

Harvest, railway transportation and banking services to the agriculture in the Central Black Earth Region of the Russian Empire in the late 19th century

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Abstract

This paper studies the influence of the service sector (joint-stock commercial banks and railways) on the economic development of agricultural regions within the Russian empire in the second half of the 19th century, using the case of the Central Black Earth region. The study compares yield data for major crops, railroad transportation of grain and flour, and the banking services to agriculture producers and traders. Statistical analysis of this data disproves the prevailing historical economic viewpoint which claims that agricultural exports were not accompanied by bank support, because it did not take into account a rather high level of infrastructure around the Riga–Oryol railway trunk, which was formed back in the 1870s. The exports in this region consisted of the prior year's harvest, which indicated a rather developed system of crop storage and accompanying banking services. The study reveals a dramatic growth in the services sector throughout the Central Black Earth region during the 1890s. In previous decades, this system could not be extended to the entire region due to a long history of unfavorable conditions in the agricultural and banking sectors. Thus, banking services in Russia at the end of the 19th century were provided to not just industrial and stock markets customers. In those regions dominated by agriculture, services infrastructure had been oriented towards this sector.

Keywords: commercial banks, bank credit, railroads, crop statistics, agriculture, commodity trade, agrarian crisis, Central Black Earth region, Russian Empire, historical statistics.

JEL classification: N23, N53, N73, N93, R11, R32, R41, R51.

1. Introduction

Improving the conditions for exchanging goods and services is one of the main functions of the banking system, which was particularly important for

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a country with a large agrarian sector and vast provinces like the Russian Empire in the second half of the 19th century. However, little is known about the role the banks played in exporting agricultural produce during that period. This study begins the process of filling that gap. We focus on the quality of service-related infrastructure—railways and joint-stock commercial banks—that influenced the economy of agricultural regions. We use a regional case to show that, for the Russian Empire during the second half of the 19th century, economic growth and development should be interpreted in a broader sense than just industrial development and industrialization.

The aim of this study is to reveal the connection between agricultural production and the export of agricultural products via railroads and banking services to agriculture in the Central Black Earth region during the latter half of the 19th century. The study covers six agrarian provinces, namely: the Voronezh, Kursk, Oryol, Ryazan, Tambov, and Tula Provinces. The banking sector is represented by joint-stock commercial banks, the main institutions of the 19th century which provided short-term credit and payment services to business customers.

Russian banking history is poorly related to the history of the agrarian sector for several reasons (for more information on agricultural banking during the latter half of the 19th century in Russian literature see: Salomatina, 2019, pp. 153–154). First, the sectoral affiliation of the customers is not evident from the banking statistics of that era. Second, the academic literature focuses primarily on the relationship between the banks and industry with regards to the industrialization. Third, economic conditions from 1875 to 1893 were generally unfavorable for both banks and agriculture; as a result, scholarly literature is dominated by the crisis topic.

Banks are also not mentioned in the literature on Russian economic history dedicated to the grain trade and rail transport for agricultural products (Radtsig, 1896; Metzer, 1974; Slepnev, 1992; Davydov, 2010; Kitanina, 2011). At the same time, global economic history has a variety of studies of the nineteenth-century tertiary infrastructure related to the development of railways, and the integration of the agricultural sector into the global market, as well as in the context of the economic history of imperialism (Clark, 1964; Fishlow, 1965; Forward, 1982; Derbyshire, 1987; Novek, 1987; O'Brien, 1997; Cain and Hopkins, 2001, pp. 36–37).

The main hypothesis of our study is that with sufficiently developed services infrastructure, the previous year's harvest was exported from the region. This indicates sufficient capacity for crop storage in the region, and the storage of agricultural produce was naturally combined with bank credit against the produce and other forms of banking services for agriculture. Testing this hypothesis requires data on crops, transportation, and agricultural banking services. This data was collected for the provinces of the Central Black Earth region for the period of 1874–1901. The time frame of the study is determined by the available data arrays on loans secured by agricultural goods issued by the largest commercial bank in the region, the Oryol Commercial Bank.

The yield data for this study was gathered from the appendices to the Governors' Reports and from the publication of the Central Statistical Committee of the Ministry of Internal Affairs (TsSK MVD). Statistics on railroad transportation by the Central Black Earth provinces are taken from the grain and flour

shipment data by stations, published by the Ministry of Transportation. Banking statistics include the annual sum of credits in the form of discounted bills of exchange, loans against goods and documents for goods in transit, as well as banking services related to collections of payments under bills and documents for goods. These statistics include only operations related to agriculture and trade in agricultural products carried out by the units of all joint-stock commercial banks operating in the Central Black Earth region (headquarters, branch offices, agencies, commission agents).

The study consists of two sections. The first section focuses on crop dynamics and yield statistics. The second section compares crop, transportation and banking transactions by regional clusters within the Central Black Earth region, based on the location of railways and banking offices. The final section summarizes the findings of the study.

Thus, our study uses specific data to show that banking services in Russia during the late 19th century were not limited to heavy industry, joint-stock companies and the stock markets in St. Petersburg and Moscow, as emphasized by previous historical studies. The importance of agriculture in the economy implied a close relationship between the agricultural and financial sectors, which can be identified and analyzed.

2. Agricultural production statistics in the Central Black Earth region, 1874–1901

This section is devoted to agricultural production trends in the Central Black Earth region from 1874 to 1901. We propose comparing the dynamics of the harvest, i.e. annual changes in crop output, to that of railway transportation and banking operations. This requires the data to be broken down by district (*uezd*) so that we can match the agricultural production areas with railroad transportation volumes and banking networks as precisely as possible.

The use of harvest statistics collected by the Russian authorities requires an explanation as to the kind of statistics these were and how they are utilized in our research. Scientific discussions comparing yield data from different sources are not directly relevant to the topic of our study (e.g., see: Nifontov, 1974, pp. 3–81; Kovalchenko, 1979; Davydov, 2012a, 2012b; Kuznetsov, 2012); however, the materials on the Central Black Earth region that we collected and processed constitute another contribution towards addressing this problem.

The regular publication of yield data by district did not occur in the Russian Empire until the 1880s. The most comprehensive publication is the TsSK MVD “Yield... of year... in European (and Asian) Russia,” which presents data starting in 1883. We took data from this publication on yields for major grain crops—rye, wheat, oats, and barley—in the six Central Black Earth districts for 1883–1901. This data is stated in poods (*puds*) starting in 1888. Data for 1883–1887, published in quarters (*chetverts*), were converted to poods using data on average weight of quarter of various types of cereals for 1881–1900 from the monograph by Mironov (1985, Appendix, Table 19).

For the years 1874–1882, harvest data was collected from the appendices to the Governors’ Reports. These materials are available in two versions: first, as the publications of “Review of... Province for year...,” filed in libraries, and

second, as appendices to the Governors’ Reports in various funds of the Russian State Historical Archive (see Appendix 1 for the bibliography of Province Reviews and appendices to the Governors’ Reports). This data is expressed in quarters. To convert from quarters to poods, we draw on the average numbers used by B. N. Mironov for 1881–1900. Similar data for the 1870s could not yet be found, although it is unlikely that these indicators changed much from the 1870s to the 1890s.

Time series compilation using data from the Governors’ Reports and TsSK MVD is a long-established technique (Nifontov, 1974). The question for our study is how the two statistics would correlate specifically for the Central Black Earth region. For this purpose, Fig. 1 shows an example of a complete data series compiled from the appendices to the Governors’ Reports (1874–1901), compared to the TsSK MVD data (1883–1901) for the Oryol province, where the largest and most successful commercial bank in the Central Black Earth region, the Oryol Commercial Bank, was operating. The dynamics and linear trends of the two series effectively coincide, i.e. if either series is used, the years of growth and decline will be the same, and there was no growth in grain production over the period as a whole. The shortcoming of the appendices for the Oryol province is a gap in the 1897–1898 period, when no reports were compiled (Razdorskii, 2011, p.398). TsSK MVD data had to be used in order to fill this gap.

At the same time, the harvest according to TsSK MVD data was noticeably lower in absolute figures than in the appendices to the Governor’s Reports for the Oryol province. To what extent was this difference typical for the Central Black Earth region? To answer this question, Tables 1 and 2 compare figures from the two sources for all six provinces during the late 1880s and 1890s, i. e. for 1888 and 1898. From Table 1, it appears that in 1888 there were no unilateral overestimations or underestimations between the two sources of statistics. Interestingly, the Ryazan Province simply published the TsSK MVD data in the Appendix to

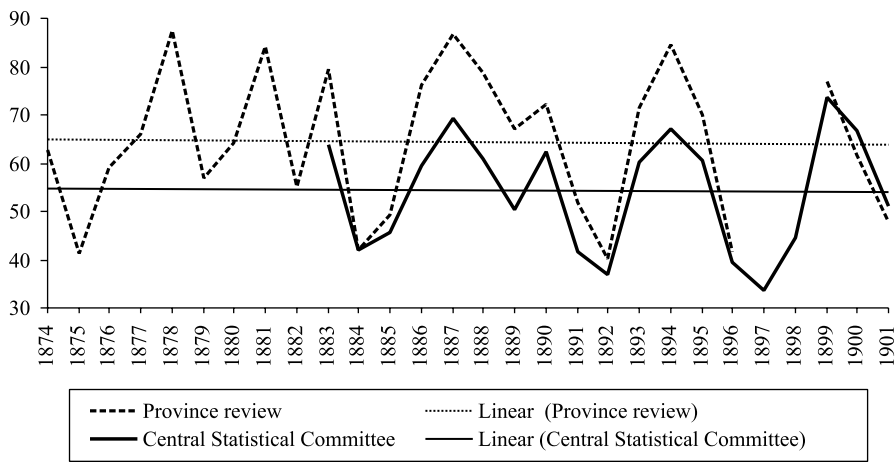


Fig. 1. Harvest in Oryol Province according to the Central Statistical Committee (TsSK MVD) and Province Review (million poods).

Note: Harvest of rye, wheat, oats and barley.
Sources: TsSK MVD, 1884–1888, 1889–1902; See Appendix 1 for reviews of the Oryol province and appendices to the Oryol Governor’s Reports.

Table 1

Central Statistical Committee (TsSK MVD) and Province Review data for 1888.

| | Rye | Wheat | Oats | Barley |
|--|------|-------|------|--------|
| Province Reviews, million poods | | | | |
| Voronezh Province | 46.5 | 13.4 | 18.8 | 4.7 |
| Kursk Province | 47.2 | 7.5 | 23.0 | 1.1 |
| Oryol Province | 42.8 | 4.3 | 31.4 | 0.3 |
| Ryazan Province | 35.9 | 0.8 | 24.2 | 0.01 |
| Tambov Province | 55.6 | 2.5 | 38.5 | 0.1 |
| Tula Province | 28.6 | 0.7 | 26.3 | 0.2 |
| TsSK MVD, million poods | | | | |
| Voronezh Province | 51.7 | 21.0 | 20.7 | 5.2 |
| Kursk Province | 40.4 | 10.8 | 20.2 | 1.2 |
| Oryol Province | 32.4 | 4.8 | 23.4 | 0.3 |
| Ryazan Province | 35.4 | 0.8 | 24.6 | 0.01 |
| Tambov Province | 60.7 | 4.7 | 34.5 | 0.2 |
| Tula Province | 32.7 | 1.4 | 27.3 | 0.2 |
| Province Reviews, % of the TsSK MVD data | | | | |
| Voronezh Province | 90 | 64 | 91 | 90 |
| Kursk Province | 117 | 70 | 114 | 93 |
| Oryol Province | 132 | 88 | 134 | 109 |
| Ryazan Province | 101 | 99 | 98 | 101 |
| Tambov Province | 92 | 54 | 112 | 31 |
| Tula Province | 87 | 51 | 96 | 100 |

Sources: TsSK MVD, 1889; see Appendix 1 for Province Reviews and appendices to the Governors' Reports.**Table 2**

Central Statistical Committee (TsSK MVD) and Province Reviews data for 1898.

| | Rye | Wheat | Oats | Barley |
|--|------|-------|------|--------|
| Province Reviews, million poods | | | | |
| Voronezh Province | 37.9 | 15.4 | 12.1 | 7.6 |
| Kursk Province | 42.1 | 6.2 | 24.2 | 2.2 |
| Oryol Province ^{a)} | — | — | — | — |
| Ryazan Province | 26.5 | 0.1 | 6.7 | 0.004 |
| Tambov Province | 62.2 | 1.2 | 17.6 | 0.03 |
| Tula Province | 19.9 | 0.3 | 13.7 | 0.1 |
| TsSK MVD, million poods | | | | |
| Voronezh Province | 37.7 | 16.1 | 12.8 | 8.2 |
| Kursk Province | 43.2 | 6.2 | 24.2 | 2.2 |
| Oryol Province | 27.6 | 1.2 | 15.3 | 0.3 |
| Ryazan Province | 26.5 | 0.1 | 6.7 | 0.004 |
| Tambov Province | 63.1 | 1.1 | 18.8 | 0.02 |
| Tula Province | 19.9 | 0.2 | 13.7 | 0.1 |
| Province Reviews, % of the TsSK MVD data | | | | |
| Voronezh Province | 100 | 96 | 95 | 92 |
| Kursk Province | 98 | 100 | 100 | 100 |
| Oryol Province | — | — | — | — |
| Ryazan Province | 100 | 100 | 100 | 100 |
| Tambov Province | 99 | 108 | 94 | 108 |
| Tula Province | 100 | 127 | 100 | 100 |

^{a)} No appendix was compiled.*Sources:* TsSK MVD, 1898, 1899; see Appendix 1 for Province Reviews and appendices to the Governors' Reports.

the Governor's Report; the small difference present in the table is caused by the conversion from quarters to poods.

Comparing Tables 1 and 2 (for 1888 and 1898), we noticed that the situation with the Governors' Reports changed drastically from the 1880s to the 1890s. In 1898, the Oryol province did not prepare any appendices on yields. The Ryazan province had switched to publishing the TsSK MVD data long ago, while figures in other Province Reviews were much closer to the TsSK MVD data than in the late 1880s, meaning that the difference between the two statistical sources was gradually eroding.

It is important to note that the appendices to the Governors' Reports were a very time-consuming source to work with. Having a Province Review published did not necessarily mean that a copy held in a particular library would have the required statistical table. The data published in the Province Reviews was often too abbreviated or too generalized, or not in the proper layout we needed, which made it necessary to recalculate entire data sets. We had to resort to the RGIA (Russian State History Archive) funds in search of appendices to the Governors' Reports noticeably more frequently than we assumed at the beginning of this work, when the main emphasis was supposed to be placed on the published Province Reviews. The results of this work are systematized in Appendix 1, which contains a bibliography of the Province Reviews and appendices to the Governors' Reports used in our study.

Eventually, it turned out that both sources were suitable for identifying agricultural production dynamics and trends. In absolute numbers, the difference between the two statistical sources varied between provinces and significantly decreased by the end of the 1890s. The advantage of the TsSK MVD data was its ease of use, which is noted in other studies (Davydov, 2012a, pp. 149–150). The laborious process of handling the appendices to the Governors' Reports was a significant factor in research planning. In addition, the set of published Province Reviews was not a complete substitute for the archived materials. In our study, working with the appendices proved optimal only for the years 1874–1882, for which no TsSK MVD data existed.

The entire harvest of rye, wheat, oats, and barley for 1874–1901 is shown in Fig. 2. While the data series does not show an overall downward trend, years of poor harvest are clearly seen, which are also confirmed by other sources: the heaviest ones occurring in 1875, 1891–1892, 1897, and some years with smaller drops—1879–1880, 1882, 1884, and 1889. Of course, only a portion of the harvest reached the market, but in any case, these fluctuations negatively affected agricultural traders and producers, who were served by banks.

What was happening with agricultural prices during those periods is a special question, because, as we know, these were the years of a global agrarian crisis (Egiazarova, 1959; Mironov, 1985, pp. 45–49). In our paper, the agrarian crisis is specifically understood as a consequence of falling prices, because for banks it meant a decrease in the value of the collateral they worked with, which increased the bankruptcy risk for customers in the agricultural production and trade sector (for an overview of approaches to the agrarian crisis see: Slepnev, 2019).

The scale of the price drop in the Central Black Earth region can be estimated if we conventionally convert poods to rubles per the same ratio of the four kinds of grains shown in the harvest statistics. The problem is that for the 1874–1901

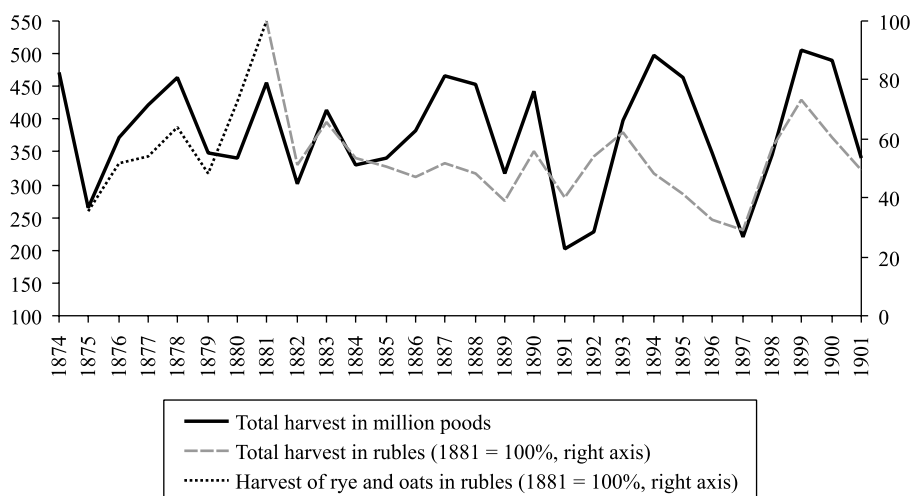


Fig. 2. Grain harvest in the Central Black Earth region's provinces, 1874–1901.

Note: Entire harvest—for rye, wheat, oats and barley.

Sources: 1874–1882: see Appendix 1; 1883–1901: TsSK MVD, 1884–1888, 1889–1902; Grain prices: Mironov (1985, Appendix, Tables 11, 14–16).

period, no regular price data is available for the region until 1881. Mironov (1985) provides a collection of data gathered from various sources. These prices Mironov describes as procurement prices (Mironov, 1985, Appendix, Tables 11, 14–16). As for the 1874–1880 period, Mironov only included the quartermaster prices of oats and the price of rye flour as a substitute for rye prices (Mironov, 1985, Appendix, Tables 11, 14; Source data for 1875–1880: Kaufman, 1889). We have not yet been able to gather prices for all cereals (rye, wheat, oats and barley) for all provinces of the Central Black Earth region for 1874–1880 either, despite working with known lists of sources (Mironov, 1985, pp. 290–291; Izmestjeva, 1979), so these prices are a topic for future research, and our paper uses price data from Mironov's book.

The price trends for all cereals are presented in Fig. 2 for 1881–1901 as a percentage of 1881. Generally, the series trends downwards, despite several annual rises in prices due to poor harvests. The 1880s were a particularly unfavorable period for the agricultural operations of banks. In the 1890s, market players had adapted to price fluctuations (Egiazarova, 1959, 135–152); however, market conditions were still unstable, as shown by 17 banking units (mostly small—agencies and commission agents) closing down between 1896 and 1898. In total, we managed to find information about 40 various units of joint-stock commercial banks operating in the Central Black Earth region during the 1890s.

The price trends in the early part of the period, 1874–1880, are represented only by the prices of oats and rye flour, and the trend during this time period, on the contrary, is upward. However, it was against this background that the bank branches in Kursk, Kozlov and Morshansk closed in 1878, and about which very little information is available.

Thus, we can see that agricultural production during the 1874–1901 period was highly volatile and accompanied by long periods of falling prices. Surviving during this time was not easy for traders and producers. The next section describes

the development of railroad transportation and banking services for the agricultural sector under these conditions.

3. Harvest, rail transportation and banking transactions: Regional detail

This section focuses on the relationship between crop yields, their transportation by rail, and banking services provided to the agricultural sector, primarily via short-term credit. It is a question of developing service infrastructure in agrarian regions.

Transportation can be related to agrarian production in two ways. First, when the current year's harvest is exported to other regions for storage, processing, or resale. This means a correlation between the current year's shipments and the same year's crops. And second, if the previous year's harvest was exported, which meant that the area had storage opportunities that were available and utilized. In this case, the current year's shipments must correlate with the previous year's crop. The relationship between crops and transportation may not be statistically apparent if the railway network did not cover the entire study area, and if both the current and the previous year's crops were exported each year in comparable proportions.

Commercial banks could also participate in exporting the harvest. If the current year's harvest was exported, banks issued advance payments against shipments of goods, and also provided services to receive payments on discounted bills of exchange and documents for transported goods in interregional settlements. If the previous year's harvest was exported, another type of short-term agricultural credit was added to the aforementioned operations: in the autumn, during the low-priced period, a producer or wholesaler would take a loan for current expenses secured by agricultural products, which were sold a few months later at higher prices. In addition to loans in the form of advance payments or loans secured by agricultural produce, personal credit to producers or wholesalers was often used in the form of discounting of the bills of exchange, which were not linked to specific batches of goods.

The correlation between banking operations, on the one hand, and transportation and agricultural production, on the other, is in itself an indication that the banking business had developed to a noticeable scale for the regional economy. If this correlation did not exist, it would mean that joint-stock commercial bank operations were not significant within the territory. However, in this case, other intermediaries—trading firms, branches of the State Bank, small banks (mutual credit societies and municipal banks)—could take over the provision of financial services to the agricultural sector. In such a case, the correlation between transportation and agricultural production would still be observed, even in the absence of correlation with banking operations.

Railway infrastructure and banking services availability were very different across the Central Black Earth region. For regional detail, this study introduces clusters, i.e. areas united by common rail and banking networks. The cluster boundaries are primarily drawn along district boundaries, though with a few exceptions due to the location of railways and banking units which we will comment on later. Fig. 3 presents a map showing the clusters, railroads, and localities that

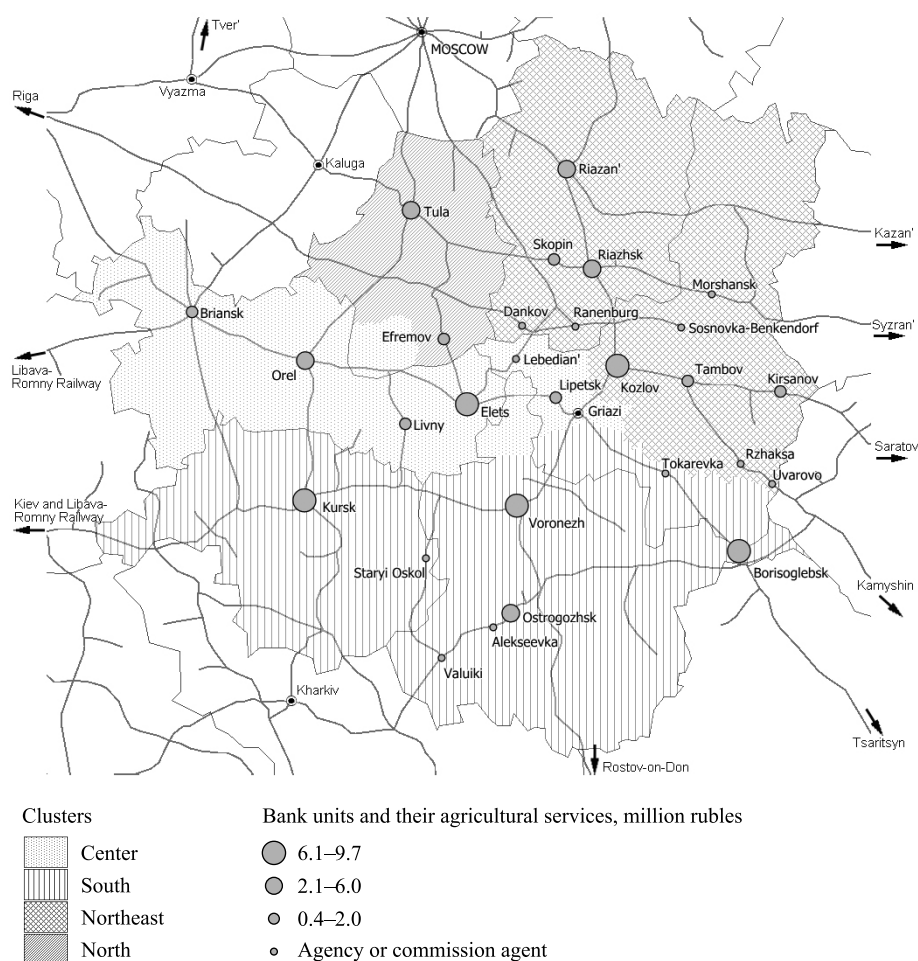


Fig. 3. Regional clusters, railways and banking services provided to the agricultural sector in the Central Black Earth region in 1900.

Source: Created by T. Valetov based on the data compiled by the authors.

had joint-stock commercial bank units by the end of the study period, i.e., 1900. The items are ranked by the volume of banking services provided to agriculture in each item.

For each regional cluster, a correlation for three indicators was calculated: yields, transportation, and banking (Table 3). The calculation of annual growth for each series was used as a trend removal method.

Comments on the yields of the four major crops (rye, wheat, oats, and barley) for the 1874–1901 period have been provided in the previous section. This series is included in the calculations in two versions: first, without a shift relative to the transportation and banking series, so that the series can be compared with the current year's crop; and second, with a shift of one step to the right, in which case it would show a correlation with the previous year's crop.

Data series on rail shipments include data on shipments of the four types of grains mentioned above, as well as wheat and rye flour from stations that also had a bank unit that year (Fig. 4). In other words, we are trying to track the volume of commod-

Table 3
The correlation between yield data, transportation and banking transactions.

| Cluster | Transportation × Yield | Credit × Yield | Transportation × Credit |
|---|---------------------------|-------------------|----------------------------|
| Central cluster | | | |
| 1 | 0.24 | −0.15 | 0.74*** |
| 2 | 0.55** | 0.49** | — |
| South cluster | | | |
| 1 | 0.42* | 0.34 | 0.45* |
| 2 | −0.14 | 0.12 | — |
| Northeast cluster | | | |
| 1 | 0.02 | 0.21 | 0.07 |
| 2 | 0.36 | 0.26 | — |
| North cluster | | | |
| 1 | 0.21 | 0.13 | 0.06 |
| 2 | 0.67*** | −0.06 | — |
| Throughout the Central Black Earth region | | | |
| 1 | 0.25 | 0.10 | 0.62*** |
| 2 | 0.36 | 0.30 | — |

Note: 1—current year’s crop (the “Yield” row is not shifted to the right); 2—previous year’s crop (the “Yield” row is shifted one cell to the right); *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors’ calculations.

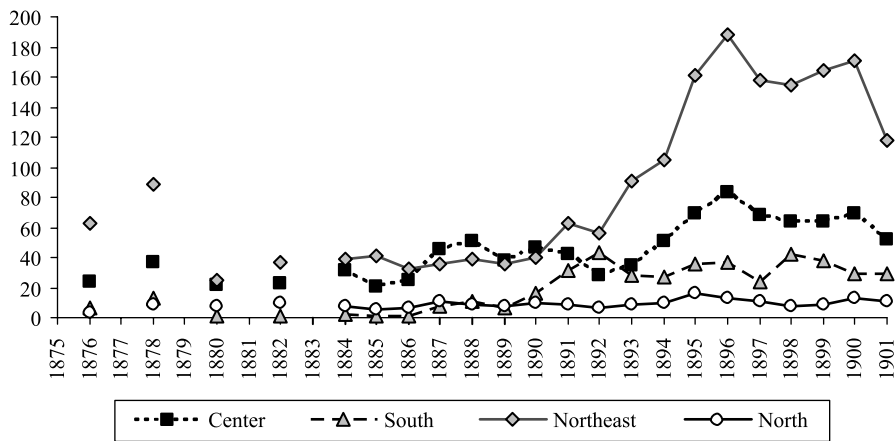


Fig. 4. Cargo shipped from railway stations where bank units were located (million poods).
Note: Shipments of rye, wheat, oats, barley, wheat and rye flour.
Source: Ministry of Transportation (1879–1903).

ity flows that were conditionally “visible” for the banks to estimate how much of it they were eventually able to service. For this purpose, we used data, published by the Ministry of Transportation for 1876, 1878, 1880, 1882 and 1884–1901. The peculiarity of these data is that they show the intensity of goods traffic by station, rather than the volumes of goods transported from one point to another.

Data on the volume of services that banks provided to the agricultural sector each year are shown in Fig. 5. Salomatina (2019, pp. 151–178) highlights the agricultural component in the operations of joint-stock commercial banks in the Central Black Earth region. In this study, we use the same methodology for handling a bank’s annual reports. The data collection refers to all joint-stock commercial bank units within the Central Black Earth region (see Appendix 2). These

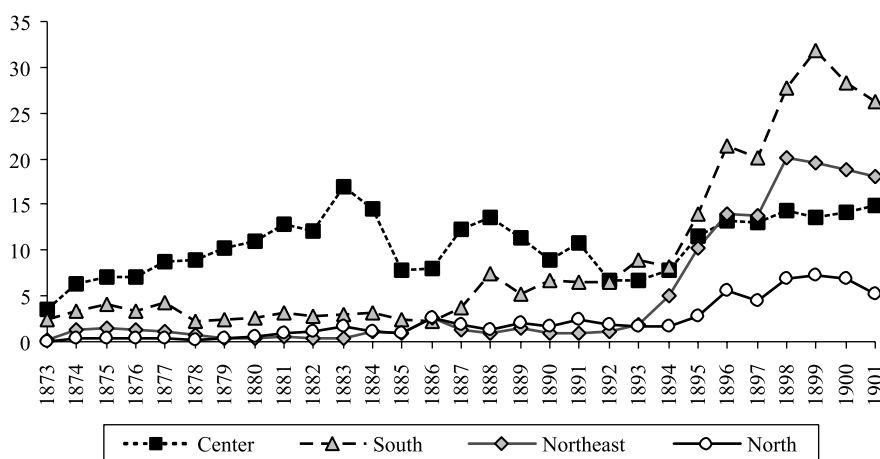


Fig. 5. Banking services provided to agriculture (million rubles).

Note: Banking services provided to the agricultural sector include discount of the bills of exchange of agricultural traders and landlords, all types of loans secured by agricultural goods and documents for goods in transit; receipt of payments under bills and documents for goods in transit, and intermediary services by the Russian Trade and Industrial Bank.

Source: see Appendix 2.

statistics refer directly to the headquarters and branch offices of banks, while lower-status units (agencies and commission agents) are only marked in map on Fig. 3, and quantitative data on their operations are included in data on higher-level unit statistics, because that is the way banking statistics were organized in the 1890s. The sum of short-term credits and payment services provided during the year is an indicator of the banking services. These credits are the discounted bills of exchange and loans secured by goods. Of the total sum of credits and payments, only those related to the operations of agricultural traders and landlords were counted.

In our data series on banking transactions prior to 1893, credits represented 95%. Between 1893 and 1901, this proportion decreases slightly, to 87% on average. The remaining share is attributable to commission services related to the receipt of payments under bills and documents for transported goods. Broadly speaking, these services are part of the services to the agricultural sector, although the bank does not bear credit risk on them. Credits could be provided by a wholesaler, for example, and the banks would only assist him and his customers with settlements. From 1894 to 1901, intermediary services by the Russian Trade and Industrial Bank in the sale of agricultural goods accounted for 1% of the total volume of banking services as reflected in the bank's correspondent accounts in its public reports.

Let us now analyze the relationship between yields, transportation, and banking services for each regional cluster.

The *Central Cluster* was formed back in the early 1870s as a major exporter of agricultural products by railroad to Baltic ports in the West and to Russia's Western land boundaries. The cluster includes the Oryol Province, Novosilsky District of Tula Province in the North, two districts of the Tambov Province in the East (Lipetsk and Lebedyan) and districts of the Voronezh Province in the southeast (Zadonsky and the northern part of Zemlyansky). This is an area influenced by

one of the largest railway trunks in the European part of Russia, running East to West, from Tsaritsyn to Riga. The Bryansk–Oryol–Yelets–Lipetsk–Gryazi section passed through the Central Cluster. Agrarian exports along the North-South railroads gravitated heavily to this Riga–Oryol route: Moscow–Kursk Railway (from Tula to Oryol from the North and from Kursk to Oryol from the South), as well as transportation to the Yelets railway junction.

In terms of developing the banking network, conditions in the central cluster were the most favorable. The largest bank in the Central Black Earth region—Oryol Commercial Bank—had been operating there since 1872. It set up a network of 4 units: the HQ in Oryol and, starting in 1873, branches in Yelets, Livny and Bryansk. In the 1890s, two more joint-stock commercial banks tried to gain a foothold within this cluster. By 1900, there were 6 full-fledged bank units (headquarters and branch offices) in Yelets (2 units), Oryol, Bryansk, Livny, and Lipetsk, along with an agency in Lebedyan.

In terms of agricultural production, the Central Cluster represents only 20% of the entire yield in the Central Black Earth region. Traffic intensity has always been high here. The banking system in the Central Cluster managed to survive the 1880s, despite major fluctuations in transaction volume. Because of the relatively high level of transactions during the 1880s, the Central Cluster did not experience rapid banking growth during the 1890s.

The most important phenomenon in the Central Cluster statistics is the correlation of transportation and banking with the previous year's crop: 0.55 for crops and transportation, and 0.49 for crops and banking services. This means that the availability of credit has led to a steady practice where crops are not sold in autumn but in the spring/summer of the following year. This practice meant that sufficient crop storage infrastructure had been established within the region; most likely the producers themselves handled this task, although this issue needs to be further investigated. The correlation between transportation and banking services was very high (0.74) in the Central Cluster, indicating that a significant share of the goods traffic was serviced by banks.

Southern cluster—at first these were loosely connected areas around the railways which mainly worked to supply the Riga–Oryol railway to the North, located in the Central cluster. But in the 1890s, as the railways and banking networks grew, the South began to successfully compete with the Center.

First, the southern cluster includes the Kursk Province. In the 1870s, Kursk was a junction point for three railways: Moscow–Kursk (Moscow–Tula–Oryol–Kursk), Kursk–Kiev and Kursk–Kharkov–Azov. But Kursk had little luck with banks for a long time. In 1873 the Kursk Commercial Bank, which had been authorized to open its doors, failed to start operations there. Starting in November 1872, a branch of the Kiev Industrial Bank operated in Kursk, specializing in lending for commodity transactions, especially those involving sugar. However, at the end of 1878, it was closed with great losses, probably due to the unfavorable market situation of 1876–1878. No new attempts to set up a joint-stock commercial bank in Kursk were made until 12 years later, in 1890, when the Moscow International Trade Bank opened a branch there.

Second, the Southern cluster includes the Voronezh Province without the northern districts (Zadonsky and northern part of the Zemlyansky district) and the southern Tambov Province (Usman and Borisoglebsky districts and territories

around Tokarevka station in the Tambov District). A railway from Ryazan through Kozlov to Rostov-on-Don crossed the Voronezh Province from North to South. The main exports from the province went through this line to the Gryazi junction in the North, where it crossed the Riga-Tsaritsyn railway, or further North to Moscow via Kozlov and Ryazan. The Gryazi–Tsaritsyn section of the Riga–Tsaritsyn railroad passed through the southern districts of the Tambov Province.

These territories were served by the Voronezh Commercial Bank in the 1890s. The bank had been in operation since 1873, but until 1887 it was confined to the city of Voronezh. In the 1890s, its offices spread to the entire territory surrounding the railways, also affecting the east areas of the Kursk Province in Stary Oskol.

In the 1890s, the Southern cluster reached a major breakthrough, shooting into the first place in the Central Black Earth region in terms of banking operations. By 1900, there were 4 banks operating there with 6 higher-level units (headquarters and branch offices)—two each in Voronezh and Borisoglebsk, and two more in Kursk and Ostrogozhsk. In addition, there were four agencies and commission agents on railway stations in Alekseevka, Valuiki, Tokarevka and Stary Oskol.

The Southern cluster produced the largest portion of the agricultural output in the Central Black Earth region—41%. However, the region had long lacked railroads, particularly in the East-West direction. A line between Kursk and Voronezh only appeared in 1894. In 1895, another section crossed the Southern part of the Voronezh Province from east to west, from Balashov to Kharkov. In 1897, an additional North-South line, the Yelets–Valuyki, was opened. Thus the region's railway network would not become a unified system until the 1890s. Moreover, this new network would gravitate westward for exports, not towards the Riga–Oryol line, but towards the competing Libau–Romny line that ran further South.

Because of the lack of railroads during the 1870s and 1880s, there was little traffic there, not just in locations with a banking presence, but in general. The current year's harvest was exported to storage and redistribution centers outside the cluster ($r = 0.42$), indicating weak trade infrastructure in the cluster prior to the 1890s. However, those small shipments that were in the region clearly correlated with the banking services ($r = 0.45$), which reflects the influence of the Voronezh Commercial Bank, which managed to survive the 1870s and 1880s, despite low transaction volumes.

The Northeastern Cluster is the territory of railways which were used to deliver goods to Moscow from the East. The cluster includes the Ryazan Province and most of the Tambov Province, except for two western counties (Lipetsk and Lebedyan) and two southern counties (Usman and Borisoglebsk) and the area of the Tokarevka station in the southern part of the Tambov District.

The axis of this road system is a North-South line Moscow–Ryazan–Ryazhsk–Kozlov–Gryazi–Voronezh and then further to Rostov-on-Don. A branch line from Tambov and Saratov approaches Kozlov from the East. Traffic along the Tambov–Kamyshin line to the southeast opened in 1894. The Penza–Syzran–Samara–Orenburg–Chelyabinsk line approached from the east through Ryazhsk. In 1894, a branch line from Kazan approached Ryazan from the east.

Cargo traffic through these territories has always been among the heaviest in the region, but its banking history has featured a series of setbacks. A joint-stock commercial bank tried to open in Kozlov in 1873, with a branch in Tambov, but failed. From 1873 to 1878, the Ryazan Trade Bank tried to establish branches

in Kozlov and Morshansk, but had to close them because of losses in 1878. By the end of the 1870s, only the Ryazan Trade Bank's headquarter in Ryazan, founded in 1872, survived in the region with very limited operations. In 1884, the HQ moved to Moscow, while retaining a branch in Ryazan. In the 1890s, banks from St. Petersburg, Moscow and Oryol came to the region and reestablished the banking system here. By 1900, the Northeast banking system had 7 headquarters and branch offices, as well as 8 agencies and commission agents (listed in descending order by operational volume): Kozlov, Ryazhsk, Ryazan, Tambov, Skopin, Kirsanov, and small units in Dankov, Morshansk, Ranenburg, and at the Rzhaksa, Sovnovka-Bankendorf and Uvarovo stations.

The Northeast accounted for 27% of the Central Black Earth region's agricultural output, as well as the most intensive goods traffic. However, there is no statistically significant correlation between transportation and agricultural production. This means the region exported both the current and prior year's produce, with no clear predominance of one model over the other. Because of weak banks during the 1870s and 1880s, there is no correlation between banking operations and other indicators here either.

At the same time, the correlation between transportation and previous year's crop is 0.36 (at $p = 0.15$). This means the data still shows a minor trend towards exporting the prior year's crops, which means that other bank intermediaries were operating in the region. It is possible that they were branches of the State Bank or other types of commercial banks, but there is still little understanding of this issue.

The North Cluster included just the Tula Province territory, without the Novosilsky district. The Tula Province was used for the transit of shipments from the southern provinces (Kursk and Oryol) to Moscow. The Western part of the Syzran-Vyazma railroad (from Ryazhsk to Vyazma via Tula and Kaluga) crossed the Tula Province in an east-west direction, while the eastern portion of that railroad (Ryazhsk–Morshansk) bypassed the Tula Province, heading to Moscow via Ryazan.

The first joint-stock commercial bank came to Tula in 1874 from Ryazan—it was a branch of the Ryazan Trade Bank. The second banking unit in the North Cluster opened in Efremov 20 years later, in 1894; it belonged to the same bank, which by that time was called the Moscow International Trade Bank. Agricultural exports from Efremov headed mainly in the direction of Tula.

The Northern Cluster accounts for only 12% of the agricultural production in the Central Black Earth region; cargo shipment volumes here were much smaller than in other clusters. Exports are strongly correlated with the previous year's harvest ($r = 0.67$). Apparently, this is due to the influence of the Central Cluster, where the prior year's crop was also exported. This also indicates that there was additional credit in the region above what was provided by the Tula and Efremov branches, whose operations were so small they did not correlate with either agricultural production or exports.

Overall, in the Central Black Earth region, there was no statistically significant correlation between agricultural production and transportation trends during the 1874–1901 period. At the same time, the correlation between the operations of joint-stock commercial banks and transportation is quite strong—0.62, due to the operations of the two largest banks in the region—the Oryol Commercial Bank in the Central Cluster and the Voronezh Commercial Bank in the South.

Thus, the banks' role in the region's agricultural exports turned out to be more significant than could be assumed based on previous historiography. The growth of the services sector in the 1890s was a great success of the Central Black Earth region. However, the availability of banking and trade infrastructure for agrarian needs differed substantially between regional clusters.

4. Conclusion

This study is dedicated to the impact of the service sector (railways and joint-stock commercial banks) on the economy of the Central Black Earth region as an agrarian location within the Russian Empire during the latter half of the 19th century, a period marked by lengthy spells of unfavorable market conditions. Services to agriculture were to play an important role in a country with a large agrarian sector, along with lending to the manufacturing industry. However, for a long time agriculture remained at the periphery of the Russian banking history. To bridge this gap, we compared three indicators over the 1874–1901 period: agricultural grain production, railroad transportation of grain and flour, and banking services to the agricultural sector, primarily credit services.

As a result, despite attempts to establish joint-stock commercial banks all over the Central Black Earth region as early as the start of the 1870s, the service sector was still unevenly distributed.

In the central part, along the Riga–Oryol trunk (primarily the Oryol Province), the agricultural export infrastructure to the western borders was the most developed, with the previous year's harvest being exported, which implied a sufficiently developed banking credit and warehousing system for goods. The link between transportation and banking was very close there. In the 1890s, there was little growth in the Center's infrastructure because that growth had already taken place in prior decades. In addition, as railways developed in the southern portion of the Central Black Earth region, the more southern Libau–Romny railroad became the main export channel to the west there, which reduced the importance of the Riga–Oryol line in interregional transportation.

In the South (Kursk, Voronezh, and the southern portion of the Tambov Province) there was a lack of east-west railroads until the 1890s, so not all of this area fell into agrarian exports by railroad zone. The current year's harvest was primarily exported from there, i.e. warehousing and resale points for local produce were located outside the region. The banking sector in the South during the 1870s and 1880s was small, but its operations clearly correlated with the commodity flows. In the 1890s, the construction of new railroads and the growth of banking offices enabled the South to successfully compete with the Center.

In the Northeast (Ryazan, and the central and northern parts of the Tambov Province), a coalition of forces that would ensure the sustainable functioning of local banks had not been established. An extensive railroad network, which was used for both local exports and the delivery of goods to Moscow from the East was effectively left without banking support. During the 1890s, banks from other regions—St. Petersburg, Moscow, and Oryol—established the banking system here literally from the ground up. As a result, there is no correlation between agricultural production, transportation, and banking operations in the region.

The previous year's crops were exported in the northern areas, in the Tula Province, as well as in the neighboring Oryol Province, which indicates the presence of service infrastructure, but the operations of local joint-stock commercial bank units remained insignificant and did not correlate with the other indicators.

To sum up, the opinion that agrarian exports in the Central Black Earth region were carried out without any banking support during the late 19th century does not correspond to reality, as this viewpoint fails to take into account the relatively high level of infrastructure at that time around the Riga–Oryol railway which emerged back in the 1870s. In addition, another important achievement was the rapid growth of the agricultural services sector during the 1890s in the Central Black Earth region as a whole. It was not possible to expand the banking system to the whole region until the 1890s because of long periods of unfavorable trends in banking and agriculture. Since the beginning of their history, Russian joint-stock commercial banks were not limited to serving exclusively commercial and industrial customers. In those regions dominated by agriculture, services infrastructure had been oriented towards this sector.

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- TsSK MVD (1899). Harvest 1898 in European and Asian Russia. Vol. 46, Part 2. St. Petersburg: Central Statistical Committee of the Ministry of Internal Affairs (in Russian).

Appendix A. Province reviews and appendices to the Governors' reports used

Voronezh province. 1874–1882, 1898: Review of the Voronezh province for [1874–1882, 1898], Voronezh, 1875–1899. 1888: Russian State Historical Archive (RSA), fund 1284, inv. 223, file 151.

- Kursk province.* 1874–1882, 1888, 1898: Review of the Kursk province for [1874–1882, 1888, 1898]. Kursk, 1875–1899.
- Oryol province.* 1874–1879, 1886: RSHA, fund 1263, inv. 1, file 3780, 3853, 3910, 3972, 4034, 4101, 4591. 1885: RSHA, fund 1284, inv. 223, file 72. 1892: Reference Library of RSHA. 1880–1884, 1887–1891, 1893–1896, 1899–1901: Review of the Oryol province for [1880–1884, 1887–1891, 1893–1896, 1899–1901], Oryol, 1881–1902. 1897–1898: Appendixes were not composed.
- Ryazan province.* 1874–1878, 1880–1881, 1888 (copy of the Russian National Library), 1898: Review of the Ryazan province for [1874–1878, 1880–1881, 1888, 1898], Ryazan, 1885–1899. 1879, 1882: RSHA, fund 1284, inv. 70, file 156; inv. 223, file 49.
- Tambov province.* 1874, 1875, 1877 1879, 1882: RSHA, fund 1284, inv. 69, file 286, 335, 408; inv. 70, file 330; inv. 223, file 75. 1888: Reference Library of RSHA. 1876, 1878, 1880–1881, 1898: Review of the Tambov province for [1876, 1878, 1880–1881, 1898], Tambov, 1877–1899.
- Tula province.* 1875, 1882: RSHA, fund 1284, inv. 69, file 166; inv. 223, file 77. 1874, 1876–1881, 1888, 1898: Review of the Tula province for [1874, 1876–1881, 1888, 1898], Tula, 1877–1899.

Appendix B. Sources of data on joint-stock commercial banks in the Central Black Earth region, 1872–1901

General publication

- Ministry of Finance Yearbook, vol. 7–13 [1874–1880]. St. Petersburg, 1876–1883.
- Yearbook of Russian credit institutions, vol 1–4 [1877–1880]. St. Petersburg, 1880–1886.
- Golubev, A. K. Russian banks: reference and statistical information about all state, private and public credit institutions operating in Russia, vol. 1 (1895), St. Petersburg, 1896; vol. 2 (1897), St. Petersburg, 1897; vol. 3 (1899), St. Petersburg, 1899.
- Russian banks in 1917. Petrograd, 1918.
- Statistics of short-term credit: Operations of joint-stock commercial banks, vol. 1: 1894–1900. St. Petersburg: Tip. V. Kirshbauma, 1905.
- Index of Decrees of the Ministry of Finance, 1881–1884.
- Bulletin of finance, industry and trade, balances of credit institutions, 1885; Reports of enterprises obliged to public accountability, 1886–1901.

Single banks

- Central State Archive of Moscow, fund 267: Moscow International Trade Bank, inv. 2, file 1: Minutes of shareholders' meetings and lists of shareholders, 1873–1901.
- Review of the activity of the Oryol Commercial Bank for the twenty-five years 1872–1897. Oryol, 1898.
- Report of the Kiev Industrial Bank for 1874, 1875, 1877. Kiev, 1875, 1876, 1878.
- Report of the Moscow International Trade Bank for 1891, 1895, 1898, 1902. Moscow, 1892, 1896, 1899, 1903.
- Report of the Moscow-Ryazan Trade Bank for the eighteen reporting year of 1890. Moscow, 1891.
- Report of the Oryol Commercial Bank for 1872/1873–1901. Oryol, 1874–1902.
- Report of the Ryazan Commercial Bank for 1883. Ryazan, 1884.
- Report of the Ryazan Commercial Bank for the period from 4 January 4, 1873 to 1 January 1, 1874. Ryazan, 1874.
- Report of the Russian Trade and Industrial Bank in St. Petersburg for 1890–1901. St. Petersburg, 1891–1902.
- Report of the St. Petersburg–Azov Commercial Bank for 1889–1900. St. Petersburg, 1890–1901.
- Report of the Voronezh Commercial Bank for 1894, 1895, 1899. Voronezh, 1895, 1896, 1900.
- Voronezh Commercial Bank, XXV, 1873–1898. Review of twenty-five years of activity. Voronezh, 1898.