorter term instrument, are also widely considered to have been employed in industrial credit too.[19] Unfortunately, data on individual financial instruments are not always available for all branches, especially before 1900 (see Appendix D). While the financial data do provide an overview of general trends in credit provision, we therefore do not rely on them for our main results, for which we measure access to finance provided by geography, rather than finance itself. Similarly, wherever we do control for the availability of finance at the branch level in our empirical analysis, we prefer to use a "coarse" binary indicator variable splitting the sample at the median into branches with high or low credit provision. This avoids a fine-grained continuous measure that might to a greater degree be contaminated by measurement error.

In addition, we include demographic and socio-economic variables at the district and province levels. Summary statistics, definitions and sources for all variables are provided in tables A.3-A.7.

4 Empirical strategy

4.1 Identifying assumptions

Causal inference We are interested in measuring the effect of State Bank credit on Russian industry. As the historical overview in section 2 has shown, the timing of the State Bank's branching was endogenous to local conditions. This rules out a staggered treat-

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[19]Industrial loans were extended on the basis of collateral, including government securities, and were often government-subsidized loans. The second type of loans were used to cover short-term credit needs, with their liquidity limit set by the promissory notes they are attached to. Given the longer duration of industrial loans, these were utilized for capital investment, while promissory notes solved more immediate cash flow constraints. See Appendix G for more detail.

ment analysis of branching on provincial outcomes. Moreover, the credit volume each branch extended might have been determined in response to local industrial characteristics. This rules out a simple comparison of credit volumes between provinces (as was done in figure 1b). Our core strategy is to treat both the branch network and factory location as given in 1890 before the start of Witte's credit policy and examine subsequent changes in outcomes at the factory-level.

Firstly, we need a measure of the exposure of each factory to the bank that is not driven by factory characteristics. For example, even if individual level loan data were available, the extension of loans is likely to have been driven by factory revenues, or expectations about revenues. We circumvent this problem by using the geographical distance from each factory to its local bank branch as a measure of exposure to finance. Larger distances will be reflected in higher transaction costs for factory owners in applying for loans and in higher monitoring costs on the part of the bank. This is especially salient in Imperial Russia, were distances were large and transport links were still developing (Kahan, 1989).[20] Moreover, the historical overview (section 2) demonstrated that cultivating personal connections to state bankers was an important factor in receiving loans and that these networks were highly localized (Hillmann and Aven, 2011). As localized business network strength generally decreases with geographic distance (Chaney, 2014), so will the probability of receiving credit.

Secondly, we need to fix the location of the bank branch. Clearly, policy makers could have placed branches closer to important clusters of factories to minimize the costs of accessing finance. In this case, distances would not be exogenous to firm characteristics. We therefore exploit the administrative rule for the location of bank branches: "Every Town a Bank". In practice, this meant that if a province received a bank branch, this

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[20]In our data, the mean distance to a branch of the State Bank is a considerable 87km, roughly a 10-hour journey by horse carriage.

was placed in the town serving as the administrative capital of a province.[21] We can therefore use the distance from each factory to its provincial capital, rather than distance to a bank branch, as a measure for its access to finance. As the designation of towns as provincial capitals had been historically determined before the creation of the State Bank, this measure is not influenced by bankers' assessments of the economic potential of a region.

Thirdly, we have to confront the likelihood that distance to the provincial capital coincides with access to administrative services or markets for inputs and outputs, all of which could spur the growth of factories. In this case, we would we picking up a general "capital" effect, rather than the specific "bank" effect. To circumvent this, we interact distance to the provincial capital with the presence of a State Bank branch in the capital, thus using factories located in provinces without a bank in their capital to identify the "pure" effect of being located close to a capital.

Fourthly, we insert fixed effects at the province – and therefore the branch – level. These serve a dual purpose. For one, these control for the possibility that the unobservable characteristics of a region (such as economic potential) could influence the decision on whether to invest the provincial capital with a bank branch. Furthermore, these fixed effects control for the specific geography of a province. For example, branches in outlying rural provinces may be systematically worse in allocating loans (a valid concern given the difficulties of finding qualified staff in remote locations). In this case, we would still pick up a "real" effect of finance on growth, but the interpretation would be different. Once we include province dummies, however, we capture the variation in access to finance by individual factories, rather than the supply of credit in an entire province.

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[21]Our data reveal that 82% of provincial capitals received a branch, while only 5% of lower-ranked towns were accorded such pre-eminence. We control for lower-ranked towns that receive a branch in the analysis.

Finally, having found an exogenous location for the bank branch, we need to fix the location of factories in space. If factories were free to relocate (or could be newly founded), owners could choose to locate close to the bank to minimize transaction costs. This might be a problem if the propensity to do so correlates with factory outcomes (i.e. more successful factories find it easier to relocate). We avoid this threat to our identification strategy by matching factories in 1908 to those already existing in their present location in 1890 before the start of Witte's policies. As noted, before the State Bank started to dispense credit liberally under Witte, there was little reason to locate close to the State Bank for access to credit. Moreover, to preclude factory owners locating close to the bank in anticipation of this policy change, we limit the sample to those plants already established in their location *before* their local branch was founded, as a robustness check.[22]

Identifying assumption   We can now state our identifying assumption. We estimate the causal effect of banking on factory level outcomes if the factories that will experience a stronger growth of revenue, machine use, or productivity in the 1890s do not systematically sort closer to the provincial capital in those provinces that eventually receive a branch of the State Bank. Note that causality does *not* require factories in those two groups of provinces to be identical - it merely requires them to be identical in the dimensions of geographical sorting that are correlated with future growth. We now present evidence that this claim is plausible.

Table 2 shows that there exists no statistically significant relationship between factory-level outcomes in 1890 and the interaction of distance and bank placement. Factories located closer to a capital city with a bank did not exhibit higher levels of revenue, ma-

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[22]We can do this because the 1890 census provides each factory's founding date. Note that we estimate the effect of finance on existing firms (the intensive margin) as we exclude firms that were founded between 1890 and 1908 (whose location may be endogenous). Cheap credit may also have eased the founding of these new firms at the extensive margin, which would imply that we understate the overall effect of Witte's policy.

Table 2: No evidence of selection into treatment: **Falsification test**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Factory outcomes 1890	Factory outcomes 1908	Factory outcomes 1908 full sample	Factory outcomes 1890	Factory outcomes 1908	Factory outcomes 1908 full sample	Factory outcomes 1890	Factory outcomes 1908	Factory outcomes 1908 full sample
	Dep. Var.: revenue			Dep. Var.: Machinery			Dep. Var.: labor Productivity		
Distance to province capital × bank in capital	-0.0011	-0.0031**	-0.0021**	-0.0392	-0.2179**	-0.4177**	-0.0005	-0.0029***	-0.0025***
	(0.0033)	(0.0015)	(0.0010)	(0.0312)	(0.0966)	(0.1688)	(0.0022)	(0.0007)	(0.0006)
Distance to province capital	-0.0007	0.0018	0.0017*	0.0220	0.1167	0.3538**	-0.0003	0.0018***	0.0020***
	(0.0033)	(0.0015)	(0.0009)	(0.0293)	(0.0839)	(0.1569)	(0.0022)	(0.0007)	(0.0005)
Province F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2	0.26	0.49	0.40	0.08	0.29	0.09	0.27	0.41	0.39
Observations	1882	1882	16116	2491	2491	16746	2049	2049	16090

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Full sample is not restricted to factories matched across 1890 and 1908 census years. Dep. Var. (1) - (3): natural logarithm of factory-level revenue (in rubles); (4)-(6) horse power of installed machinery; (7)-(9) natural logarithm of labor productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. 1908 regressions control for (district level) revenue, machinery and productivity in 1890. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Standard errors clustered at district (*uezd*) level (418-651 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

chinery use, or productivity before the start of Witte's policy. This suggests that there was no geographical sorting by high-performing plants and that the development-distance link did not differ systematically between banked and unbanked provinces. We then run this regression on the same set of plants in 1908, after Witte's policy of cheap credit. Now we do observe a relationship between factory outcomes and distance in banked towns. Given that distance between factory and bank is fixed by construction, this implies that the bank's lending activity has changed the importance of distance. Being far away from a bank now carries a penalty that it did not carry before. In columns (3), (6) and (9) of the same table, we show that this insight is not due to sample selection stemming from our procedure of matching factories across census years. Running the same regression on the full set of geocoded factories in the Russian Empire, we find a similar result (with statistically similar coefficients): differential access to banking is associated with differential outcomes in 1908.

4.2 Specification in differences, 1890-1908

The preceding analysis on 1908 data offers preliminary evidence of the importance of the State Bank. For our main analysis, we express our dependent variables in differences. This has three advantages. First of all, by examining *changes* in revenues, workers or machinery, we can control for the starting level of these variables in 1890. Secondly, this focuses the analysis on factories whose location is fixed in 1890, before Witte's policy of industrial credit. Thirdly, by utilizing the 1890 census, we gain access to data on the founding year of each factory, which we use for robustness checks. Based on the requirements of our identification strategy discussed in section 4.1 above, our benchmark specification then is:

$$\Delta Y_{i,\,k,\,s(j)\,t_1} = \beta_0 + \beta_1 d_{ij} + \beta_2 d_{ij} * b_j + \beta_3 Y_{i,\,k,\,s(j)\,t_0} + X_i' \gamma + \mu_k + \mu_j + \epsilon_i \qquad (1)$$

where t_0 and t_1 are 1890 and 1908 respectively, and i refers to the individual factory, k to the industry, and $s(j)$ to the municipality s that is a part of the province j. Fixed effects (μ_j, μ_k) are therefore at the province and industry level. Distance between the factory and the provincial capital d_{ij} is interacted with the presence of a bank b_j in the provincial capital [0,1].[23] The parameter β_2 is our coefficient of interest. It will identify the causal effect of the State Bank subject to the assumptions discussed above in 4.1. Dependent variables Y include either growth in revenue, machinery use or labor productivity, all measured at the factory level.[24] Factory baseline outcomes $Y_{i,\,k,\,s(j)\,t_0}$ - revenue, machine use or productivity in 1890 - are inserted as controls. Establishment-level covariates in X_i, such as ownership type, are time invariant.

We cluster standard errors at the level of the district (*uezd*), resulting in a maximum of 480 clusters. Alternatives to this clustering are explored in C.6.

5 Results

5.1 Principal results: Access to banking improves factory outcomes

Benchmark The empirical results suggest the State Bank supported the growth of Russian industry. As columns (2), (5) and (8) of table 3 demonstrate, factories located further away from a branch of the State Bank in the provincial capital display a lower pace of growth in revenue, invest less in additional machinery, and experience slower growth in labor

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[23]Note that in the presence of province fixed effects, the main effect of the bank in the the province capital is absorbed.

[24]Although we also use the size of the workforce as an additional outcome, this is not the focus of this paper. Increasing manufacturing employment was not the core goal of Witte's policy, but rather a side effect.

productivity. The coefficients on the interaction of interest are statistically significant at conventional levels, and do not change noticeably upon the inclusion of a rich battery of factory-level controls in columns (3), (6) and (9). Throughout, we control for baseline levels of revenue, machine use, and productivity. The sign on the coefficients of these baseline variables suggests convergence between factories for revenue and productivity, with initially larger and more productive plants growing less rapidly on average. This suggests that the process of industrial growth was not confined to plants that had a head start.

Table 3: Explaining change in enterprise-level outcomes 1890-1908: **Benchmark**

	(1) Distance only	(2) Distance with bank interaction	(3) Including factory level controls	(4) Distance only	(5) Distance with bank interaction	(6) Including factory level controls	(7) Distance only	(8) Distance with bank interaction	(9) Including factory level controls
	Dep. Var.: Δ revenue			Dep. Var.: Δ Machinery			Dep. Var.: Δ labor Productivity		
Distance to province capital × bank in capital		-0.0045*** (0.0017)	-0.0041*** (0.0014)		-0.2054** (0.0881)	-0.2179** (0.0966)		-0.0034*** (0.0008)	-0.0029*** (0.0007)
Distance to province capital	-0.0013** (0.0006)	0.0030* (0.0016)	0.0026** (0.0013)	-0.1227** (0.0533)	0.0741 (0.0727)	0.1159 (0.0839)	-0.0010*** (0.0003)	0.0022*** (0.0007)	0.0018*** (0.0007)
revenue 1890	-0.5274*** (0.0267)	-0.5282*** (0.0265)	-0.6057*** (0.0264)						
Machinery 1890				0.2295 (0.3296)	0.2288 (0.3296)	0.1586 (0.3140)			
Productivity 1890							-0.8059*** (0.0243)	-0.8064*** (0.0241)	-0.8218*** (0.0249)
Province F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Factory controls			✓			✓			✓
R2	0.33	0.33	0.42	0.13	0.13	0.21	0.50	0.50	0.53
Observations	2079	2079	2079	2491	2491	2491	2049	2049	2049

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (3): change in natural logarithm of factory-level revenue (in rubles); (4)-(6) change in horse power of installed machinery; (7)-(9) change natural logarithm of labor productivity (revenue per worker). See table 2 for more details on estimation and variable definitions. Standard errors clustered at district (*uezd*) level (418-480 clusters). Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

The coefficient on distance supports the role of the State Bank. In columns (1), (4) and (7), before inserting the interaction of interest, the coefficient on distance is negative, and statistically significant. After interacting distance with the presence of a bank in the

capital, the main effect of distance switches sign and turns positive. This implies that, after accounting for the effect of the bank branch, there is no longer a penalty associated with being far away from the provincial capital. This is quite in line with the discussion in section 4.1 - industrialists had little to gain from proximity to government services (which were rudimentary, and sometimes predatory) in the absence of Witte's credit policies. In fact, once we have accounted for the presence of a bank, the results suggest that factories located further from provincial capitals posted higher growth in revenues and productivity. Apart from a possible escape from government predation, the historical literature suggests two reasons for the benefits of geographical dispersion. Firstly, many industries were dependent on a steady supply of raw materials, the transport of which was costly given Russia's undependable infrastructure. In industries where freight costs for inputs outweighed those for the finished product, locating close to raw material sources was beneficial (Spechler, 1980; Gregory, 2014).

The most important reason for choosing a rural location, however, was access to workers. In table C.1, we use growth in a factory's workforce as the dependent variable, and find that plants further from provincial centers experienced *larger* increases in employment once we account for the presence of a bank. This apparent paradox is well-established in Imperial Russian history. Much to the chagrin of Lenin and his comrades-in-arms, Russia's urban proletariat was small, and much industrial labor was provided by peasants. This work was often of a seasonal nature. Before its reform in 1906, the rural commune system also placed restrictions on the distance that peasants could travel to work in manufacturing. Moreover, few were willing to migrate permanently to cities were food and housing costs were exceedingly high. Factory owners therefore had an incentive to choose rural sites close to their workforce (Spechler, 1980; Chernina et al., 2014; Gregg and Mati-

ashvili, 2021). Although these location decisions reflected sound economic fundamentals at the time they were made, they proved costly once provincial centers became a lucrative source of finance in the 1890s. Factories close to capitals with a bank are able to expand their workforce at a faster rate, as table C.1 shows.

Economic significance   The standardized β-coefficients on the interaction of distance and bank presence in table 4 suggest the effects we find are economically large. A one standard deviation increase in distance to the bank decreases revenue and productivity growth by more than 0.2 standard deviations, a sizable effect. However, to properly evaluate the marginal effect of distance from the bank we have to take into account two countervailing forces. First, there is the benefit from proximity to bank credit apparent in the interaction term. Working against this is the (numerically smaller) benefit from being close to rural inputs of raw materials and labor discussed above, expressed in the main effect of distance. Table 4 calculates the net marginal effect. Counterfactually moving a factory one standard deviation away from the bank (87km) decreases the growth rate of revenue by 0.13 % - points (from a mean growth rate of 0.97). The effect for machinery is similar in size (a decrease of 8.9 horse powers from a mean growth of 58hp), while the effect for productivity is comparatively larger. Overall, this exercise suggests that the State Bank had a noticeable effect on factory outcomes.

Potential threats to causal identification   We identify the causal effect of distance to a bank branch conditional on the assumption that the extent of geographic sorting by *future* factory outcomes does not differ between banked and unbanked locations. We now investigate potential confounds to this assumption. In section 4.1 we have already presented evidence that high-performing factories had not sorted closer to provincial capitals with a bank in

Table 4: Marginal effects and economic significance

Outcome Variable	Mean of outcome	Unit of outcome	Average marginal effect of distance if bank present	Effect of 1 std. dev. increase in distance (87 km) on outcome	Standardised β coefficient on interaction
Δ revenue	0.97	%-growth	-0.0015*** (0.00056)	**-0.131**	-0.214
Δ Machinery	58.2	horsepower increase	-0.1020** (0.05205)	**-8.874**	-0.084
Δ labor productivity	0.32	%-growth	-0.0011*** (0.00033)	**-0.096**	-0.215

Coefficients and marginal effects of distance from benchmark regressions (3), (6) and (9) from table 3. Robust standard errors on marginal effects in parentheses: * p<0.10, ** p<0.05, *** p<0.01

1890, before Witte's policy. However, if factory owners with better growth *potential* anticipated the policy they could nonetheless have chosen to locate closer to a bank branch. This would have required a large degree of foresight on the part of entrepreneurs, which seems unrealistic given that Witte's policy broke with established monetary orthodoxy in Russia (Crisp, 1976). Nonetheless, if such sorting occurred, it would not be picked up by examining outcomes in 1890. In table C.2 we therefore examine the growth of factories that were already established in their location before their provincial capital received a State Bank branch. The coefficient on revenue decreases slightly, the impact on machinery increases, and the effect on productivity is unchanged. In all cases, the coefficient on the interaction remains statistically significant. We go one step further by restricting the sample to factories established before 1860, when the idea of a State Bank was conceived. We again find similar results, albeit with a decreased degree of precision due to the diminishing number of observations.

In the same table C.2, we also control for proximity to any other State Bank branch (including those not located in a provincial capital). However, we find our coefficients of

interest to be largely unaffected when inserting a variable measuring the sum of inverse distances to all other State Bank branches.[25]

Finally, our causal interpretation could be threatened if proximity to banked capitals became more important during the 1890s for reasons unrelated to banking. For example, banked capitals might coincidentally receive better access to railways or experience higher population growth, and these benefits might spill over to closer enterprises. This would not be picked up in our benchmark specification. In table 5 we investigate these potential confounders. We interact distance to the province capital with an indicator denoting (1) whether a capital was connected to a railway network in 1890; (2) whether a capital received a rail connection after 1890; or (3) whether the capital lay at a junction in the rail network. We find that being close to a rail-connected provincial capital is indeed beneficial for factory growth. The coefficient on our interaction of interest, if anything, increases in size once we control for rail access. In columns (4) and (5) of the same table, we interact distance with two measures of population growth in the capital.[26] The results show that proximity to faster-growing capitals is not correlated with higher factory revenue growth. Importantly, the effect of the State Bank does not change upon the inclusion of this control variable. In conclusion, neither railway access nor population growth seems to confound our estimates.

Direct evidence of credit allocation   To what extent does the data from the State Bank's branch accounts back up our conclusions? In table 6 we introduce a binary indicator capturing the extent to which promissory notes or industrial credit emission at a branch was be-

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[25]Note that the coefficient on the new proximity variable cannot be interpreted causally, as many non-capital branches were explicitly assigned to be close to prosperous areas. In any case, this variable is not always at conventional levels of statistical significance.

[26]Due to data availability, neither of the two periods over which we can measure population growth coincide perfectly with our study period.

Table 5: Railroads and population growth in province capital 1890-1908: **Confounders**

	(1) Including old railway stations	(2) Including new railway stations	(3) Including railway junctions	(4) Including population growth 1897-1913	(5) Including population growth 1884-1913
	Dep. Var.: Δ revenue				
Distance to province capital × bank in capital	-0.0052*** (0.0015)	-0.0052*** (0.0015)	-0.0056*** (0.0016)	-0.0042*** (0.0015)	-0.0042*** (0.0015)
Distance to province capital × pre-1890 rail station in capital	-0.0035*** (0.0011)	-0.0033** (0.0014)	-0.0035*** (0.0011)		
Distance to province capital × post-1890 rail station in capital		0.0003 (0.0016)			
Distance to province capital × pre-1890 rail junction in capital			0.0009 (0.0010)		
Distance to province capital × 1897-1913 population growth in capital				-0.0067 (0.0418)	
Distance to province capital × 1884-1913 population growth in capital					-0.0203 (0.0474)
Distance to province capital	0.0061*** (0.0017)	0.0059*** (0.0019)	0.0059*** (0.0017)	0.0028 (0.0018)	0.0032* (0.0019)
Province F.E.	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓
R2	0.42	0.42	0.42	0.42	0.42
Observations	2079	2079	2079	2079	2079

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in natural logarithm of factory-level revenue (in rubles). Rail station and rail junctions (intersections of rail lines) are dummy variables taking the value of 1 if these facilities exist in the provincial capital. Population growth is the compound average growth rate over the period. See table 2 for more details on estimation and variable definitions. Standard errors clustered at district (*uezd*) level (424-499 clusters). Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

low or above the median.[27] In columns (1), (4) and (7) the indicator for credit based on promissory notes replaces our banking indicator and is interacted with our distance variable. The data suggest that credit at the branch level indeed improved growth in revenue and productivity (but not machinery).

Table 6: Access to State Bank branch and branch credit emission: **Promissory notes and industrial credit**

	(1) Promissory notes	(2) Promissory notes & bank interaction	(3) Industrial credit & bank interaction	(4) Promissory notes	(5) Promissory notes & bank interaction	(6) Industrial credit & bank interaction	(7) Promissory notes	(8) Promissory notes & bank interaction	(9) Industrial credit & bank interaction
	Dep. Var.: Δ revenue			Dep. Var.: Δ Machinery			Dep. Var.: Δ Labour Productivity		
Prom. notes (1) × distance	-0.0033*** (0.0010)			0.0622 (0.0998)			-0.0023*** (0.0006)		
Prom. notes (0) × bank (1) × distance		-0.0026* (0.0015)			-0.2600** (0.1083)			-0.0019** (0.0008)	
Prom. notes (1) × bank (1) × distance		-0.0056*** (0.0016)			-0.1770 (0.1107)			-0.0040*** (0.0008)	
Ind. credit (0) × bank (1) × distance			-0.0040*** (0.0015)			-0.1622 (0.0987)			-0.0026*** (0.0008)
Ind. credit (1) × bank (1) × distance			-0.0044*** (0.0017)			-0.2730** (0.1359)			-0.0037*** (0.0010)
Distance to province capital	0.0002 (0.0006)	0.0026* (0.0013)	0.0026** (0.0013)	-0.1218** (0.0616)	0.1178 (0.0842)	0.1105 (0.0877)	0.0001 (0.0004)	0.0018*** (0.0007)	0.0018*** (0.0007)
Province F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2	0.42	0.42	0.42	0.21	0.21	0.22	0.53	0.53	0.53
Observations	2052	2052	1749	2464	2464	2112	2023	2023	1728

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (3): change in natural logarithm of factory-level revenue (in rubles); (4)-(6) change in horse power of installed machinery; (7)-(9) change in natural logarithm of labour productivity (revenue per worker). See table 2 for more details on estimation and variable definitions. Extent of promissory notes (1896-1900) and industrial credit (1893-1908) emission measured at branch level and converted into indicator variables at the median. Base category for all interactions: provinces without State Bank branch. Standard errors clustered at district (*uezd*) level (352-476 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

In the remaining columns, we implement a triple interaction between banking presence, distance, and one of our two financial variables. Comparing the coefficients on this inter-

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[27]The choice of using binary variables, as well as the time period over which they are defined, is dictated by the availability of the archival data. See section 3.

action within each column, we find larger coefficients for promissory notes on revenue and productivity, while industrial credit mattered more for machinery investment.[28] The differential effect between financial instruments ties in with their term structure, as industrial credit was often extended for longer durations and was therefore more suitable for capital investment (Appendix G and H). While distance provides a useful proxy of bank access, it is reassuring that the State Bank's credit data point in a similar direction.

5.2 Effects by factory and region characteristics

We now show that the effect of the State Bank is particularly large for factories lacking alternative sources of finance. This is especially true for growth in machinery, indicating better access to finance mattered especially for long-term investment.

Factory characteristics We first investigate whether the effect of the State Bank differs by factory age and size in table 7. On the one hand, empirical research shows that smaller and newer firms benefit more from improved access to external finance, as they are not able to refinance themselves from retained earnings. On the other hand, the importance of business networks for obtaining credit might have given larger and more established firms an insider advantage (Beck et al., 2008). For ease of interpretation, we divide factories in two groups, and interact them with the treatment.[29] The results in the upper and middle panels suggest that the benefits of incumbency do not outweigh the benefits that external finance accords to smaller and newer plants: there is little difference in the coefficients according to either size or age. Similarly, we find little evidence that access to banking has differential effects according to the social status or ethnicity of the factory owner

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[28]In terms of magnitudes, factories close to a bank can expect 1.68 times more machinery investment (0.2730 / 0.1622) if their branch extends industrial credit above the median.

[29]For age, we split factories at the median according to their 1890 values. For size, where we are concerned with the presence of fat tails at the upper end of the distribution, we use the 75th percentile.

(table C.3). Factories owned by nobles benefit as much from State Bank presence as others. Similarly, factories owned by entrepreneurs with a Russian name (rather than a name associated with ethnic minorities) do not benefit disproportionately from proximity to the bank.[30]

Table 7: Access to State Bank branch and factory characteristics: **Age, size and corporation status**

	(1) Factory age	(2) Factory workforce size	(3) Corporation status	(4) Factory age	(5) Factory workforce size	(6) Corporation status	(7) Factory age	(8) Factory workforce size	(9) Corporation status
	Dep. Var.: Δ revenue			Dep. Var.: Δ Machinery			Dep. Var.: Δ labor Productivity		
bank × old (0) × distance	-0.0051***			-0.1207			-0.0053***		
	(0.0018)			(0.1079)			(0.0011)		
bank × old (1) × distance	-0.0043**			-0.0796			-0.0050***		
	(0.0018)			(0.1065)			(0.0011)		
bank × large (0) × distance		-0.0044***			-0.1353			-0.0035***	
		(0.0017)			(0.0895)			(0.0007)	
bank × large (1) × distance		-0.0042**			-0.0621			-0.0033***	
		(0.0018)			(0.1546)			(0.0008)	
bank × corporation (0) × distance			-0.0041***			-0.2221**			-0.0029***
			(0.0014)			(0.1004)			(0.0007)
bank × corporation (1) × distance			-0.0052			-1.4987			-0.0035
			(0.0046)			(1.4242)			(0.0028)
Distance to province capital	0.0034**	0.0028*	0.0027**	0.0433	0.0101	0.1286	0.0040***	0.0023***	0.0018***
	(0.0017)	(0.0016)	(0.0013)	(0.0935)	(0.0771)	(0.0890)	(0.0010)	(0.0007)	(0.0007)
Province F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2	0.41	0.41	0.42	0.22	0.22	0.21	0.53	0.53	0.53
Observations	1925	2051	2079	2245	2416	2491	1904	2049	2049

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (3): change in natural logarithm of factory-level revenue (in rubles); (4)-(6) change in horse power of installed machinery; (7)-(9) change in natural logarithm of labor productivity (revenue per worker). See table 2 for more details on estimation and variable definitions. Regressions control for revenue, machinery and productivity in 1890. Factory characteristics are converted into indicator variables at the median. Base category for interactions: 0-value of respective indicator variable in provinces without a State Bank branch. 1-value of indicator in provinces without a branch omitted from table for brevity. Standard errors clustered at district (*uezd*) level (403-480 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

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[30]This does not imply the absence of discrimination against non-Russians – there is ample evidence of stigmatization and violence against the Empire's Jewish, German or Polish commercial minorities (Grosfeld et al., 2020). Yet conditional on discrimination, minority entrepreneurs were probably positively selected, and therefore comparatively successful. It should also be borne in mind that Witte's policy was attacked by Russian nativists precisely for *not* favouring ethnic Russian over minority entrepreneurs (Owen, 1995).

Although the social status of factory owners does not seem to matter, ownership structure does. We show this in the lower panel of table 7. Factories that have been incorporated as separate legal persons do not suffer from a penalty if they are located away from the bank. This is what we would expect: the purpose of incorporation was to raise capital, either by bringing in partners or by publicly issuing shares. These enterprises were therefore not dependent upon State Bank loans. For the majority of establishments, however, incorporation was too costly given the extraordinarily high administrative hurdles attached to the process – which often required the corporate charter to be signed by the Tsar himself (Gregg and Nafziger, 2019). Lacking alternative access to capital, these non-incorporated plants benefited from being close to a branch of the State Bank.

Region characteristics Gerschenkron's original conjecture and the literature on the Big Push emphasize that the role of state aid in industrialization should decrease with prior levels of development and market size. If markets were large and well-developed, there would be no role for intervention (Murphy et al., 1989). The historical literature on Russia agrees that "the main aim [of the Bank] was to increase credit to all branches of the economy were private credit was deficient" (Crisp, 1976, pp. 134, 155). What does the empirical evidence say? Table 8 provides a first glance by splitting the sample according to provinces below and above the median value of aggregate industrial output.[31] We find that being located far from a branch of the State Bank decreases growth in revenue, machinery use and productivity only in provinces with weakly developed industries. In those provinces already containing substantial industries, there is no penalty for lacking access to the State Bank. We cannot pin down the exact mechanism in this table – industrialized provinces may offer better infrastructure, more developed credit or input markets, or a

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[31]We use aggregate 1897 provincial output figures as compiled by the official statistical agencies, rather than aggregating revenue ourselves from factory-level data. This precludes the underestimation of province-level variables.

larger customer base. Yet these results are in line with the theory on late industrialization, which sees existing market size and government intervention as substitutes (Murphy et al., 1989).

Table 8: Access to State Bank branch and 1897 regional development: **Industrial output**

	(1) Regional output < median	(2) Regional output ≥ median	(3) Regional output < median	(4) Regional output ≥ median	(5) Regional output < median	(6) Regional output ≥ median
	Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ labor Productivity	
Distance to province capital × bank in capital	-0.0046***	0.0155***	-0.1651**	0.4557	-0.0031***	0.0006
	(0.0013)	(0.0035)	(0.0755)	(0.6663)	(0.0008)	(0.0022)
Distance to province capital	0.0035***	-0.0177***	0.1071	-0.5818	0.0021***	-0.0021
	(0.0011)	(0.0033)	(0.0722)	(0.6732)	(0.0007)	(0.0020)
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.46	0.41	0.32	0.23	0.59	0.50
Observations	887	1192	1174	1317	872	1177

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (2): change in natural logarithm of factory-level revenue (in rubles); (3)-(4) change in horse power of installed machinery; (5)-(6) change in natural logarithm of labor productivity (revenue per worker). See table 2 for more details on estimation and variable definitions. Regressions split sample at the regional median. Regional revenue is industrial output (in rubles) at the governorate level according to the 1897 census. Standard errors clustered at district (*uezd*) level (132-332 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

We improve our insight into the relationship between access to state finance and prior development in table 9, where we split up market development into various components. We focus on machinery use as our dependent variable, that is on investment requiring a longer time horizon. Columns (1) and (2) show the effect of the State Bank on factories without and with a commercial bank in their municipality. For plants with a nearby commercial bank, there is no statistically significant penalty associated with remoteness from a branch of the public banking system. For plants not close to private banking establishments, there is a very large penalty for also being far removed from public banking: the coefficient on the interaction of interest increases by a factor of 3.3. This suggests that public capital did indeed substitute for private capital in Russia's industrialization. We provide

further evidence of this phenomenon in table C.4, where we interact the presence of a bank with two proxies for informal inter-enterprise credit (geographic and ethnic proximity to other factory owners). We find suggestive evidence that while access to inter-enterprise credit tends to benefit factory-level outcomes, this advantage disappears in provinces with a public bank.

Returning to table 9, columns (3) and (4) proxy the strength of landed elites on the basis of land ownership data. We concentrate on the share of land in a district owned by the nobility - the segment of the Russian elite that often opposed industrialization.[32] Districts with extensive noble landownership had lower shares of merchants or townspeople owning land. In a society where land possession was still a mark of status and economic influence, these were therefore districts were mercantile elements held less power (Von Laue, 1968). The results indicate that proximity to the State Bank was important in regions where nobles were economically powerful and mercantile interests weakly developed. Once again, the size of the coefficient of interest indicates that proximity to the State Bank significantly eased machinery investment in areas where the landed nobility held sway.[33]

We now use a more direct measure of prior market development in columns (5) and (6), where we examine differential effects according to sales at market fairs in a province. Periodic fairs were the traditional means in Imperial Russia to market local produce, and fairs saw a large offering of agricultural products, raw materials and basic tools. Places at which such fairs were held would therefore have had an ample supply of inputs for industry. Many fair locations later grew into prosperous industrial towns (Fitzpatrick, 1990). We use detailed data on the volume of sales (in rubles) at these fairs in 1834 as a measure of historic development of markets for industrial inputs. The results suggest that

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[32]We use data from the 1877 land census rather than the more recent 1905 version, as landownership in 1905 might have shifted as a result of Witte's policy.

[33]This finding does not reflect a greater propensity by noble factory owners to receive credit - we saw in table C.3 that they did not.

Table 9: Access to State Bank branch and investment in machinery: **Prior market development**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	No commercial banks	Commercial banks present	Nobility landholding < median	Nobility landholding ≥ median	Annual fairs sales < median	Annual fairs sales ≥ median	Market potential < median	Market potential ≥ median
				Dep. Var.: Δ Machinery (horse power)				
Distance to province capital × bank in capital	-0.7304***	0.0962	-0.2461	-0.6495**	-0.3115*	-0.1729	-0.4972**	0.1765
	(0.2393)	(0.2929)	(0.1703)	(0.2791)	(0.1651)	(0.1703)	(0.2252)	(0.1478)
Distance to province capital	0.5326**	-0.0374	0.2584	0.3699	0.3112*	-0.0007	0.3436	-0.1215
	(0.2138)	(0.2887)	(0.1655)	(0.2449)	(0.1660)	(0.1465)	(0.2100)	(0.1129)
Machinery 1890	0.4851**	-0.2155	0.7417***	-0.4675**	-0.0911	0.5755	0.8294***	-0.3244
	(0.2301)	(0.3052)	(0.2388)	(0.2188)	(0.4647)	(0.3654)	(0.2211)	(0.2322)
Province F.E.	✓	✓	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓	✓	✓
R2	0.27	0.30	0.25	0.25	0.26	0.20	0.30	0.21
Observations	1550	941	972	939	966	1044	1195	1296

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in workforce at factory-level revenue (headcount). See table 2 for more details on estimation and variable definitions. Presence of commercial banks refers to a non-state bank in the municipality. Other regressions split sample at the regional median. Noble landholdings refers to the share of land held by nobles in a district in 1877. Annual fairs refers to the volume of goods sold during historical private annual fairs in a governorate in 1830. Market potential refers to a district's population-weighted distance to internal Russian markets. Standard errors clustered at district (*uezd*) level (160-449 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

there was little effect of public funds in areas where turnover at these traditional markets was already voluminous, again suggesting that public credit was more important when private markets were less developed.[34]

Finally, we explore heterogeneity in the development of markets for industrial output. Factories located close to customers will find it easier to market products, and therefore generate sales without government assistance (Donaldson and Hornbeck, 2016). We therefore compute a measure of market access for each district in the Russian Empire by calculating its distance to other districts, weighted by the size of the population in these districts. The results in columns (7) and (8) demonstrate that successful factories in districts with lower market potential were more dependent on funding from the State Bank. For those factories located in districts close to the major population centers of the Empire, however, access to the State Bank seems not to have spurred growth.

In summary, these results suggest that the State Bank was particularly important in funding long-term industrial investment in areas where private financial and input markets were weakly developed, where revenues where harder to market, and where mercantile interests were politically weak. In other words, public capital substituted for private capital.

5.3 Robustness

Some final checks on our main results may be in order. Levels of urbanization at the sub-provincial level could have affected factory outcomes and therefore the precision of the estimates. Table C.7 controls for population in the factory's municipality, as well as dropping the Empire's dominant provinces of Moscow and St. Petersburg. The results are qualitatively unaffected, despite large variations in sample composition in the latter case.

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[34]The use of the year 1834 is due to the source material. It is nonetheless a suitable year, as it predates the founding date for 95% of factories for which we have data in 1890. We also present evidence for the importance of contemporary input markets in table C.5, where we show that the bank mattered more where crop and animal inputs where less readily available, although this differential effect does not appear for mining inputs.

A more pressing concern may be that our method of matching factories across the 1890 and 1908 census years induced sample selection bias. We have already presented two pieces of evidence that allay this concern. Firstly, 1908 factory characteristics are broadly balanced between the matched and unmatched group (section 3). Secondly, the results for predicting factory outcomes in 1908 are very similar when using either the matched sample or the full sample (table 2). We now experiment with alternative matching procedures. In table C.8, we replicate our results while omitting the manual check of the validity of matched pairs and unmatched factories. Fully automated matching limits researchers' discretion, but invariably induces a larger measurement error. We find smaller effects for machinery investment, but broadly similar results for revenue and productivity growth. As a further step, we allow for entrepreneurial dynasties by including factories that may have been split or merged between the census years, in table C.9. We again find slightly smaller coefficients across specifications, but no reason to revise the substance of our conclusions.

We also investigate whether distance might have non-linear effects. In table C.10, we implement binned interactions, where our bank indicator is multiplied with indicators for middle and upper tertile distances (with the lower tertile being the omitted category). These suggest that the distance effect is particularly noticeable in the upper tertile. Re-assuringly though, dropping very large outlier distances (upper 5%-percentile) does not not affect our results qualitatively; neither does dropping provinces with large internal distances (table C.11). In a similar vein, results are unaffected by dropping randomly selected groups of provinces or industries (tables C.12- C.15). Some industry-specific effects are apparent, however: We find that the impact of the bank is somewhat more pronounced in industries with greater capital requirements. For example, the effects of the bank are

least pronounced in labour-intensive industries such as alcohols and leather, but more pronounced in capital-intensive industries such as mechanical wood processing.

6   Conclusion

Our results are in line with a cautious Gerschenkronian view of the state in fostering industrialization. We find evidence that the presence of State Bank branches did raise the growth rate of revenue and labor productivity in nearby factories (although Witte's policy seems to have affected a broader range of factories than the large heavy industrial conglomerates Gerschenkron had in mind). The results on the mechanization of production also suggest that public credit did not merely boost sales, but was also utilized for long-term investment. The latter was especially important in regions were local markets were smaller and private capital scarcer.

Our conclusions rely on the identification assumption that the extent of geographic sorting by *future* factory outcomes did not differ between banked and unbanked locations. By studying the date of factory locations and the potentially confounding effects of railways and population growth, we have offered evidence that this assumption is plausible.

In a narrow sense, Witte's policy was successful. His stated aim was to spur Russia's industrial growth, and loans from the State Bank did aid this goal. Whether industrialization was the "correct" objective is, of course, a different question. Future research should evaluate the distributional consequences of state-led industrial policy more directly. The social cleavages of Imperial Russia and the violent upheavals they engendered in 1917 suggest this to be a pertinent question.

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Appendix to 'Financing Late Industrialization: Evidence from the State Bank of the Russian Empire'

A Summary Statistics

Table A.1: Administrative divisions of the Russian Empire present in analysis samples

Sample #	Province ("Governorate")	District ("Uezd")	Municipality ("Volost")	Municipalities per province
Entire Empire	80	710	13,398	167
Geocoded factory sample 1908	80	651	4,068	51
Handmatched factory sample 1890-1908	74	480	1135	15

Administrative divisions are as used in the empirical analysis, and reflect status of 1913. Autonomous regions of Central Asia and Finland are excluded. Handmatched sample excludes merged or split factories.

Table A.2: Distribution of factories: **by province**

Percentiles	All factories	Distinct distances
10%	4	2
25%	12	6
50%	23	14
75%	40	23
90%	82	34
Mean	34.7	16.0

"Distinct distances" only counts observations if they exhibit a distinct distance to the province capital, e.g. the median province has 23 factories in total and 14 factories with a distance to the province capital that differs from all other factories in the province.

Table A.3: Summary statistics I: 1890-1908, matched enterprises

Variable	Obs	Mean	Std. Dev.	Min	Max
	Dependent variables				
Δ revenue	2079	.97	1.611	-6.325	7.415
Δ machinery	2491	58.181	225.377	-992	4165
Δ productivity	2049	.319	1.136	-6.988	5.052
Δ workers	2596	58.613	308.401	-4435	4914
	Factory-level variables				
revenue 1890	2087	82.3	261.39	2	4800
machinery 1890	2491	13.608	58.005	0	1300
productivity 1890	2059	1.558	2.534	.035	37
workers 1890	2599	56.859	169.916	2	4571
founding year	2414	1869.303	21.032	1610	1892
incidental revenues	2678	.15	.358	0	1
corporation	2678	.016	.124	0	1
Russian owner	2678	.563	.496	0	1
merchant owner	2678	.242	.428	0	1
noble owner	2678	.118	.322	0	1
citizen owner	2678	.069	.253	0	1
townsman owner	2678	.094	.292	0	1
retail	2678	.029	.167	0	1
craftshop	2678	.018	.133	0	1
workshop	2678	.234	.424	0	1
factory	2678	.632	.482	0	1
rail connection	2678	.006	.075	0	1
river connection	2678	.014	.117	0	1
post connection	2678	.416	.493	0	1
tel. connection	2678	.124	.329	0	1
footloose industry	2678	.541	.498	0	1
	Municipality-level variables				
distance to capital	2678	79.296	87.602	0	1032.346
proximity to banks	2678	.147	.034	.023	.498
commercial banks	2678	2.025	4.001	0	15
urban population	2678	164.095	345.409	0	1264.92

Table A.4: Summary statistics II: 1890-1908, matched enterprises

Variable	Obs	Mean	Std. Dev.	Min	Max
		District-level variables			
nobility landholding	2079	.337	.153	0	.705
market potential	2678	76511.49	39826.58	7124.432	217375.5
factory density	2654	186.954	272.005	2	1017
coethnic density	2654	53.584	89.245	1	466
		Province-level variables			
bank in capital	2678	.933	.25	0	1
founding year	2499	1871.395	10.89	1860	1895
industrial credit	2271	1523.301	5408.778	0	23519.08
promissory notes	2640	32191.29	51800.21	0	161777
rail station 1890	2678	.813	.39	0	1
rail station new	2678	.111	.314	0	1
rail junction	2678	.56	.496	0	1
population 1897-13	2678	.021	.013	-.003	.124
population 1884-13	2678	.022	.01	-.004	.11
industry output	2678	9.71e+07	1.14e+08	971171.9	3.34e+08
market fairs	2179	6459135	1.74e+07	0	1.16e+08
crop farming	2678	.621	.485	0	1
livestock farming	2678	.472	.499	0	1
mining	2678	.383	.486	0	1
large region	2678	.251	.433	0	1

Table A.5: Variable definitions and Sources I: 1890-1908, matched enterprises

Variable	Definition	Source
	Dependent variables	
Δ revenue	Change in log revenue (rubles)	Varzar (1912)
Δ machinery	Change in capacity of machinery (horsepower)	Varzar (1912)
Δ productivity	Change in labour productivity (revenue per worker)	Varzar (1912)
Δ workers	Change in workforce (headcount)	Varzar (1912)
	Factory-level variables	
revenue 1890	revenue ('000 rubles) in 1890	Orlov and Budagov (1894); Orlov (1895)
machinery 1890	capacity of machinery in horsepower in 1890	Orlov and Budagov (1894); Orlov (1895)
productivity 1890	revenue ('000 rubles) per worker 1890	Orlov and Budagov (1894); Orlov (1895)
workers 1890	workforce (headcount) in 1890	Orlov and Budagov (1894); Orlov (1895)
founding year	year factory was founded	Orlov and Budagov (1894); Orlov (1895)
incidental revenues	revenues not included in ordinary revenue	Varzar (1912)
corporation	factory is incorporated as legal entity	Varzar (1912)
Russian owner	owner has Russian name	Varzar (1912)
merchant owner	owner belongs to merchant estate	Varzar (1912)
noble owner	owner belongs to noble estate	Varzar (1912)
citizen owner	owner belongs to urban citizenry estate	Varzar (1912)
townsman owner	owner belongs to urban commoner estate	Varzar (1912)
retail	establishment classified as wholesaler	Varzar (1912)
craftshop	establishment classified as artisanal craft shop	Varzar (1912)
workshop	establishment classified as industrial workshop	Varzar (1912)
factory	establishment classified as factory	Varzar (1912)
rail connection	establishment is close to rail station	Varzar (1912)
river connection	establishment is close to navigable river	Varzar (1912)
post connection	establishment has postal service address	Varzar (1912)
tel. connection	establishment has telegraph address	Varzar (1912)
footloose industry	industry less reliant on local inputs	Varzar (1912)
	Municipality-level variables	
distance to capital	distance to governorate capital (km.)	Fish (1913)
proximity to banks	sum of inverse distances to all other bank branches	Bugrov (2012)
commercial banks	Count of commercial bank branches in locality	Salomatina (2014)
urban population	Total urban population ('000) in locality	Troinitskiy (1905)

Table A.6: Variable definitions and Sources II: 1890-1908, matched enterprises

Variable	Definition	Source
	District-level variables	
nobility landholding	share of land held by noble estate 1877	MVD (1906)
market potential	inverse distance to all urban populations in Empire	Troinitskiy (1905)
factory density	number of establishments per district 1890	Orlov and Budagov (1894); Orlov (1895)
coethnic density	number of establishments with owner of same ethnicity 1890	Orlov and Budagov (1894); Orlov (1895)
	Province-level variables	
bank in capital	governorate capital has branch of State Bank before 1908	Bugrov (2012)
founding year	year bank branch was founded	Bugrov (2012)
industrial credit	average industrial credit by branch ('000 rubles), 1893-1908	RGIA (2018)
promissory notes	total promissory notes by branch ('000 rubles), 1896-1900	RGIA (2018)
rail station 1890	governorate capital had rail connection 1890	Leonard et al. (2021)
rail station new	governorate capital new rail connection 1890-1908	Leonard et al. (2021)
rail junction	governorate capital at rail junction 1890	Leonard et al. (2021)
population 1897-13	average growth of population 1897-13 in governorate capital	various (2023)
population 1884-13	average growth of population 1897-13 in governorate capital	various (2023)
industry output	output of all industries in region 1897 (rubles)	Kessler and Markevich (2020)
market fairs	total sales (rubles) at all seasonal fairs in region 1830	MVD (1834)
crop farming	regional output of food crops (puds) 1897 > national median	Kessler and Markevich (2020)
livestock farming	regional headcount of cattle 1897 > national median	Kessler and Markevich (2020)
mining	regional mining output 1897 > national median	Kessler and Markevich (2020)
large region	average internal distances in region > 100 km	Kessler and Markevich (2020)

Table A.7: Detailed descriptive statistics on State Bank financial data

Variable	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
			Full sample					1881-1890		
Turnover Statement										
Assets for Operations (Inflow)	762	299	2 605 903	87 473.14	234 644.94	183	299	515 611	46 665.54	96 535.65
Assets for Exchange (Inflow)	268	0	17 635	277.04	1 692.05	268	0	17 635	277.04	1 692.05
Assets for Operations (Outflow)	34	47	458 079	38 831.09	80 475.77	34	47	458 079	38 831.09	80 475.77
Assets for Exchange (Outflow)	32	0	15 238	563.09	2 680.14	32	0	15 238	563.09	2 680.14
Total Assets	1691	1 388	6 593 915	149 410.40	374 458.00	-	-	-	-	-
Agricultural Loans	1048	1	2 901	220.36	372.47	-	-	-	-	-
Industrial Loans	416	1	70 264	1 315.83	7 078.57	-	-	-	-	-
Balance Sheet										
Promissory Notes	2633	1	43 127	1 258.18	3 247.29	305	2	26 908	1 505.64	3 407.90
Loans Secured by Government Bonds	2964	1	15 566	278.46	944.76	303	3	3 965	207.99	355.46
Loans Secured by Stocks & Bonds	287	0	1 544	65.59	176.85	287	0	1 544	65.59	176.85
Open Promissory Notes	1624	0	125 895	825.64	5 241.89	186	0	14 326	743.67	1 988.66
Overall Balance	2677	42	1 676 478	11 877.82	64 110.60	372	157	298 750	12 171	33 914
(Assets vs. Liabilities)										
Agricultural Loans	1730	0	3 128	165.05	251.47	-	-	-	-	-
Industrial Loans	631	0	35 593	681.36	3 706.19	-	-	-	-	-
Sent Promissory Notes	564	1	11 676	567.09	1 189.14	-	-	-	-	-
Total Promissory Notes	847	2	42 381	1 440.20	3 505.65	-	-	-	-	-
Commercial Banks	1401	1	31	3.36	3.39	-	-	-	-	-
(Private Credit Organizations)										
Mutual Credit Societies	1089	1	42	3.82	5.07	-	-	-	-	-
(Private Credit Organizations)										
Accounted Loans	1514	3	1 108 354	18 769.99	68 271.88	-	-	-	-	-
(Private Credit Organizations)										
Debt to the State Bank	1300	1	205 692	1 749.16	11 564.12	-	-	-	-	-
(Private Credit Organizations)										

Table A.7 continued from previous page

| Variable	1891-1900					1901-1914				
	N	Min	Max	Mean	SD	N	Min	Max	Mean	SD
Turnover Statement										
Assets for Operations (Inflow)	579	2 064	2 605 903	100 370.88	263719.22	-	-	-	-	-
Assets for Exchange (Inflow)	-	-	-	-	-	-	-	-	-	-
Assets for Operations (Outflow)	-	-	-	-	-	-	-	-	-	-
Assets for Exchange (Outflow)	-	-	-	-	-	-	-	-	-	-
Total Assets	-	-	-	-	-	1691	1 388	6 593 915	149 410.40	374 458.00
Agricultural Loans	-	-	-	-	-	1048	1	2 901	220.36	372.47
Industrial Loans	-	-	-	-	-	416	1	70 264	1 315.83	7 078.57
Balance Sheet										
Promissory Notes	721	1	43 127	1 454.64	3 959.96	1607	2	31 039	1 123.07	2 837.32
Loans Secured by Government Bonds	1046	1	14 346	302.25	951.30	1615	2	15 566	276.28	1 014.37
Loans Secured by Stocks & Bonds	-	-	-	-	-	-	-	-	-	-
Open Promissory Notes	358	0	9 285	320.01	1 144.32	1080	1	125 895	1 007.36	6 341.80
Overall Balance (Assets vs. Liabilities)	676	42	591 208	8 141	40 697	1 629	290	1 676 478	13 361	76 204
Agricultural Loans	683	0	2 333	201.11	272.87	1047	1	3 128	141.53	236.53
Industrial Loans	366	0	35 446	280.48	2 201.54	265	1	35 593	1 235.03	5 106.21
Sent Promissory Notes	564	1	11 676	567.09	1 189.14	-	-	-	-	-
Total Promissory Notes	847	2	42 381	1 440.20	3 505.65	-	-	-	-	-
Commercial Banks (Private Credit Organizations)	-	-	-	-	-	1401	1	31	3.36	3.39
Mutual Credit Societies (Private Credit Organizations)	-	-	-	-	-	1089	1	42	3.82	5.07
Accounted Loans (Private Credit Organizations)	-	-	-	-	-	1514	3	1 108 354	18 769.99	68 271.88
Debt to the State Bank (Private Credit Organizations)	-	-	-	-	-	1300	1	205 692	1 749.16	11 564.12

B   Maps

Figure B.1: **Location of factories and their annual revenue, 1908, entire Russian Empire.**.

1908 census: Annual firms' revenue

Figure B.2: **Location of factories and their annual revenue, 1908, western part of Russian Empire.**.

1908 census: Annual firms' revenue
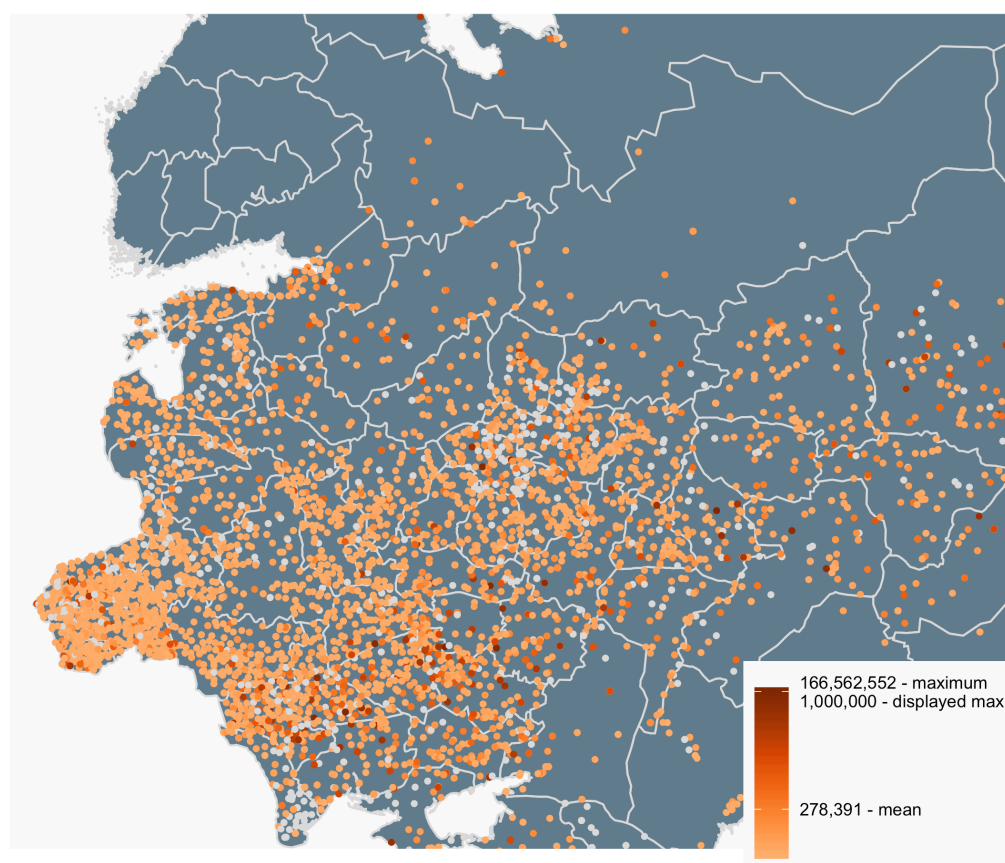
C   Robustness and Additional Results

Table C.1: Alternative dependent variable: **Workforce**

	(1)	(2)	(3)	(4)	(5)	(6)
		Distance with bank interaction	Including factory level controls	Factories founded < bank branch	Including other State Bank branches	Automated Matching
	Distance only					
			Dep. Var.: Δ Workforce			
Distance to province capital × bank in capital		-0.2544*	-0.2994**	-0.3962**	-0.2993**	-0.1768*
		(0.1443)	(0.1258)	(0.1671)	(0.1268)	(0.1020)
Distance to province capital	-0.0995	0.1440	0.2289**	0.3155***	0.2290**	0.1603*
	(0.0677)	(0.1255)	(0.1080)	(0.1189)	(0.1090)	(0.0946)
Workforce 1890	-0.4096*	-0.4098*	-0.4871**	-0.7114***	-0.4872**	-0.0566
	(0.2349)	(0.2349)	(0.2166)	(0.2076)	(0.2166)	(0.0983)
Proximity to other State Bank branches					106.29	
					(227.60)	
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.13	0.13	0.22	0.35	0.22	0.20
Observations	2596	2596	2596	1137	2596	2619

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in workforce at factory-level revenue (headcount). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Proximity to other State Bank branches is the sum of inverse distances to all branches of the State Bank other than the governorate's capital branch. Standard errors clustered at district (*uezd*) level (351-496 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.2: Controlling for State Bank branch age and presence of other branches 1890-1908: **Robustness**

	(1)	(2)	(3) Including other State Bank branches	(4)	(5) Including other State Bank branches	(6)	(7) Including other State Bank branches
	Factories founded < 1860	Factories founded < bank branch		Factories founded < bank branch		Factories founded < bank branch	
			Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ Labour Productivity
Distance to province capital × bank in capital	-0.0056**	-0.0037**	-0.0041***	-0.2901**	-0.2179**	-0.0028***	-0.0030***
	(0.0025)	(0.0015)	(0.0014)	(0.1147)	(0.0969)	(0.0009)	(0.0007)
Distance to province capital	0.0058**	0.0031**	0.0026**	0.1624**	0.1161	0.0019***	0.0018***
	(0.0022)	(0.0012)	(0.0013)	(0.0789)	(0.0843)	(0.0007)	(0.0007)
Proximity to other State Bank branches			-0.9992		31.6360		-0.9982**
			(0.8558)		(178.6190)		(0.4996)
Province F.E.	✓	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓	✓
R2	0.54	0.46	0.42	0.29	0.21	0.56	0.53
Observations	375	879	2079	1078	2491	867	2049

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (3): change in natural logarithm of factory-level revenue (in rubles); (4)-(5) change in horse power of installed machinery; (6)-(7) change natural logarithm of labour productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. All regressions control for initial level of revenue, machinery and productivity. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Proximity to other State Bank branches is the sum of inverse distances to all branches of the State Bank other than the governorate's capital branch. Factory location defined as the factory's municipality (*volost*). Standard errors clustered at district (*uezd*) level (174-480 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.3: Access to State Bank branch and factory characteristics: **Ownership status**

	(1) Russian owner	(2) Noble owner	(3) Russian owner	(4) Noble owner	(5) Russian owner	(6) Noble owner
	Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ Labour Productivity	
bank $\times$ Russian (0) $\times$ distance	-0.0055***		-0.2252*		-0.0036***	
	(0.0016)		(0.1266)		(0.0008)	
bank $\times$ Russian (1) $\times$ distance	-0.0036**		-0.1907		-0.0029***	
	(0.0015)		(0.1192)		(0.0008)	
bank $\times$ noble (0) $\times$ distance		-0.0043***		-0.2266**		-0.0027***
		(0.0014)		(0.1045)		(0.0008)
bank $\times$ noble (1) $\times$ distance		-0.0043***		-0.2410**		-0.0028***
		(0.0015)		(0.1070)		(0.0008)
Distance to province capital	0.0027*	0.0028**	0.0987	0.1379	0.0020***	0.0017**
	(0.0014)	(0.0014)	(0.1051)	(0.0929)	(0.0007)	(0.0007)
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.42	0.42	0.21	0.21	0.53	0.53
Observations	2079	2079	2491	2491	2049	2049

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (2): change in natural logarithm of factory-level revenue (in rubles); (3)-(4) change in horse power of installed machinery; (5)-(6) change in natural logarithm of labour productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. Regressions control for revenue, machinery and productivity in 1890. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Owners' characteristics are measured at the factory level and converted into an indicator. Base category for interactions: 0-value of respective indicator variable in provinces without a State Bank branch. 1-value of indicator in provinces without a branch omitted from table for brevity. Standard errors clustered at district (*uezd*) level (403-480 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.4: Inter-factory networks: **Proximity and ethnicity**

	(1) All-factory networks	(2) Co-ethnic networks only	(3) All-factory networks	(4) Co-ethnic networks only	(5) All-factory networks	(6) Co-ethnic networks only
	Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ Labour Productivity	
Factory density in district × bank in capital	-0.0066*		-0.4200**		-0.0013	
	(0.0038)		(0.1648)		(0.0014)	
Factory density in district	0.0061*		0.3815**		0.0014	
	(0.0037)		(0.1602)		(0.0014)	
Co-ethnic factory density in district × bank in capital		-0.0062*		-0.4957*		-0.0005
		(0.0037)		(0.2672)		(0.0015)
Co-ethnic factory density in district		0.0061*		0.4261		0.0008
		(0.0037)		(0.2610)		(0.0015)
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.42	0.42	0.21	0.21	0.53	0.53
Observations	2057	2057	2468	2468	2027	2027

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (2): change in natural logarithm of factory-level revenue (in rubles); (3)-(4) change in horse power of installed machinery; (5)-(6) change natural logarithm of labour productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. All regressions control for initial level of revenue, machinery and productivity. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). All regressions control for distance to the province capital. Factory density refers to the count of all factories in the same district. Co-ethnic density only counts those factories with an owner belonging to the same ethno-confessional group in a district (possible groups are: Armenian, German, Jewish, Muslim, Polish, Russian, Ukrainian, other resident minorities, foreign nationals, non-personal proprietorship). Standard errors clustered at district (*uezd*) level (413-480 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.5: Access to State Bank branch and investment in machinery: **Primary inputs**

	(1) Crop farming < median	(2) Crop farming > median	(3) Livestock farming < median	(4) Livestock farming > median	(5) Mining extraction < median	(6) Mining output > median
	Dep. Var.: Δ Machinery (horse power)					
Distance to province capital × bank in capital	-0.5435***	-0.0634	-0.5008**	-0.0654	-0.1908*	-0.2504*
	(0.1932)	(0.1093)	(0.1984)	(0.1045)	(0.1059)	(0.1492)
Distance to province capital	0.4882***	-0.0506	0.4397***	-0.0379	0.1758*	0.0774
	(0.1738)	(0.0967)	(0.1529)	(0.0985)	(0.0979)	(0.1316)
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.29	0.18	0.25	0.19	0.21	0.24
Observations	982	1509	1351	1140	1511	980

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in horse power of installed machinery. All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All regressions control for initial level of machinery. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Agricultural and mining products recorded at the governorate level, with sample splits at the median governorate. Crop agriculture refers to total production of barley, maize, oats, potatoes, rye and wheat in puds; livestock agriculture refers to total headcount of cattle (incl. calves); mining extraction to total production of coal, copper, gold ore, iron ore and crude oil in rubles. Standard errors clustered at district (*uezd*) level (167-316 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.6: Explaining change in enterprise-level outcomes 1890-1908: **Alternative standard error clustering**

	(1) governorate level clustering	(2) governorate × industry level clustering	(3) municipal level clustering	(4) governorate level clustering	(5) governorate × industry level clustering	(6) municipal level clustering	(7) governorate level clustering	(8) governorate × industry level clustering	(9) municipal level clustering
	Dep. Var.: Δ revenue			Dep. Var.: Δ Machinery			Dep. Var.: Δ labor Productivity		
Distance province capital × bank in capital	-0.0041**	-0.0041***	-0.0041***	-0.2179*	-0.2179*	-0.2179**	-0.0029***	-0.0029***	-0.0029***
	(0.0016)	(0.0011)	(0.0015)	(0.1160)	(0.1241)	(0.1080)	(0.0007)	(0.0005)	(0.0008)
Distance province capital	0.0026*	0.0026***	0.0026*	0.1159	0.1159	0.1159	0.0018***	0.0018***	0.0018**
	(0.0014)	(0.0005)	(0.0014)	(0.1018)	(0.1322)	(0.0953)	(0.0006)	(0.0003)	(0.0007)
Province F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fac. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
R2	0.42	0.42	0.42	0.21	0.21	0.21	0.53	0.53	0.53
N	2079	2076	2079	2491	2488	2491	2049	2046	2049
Clusters	75	16	862	75	16	1136	75	16	850

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (3): change in natural logarithm of factory-level revenue (in rubles); (4)-(6) change in horse power of installed machinery; (7)-(9) change natural logarithm of labor productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. Regressions control for revenue, machinery and productivity in 1890. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Standard errors clustered as indicated.

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

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Table C.7: Access to State Bank branch and urbanisation controls: **Robustness**

	(1)	(2) Excluding Moscow & St. Petersburg	(3)	(4) Excluding Moscow & St. Petersburg	(5)	(6) Excluding Moscow & St. Petersburg
	Urban population		Urban population		Urban population	
	Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ Labour Productivity	
Distance to province capital $\times$ bank in capital	-0.0038***	-0.0039***	-0.2542**	-0.2382***	-0.0026***	-0.0027***
	(0.0014)	(0.0014)	(0.1005)	(0.0908)	(0.0007)	(0.0007)
Distance to province capital	0.0026*	0.0028**	0.1218	0.1171	0.0018***	0.0018***
	(0.0013)	(0.0013)	(0.0851)	(0.0764)	(0.0007)	(0.0006)
Population in municipality	0.0004***		-0.0526**		0.0004***	
	(0.0001)		(0.0204)		(0.0001)	
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.42	0.41	0.21	0.22	0.53	0.53
Observations	2079	1675	2491	2083	2049	1649

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (2): change in natural logarithm of factory-level revenue (in rubles); (3)-(4) change in horse power of installed machinery; (5)-(6) change in natural logarithm of labour productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. Regressions control for revenue, machinery and productivity in 1890. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Urban population at municipal level. Standard errors clustered at district (*uezd*) level (403-480 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.8: Fully automated matching between factories across 1890-1908: **Robustness**

	(1)	(2) Including factory level controls	(3)	(4) Including factory level controls	(5)	(6) Including factory level controls
	Distance with bank interaction		Distance with bank interaction		Distance with bank interaction	
	Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ Labour Productivity	
Distance to province capital $\times$ bank in capital	-0.0040***	-0.0034***	-0.1520**	-0.1285	-0.0025***	-0.0021**
	(0.0010)	(0.0010)	(0.0703)	(0.1000)	(0.0009)	(0.0008)
Distance to province capital	0.0025***	0.0021**	0.0586	0.0802	0.0014*	0.0011
	(0.0010)	(0.0009)	(0.0616)	(0.0948)	(0.0009)	(0.0008)
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls		✓		✓		✓
R2	0.34	0.43	0.09	0.19	0.48	0.51
N	2083	2083	2694	2694	2055	2055

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (2): change in natural logarithm of factory-level revenue (in rubles); (3)-(4) change in horse power of installed machinery; (5)-(6) change natural logarithm of labour productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. All regressions control for initial level of revenue, machinery and productivity. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Standard errors clustered at district (*uezd*) level (424-499 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.9: Allowing for merged and split factories across 1890-1908: **Robustness**

	(1)	(2)	(3)	(4)	(5)
			Including		Distance to
		Distance	factory	Excluding	other bank >
		with bank	level	top 5%	distance to
	Distance only	interaction	controls	distances	capital
			Dep. Var.: Δ revenue		
Distance to province capital × bank in capital		-0.0032**	-0.0029**	-0.0029**	-0.0067*
		(0.0015)	(0.0015)	(0.0015)	(0.0036)
Distance to province capital	-0.0009**	0.0023	0.0019	0.0031	0.0050
	(0.0004)	(0.0014)	(0.0014)	(0.0019)	(0.0035)
Province F.E.	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓
Factory controls			✓	✓	✓
R2	0.31	0.31	0.39	0.39	0.40
Observations	3228	3228	3228	3079	2496

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in natural logarithm of factory-level revenue (in rubles). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All regressions control for initial level of revenue, as well as incidental revenues. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). Standard errors clustered at district (*uezd*) level (411-497 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.10: Access to State Bank branch and distance heterogeneity: **Non-linear interaction**

	(1) Interaction with distance tertiles	(2) Dropping large distances	(3) Interaction with distance tertiles	(4) Dropping large distances	(5) Interaction with distance tertiles	(6) Dropping large distances
	Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ Labour Productivity	
bank × middle tertile distance to province capital	-0.0194		8.5597		-0.5081***	
	(0.2573)		(16.2072)		(0.1653)	
bank × upper tertile distance to province capital	-0.8880***		-36.5858**		-0.6537***	
	(0.2966)		(16.0655)		(0.1684)	
middle tertile distance to province capital	-0.1470		13.7627		0.2546	
	(0.2387)		(10.6424)		(0.1578)	
upper tertile distance to province capital	0.4644*		28.1481***		0.3483**	
	(0.2804)		(9.6932)		(0.1574)	
bank × distance to province capital		-0.0057**		-0.3015*		-0.0050***
		(0.0029)		(0.1582)		(0.0017)
Distance to province capital		0.0022		0.1807		0.0030*
		(0.0028)		(0.1376)		(0.0016)
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.42	0.42	0.21	0.22	0.53	0.52
Observations	2079	1982	2491	2368	2049	1956

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (2): change in natural logarithm of factory-level revenue (in rubles); (3)-(4) change in horse power of installed machinery; (5)-(6) change in natural logarithm of labour productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. Regressions control for revenue, machinery and productivity in 1890. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. Factory location defined as the factory's municipality (*volost*). (1), (3) and (5): Binned discrete interaction with distance to the capital divided into tertiles and an indicator variable for middle and upper tertiles interacted with bank presence. Base category for interactions: lower distance tertile. (2), (4) and (6): Dropping distances exceeding 234 km (upper 5-percentile). Standard errors clustered at district (*uezd*) level (388-483 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

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Table C.11: Access to State Bank branch and distance heterogeneity: **Sample changes**

	(1) Dropping small provinces	(2) Dropping large provinces	(3) Dropping small provinces	(4) Dropping large provinces	(5) Dropping small provinces	(6) Dropping large provinces
	Dep. Var.: Δ revenue		Dep. Var.: Δ Machinery		Dep. Var.: Δ Labour Productivity	
bank $\times$ distance to province capital	-0.0042***	-0.0050***	-0.2144**	-0.1785*	-0.0029***	-0.0036***
	(0.0014)	(0.0015)	(0.0927)	(0.1032)	(0.0007)	(0.0008)
Distance to province capital	0.0027**	0.0027**	0.1154	0.1333	0.0017***	0.0018***
	(0.0013)	(0.0013)	(0.0798)	(0.0816)	(0.0006)	(0.0007)
Province F.E.	✓	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓	✓
R2	0.42	0.41	0.19	0.22	0.53	0.52
Observations	1804	1870	2173	2227	1776	1842

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var. (1) - (2): change in natural logarithm of factory-level revenue (in rubles); (3)-(4) change in horse power of installed machinery; (5)-(6) change in natural logarithm of labour productivity (revenue per worker). All regressions are Ordinary Least Squares, with fixed effects at the level of industry and governorate. Factory-level controls include dummies for ownership categories (noble, merchant, townsman, citizen), owner ethnicity (Russian or otherwise), corporation type (public, cooperative, shareholding, partnership), factory type (workshop, retail establishment, factory, craft shop), and infrastructure availability (rail, river, post office, telegraph). All revenue regressions control for incidental revenues. Regressions control for revenue, machinery and productivity in 1890. Distances measured in kilometers. Bank in capital refers to the presence of a branch of the State Bank in a governorate's capital prior to 1908. (1), (3) and (5): Dropping 10 smallest governorates by mean distance between factory and capital. (2), (4) and (6): Dropping 10 largest governorates by mean distance between factory and capital. Standard errors clustered at district (*uezd*) level (382-423 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.12: Jackknife regressions: **Omitting provinces I**

	(1) Omitting Group 1	(2) Omitting Group 2	(3) Omitting Group 3	(4) Omitting Group 4	(5) Omitting Group 5
	Dep. Var.: Δ revenue				
Distance to province capital × bank in capital	-0.0040***	-0.0043***	-0.0033***	-0.0046***	-0.0041***
	(0.0012)	(0.0011)	(0.0011)	(0.0012)	(0.0012)
Distance to province capital	0.0030***	0.0030***	0.0029***	0.0031***	0.0031***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Province F.E.	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓
R2	0.38	0.37	0.39	0.37	0.38
Observations	1864	1836	1579	1926	1834

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in natural logarithm of factory-level revenue (in rubles); See table 2 for more details on estimation and variable definitions. Tables C.12 and C.13 test robustness of the results to *geographical* variation in sample composition. For this purpose the sample was divided into ten groups of governorates (using the alphabetical order in which they appear in the Russian administrative enumeration). Each regression then omits all banked governorates of one group as indicated in the column headings. Ommitted governorates are as follows: Group 1: Arkhangelsk, Astrakhan, Bessarabia, Vilno, Vitebsk, Vladimir, Vologda, Volhynia and Vologda; Group 2: Vyatka, Grodno, Dagestan, Yekaternoslavsk, Kazan, Kaluga, Kyiv, Kaunas; Group 3: Kostroma, Kuban, Kurland, Kursk, Livonia, Minsk, Mogilev, Moscow and Nizhny Novgorod; Group 4: Novgorod, Olonets, Orenburg, Oryol, Penza, Perm, Podolsk, Poltava and Pskov; Group 5: Ryazan, Samara, St. Petersburg, Saratov, Simbirsk, Smolensk, Stavropol, Taurida, and Tambov. Standard errors clustered at district (*uezd*) level (356-371 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.13: Jackknife regressions: **Omitting provinces II**

	(1) Omitting Group 6	(2) Omitting Group 7	(3) Omitting Group 8	(4) Omitting Group 9	(5) Omitting Group 10
	Dep. Var.: Δ revenue				
Distance to province capital $\times$ bank in capital	-0.0043***	-0.0041***	-0.0040***	-0.0040***	-0.0043***
	(0.0012)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Distance to province capital	0.0030***	0.0031***	0.0031***	0.0029***	0.0030***
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
Province F.E.	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓
R2	0.37	0.37	0.38	0.37	0.37
N	1897	1964	2012	1877	2042

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in natural logarithm of factory-level revenue (in rubles); See table 2 for more details on estimation and variable definitions. Tables C.12 and C.13 test robustness of the results to *geographical* variation in sample composition. For this purpose the sample was divided into ten groups of governorates (using the alphabetical order in which they appear in the Russian administrative enumeration). Each regression then omits all banked governorates of one group as indicated in the column headings. Ommitted governorates are as follows: Group 6: Tver, Terek, Tula, Ufa, Kharkiv, Kherson, Chernigiv, Black Sea, Estonia; Group 7: Yaroslavl, Akmola, Amur, Baku, Batumi, Warsaw, Yelizavetpol, Yenisei, Transbaikal; Group 8: Irkutsk, Kalisz, Kutaissi, Kielce, Lomza, Lublin; Group 9: Piotrkow, Plock, Primorskaya, Radom, Suwalki; Group 10: Siedlce, Tbilisi, Tobolsk, Tomsk, Erivan, Yakutia. Standard errors clustered at district (*uezd*) level (371-407 clusters).
Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.14: Jackknife regressions: **Omitting industries I**

	(1)	(2)	(3)	(4)	(5)
				Omitting	
			Omitting	ceramics,	Omitting
	Omitting	Omitting	chemicals	glass	machines
	textiles	woods	& oil	& stones	& metals
	Dep. Var.: Δ revenue				
Distance to province capital × bank in capital	-0.0035***	-0.0031**	-0.0043***	-0.0042***	-0.0044***
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0016)
Distance to province capital	0.0026**	0.0022*	0.0033***	0.0030***	0.0034**
	(0.0010)	(0.0011)	(0.0011)	(0.0011)	(0.0015)
Province F.E.	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓
R2	0.40	0.38	0.37	0.40	0.38
Observations	1663	1896	2016	1866	1833

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in natural logarithm of factory-level revenue (in rubles); See table 2 for more details on estimation and variable definitions. This table tests robustness of the results to variation in the sample of *industries*. To this end, each regression omits one industry group, as indicated in the column heading. Standard errors clustered at district (*uezd*) level (400-418 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

Table C.15: Jackknife regressions: **Omitting industries II**

	(1) Omitting food processing	(2) Omitting alcohol, sugar & tobacco	(3) Omitting paper & printing	(4) Omitting grease, wax & leathers	(5) Omitting others & mining
	Dep. Var.: Δ revenue				
Distance to province capital × bank in capital	-0.0035***	-0.0049***	-0.0037***	-0.0049***	-0.0041***
	(0.0011)	(0.0013)	(0.0012)	(0.0011)	(0.0011)
Distance to province capital	0.0025**	0.0035***	0.0026**	0.0035***	0.0030***
	(0.0010)	(0.0012)	(0.0011)	(0.0010)	(0.0010)
Province F.E.	✓	✓	✓	✓	✓
Industry F.E.	✓	✓	✓	✓	✓
Factory controls	✓	✓	✓	✓	✓
R2	0.36	0.39	0.37	0.38	0.37
Observations	1871	1682	1975	1836	2073

Sample: governorates of the Russian Empire, excluding Central Asia and Finland, 1890-1908. Dep. Var.: change in natural logarithm of factory-level revenue (in rubles); See table 2 for more details on estimation and variable definitions. This table tests robustness of the results to variation in the sample of *industries*. To this end, each regression omits one industry group, as indicated in the column heading. Standard errors clustered at district (*uezd*) level (344-417 clusters).

Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01

D   Sources on the State Bank

Figure D.1: Turnover Statement of the Kharkov Office of the State Bank from January 1, 1881, to January 1, 1882 *[Оборотная Ведомость Харковьской Конторы Государственного Банк с 1го января 1881 до 1го января 1882 года].*

Note: Russian State Historical Archive, St. Petersburg; this is the turnover statement of the Kharkov office of the State Bank, which is followed by the balance sheet on the next page, for 1881.

Table D.1: Turnover Statement & Balance Sheet: Recorded variables and missing data for key variables.

Variables						
Turnover Statement	Assets for Operations (Inflow)	Assets for Exchange (Inflow)	Assets for Operations (Outflow)	Assets for Exchange (Outflow)	Total Assets	Agricultural Loans Industrial Loans
Period:						
1881-1890	√	√	√	√	-	- -
1891-1900	√	-	-	-	-	- -
1901-1914	-	-	-	-	√	√ √
Balance Sheet	[Accounted] Promissory Notes	Loans Secured by Government Bonds	Loans Secured by Stocks & Bonds	Open Promissory Notes	Overall Balance (Assets = Liabilities)	Agricultural Loans Industrial Loans
Period:						
1881-1890	√	√	√	√	√	- -
1891-1900	√	√	-	√	√	√ √
1901-1914	√	√	-	√	√	√ √
Balance Sheet	Sent Promissory Notes	Total Promissory Notes	Commercial Banks (Private Credit Organizations)	Mutual Credit Societies (Private Credit Organizations)	Accounted Loans (Private Credit Organizations)	Debt to the State Bank (Private Credit Organizations)
Period:						
1881-1890	-	-	-	-	-	-
1891-1900	√	√	-	-	-	-
1901-1914	-	-	√	√	√	√

Note: Russian State Historical Archive, St. Petersburg. All variables are direct translations of the terms appearing in the original documents. A "-" indicates data for the variable are missing for this period. Total promissory notes constitute the sum of accounted, open, and sent promissory notes for the 1891-1900 period. Total and sent promissory notes are not available for the 1881-1890 and 1901-1914 periods. Accounted promissory notes constitute part of the balance/portfolio of the respective credit organization (State Bank office or branch) and involve a regular schedule of repayments by the borrower to the lender. Open promissory notes provide liquidity to borrowers in the form of credit by setting a due repayment date in the future. Sent promissory notes offer – for example - a proxy for State Bank transactions with local treasuries or for financing interregional trade in case the regional economy of the respective State Bank office or branch depended on goods produced in other governorates of the Russian Empire.

Table D.2: Missing State Bank Data by region and year [No. of missing years*branch], 1881-1914.

Turnover Statement	Assets for Operations (Turnover-Inflow)	Assets for Exchange (Turnover-Inflow)	Assets for Operations (Turnover-Outflow)	Assets for Exchange (Turnover-Outflow)	Total Assets	Agricultural Loans	Industrial Loans
Region:							
Capital (St. Petersburg & Moscow) (2)	5	10	9	10	0	0	2
Caucasus (9)	65	34	50	50	0	77	122
Eastern-Black Earth (15)	172	108	139	139	0	2	169
Central Russian (11)	122	72	93	93	0	49	111
Central Asian (7)	39	22	25	25	0	88	90
Northern (9)	77	42	66	66	0	92	76
Northwestern (13)	139	76	98	113	0	48	171
Siberian (12)	83	42	50	60	0	148	132
Southeastern (9)	93	53	75	76	0	43	76
Southern (14)	118	66	95	95	0	38	169
Southwest&Ukraine(10)	76	40	62	62	0	6	98
Poland (10)	80	39	54	54	0	55	140
Balance Sheet	[Accounted] Promissory Notes	Loans Secured by Government Bonds	Loans Secured by Stocks & Bonds	Open Promissory Notes	Overall Balance (Assets vs. Liabilities)	Agricultural Loans	Industrial Loans
Region:							
Capital (St. Petersburg & Moscow) (2)	3	3	1	3	9	3	7
Caucasus (9)	76	46	36	149	87	139	185
Eastern-Black Earth (15)	159	99	99	255	147	10	246
Central Russian (11)	121	69	68	126	101	68	202
Central Asian (7)	75	47	33	139	66	142	129
Northern (9)	103	92	48	162	114	133	144
Northwestern (13)	124	81	69	170	117	90	269
Siberian (12)	90	53	48	236	94	216	204
Southeastern (9)	81	78	54	184	84	89	152
Southern (14)	114	84	62	185	91	70	265
Southwest&Ukraine (10)	66	37	36	155	71	17	168
Poland (10)	80	31	36	212	70	108	233

Balance Sheet	Sent Promissory Notes	Total Promissory Notes	Commercial Banks (Private Credit Organizations)	Mutual Credit Societies (Private Credit Organizations)	Accounted Loans (Private Credit Organizations)	Debt to the State Bank (Private Credit Organizations)
Region:						
Capital (St. Petersburg & Moscow) (2)	7	17	0	0	0	0
Caucasus (9)	30	34	18	28	12	29
Eastern-Black Earth (15)	75	25	8	84	3	27
Central Russian (11)	55	15	27	82	12	28
Central Asian (7)	27	19	33	72	26	41
Northern (9)	48	36	49	62	30	52
Northwestern (13)	70	30	24	28	13	10
Siberian (12)	49	28	37	127	36	110
Southeastern (9)	43	28	21	44	14	36
Southern (14)	47	40	12	45	11	32
Southwestern & Ukrainian(10)	40	15	9	12	4	5
Poland (10)	55	16	54	21	19	24

Note: Russian State Historical Archive, St. Petersburg. In parentheses, we report the number of branches per region. Note that the regions enumerated here follow the divisions used in the source material, where they are referred to as banking districts. The term in the source material for 'Ukrainian' is 'малороссийский' ('Little Russian'). For the computation of missing year*governorate, we consider the timing of branch expansion into account; years, when the branch was not opened, do not count as missing. The Capital region includes the cities-branches of St. Petersburg and Moscow. The Caucasus region includes the branches of Tiflis, Vladikavkaz, Yekaterinodar, Novorossiysk, Stavropol, Baku, Batumi, Erevan, and Pyatigorsk. The Eastern-Black Earth region includes the branches of Borisoglebsk, Voronezh, Yelets, Kozlovsky, Kursk, Morshansk, Orlov, Penza, Ryazan, Saratov, Simbir, Syzran, Tambov, Tula, and Tsaritsyno. The Central region includes the branches of Vladimir, Ivanovo-Voznesensk, Kaluga, Kostroma, Murom, Nizhniy Novgorod, Rzhev, Rybinsk, Smolensk, Tver, and Yaroslavl. The Central Asian region includes the branches of Askhabad, Bukhara, Samarkand, Tashkent, Kokand, Semipalatinsk, and Kuyandin (temporary). The Northern region includes the branches of Yekaterinburg, Arkhangelsk, Vologda, Vyatka, Novgorod, Perm, Sarapul, Ivano-Krestovskiy (temporary), and Irbit (temporary). The Northwestern region includes the branches of Riga, Vindava, Libava, Reval, Vilna, Vitebsk, Dvina, Grodno, Bialystok, Kovno, Minsk, Mogilev, and Pskov. The Siberian region includes the branches of Tobolsk, Tyumen, Petropavlovsk, Omsk, Tomsk, Krasnoyarsk, Irkutsk, Vodaybo, Chita, Blagoveshensk, Khabarovsk, and Vladivostok. The Southeastern region includes the branches of Astrakhan, Kazan, Orenburg, Samara, Ural, Ufa, Chelyabinsk, Chistopol, and Menzelinsk (temporary). The Southern region includes the branches of Odessa, Rostov, Berdyansk, Yekaterinoslav, Elizavetgrad, Kishinev, Mariupol, Nikolaev, Sevastopol, Taganrog, Kherson, Yuzovka, Fyodosia, and Yalta. The Southwestern and Ukrainian region includes the branches of Kiev, Kharkov, Zhitomir, Kamenets-Podolsk, Kremenchuk, Poltava, Rovno, Romny, Sumy, and Chernigov. The Polish (Privislinskiy) region includes the branches of Warsaw, Kalish, Lodz, Lomzha, Lyublin, Petrokov, Plotsk, Radom, Tomashov, and Chestokhova.

E   Sources on Industrial Factories and Plants

E.1: 1908 Industrial census

(Varzar, 1912, p. 77)

ГРУППА IV.

Въ эту группу входятъ слѣдующія производства: 1) льно и пенько-трепальное, 2) льно и пенько-прядильное, 3) льно-пенько и джуто-ткацкое, 4) отбѣльное, красильное и отдѣлочное для льна, пеньки и джута, 5) канатное, веревочное и шпагатное.

Число заведеній въ IV группѣ 278.

Архангельская губ.

Клафтонъ, Эдм. Як., куп. Канат. зав. г. Архангельскъ, Успенск. ул., д. 172. Выраб. канаты и веревки. Год. произв. 93,000 р. Двиг. пар. съ ч. с. 18. Чис. раб. 80.

Пахомовъ, Вас. Михѣев., куп. 2 г. Канат. зав. г. Архангельскъ, Северодвинск. ул. г. Архангельскъ, С.-Петербургск. пр., д. 26. Выраб. канаты и веревки. Год. произв. 26,000 р. Двиг. пар. съ ч. с. 20. Чис. раб. 22.

Яковлевъ, Андр. Ив., кр. Канат. зав. Архангельск. у., Кегостровск. вол., с. Кяростровъ г. Архангельскъ, городск. ласки, пеньковый рядъ. Выраб. канаты, веревки, рыболов. снасти, шпагатъ, бичевка и пр. Год. произв. 18,500 р. Чис. раб. 20.

Варшавская губ.

Гилле и Дитрихъ, Акц. О-во Жирардовскихъ М-ръ. Блонск. у., пос. Жирардовъ. Выраб. вязал. и чулоч. тов. (2,433 т. р.), столовое бѣлье (2,412 т. р.), парусина и холсты (1,314 т. р.), тонк. и средн. полотна (1,128 т. р.), нитки (239 т. р.), пряжа очесоч. (118 т. р.). Год. произв. 9.782,558 р. Двиг. пар. съ ч. с. 5,830. Чис. раб. 8,318.

Бакановъ, Ил. Плат., кр. Мех. ткац.-полотнян. фабр. Вязниковск. у., Никологорск. вол., дер. Холщево. Никологоры. Выраб. мѣшки льнян. суров. Год. произв. 250,000 р. Двиг. локмб. съ ч. с. 15. Чис. раб. 153.

Бр. Бузины, И. и В. Влад., Тор. Д. Ткац. полотнян. мѣшоч. фабр. Судогодск. у., Воскресенск. вол. бл. дер. Степанцево. Поч.: Соколово, тел.: Эсино. Выраб. упаковоч. тк. (288 т. р.), мѣшки льнян. (196 т. р.), парус. и холсты (163 т. р.). Год. произв. 647,468 р. Двиг. пар. съ ч. с. 115. Чис. раб. 412.

Голубевъ, Каз. Львов. съ С-ми, пот. поч. гр. Тор. Д. Льнопряд. фабр. г. Судогда. Выраб. пряжа очесоч. (420 т. р.), льнян. (122 т. р.), нитки и пр. Год. произв. 688,330 р. Двиг. пар. съ ч. с. 240. Чис. раб. 1,089.

Городовъ, Вас. Гавр. млад., кр. Отдѣл. звд. Вязниковск. у., с. Никологоры. Отдѣл. парусина и холстъ. Выруч. по зак. 2,318 р. Двиг. локмб. съ ч. с. 12. Чис. раб. 7.

Городовъ, Як. Вас., кр. Ткац.-полотнян. фабр. Вязниковск. у., с. Никологоры. Выраб. парусина и холстъ. Выруч. по зак. 26,715 р. Двиг. пар. съ ч. с. 22. Чис. раб. 107.

Демидовъ, Вас. Фед., ком. сов. Т-во льнопряд. и по-

annotation boxes:

Industry group and description of included products: Linen and related manufacture

Governorate: Arkhangelsk

Owner name:	Pakhomov, Vasiliy M.
Social Estate:	Merchant, 2nd guild
Location:	Arkhangelsk city, Severodvinskaya Street
Postal address:	Arkhangelsk city, St. Peterburgskaya Lane
Activity:	Manufacture of ropes & chords
Revenue:	26,000 rubles
Machinery type:	steam
Machinery power:	20
Workforce:	22

E.2: 1890 Industrial census

(Orlov and Budagov, 1894, p. 31)

Производство вязаныхъ издѣлій.

ГУБЕРНIИ:	Числ. фабр.	Сумма произв. въ тысяч. рубл.	Число рабо- чихъ.	ГУБЕРНIИ.	Числ. фабр.	Сумма произв. въ тысяч. рубл.	Число рабо- чихъ.
Астраханская . . .	1	4	5	С.-Петербургская .	9	258	271
Виленская	2	8	10	Херсонская	2	21	14
Владимірская . . .	1	9	50	Черниговская . .	8	17	55
Гродненская. . . .	3	18	21				
Лифляндская . . .	2	46	52				
Московская	31	1,218	1,729	Всего. . .	54	1,594	2,207

Industry group: Production of knitted goods

Aggregates for this industry at the governorate level

Governorate: Astrakhan

Астраханская губ.

Подольская, Марія Лазар., мѣщ.—Въ г. Астрахани, 2 уч., Полицейская ул., д. Казачкова.—Выдѣлыв. чулки и носки (1888) . . . . 4— 5

Виленская губ.

Краковская, Мейта-Гитель, купч.—Въ г. Вильнѣ, по Рудницкой ул., д. Глобуса. Выдѣлыв. 1,525 дюж. чухокъ (1888) . . . . 4— 5

Брунъ, Исаакъ Мордук., куп.—Тамъ же, по той же улицѣ, д. Бройдо. Выдѣлыв. 1,100 дюж. чулокъ (1886) . . . . 4— 5

Владимірская губ.

Мураковъ, Ив. Флоров., куп. — Въ г. Иваново-Вознесенск.—16 вяз. машинъ, 2 чесальн. и 3 пряд. по 50 верет. Изгот. до 30,000 чулковъ . . . . 9— 50

Owner name:	Podolskaya, Mariya L.
Social Estate:	Townsperson
Location:	Astrakhan city, Policheyskaya Street, Kazachkova
Activity:	Manufacture of tights and socks
Founding year:	1888
Revenue:	4,000 rubles
Workforce:	5

F   Sources on Commercial Banks

Table F.1: Private Banks, 1901-1914, number by region.

	Years													
	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Region:														
Capital														
(St. Petersburg & Moscow) (2)	24	24	25	25	26	26	26	27	28	27	31	53	56	53
Caucasus (9)	13	14	15	15	15	15	15	17	20	26	55	57	56	59
Eastern-Black Earth (15)	17	24	27	27	29	29	33	33	37	41	80	83	85	84
Central Russian (11)	8	9	12	12	15	15	15	15	16	17	25	28	31	34
Central Asian (7)	4	4	5	5	5	6	9	11	12	18	36	36	37	35
Northern (9)	5	3	5	4	6	9	13	13	14	16	24	26	26	25
Northwestern (13)	19	21	23	24	26	26	28	28	30	33	61	64	66	48
Siberian (12)	11	11	11	12	12	14	14	16	19	19	45	42	42	42
Southeastern (9)	12	14	14	15	16	16	16	19	24	25	43	47	43	47
Southern (14)	22	25	31	31	33	33	35	36	45	54	84	90	92	91
Southwestern														
& Ukrainian (10)	17	19	21	21	23	26	27	28	25	26	54	57	58	62
Poland (10)	13	14	13	14	15	14	14	15	16	18	26	30	30	14
Total	165	182	202	205	221	229	245	258	286	320	564	613	622	594

Note: Russian State Historical Archive, St. Petersburg. In the parentheses, we report the number of branches per region. Note that the regions enumerated here follow the divisions used in the source material, where they are referred to as banking districts. The term in the source material for 'Ukrainian' is 'малороссийский' ('Little Russian'). The Capital region includes the cities-branches of St. Petersburg and Moscow. The Caucasus region includes the branches of Tiflis, Vladikavkaz, Yekaterinodar, Novorossiysk, Stavropol, Baku, Batumi, Erevan, and Pyatigorsk. The Eastern-Black Earth region includes the branches of Borisoglebsk, Voronezh, Yelets, Kozlovsky, Kursk, Morshansk, Orlov, Penza, Ryazan, Saratov, Simbir, Syzran, Tambov, Tula, and Tsaritsyno. The Central region includes the branches of Vladimir, Ivanovo-Voznesensk, Kaluga, Kostroma, Murom, Nizhniy Novgorod, Rzhev, Rybinsk, Smolensk, Tver, and Yaroslavl. The Central Asian region includes the branches of Askhabad, Bukhara, Samarkand, Tashkent, Kokand, Semipalatinsk, and Kuyandin (temporary). The Northern region includes the branches of Yekaterinburg, Arkhangelsk, Vologda, Vyatka, Novgorod, Perm, Sarapul, Ivano-Krestovskiy (temporary), and Irbit (temporary). The Northwestern region includes the branches of Riga, Vindava, Libava, Reval, Vilna, Vitebsk, Dvina, Grodno, Bialystok, Kovno, Minsk, Mogilev, and Pskov. The Siberian region includes the branches of Tobolsk, Tyumen, Petropavlovsk, Omsk, Tomsk, Krasnoyarsk, Irkutsk, Vodaybo, Chita, Blagoveshensk, Khabarovsk, and Vladivostok. The Southeastern region includes the branches of Astrakhan, Kazan, Orenburg, Samara, Ural, Ufa, Chelyabinsk, Chistopol, and Menzelinsk (temporary). The Southern region includes the branches of Odessa, Rostov, Berdyansk, Yekaterinoslav, Elizavetgrad, Kishinev, Mariupol, Nikolaev, Sevastopol, Taganrog, Kherson, Yuzovka, Fyodosia, and Yalta. The Southwestern and Ukrainian region includes the branches of Kiev, Kharkov, Zhitomir, Kamenets-Podolsk, Kremenchuk, Poltava, Rovno, Romny, Sumy, and Chernigov. The Polish (Prisvislinskiy) region includes the branches of Warsaw, Kalish, Lodz, Lomzha, Lyublin, Petrokov, Plotsk, Radom, Tomashov, and Chestokhova.

Table F.2: Private Loans by Commercial Banks to Private Persons by region, 1901-1914, million nominal rubles.

Region:	Years													
	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914
Capital (St. Petersburg & Moscow) (2)	461.2	514.9	574.7	609.1	565.0	559.9	592.8	615.9	706.7	919.3	1030.9	1502.4	1673.2	1877.9
Caucasus (9)	45.4	51.2	62.0	62.5	63.9	60.8	65.4	71.5	91.4	122.7	199.1	196.7	221.7	212.5
Eastern-Black Earth (15)	58.1	68.8	66.1	68.6	72.2	75.3	94.9	96.2	93.8	108.1	182.3	197.3	221.7	194.3
Central Russian (11)	30.4	36.5	35.3	32.1	32.3	31.4	38.7	37.4	40.1	52.2	76.9	88.5	92.7	87.7
Central Asian (7)	1.7	2.3	3.4	4.7	5.9	12.7	15.3	17.5	18.5	56.7	99.9	119.1	126.1	106.6
Northern (9)	8.1	8.8	11.1	8.9	8.3	10.4	14.6	20.0	22.0	26.0	57.7	68.4	69.4	68.3
Northwestern (13)	78.7	84.5	97.9	89.0	91.4	85.9	94.3	110.2	116.8	152.1	225.8	251.9	294.6	248.1
Siberian (12)	9.9	10.2	9.6	8.9	9.9	17.7	22.9	22.5	32.5	58.6	120.9	108.0	138.8	101.2
Southeastern (9)	41.9	50.1	51.9	51.0	52.5	54.2	63.2	76.4	84.1	103.3	120.6	139.7	155.4	134.1
Southern (14)	112.1	115.3	124.8	136.6	142.1	129.1	132.8	154.0	199.2	264.0	392.1	431.2	445.5	412.0
Southwestern & Ukrainian (10)	159.0	101.3	105.3	103.0	108.5	117.7	127.6	135.9	150.2	203.9	295.9	332.4	363.5	329.2
Poland (10)	50.0	57.5	77.8	60.8	54.6	57.6	71.9	91.0	114.5	153.2	232.2	234.8	269.2	164.0
Total	1056.4	1101.6	1220.0	1235.2	1206.6	1212.6	1334.4	1448.5	1670.0	2220.1	3034.3	3670.3	4071.8	3935.8

Note: Russian State Historical Archive, St. Petersburg. In parentheses, we report the number of branches per region. Note that the regions enumerated here follow the divisions used in the source material, where they are referred to as banking districts. The term in the source material for 'Ukrainian' is 'малороссийский' ('Little Russian'). The Capital region includes the cities-branches of St. Petersburg and Moscow. The Caucasus region includes the branches of Tiflis, Vladikavkaz, Yekaterinodar, Novorossiysk, Stavropol, Baku, Batumi, Erevan, and Pyatigorsk. The Eastern-Black Earth region includes the branches of Borisoglebsk, Voronezh, Yelets, Kozlovsky, Kursk, Morshansk, Orlov, Penza, Ryazan, Saratov, Simbir, Syzran, Tambov, Tula, and Tsaritsyno. The Central region includes the branches of Vladimir, Ivanovo-Voznesensk, Kaluga, Kostroma, Murom, Nizhniy Novgorod, Rzhev, Rybinsk, Smolensk, Tver, and Yaroslavl. The Central Asian region includes the branches of Askhabad, Bukhara, Samarkand, Tashkent, Kokand, Semipalatinsk, and Kuyandin (temporary). The Northern region includes the branches of Yekaterinburg, Arkhangelsk, Vologda, Vyatka, Novgorod, Perm, Sarapul, Ivano-Krestovskiy (temporary), and Irbit (temporary). The Northwestern region includes the branches of Riga, Vindava, Libava, Reval, Vilna, Vitebsk, Dvina, Grodno, Bialystok, Kovno, Minsk, Mogilev, and Pskov. The Siberian region includes the branches of Tobolsk, Tyumen, Petropavlovsk, Omsk, Tomsk, Krasnoyarsk, Irkutsk, Vodaybo, Chita, Blagoveshensk, Khabarovsk, and Vladivostok. The Southeastern region includes the branches of Astrakhan, Kazan, Orenburg, Samara, Ural, Ufa, Chelyabinsk, Chistopol, and Menzelinsk (temporary). The Southern region includes the branches of Odessa, Rostov, Berdyansk, Yekaterinoslav, Elizavetgrad, Kishinev, Mariupol, Nikolaev, Sevastopol, Taganrog, Kherson, Yuzovka, Fyodosia, and Yalta. The Southwestern and Ukrainian region includes the branches of Kiev, Kharkov, Zhitomir, Kamenets-Podolsk, Kremenchuk, Poltava, Rovno, Romny, Sumy, and Chernigov. The Polish (Privislinskiy) region includes the branches of Warsaw, Kalish, Lodz, Lomzha, Lyublin, Petrokov, Plotsk, Radom, Tomashov, and Chestokhova.

Table F.3: List of Banks in Imperial Russia (end of 19th/beginning of 20th century).

Joint Stock Commercial Credit Banks				Types of Credit Institutions in Russian Governorates
St. Petersburg	Moscow	Other	Special Regime	
Azov-Don Commercial Bank	Moscow Bank	Buzuluk Bank	Libau Exchange Bank	State Bank branches
Volga-Kama Commercial Bank	Moscow Merchant Bank	Commercial Bank in Bialystok	Riga Exchange Bank	Branches of capital region joint-stock banks
Russian Foreign Trade Bank	Moscow People's Bank	Trade & Industrial Bank in Warsaw	Riga City Bank of Accounts	Provincial joint-stock banks
Russian Commercial & Industrial Bank	Moscow Trade Bank	Commercial Bank in Warsaw	Yuryev Bank	Branches of provincial banks
Russian-Asian Bank	Moscow Bank of Accounts	Cooperative Bank in Warsaw		Mutual credit societies
Russian-English Bank	Moscow Private Bank	Warsaw Industrial Bank		City banks
Russian-French Bank	United Bank	Warsaw Bank of Accounts		
St. Petersburg. International Commercial Bank	Commercial Bank Juncker and Co.	Vilna Private Commercial Bank		Savings banks
St. Petersburg Trade Bank		Voronezh Commercial Bank		
St. Petersburg Bank of Accounts & Loans		Kazan Merchant Bank		
St. Petersburg Private & Commercial Bank		Kiev Private Commercial Bank		
Siberian Trade Bank		Lodz Merchant Bank		
Lyon Credit Bank		Lodz Trade Bank		
		Mitava Commercial Bank		
		Nizhny Novgorod Merchant Bank		
		Odessa Merchant Bank		
		Odessa Bank of Accounts		
		Pskov Commercial Bank		
		Riga Commercial Bank		
		Rostov-on-Don Merchant Bank		
		Samara Merchant Bank		
		Smolensk Merchant Bank		
		North Caucasus Commercial Bank		
		Tiflis Commercial Bank		

Note: Library of the Russian State Historical Archive, St. Petersburg.

G   New State Bank Charter

Figure G.1: New Charter of the State Bank 1894.

1 ю н ь.   **1894**   *1 ю н ь.*

10767 питей, ихъ помощниковъ и конторщиковъ, предоставляется Управляющему акцизными сборами. Наемъ и увольненіе прочихъ служащихъ, какъ-то: подвальныхъ, мастеровыхъ, рабочихъ и сторожей при означенныхъ мѣстахъ производится завѣдующими оными. Число сихъ лицъ и размѣръ вознагражденія ихъ опредѣляются смѣтными исчисленіями, ежегодно утверждаемыми Управляющимъ акцизными сборами.

50. Чинамъ акцизнаго надзора, полиціи, а также означеннымъ въ статьѣ 47 лицамъ, не состоящимъ на государственной службѣ, за особые труды по исполненію возложенныхъ на нихъ симъ Положеніемъ обязанностей могутъ быть назначаемы, по представленію ихъ начальства, денежныя награды. Награды сіи выдаются по распоряженію Министра Финансовъ, по предварительномъ соглашеніи, относительно чиновъ полиціи, съ Министромъ Внутреннихъ Дѣлъ.

(Росписанія см. въ концѣ Тома.)

10767.—Іюня 6. Высочайше утвержденный Уставъ Государственнаго Банка.

Мнѣніе Государственнаго Совѣта, Высочайше утвержденное 6 Іюня 1894 года (Собр. Узак. 1894 г. Іюня 24, ст. 698).—Государственный Совѣтъ, въ Соединенныхъ Департаментахъ Государственной Экономіи, Законовъ и Гражданскихъ и Духовныхъ Дѣлъ и въ Общемъ Собраніи, разсмотрѣвъ представленіе Министра Финансовъ по проекту новаго Устава Государственнаго Банка, *мнѣніемъ положилъ:*

I. Проекты: *а)* Устава Государственнаго Банка и *б)* росписанія должностей сего Банка поднести къ Высочайшему Его Императорскаго Величества утвержденію.

II. Опредѣленіе срока и порядка введенія въ дѣйствіе означенныхъ Устава и росписанія (отд. I) предоставить Министру Финансовъ, съ соблюденіемъ при томъ слѣдующихъ правилъ:

1) Служащія въ Государственномъ Банкѣ лица, которыя при преобразованіи онаго не получатъ новаго назначенія, оставляются за штатомъ, на общемъ основаніи.

2) Лицамъ, оставляемымъ на службѣ въ Банкѣ въ должностяхъ, соотвѣтствующихъ занимаемымъ ими должностямъ, сохраняются присвоенные имъ оклады содержанія и классы по чинопроизводству, если эти оклады и классы выше, чѣмъ означенные въ росписаніи (п. *б* отд. I).

3) Служащіе въ Отдѣленіяхъ Государственнаго Банка въ девяти Западныхъ губерніяхъ сохраняютъ присвоенныя имъ прибавки къ содержанію за службу въ краѣ въ прежнемъ размѣрѣ, пока будутъ занимать, въ краѣ должности, соотвѣтствующія по росписанію (п. *б* отд. I) нынѣшнимъ ихъ должностямъ.

4) Производство личныхъ прибавокъ къ содержанію, присвоенныхъ по особымъ Высочайшимъ повелѣніямъ нѣкоторымъ изъ служащихъ въ Банкѣ, пока они будутъ состоять на службѣ въ Банкѣ, продолжается на прежнихъ основаніяхъ.

5) Постановленія Устава Государственнаго Банка (п. *а* отд. I) относительно подчиненія Отдѣленій и Агентствъ Банка Конторамъ приводятся въ исполненіе въ отдѣльныхъ мѣстностяхъ Имперіи въ той постепенности, которая будетъ установлена Министромъ Финансовъ, по постановленію Совѣта Банка, причемъ тѣ мѣстныя учрежденія Банка, которыя временно не будутъ подчинены Конторамъ, остаются въ завѣдываніи Центральнаго Управленія Банкомъ на основаніяхъ, опредѣляемыхъ Министромъ Финансовъ, по постановленію Совѣта Банка.

III. Производство служащимъ въ Государственномъ Банкѣ прибавокъ къ содержанію за операціи учетную и ссудную подъ соло-векселя землевладѣльцевъ отмѣнить.

IV. Предоставить Министру Финансовъ, не учреждая Отдѣленій Государственнаго Банка въ мѣстностяхъ, гдѣ будетъ признано возможнымъ ограничиться производствомъ простѣйшихъ банковыхъ операцій, какъ напримѣръ: выдачею ссудъ подъ цѣнныя бумаги, переводомъ суммъ, пріемомъ платежей за счетъ довѣрителей, покупкою и продажею процентныхъ бумагъ на коммисію, пріемомъ вкладовъ, размѣномъ кредитныхъ билетовъ и т. п.,—возлагать сіи операціи на мѣстныя Казначейства, на основаніи утверждаемыхъ имъ, Министромъ, по соглашенію съ Государственнымъ Контролеромъ, правилъ, съ усиленіемъ, въ потребныхъ случаяхъ, средствъ Казначействъ на счетъ прибылей Банка.

V. Отчисленія въ строительный капиталъ Государственнаго Банка, производимыя изъ взимаемыхъ Отдѣленіями Банка процентовъ по учету векселей (Выс. пов. 20 Декабря 1874 г.),—прекратить, съ тѣмъ, чтобы образовавшійся ко времени прекращенія сихъ отчисленій капиталъ числился по балансамъ Банка на особомъ счету, и чтобы на оный были относимы, съ разрѣшенія Министра Финансовъ, строительные расходы по всѣмъ учрежденіямъ Банка.

VI. Статью 23 Учрежденія Государственнаго

Translation of related excerpts
Chapter 4 Commercial Operations of the State Bank.

Part 1 Commercial Operations of the State Bank, in general.
72. The State Bank provides the following operations: 1. Accounting of promissory notes and other short-term obligations, 2. Issuance of loans and opening of credits, 3. Acceptance of deposits, cash and for storage, 4. Purchase and sale of promissory notes and other valuables and 5. Transfer of funds and other commissioned transactions.

Part 2 Accounting of promissory notes and other short-term obligations.
73. The State Bank accepts toward accounting promissory notes and fixed-term obligations based on personal credit such as: certificates of payment issued by treasuries as well as other obligations of this kind that are recognized by the Bank as valid – by separate individuals, trade, industrial and financial firms, and public institutions to which it is possible to provide credit by the process outlined in Articles 65 and 66.

74. Fixed-term obligations, which are not based on individual credit, are as follows: coupons from government and private securities, which are accepted by the Bank as collateral for loans; the same securities of this kind, in the redemption circulation or the appropriation of mining [enterprises] etc., are accepted toward accounting from each of their bearers.

75. The Bank accepts toward accounting based on Article 13 regular and transferable promissory notes, which can be issued either in the Empire or abroad, if they are scheduled for payment at one of the location points, where there is an institution of the Bank.

76. The promissory notes that are accepted toward accounting must be secured in payment with no less than two trustworthy signatures.

77. Promissory notes, which are utilized as the basis for trade transactions, as well as promissory notes, which are issued for trade-industrial objectives, are accepted toward accounting.

78. Promissory notes and obligations determined in Articles 73 and 74 are accepted toward accounting only in the case that until the payment deadline, there are no more than six months left.
Note. The Bank may be provided – on the resolution of the Bank Council, approved by the Minister of Finance, to accept toward accounting, in well-known locations and for specific types of trade and industry, promissory notes and obligations, for which there are more than six months toward the payment deadline, but not more than twelve months.

79. The insignificance of the sum of promissory notes cannot be an obstacle to their acceptance into accounting.

80. The size of the discount rate is defined by the Bank Council, with the approval of the Minister of Finance, per conditions of trade and industry, as well as with the state of the capital market. The discount rate may not be the same in the localities of the Empire and for different types of trade and industry, and it is determined at a lower level for accounting in short deadlines, in comparison with long deadlines.

Part 3 Issuance of Loans & Opening of Credits.

I. Industrial Loans Under Solo Promissory Notes with Collateral
89. The State Bank can open credits and issue loans under solo promissory notes (under promissory notes with one signature by the promiser), with collateral of: 1. Real estate mortgage, 2. Agricultural or factory inventory mortgage (machines and tools of production), 3. Surety, and 4. Other trustworthy collaterals according to the nearest indication by the Minister of Finance.

90. The loans and credits determined in Article 89 must have a clearly defined characterization, which is indicated by the borrower himself in statements submitted when applying for loans and they are authorized by the Bank exclusively for the supply of turnover capital and necessary equipment: 1. agriculture, 2. industrial enterprises, 3. artisans and handicraftsmen, and 4. small traders.
Note: The Bank is allowed to open credits and issue loans with solo promissory notes for artisans, handicraftsmen, and small traders and without the collaterals specified in Article 89, but such that the amount of the loan issued to an individual borrower does not exceed 300 rubles and that the loans are issued only with the permission of the Ruling Controller.

96. The conditions for the issuance of loans to industrial enterprises (part 2 of Article 90), indicating the industries that can benefit from these loans, are determined by rules approved by the Minister of Finance, and published as general information.

97. The size of a loan to one industrial enterprise (part 2 of Article 90) cannot exceed 500,000 rubles, and to an individual small trader (part 4 of Article 90) six hundred rubles, except for the cases specified in the note to Article 90.

98. Interest rates on solo promissory notes are charged upon expiration of solo promissory notes or early payment.

99. Regarding the procedure for determining the amount of interest rates on loans under solo promissory notes with collateral, as well as regarding the terms for which these loans are issued, and for which installments on these debts are provided, the general rules established for promissory notes apply, which are set for promissory notes with two signatures (Articles 78, 80 and 88). Loans for the purchase of inventory may be issued for periods longer than those specified in Article 78 (with a note), but not longer than three years, so that the loan is repaid gradually, on the conditions specified when issuing it, and such that when each fixed-term payment was presented with a new solo promissory note for the amount remaining due.

100. The loans and credits secured by solo promissory notes with collateral, intended to supply the borrower with turnover capital, should not exceed 75% of the turnover capital required for running his enterprise, household, or industrial business, and, when securing solo promissory notes with agricultural assets, these loans, in combination with previous mortgage debts, should not exceed 75% of the value of current assets, and in case of collateral by factories - 50% of the collateral value. The size of the loan for the acquisition and renewal of inventory cannot exceed 50% of the valuation of the inventory securing the loan.

Source in Original: 10767. Июня 6. [1894] Высочайше утвержденный Устав Государственного Банка. Мнение Государственного Совета, Высочайше утвержденное 6 июня 1894 г.; Устав Государственного Банка, Собрание Узаконений 1894 г. Июня 24, ст.698, 6 июня 1894, 24 июня 1894 (вступает в силу), Полное собрание законов Российской Империи. Собрание Третье. 01.03.1881—1913 г. (в 33 томах) (ПСЗ-3, т. 13 ст. 410-421).

H   Background on the operation of the State Bank

H.1: Structure of State Bank operations and statistics

The State Bank of the Russian Empire was composed of 120 offices and branches that developed gradually from 1881 until 1896, the year before Russia's official accession to the system of the international gold standard. The financial statement of any office or branch of the State Bank is composed of two parts. In the first part, there is a turnover statement with the reporting of flow variables (see Figure D.1, where a copy of the Kharkiv branch turnover statement for the financial year 1881 is provided). In the second part, there is a balance sheet that reports stock variables, which are crucial for the measurement of branch liquidity, such as the amount of traded promissory notes, the overall balance that matches assets with liabilities, and the size of special loans to industrial establishments and agricultural households. Table D.1 reports the variables observed in the turnover and balance sheets of the State Bank offices and branches by period, while Table A.6 provides the descriptive statistics of those variables, in total and along three periods between 1881 and 1914: 1881-1890, 1891-1900, and 1901-1914. As the State Bank system expands and bookkeeping improved with the perspective of Russia's accession to the gold standard (Crisp, 1953; Barkai, 1973; Eichengreen and Flandreau, 1994; Gregory, 1979; Gregory and Sailors, 1976; Owen, 1985; Drummond, 1976; Garvy, 1972) we observe more recorded variables in the respective balance sheets of its offices and branches, although there remain a substantial amount of missing data. During the period 1881-1890, there are more variables recorded in the turnover statement than in the balance sheet, whereas the opposite is observed during the period 1901-1914 (Table D.1). The transitional period 1891-1900 has the lowest number of recorded variables overall. When it comes to the extent of missing data for the various variables by branch, we report the degree of missing data for the whole sample period (1881-1914) in table D.2. To do that, we multiply missing observations per year by the number of governorates within the State Bank system. Furthermore, we compute the number of missing values at the level of macro-regions; each macro-region includes on average ten branches.[1] As is observable in the table, the degree to which financial data is missing varies by region and financial instrument, which is why we prefer to use an indirect measure of credit (distance to the branch) rather than credit itself in our main estimation strategy. There are also changes in statistical classification. While

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[1] The exact number of branches per region is mentioned in parenthesis next to each financial region's name.

agricultural and industrial loans are reported annually in the turnover statement for the period 1881-1890, we observe them in the balance sheet for the subsequent periods 1891-1900 and 1901-1914. This change in the accounting strategy might suggest an increase in the provision of agricultural and industrial loans from the 1880s and the 1890s onward. In the period 1901-1914, when the role of the State Bank was largely confined to shoring up the commercial banking system, there is a strong focus on variables capturing the institutional dependence of private banks on the offices and branches of the State Bank. During this period, data is available on the number of commercial banks, the number of mutual credit societies, the size of accounted loans provided by private credit organizations, and their respective debt to the State Bank office or branch within their jurisdiction.

H.2: Commercial Banking and financing environment for Russian enterprises

Apart from the State Bank, Russian enterprises had a menu of financing options available, although these were not always independent of State Bank intervention. The most obvious were commercial banks. Tables F.2 and F.3 in the Online Appendix provide descriptive evidence of the development of commercial banking in the period 1901-1914, based on State Bank records. Both in terms of private bank numbers and the size of disbursed private credit, the Capital, the Southern, the Southwestern, the Ukrainian, and the Northwestern regions constitute the cores of financial development within the premises of the Empire. There is a discontinuous jump in money liquidity between the first and the second decade of the 20th century (Table F.2), suggesting that while commercial banks became important after 1909, this was to a lesser degree the case during Witte's tenure. We see the same increase towards a deeper and more diverse financial system both in terms of the bank types that appear in the private sector as well as the geographic distribution of the dominant type of the joint stock commercial credit bank (Table F.3). We observe the dissemination of joint stock commercial credit banks beyond the premises of the capital financial region of Moscow and Saint Petersburg and in cities of key significance for the imperial Russian economy such as Warsaw, Lodz, and Odessa. Similarly, the data in tables F.2 and F.3 point towards the number of banks and the volume of credit between 1901 and 1914 increasing most dramatically in some of the most peripheral areas of the Empire, such as Siberia and the North, while it increased much slower in the Central and Capital regions.

The growth of private banking in Russia after the turn of the century disentangled credit provision from the direct control of the government and allowed private bankers to decide their terms of credit contracts with businesses; yet government control in the banking sector

remained strong and favored entrepreneurs connected to the regime (also through the State Bank system); evidence suggests private financial institutions were less likely to be subject to soft budget constraints by the Treasury compared to government-owned ones (Garvy, 1972). This mixed banking system allowed some significant discretion space for private bankers after the turn of the century, just as it had left discretionary leeway for local State Bankers during Witte's tenure in the 1890s (Gindin, 1960; Garvy, 1972; Alimdjanov and Yanchenko, 2020).

Salomatina (2018) underscores the institutional credit environment in the Russian Empire; while joint-stock banks were instrumental in providing credit to joint-stock corporations, promissory notes (vekselia) were the main transactional instrument for credit provision (Salomatina, 2022). St. Petersburg and Moscow (capital region) had the most developed private banking system compared to the financial regions, which provided a distinct advantage to capital-based firms (Brumfield et al., 2001). At the same time, at the governorate level commercial banking services were tied with agricultural production and transportation for purposes of interregional trade (Salomatina and Ivakin, 2021).

From this data and the associated literature we draw the conclusion that during Witte's tenure, commercial banking was still weakly developed outside of the Central regions, thus offering scope for State Bank intervention during this period.

Table F.3 mentions some other institutions comprising the financial landscape at the governorate level, including mutual credit societies, credit cooperatives, savings banks, district banks and city banks. While disaggregated data on their precise operation is scarce, these institutions often catered to smaller borrowers, such as artisans and food producers (Ananich, 2006). Although we cannot exclude that they offered finance to some of the smaller enterprises in our sample, the fact that Witte's new Charter of the State Bank (see below) expressly permitted and encouraged the Bank to lend to these kinds of recipients suggests that a lack of small-scale lending was deemed a serious concern in policy circles. Kotsonis (1999) accordingly paints a very dark picture of rural small-scale credit in Imperial Russia. Although on balance probably somewhat *too* pessimistic, this assessment is broadly in line with descriptive data collected by Crisp (1976, p. 118-119), which show that assets of mutual credit societies and city banks were on average contracting in the 1880s, and growing quite modestly thereafter, before expanding at a somewhat more rapid pace, especially in rural areas, before the Great War. This stands in sharp contrast to the explosion of small-scale credit in neighboring eastern Prussia at the same time (Suesse and Wolf, 2020).

Additionally, incorporation and the issuance of equity, or financing from retained earnings offered a way forward. This was mostly available to the largest of enterprises. Gregg

(2020) details the extraordinarily high administrative hurdles for incorporation as a legal entity in Russia, which led to this option only being available to the largest and most profitable establishments (less than 5% of establishments in our dataset are a corporation).

Finally, personal credit (to the individual owning an unincorporated establishment) or informal inter-firm credit were common in many situations. While there exists to our knowledge no reliable and comprehensive data on such transactions, which by their very nature were informal and therefore not always reported to the statistical authorities even if they might have been recorded locally by the individual owner, there is insightful qualitative literature on this subject. In his landmark volume on the Russian merchantry, Rieber (1991) reports on the use of informal kinship or formal guild-based networks on the basis of which merchants extended credit to each other. Social estates (merchants, nobles, townspeople) were also common markers in commercial affairs. The same author also provides qualitative and descriptive quantitative evidence suggesting that these business networks often ran along ethnic and / or confessional lines. This reflected the fact that entrepreneurial communities in many regions of Russia were often delineated along these lines. In the western parts of the Empire, Germans and Jews constituted influential commercial minorities, while this position was often occupied by Old Believers (an Orthodox Christian sect) in the central regions, and by Armenian and Greek entrepreneurs on the shores of the Black Sea, the Caucasus and further east. These accounts are corroborated by Crisp (1976), Ananich (2006), and more recently by Raskov and Kufenki (2017).

Overall, the historical evidence supports our conclusion that finance availability did provide a real constraint for many enterprises before the turn of the century, outside of the very largest establishments, or those in the central and most industrialized regions. This picture lends credence to our empirical results, where we find the effects of the State Bank to be dependent on the existing financing environment in a region.

H.3: Institutional framework for the State Bank and the 1894 Charter

As an agency of the Ministry of Finance and the main imperial financial institution, the State Bank performed both public and private banking functions. It acted as a 'commercial' deposit-taking institution (although depositors were generally large and included state agencies). At the same time it relied on its close connection to the government to be able to extend the volume and subsidization of its credit, with taxes into the state budget and sovereign debt being the ultimate guarantors of the bank's operations.

The New Charter of the State Bank in 1894 (see Appendix G for the Russian original and the translation into English) provides extensive evidence on the 'developmental' functions of the State Bank, i.e. its relations with and role in the development of industrial finance as well as commercial banking. Promissory notes appear to be the main financial instrument of the State Bank for the financing of private enterprises both for trade and industrial purposes (Articles 72, 73, and 80). The joint treatment of trade- and industry-related promissory notes that may be accepted by the State Bank underscores the role of Bank activities toward the industrialization of the imperial Russian economy supported by a hierarchically regulated State Bank institution (Article 78). Moreover, promissory notes do not only constitute sources of financial liquidity themselves, but they can also provide the basis for the issuance of loans through the opening of credit lines within the State Bank system (Article 89). The identification of industrial enterprises, artisans, and handicraftsmen as well as small traders as categorical recipients of State Bank credit based on collateral-driven promissory notes has a two-fold significance. On the one hand, it shows that the financing of industry-related units is multifaceted and, thus, it can span anything between a small workshop and a major industrial plant. On the other hand, it corroborates the centrality of promissory notes for loans issued directly by the State Bank (Articles 90, 96, and 97). The type of solo (with one signature) promissory notes allows for higher flexibility in financial transactions and can be used to generate collateral for both enterprises and industrial establishments (Article 99). An interesting phenomenon in the credit policy of the State Bank is the general absence of very long-term credit; the longest period mentioned in Article 99 is three years. There are, nonetheless, differences between the various financial instruments. Promissory notes are characterized as an instrument of short-term credit to industrial establishments (Part 2 of the Charter). This is why we observe the positive and statistically significant correlation between promissory notes and revenue and labor productivity; promissory notes provide low-risk liquidity, have a short-horizon repayment schedule, and can be utilized by and across different types of firms (industrial, trade, financial, public). Industrial loans, however, have been more inclined toward promoting machinery investment; they are provided with collateral under a solo promissory note (Part 3 of the Charter), are larger in size, have a much longer repayment schedule, although this may not exceed three years, and may reach up to 75 percent of the firm's current assets (Article 100). Their focus is on turnover capital and the supply of equipment (Article 90). Moreover, Article 100 sets the turnover capital ceilings for credit provision (50 percent for factory collateral, 75 percent for enterprise or industrial business, and 50 percent for the renewal or the acquisition of inventory).

It is also important to point out what the Charter did not do – although it specified general conditions for loan access and delineated broad groups that *could* receive loans (industry, artisans, agriculture, small traders according to Art. 90), it did not specify in detail who the exact recipient of the loan *should* be. This supports the literature arguing that local branches had significant amounts of discretion in deciding between the multitude of eligible recipients (Bugrov, 2012). Art. 80 similarly points to local discretion, stipulating that the Minister and central Bank Council set interest rates, while simultaneously opening up the possibility of these rates diverging 'in the localities of the Empire and for different types of trade and industry'.[2] In practice, of course, the extent to which individual branch managers deviated from the rules or, more benignly, were able to exercise local discretion in choosing borrowers conditional on the rules, is not detectable in the legalism of the Charter. Yet historical evidence points to the fact that loan access was a function of political connections to government officials and personal ties to firms whose production was favored by local political elites (Lychakov, 2018). Gindin (1960) also suggests that, in addition to local discretion within the rules, the rules were often simply broken, for example when local branches did not insist on repayment of loans for some enterprises, or when interest rates were held arbitrarily low for selected debtors. This led to the emergence of the soft-budget constraint in firm financing often deemed characteristic of many state-led banking systems (Dewatripont and Maskin, 1995).

Hence, it becomes clear that the existence of a principal-agent relationship between the State Bank and its office or branches underpinned the financing for industrialization during Witte's tenure, while soft budget constraints governed the relationship between branch and enterprise (Bugrov 2012). While this relationship changed somewhat after the turn of the century, it essentially introduced local commercial banks as just another agent of the State Bank into the system, while leaving the soft budget constraints intact. The State Bank was thus both a direct financing institution for industrial projects and an indirect one by channeling liquidity to the market through a multiplicity of private bank types across the country.

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[2] Frenkel (2017) provides evidence that local conditions for credit access from the State Bank did indeed vary on an interregional basis in practice.

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