

MPRA

Munich Personal RePEc Archive

**From financial crisis to revolution:
Russia 1899-1905**

Lychakov, Nikita

16 July 2019

Online at <https://mpra.ub.uni-muenchen.de/95166/>
MPRA Paper No. 95166, posted 18 Jul 2019 08:03 UTC

From financial crisis to revolution: Russia 1899-1905

Nikita Lychakov *

July 2019

What are the channels by which financial crises lead to social unrest? This paper examines the period between the major Russian financial crisis of 1899-1902 and the Russian Revolution of 1905. Using newly-constructed aggregate-level data and narrative evidence, this paper finds that in response to the crisis, the Russian government and industry transferred income and wealth from ordinary workers to industrialists and investors. The recipients of transfers weathered the crisis well and profited during the recovery, while employees' wages and wealth fell behind. The evidence also suggests that businesses required their staff to work more intensively. Ultimately, the distributional effect of the response to the crisis seems to have contributed to the occurrence of labour strikes which culminated in the revolution.

Keywords: financial crises, social unrest, businesses, labour, Russia.

JEL Classification: E3, G01, H2, H5, I3, J5, J8, L2, P16.

* Affiliation: National University Higher School of Economics (beginning Sep. 2019)

E-mail: nlychakov01@qub.ac.uk

I thank Chris Colvin and John Turner for excellent advice and Alan de Bromhead and Lucy Newton for valuable comments.

‘(T)he exacerbation of the economic needs of the proletariat’ was ‘(t)he root source and the most important basis for the entire upcoming revolutionary crisis in Russia.’¹

Lenin (1972, p. 9)

1. Introduction

Recent scholarship has established that financial crises lead to social unrest and unexpected electoral outcomes (Funke et al., 2016). However, the mechanisms by which radical social and political change emerges remain debatable. The standard view has been that crisis-induced economic shocks, such as the loss of employment or the decline in wealth due to a stock market downturn, reduce households’ income and net worth, compelling them to seek changes (DiPasquale & Glaeser, 1998; Brender & Drazen, 2008; De Bromhead et al., 2013; Lindgren & Vernby, 2016; Algan et al., 2017).² A less common view has been that an unequal response by government to a crisis, such as bailing out banks using taxpayers’ money, can benefit some citizens at the expense of others, causing what is known as the distributional effect (Halac & Schmukler, 2004; Stiglitz, 2013). The economically disadvantaged then express their views at the polls or on the streets. This paper brings new evidence to this debate by turning to the case of the Russian Revolution of 1905, a period of nationwide worker unrest that occurred just two and a half years after the conclusion of a major financial crisis. The years leading up to the 1905 revolution are unique because workers organising labour strikes called for improved living and working conditions, not for the elimination of the Czarist autocracy. This allows me to study how mostly material and apolitical demands by citizens led to social instability.

In this paper, I examine (1) the immediate effect of the financial crisis of 1899-1902 on key participants in the economy – banks, industry and government; and (2) how these participants responded to the crisis and in the process affected the fourth key group – the working class. In order to do so, I collected aggregate-level data on the economic performance of these four participants. My primary data

¹ Author’s translation, as are all other instances of text translated from Russian language.

² For a literature review of the effects of financial crises on individuals, see Jayadev (2013).

source is a series of yearbooks published by the Russian Ministry of Finance which has scarcely been used by previous researchers.

I also pool together economic data sourced from a variety of secondary sources, along with non-economic data, such as the number of labour strikes at companies. With respect to secondary sources, Russian historians often collect and describe data without explicitly engaging economic theory and quantitative methods to draw causal connections between variables. My contribution in this regard is to synthesise several existing datasets and interpret them cliometrically. Lastly, I obtain narrative evidence to identify how and why the economic participants responded to the crisis as they did. Taken together, these sources permit me to perform the most comprehensive analysis to date of Russian economic conditions between 1899 and 1905.

My main finding is that the government's response to the crisis resulted in a transfer of income and wealth from ordinary workers to industrialists and investors. The recipients of transfers weathered the crisis well and profited during the recovery, while the wages and wealth of labour fell behind. The evidence also suggests that industry required the workforce to make greater effort at the expense of their physical well-being. The extant literature has established that workers' poor working and living conditions were the central reason behind the occurrence of labour strikes (Korelin et al., 2005, p. 92). In light of this fact, my findings suggest that government's and industry's response to the crisis contributed to the deterioration of workers' material well-being, and thus intensified worker unrest.

The findings of this paper take a step forward in bridging the gap between empirical and narrative findings on the social and political implications of financial crises. On the one hand, empirical studies have found that a response by government to a financial crisis can lead to the redistribution of wealth among key groups of citizens. In particular, Halac & Schmukler (2004) show that public bailouts of banks in five Latin American countries in the 1980s-2000s led to the redistribution of wealth from ordinary taxpayers to banks and their clients. However, this study does not attempt to connect the negative effects of redistributions to social consequences. Ponticelli & Voth (2011) show empirically that discretionary

budget cuts unrelated to financial crises led to heightened social turmoil over the 1919-2008 period in Europe, but the authors do not identify the transmission mechanism.

Other studies argue that authorities' response to a crisis can cause social unrest via financial redistribution, but these studies lack empirical evidence. Specifically, Stiglitz (2013) maintains that the unequal response by American authorities to the 2007-09 financial crisis was the root source of the Occupy Movement which occurred over 2011-2. No doubt scholars have found it difficult to link economic downturns with social ramifications, perhaps due to the lack of available data.

The present paper narrows the gap between empirical and narrative findings. It does so by using quantitative data to document the redistribution of income and wealth. It then provides historical evidence that the distributional effect undermined workers' well-being, thus intensifying labour strikes. A unique contribution of this paper is to show that a crisis response by economic participants other than government – in this case businesses and banks – can also have regressive consequences. This finding supports Piketty's (2014) research in inferring that the distribution of wealth is jointly determined by 'economic, social and political actors' (p. 20).

The present study also contributes to the historical literature tracing how the relationship between the key economic groups of government, business, banking, and labour shaped the final years of the Russian Empire. In particular, this paper adds to the literature on the causes of the Russian Revolution of 1905, which brought the first fractures to the autocratic regime that had existed for hundreds of years. Only one historian, Gefter (1953, 1955), in addition to contemporaries, such as Lenin (1967, pp. 81-6; 1969, p. 218), have explored the role of the crisis of 1899-1902 and the crisis containment measures as contributing factors to the revolutionary movement. The present paper investigates the response of each key economic group using a wider range of data than has hitherto been employed, and adds weight to the view that the unfair distributional effect contributed to labour strikes and ultimately to the revolution.

Lastly, this research supplements the studies on the economic conditions in the turbulent period between 1898 and 1905. My newly-constructed data series complement narrative studies on Russian finances (Siegel, 2015; Malik, 2018), stock market analysis (Annaert et al., 2019), economic inequality

(Lindert & Nafziger, 2014), and the macro-analysis of the economy in the period (Gregory, 1982, 1994; Owen, 2013).

The arguments are built as follows. Section 2 details the key causes and effects of the Revolution of 1905. Section 3 documents the impact of the financial crisis on three of the key economic participants, banks, industry and government, and their immediate responses to the crisis. Section 4 traces the way in which these participants affected the remaining key group, the working class. Section 5 concludes.

2. The Revolution of 1905

The First Russian Revolution began on 9th January 1905, when over 140,000 factory workers marched towards the Winter Palace in St. Petersburg to deliver a petition to the Czar, in which they asked for their hardships to be alleviated (Vvedensky, 1952, pp. 539-40). The workers made 17 demands, including a declaration of freedom of speech, the press, assembly, religion, and the inviolability of the person, the introduction of an 8-hour working day, limits on overtime work and adequate pay (Gapon, 1905). The Czarist government responded by sending troops to stop the demonstrators. The day ended with an estimated 200 protestor deaths (Nevsky, 1922, p. 25). In the next few months, 90 per cent of factories were engulfed in strikes, peasants revolted all across the country, army units positioned along the Trans-Siberian Railroad refused to obey orders and the crew of the battleship *Potemkin*, one of the largest military ships on the Black Sea, mutinied (Korelin et al., 2005, p. 545; Vvedensky, 1955, pp. 199-204). The revolution was not fully suppressed until June 1907 because the industrial workers were so resilient and unsubmitive (Korelin et al., 2005, p. 16).

Scholars have expended immense effort on elucidating the factors that produced the revolution. The central factor has been identified as workers' unacceptable living and working conditions: exiguous wages, long working hours, overtime working, unfair job-related fines, cruel treatment by supervisors, unauthorised home searches by the police, unsanitary housing conditions, causing serious illnesses, and inadequate social insurance (Korelin et al., 2005, p. 92). In fact, the primary demands in nearly all the strikes that took place between 1900 and 1904 related to workers' material conditions (Shilnikova, 2012,

p. 20). The second factor was the rise in the level of workers' literacy and education, which increased their awareness of their deplorable life conditions and the lawlessness of politicians (Korelin et al., 2005, p. 92). Third, illegal underground political parties and the few existing labour unions expanded worker awareness and helped them formulate their demands (Korelin et al., 2005, p. 92). The fourth factor came from the ruthless suppression by the police and the military of any discontent and the merciless government policies toward workers in general (Pushkareva et al., 2011, pp. 47, 436). The fifth contributing factor was the war with Japan that began in 1904. In the words of the Minister of Internal Affairs, '(t)o hold back the revolution, we need a small victorious war' (Korelin et al., 2005, p. 137). As Russia began losing on the war front, the patriotic feelings among the masses quickly dissipated and were replaced by deep disappointment with the government's course of action (Korelin et al., 2005, p. 138).

The sixth contributory element and the focus of this study was the effect of the crisis of 1899-1902, the crisis containment measures undertaken by government and the response to the crisis by industry. In particular, Gefter (1953, p. 85; 1955, p. 18) argues that the crisis led to larger companies progressing at the expense of medium-sized and smaller ones. These larger companies then ruthlessly exploited their workers. As the workers saw little improvement in their material well-being, they became more prone to express their discontent, as evidenced by the rising number of labour strikes in the years leading up to the revolution (Pushkareva et al., 2011, pp. 68-9).

The period between the crisis and the revolution is unique because it saw a struggle for better material conditions and democratic rights. Workers did not seek to unseat the Czar or to replace the social order by socialism. In fact, in the minds of workers, the figure of the monarch was not associated with the government and its repressive state policies (Korelin et al., 2005, p. 95). On the eve of the revolution, workers who said anything against the Czar were quickly muted by their fellow workers. The word 'socialism' was regarded by them as a profanity. Illegal political parties and labour unions concentrated on disseminating ideas of democratic rights and material betterment, and seldom discussed the topic of socialism (Korelin et al., 2005, p. 96). Indeed, only a small number of strikes was associated with political demands and such slogans as 'Down with autocracy!', 'Down with government!' and 'Long live

socialism!’ (Pushkareva et al., 2011, p. 106). In 1903, the most rebellious year before the revolution, the percentage of workers who put forward political demands in addition to economic demands was only 8.5 per cent of all strikers (Pushkareva et al., 2011, p. 74). The remaining 91.5 per cent had purely economic wishes, expressed by slogans such as ‘An eight-hour working day!’ and ‘Down with fines!’ (Pushkareva et al., 2011, p. 110). Unlike industrial workers, the peasants, who in 1897 constituted 77.1 per cent of Russia’s population (Rubakin, 1912, p. 54), were not a major force behind social unrest before 1905 (Korelin et al., 2005, pp. 77-89).

A key outcome of the revolution was the signing of the October Manifesto, which gave the Russian people the freedoms that workers had asked for in their petition to the Czar earlier in the year. Another key outcome was the establishment of the State Duma, a legislative body composed of popularly-elected members, who now shared with the Czar the power to make laws. These changes served as a foundation for the Russian Revolution of 1917 and transformed the nation from an absolute autocracy to a constitutional monarchy – a ground-breaking achievement given the 450-year history of autocracy in Russia.

3. The effect of and responses to the financial crisis

This section documents the effects of the financial crisis on key participants in the economy – banks, industry and government – and their responses to the crisis. To quantify the effect of the crisis, I hand-collected aggregate-level data on the economic performance of these participants from individual *Yearbooks of the Ministry of Finance* (Ministry of Finance, 1900-1907a). I gathered monthly, quarterly, semi-annual and annual data, whichever were available.

I also use additional economic data, as well as non-economic data, such as the number of work-related casualties, which I extracted from a variety of secondary sources compiled by Russian historians. Typically, Russian historians collect and package data in statistical tables and describe the overall trends they see in them but abstain from deeper cliometric analysis. My contribution is to pool together data

scattered among secondary sources, and interpret them using economic theory. I also obtain narrative evidence to identify how and why the economic participants responded to the crisis as they did.

3.1. Banking distress and banks' response

The financial crisis of 1899-1902 interrupted the rapid industrialisation of the 1890s. The crisis was triggered by the reduction in foreign capital inflow into government bonds and the securities of industrial enterprises. One of the first economic participants to be affected was the banking sector. Figure 1a shows that bank shares fell more rapidly and steeply than the index of the St. Petersburg Stock Exchange, which itself declined by 45.4 per cent between the peak in February 1899 and the trough in 1901.³ Banks experienced large losses, primarily because of the investments they had made in the 1890s in heavy industrial companies (Gindin, 1948, pp. 116-7).

Authorities intervened with a massive rescue package (Gindin, 1950, 1980). Certain aspects of the rescue were very successful. To demonstrate this, I construct monthly credit and money supply time series based on data from *Yearbooks*. Figure 1b shows that the private credit supply fell only by 2.5 per cent from a peak in May 1899 to a trough in June 1900. The figure also shows that the government's credit supply, as represented mostly by credit from the quasi-central State Bank, continued an upward trend. Figure 1c reveals that the total money supply, as measured by deposits and physical money in circulation, did not deviate much from its upward direction; the largest peak-to-trough decline being only 3.7 per cent. In sum, the vast rescue package prevented the contraction of the credit and money supply, which are both essential for sustained performance in the broader economy (Friedman & Schwartz, 1963; Bernanke, 1983).

Nevertheless, beneath the positive aggregate trends, banks' lending patterns were changing, with serious consequences for industry. Banks disproportionately extended credit to larger and existing clients, while curtailing credit to smaller and new ones (Gindin, 1948, p. 124-6). *The Economist*, in its May 1901

³ Calculated from data in Goetzmann et al. (n. d.a, n. d.b).

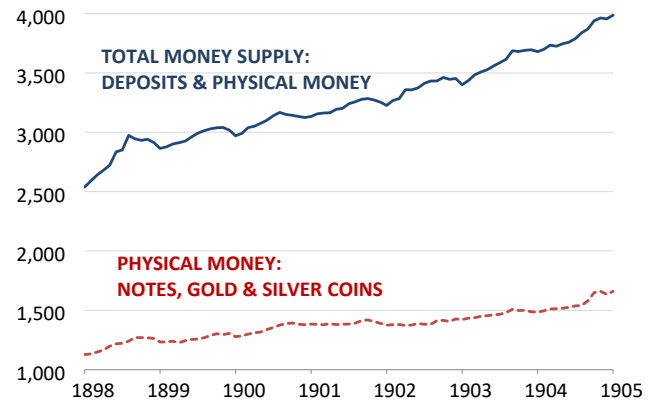
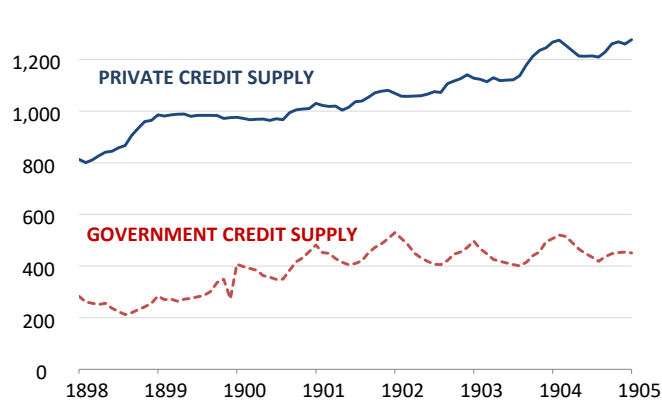
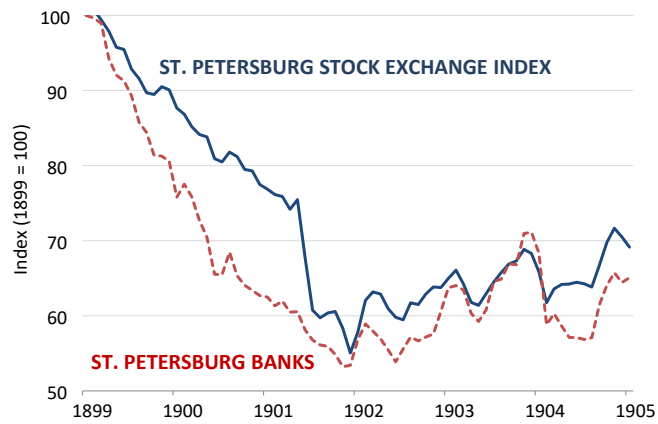


Figure 1a (left above). Monthly indices of the St. Petersburg Stock Exchange and the commercial banks headquartered in St. Petersburg, equally weighted (index 1899 = 100), 1899-1905

Notes: Included in the index of St. Petersburg banks are the Volzhsko-Kamsky, the St. Petersburg-Azovcky, the St. Petersburg International, the St. Petersburg Muscovy, the St. Petersburg Private, the Russian for Trade and Commerce commercial banks, as well as the Russian for Foreign Trade, the St. Petersburg Discount and Loan, and the Russo-Chinese banks. Credit Lyonnais did not trade on the exchange. *Sources:* The stock exchange data is from Goetzmann et al. (n. d.a) and individual banks data is from Goetzmann et al. (n. d.b)

Figure 1b (left below). Monthly credit supply (in millions of rubles), 1898-1905

Notes: Private credit supply includes credit supplied by joint-stock commercial banks (based on original monthly data), private commercial banks (interpolated linearly from beginning- and end-of-year data), and cooperative savings associations (interpolated linearly from semiannual data). Government credit supply includes credit supplied by the State Bank (monthly data) and the Russo-Chinese Bank that was partially owned by government (beginning- and end-of-year data).

Sources: Ministry of Finance (1900-1907a)

Figure 1c (right below). Monthly money supply (in millions of rubles), 1898-1905

Notes: The total money supply includes physical money in circulation, deposits held by the public at the State Bank (based on original monthly data), the Russo-Chinese Bank (interpolated linearly from beginning- and end-of-year data), joint-stock commercial banks (monthly data), private commercial banks (beginning- and end-of-year data), cooperative savings associations (interpolated linearly from semiannual data), as well as state savings branches, public city banks, credit partnerships, city banks, and savings and loan partnerships (interpolated linearly from beginning- and end-of-year data). Physical money includes paper notes (monthly data) and gold and silver coins (both interpolated linearly from beginning- and end-of-year data).

Sources: Ministry of Finance (1900-1907a)

issue, reported that Russian '(b)anks generally have been in difficulties from having sunk too much money in loans to factories as working capital, which, though paying a high rate of interest, could not be readily called in when money was urgently required' (p. 667). As is often the case, it is companies with better financial backing that weather a crisis, not necessarily the most efficient ones (Franklin et al., 2015; Hilt, 2017). As a result, banks' response to the crisis created corporate winners and losers by propping up large companies whilst limiting credit to smaller firms. Indeed, between 1901 and 1904, large industrial enterprises, as measured by capital stock, performed increasingly better in financial terms, while smaller firms declined over the same period (Bovykin, 1984, p. 126-7). This evidence suggests that banks' response to the crisis strengthened the financial position of large companies.

3.2. Recession and industry response

The crisis affected another key economic participant – heavy industry, which consisted of the manufacturing, mining (*dobyvayushchaya*) and chemical industries. According to the Ministry of Finance, in the 1890s, the supply of heavy industrial products consistently lagged behind demand. In 1900, supply outpaced demand for the first time (Gindin, 1996, pp. 136-7). As a result, as shown in Figure 2a, heavy industry went into recession in 1901-02. The monetary value of its output declined by 7.7 per cent and its revenues declined by 6.8 per cent.⁴ Light industry, which consisted of the textile, paper and ceramic industries, was unaffected.

To show the degree of industry's financial difficulties in more detail, I calculate the corporate bond risk premium for manufacturing, mining and textile industries as the excess of the current yield on corporate bonds over the highest-rated government security, the 4 per cent Russian government bond of 1894. To calculate the current yield, I use monthly price and coupon data that I collected from *Yearbooks* for 37 individual bonds, the total number of bonds traded. Figure 2b shows that the cost of borrowing for corporations rose sharply as the crisis began. Some companies faced low demand for their bond securities

⁴ Industry output is calculated from data in Izmesteva (1998) and revenues are from the *Yearbooks* (Ministry of Finance, 1900-1907a).

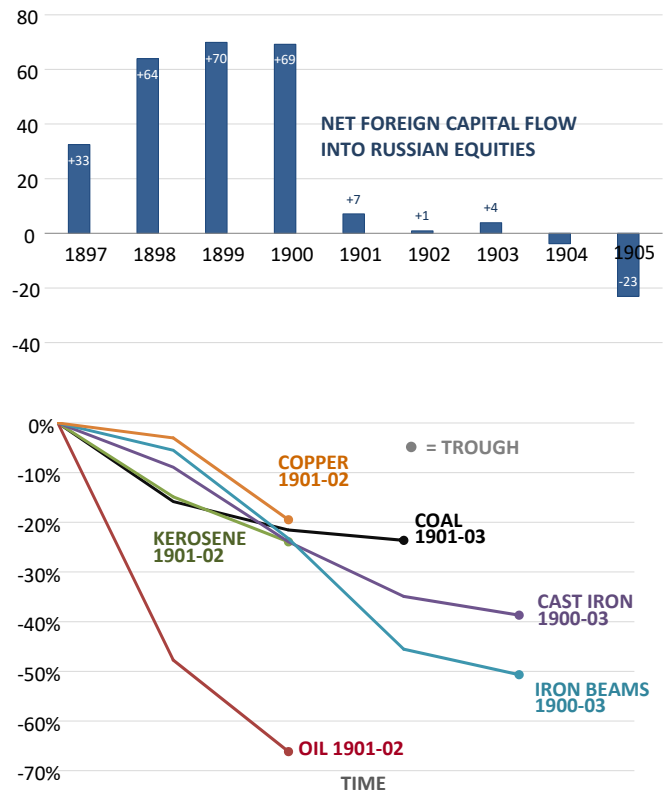
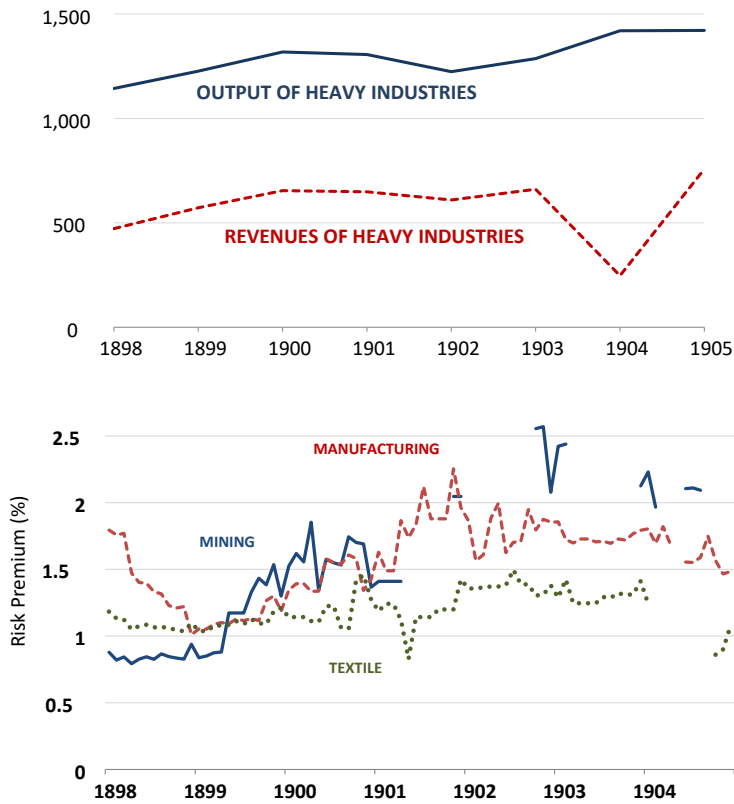


Figure 2a (left above). Annual monetary value of output and revenues of heavy industry (in millions of rubles), 1898-1905

Sources: Output is from Izmesteva (1998) and revenues are from Ministry of Finance (1900-1907a)

Figure 2b (left below). Monthly corporate bond risk premium by industry (in percent), 1898-1904

Notes: The corporate bond risk premium is the excess of current yield on corporate bonds of each of the three industries over the current yield of the highest-rated government security, the four percent Russian government bond of 1894. Current yield of each corporate bond is calculated based on price and coupon data of 37 individual bonds. Gaps in the series are due no trades in those months. Industry yield is the average yield of bonds traded every month weighted by the outstanding amount of each bond.

Sources: Price and coupon data is from Ministry of Finance (1900-1907a). Bonds outstanding are from Dmitriev-Mamonov (1903)

Figure 2c (right above). Annual net foreign equity investments in mining and manufacturing companies (in millions of rubles), 1897-1905

Sources: OI (1925, pp. 12-3)

Figure 2d (right below). Prices of heavy industry products, fall from peak to trough at annual frequency (in percent)

Sources: Lyashchenko (1956, pp. 414-5)

as can be inferred from the gaps in trading. Because it was customary for industrial companies to use bond proceeds to cover operating expenses, the rising cost of borrowing and the lack of buyers made many enterprises illiquid, and effectively bankrupt (Russian State Historical Archive, collection 587, inventory 56, file 296, pp. 10-11).

Figure 2c shows that additional funding pressures began in 1901, when foreign investments in corporate securities declined abruptly, netting only 7 million rubles during the year, as opposed to 69 million rubles the year before. In subsequent years, the net foreign capital inflow diminished further and in 1904 turned negative.⁵ An additional blow came from the deflationary pressures that are known to be particularly destructive to real sector companies (Fisher, 1933). The prices of the key commodity inputs used in industrial production declined sharply. Figure 2d shows that the price of coal fell by 35.3 per cent between 1900 and 1903, oil by 57.3 per cent between 1900 and 1902, and cast iron and iron beams by 33.7 and 42.7 per cent, respectively, between 1900 and 1903.⁶

Despite the fall in demand and prices, heavy industry continued to maintain its production. Between 1900 and 1901, the mining industry increased its output by 5.3 per cent and the manufacturing sector decreased it slightly by 0.4 per cent.⁷ This reflected most negatively on smaller companies, as noted above. As a result, industry's initial response to the crisis contributed to the diverging performance of larger versus smaller companies.

3.3. Fiscal distress and government response

The third economic participant affected by the crisis was the government. The biggest adverse shock to state finances came from abroad. To show this, I collect annual data on foreign and domestic government debt outstanding from the *Yearbooks*. Figure 3 reveals that with the onset of the crisis foreign investors stopped purchasing government bonds, the proceeds from which the state had relied on to procure the

⁵ Calculated from data in OI (1925, pp. 12-3).

⁶ Calculated from data in Lyashchenko (1956, p. 414-15).

⁷ Calculated from data in Izmeteva (1998). Data on the output of the chemical industry are not available.

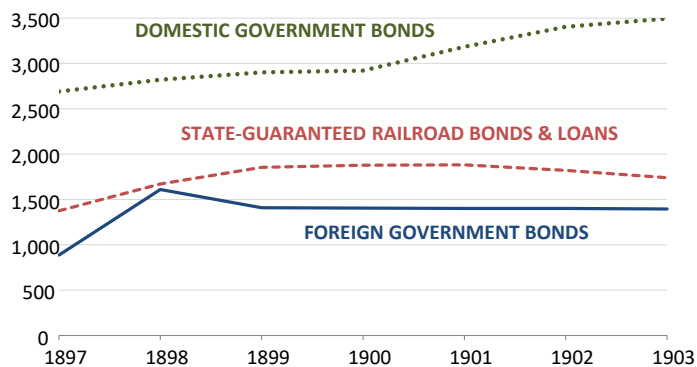


Figure 3. Annual foreign and domestic government debt outstanding (in millions of rubles), 1897-1903
Sources: Ministry of Finance (1900-1907a)

industrial output (Gindin, 2007a, p. 68). In 1899, state finances suffered an additional blow because of the decline in grain exports, which led to a negative trade balance of 56 million rubles, compared to the average trade surplus of 106 million rubles over the previous two years.⁸ In 1901, a further blow was dealt by an especially poor harvest, the worst of its kind since the devastating famine of 1891-2 (Mikhailovsky, 1921, p. 4).

The depleting of government finances had a big impact on the economy because the state in the 1890s was a dominant buyer of heavy industrial production, purchasing nearly half the output of the metalworking industry (Ozerov, 1905, p. 118). This industry, which manufactured final products from pig iron, iron, and steel, was the centrepiece of Russia's industrialisation, accounting for over 54.4 per cent of the monetary output of the entire heavy industry.⁹ Left with much reduced monetary resources at its disposal, the state was forced to curtail its procurement and to ration its orders, delegating them primarily to the companies that had been receiving state orders before the crisis (Geftter, 1953, p. 84; Gindin, 2007b, p. 77). Because typical state orders were large, only large companies had sufficient production capacity to qualify for them (Gindin, 2007b, p. 63). This led to the strengthening of large enterprises and the

⁸ Calculated from data in Valetov (2017).

⁹ Calculated from data in Izmeteva (1998).

weakening of the rest. Another way in which the government industry was by initiating a massive lending programme along with the purchase of corporate bonds for which no private buyers were found (Gindin, 1950, 1980).

To assist industry, the authorities also openly encouraged industrial firms to collude and form cartels and syndicates. This policy was the polar opposite of the stance taken by the government in the 1890s, when it had pushed for intense market competition in order to make Russian industry more competitive in foreign markets (Gindin, 2007a, p. 69). In November 1901, the Ministry of Finance openly noted in its official newspaper, *The Bulletin of Finance*, that ‘larger factories (we)re getting ahead’ (Gindin, 2007b, p. 74), and, if this continued, only a very limited number of companies would survive. The choice for firms was thus twofold: either organise a syndicate that would include all firms as its members ‘or let small and weak firms perish’, while letting the remaining enterprises ‘occupy a monopoly position’ (Gindin, 2007b, p. 74).

This policy had unintended consequences: from the late 1901 companies began to collude, but not all firms agreed to join in. Large companies receiving state procurement found it more profitable to stay away from these alliances (Shpolyanski, 1953, pp. 84-98). Fierce competition broke out between the syndicated companies and the recipients of state orders. While the syndicates tended to limit production as to drive prices upwards, the recipients leaned towards reducing prices (Shpolyanski, 1953, pp. 84-98). The result was that this badly-designed government programme distorted market competition and contributed to the creation of industrial winners and losers, with larger companies taking the lead.

4. Impact on workers

Having established the financial channels through which the crisis affected major economic participants – banks, industry and the government – and having analysed their immediate response to the crisis, this section turns to examining how these parties affected another key member in the economy – the industrial workers.

4.1. Industry and workers

Figure 4a traces how, in response to the crisis, heavy industrial companies downsized their labour force by an average of three per cent per year between 1901 and 1903.¹⁰ As analysed below, firms in all likelihood exacerbated their exploitation of the remaining workers, which I define as increasing the intensity of a worker's task, given the same or smaller number of hours worked.

Figure 4b shows that workers had organised many strikes since 1895, but the financial crisis did not coincide with the greater incidence of strikes. It was only in 1903, the year after the recession in heavy industry, that the number of strikes shot up to unprecedented levels, two-and-a-half times the number in the previous year.¹¹ In 1903, strikes occurred in 65 out of 78 provinces and involved workers of nearly all vocations (Korelin et al., 2005, p. 90). In 1904, Russia went to war with Japan, and the number of strikes fell to a historical average. This was because the government, in collaboration with company managers, made sure that the most rebellious workers were sent to the war front. Vacant positions were filled with newly-recruited peasants from the countryside who were too new to the scene to protest (Korelin et al., 2005, p. 138-9).

Two facts suggest that worker hardships were on the rise even before the escalation in strikes in 1903 and before the end of the financial crisis in 1902. First, Figure 4c shows that, between 1900 and 1901, the number of workers who made a work-related complaint nearly doubled, from about 24,000 to almost 48,000.¹² This suggests that worker discontent had already risen markedly amidst the crisis; it was merely expressed in a more civil manner. Second, as early as October 1902, the Finance Minister Sergei Witte expressed the view in conversation with the Minister of Internal Affairs that the worker movement had reached such dangerous levels that it would be impossible to stop it even by repressive measures (Korelin et al., 2005, p. 135). Witte was one of the most informed government officials in the country. Over 200 factory inspectors, who oversaw companies' compliance with labour laws and managed

¹⁰ Calculated from data in Izmesteva (1998).

¹¹ Calculated from data in Pushkareva et al. (2011, pp. 68-9).

¹² Calculated from data in Pushkareva et al. (2011, p. 322).

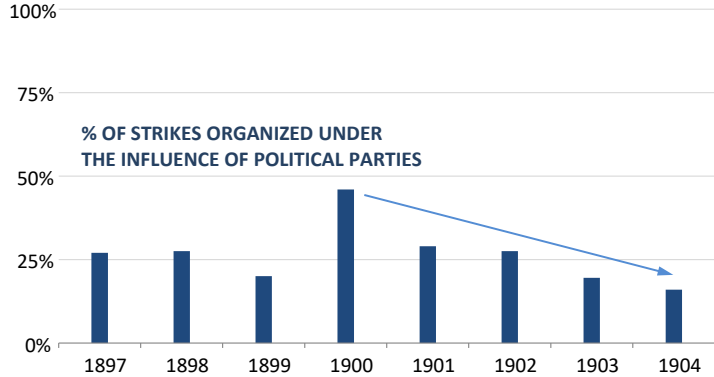
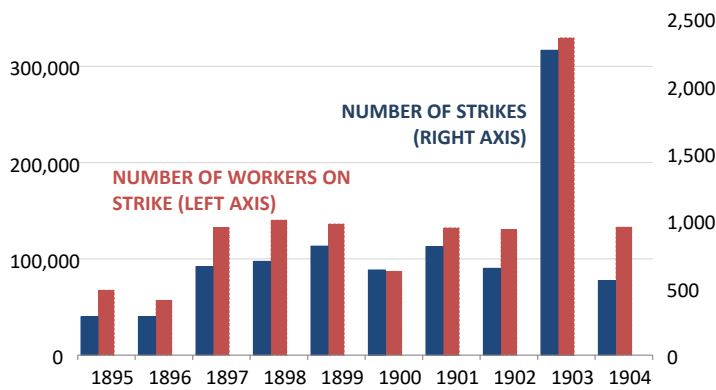
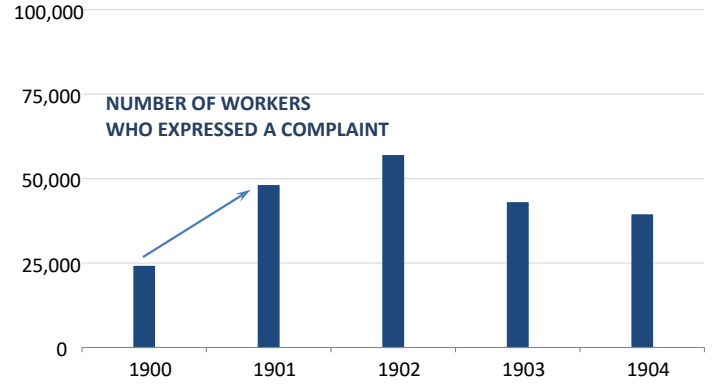
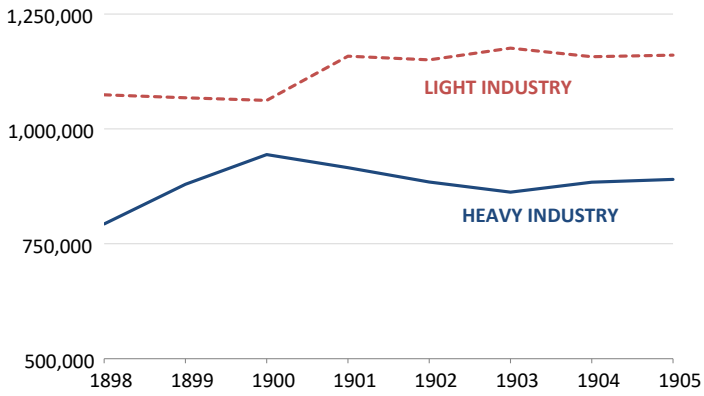


Figure 4a (left above). Annual number of workers at industrial companies, 1898-1905
Sources: Izmesteva (1998)

Figure 4b (left below). Annual number of strikes organized by workers, 1895-1904
Sources: Pushkareva et al. (2011, pp. 68-9)

Figure 4c (right above). Annual number of workers who expressed a complaint, 1900-1904
Sources: Pushkareva et al. (2011, p. 322)

Figure 4d (right below). Influence of political parties at manufacturing firms, 1897-1904
Sources: Pushkareva et al. (2011, p. 126)

disputes between workers and firms, reported to him (Korelin et al., 2005, p. 99). Wagerworker dissatisfaction must notably have increased in 1902 for Witte to have expressed such an alarming view.

The next piece of evidence speaks more directly to the possible exploitation of workers. It is indicated by the share of work-related injuries and deaths at all the mining plants and coal, iron, manganese and copper mines out of the total workers employed there. Note that in 1899 these enterprises employed over 72 per cent of the workforce in heavy industry.¹³ In 1897, 1.9 per cent of this workforce suffered from work-related injury; in 1899, the first year of the crisis, 3.5 per cent were affected; in 1902, an unprecedented 33,613 workers, or 5.4 per cent of the total were affected. I also have data on a portion of these enterprises – the coal mines located in the South. In 1897, 0.4 mineworkers were injured or killed for every 10,000 tonnes of coal and anthracite extracted; in 1902 this number soared to 3.3 workers and in 1903 to 5.0 workers.¹⁴ In a matter of two years, Southern coal mines became over six times more dangerous for those who worked in them.

The next set of data provides another perspective on workers' conditions. The share of strikes in which the workers in the mining industry demanded improvements in working conditions, namely, in the quality of machines and tools they used at work and the social benefits they received, increased from an average of 7.5 per cent over the period 1895-99 to 9.4 per cent over 1900-4. In the manufacturing industry, this share increased by an even greater amount – from a mean of 5.7 per cent over the period 1895-99 to 9.8 per cent over 1900-4 (Shilnikova, 2012, p. 20). Worker demands increased partly because workers were becoming increasingly conscious of their unacceptable working conditions, thanks to the illegal political parties that were raising their awareness (Korelin et al., 2005, p. 92). However, as can be seen in Figure 4d, the percentage of strikes in the manufacturing industry organised under the direct influence of illegal political parties declined from about 46 per cent in 1900 to 16 per cent in 1904, while

¹³ Calculated from data in Izmesteva (1998) and Shilnikova (2013a).

¹⁴ Calculated from data in Shilnikova (2013b). For comparison, in the U.S. coal industry in 1930, the first year when data are available, only 0.9 workers were injured or killed for every 10,000 tonnes of coal extracted (Moyer et al., 1952, p. 52).

the number of strikes continued to rise.¹⁵ This suggests that factors other than greater awareness contributed to worker discontent.

The next fragment of evidence concerns worker exploitation from the point of view of company financials, which I collected from the *Yearbooks*. Figure 5a shows that during the entire crisis manufacturing and chemical companies (although not mining) were able, despite declining sales, to maintain their profitability, as measured by the profit margin, or the ratio of net income to sales. In 1903, when the number of strikes rose two and a half times and workers lost many days at work for this reason, manufacturing companies made an extra 0.9 per cent in profit margins over the previous year's. In 1904, the year when Japan and Russia were at war and the sales at the heavy industries plummeted by 62.5 per cent, all the heavy industries – manufacturing, mining and chemical – doubled or tripled their profit margins. Industrialists retained high profitability in all circumstances: economic upturns and downturns, the diverging performance of larger versus smaller companies and periods of social unrest and war. To maintain such stellar bottom-line performance, companies had to skilfully manage the costs of inputs and the use of machinery and the labour force. This evidence suggests that the steady profitability was not achieved solely thanks to proficient managerial skills.

This next set of data examines the non-financial characteristics of the ferrous metallurgical industry – that is the metallurgy of iron and its alloys – which in 1899 employed over 31 per cent of the heavy industry workforce.¹⁶ Figure 5b plots the number of workers, the cumulative horsepower of the engines available for use, and the output produced in tones by this industry. Recall that 1903 was distinguished by a surge in worker unrest and 1904 by the war with Japan and disastrous corporate sales. Between 1903 and 1904, the number of workers in ferrous metallurgy stayed virtually unchanged, horsepower declined by nearly 9 per cent, while physical output rose by 16 per cent.¹⁷ A natural question

¹⁵ Calculated from data in Pushkareva et al. (2011, p. 126). The data on the mining industry are not available.

¹⁶ Calculated from data in Izmesteva (1998). To save space, I do not evaluate other industries.

¹⁷ Calculated from data in Kafengauz (1994, pp. 505-16).

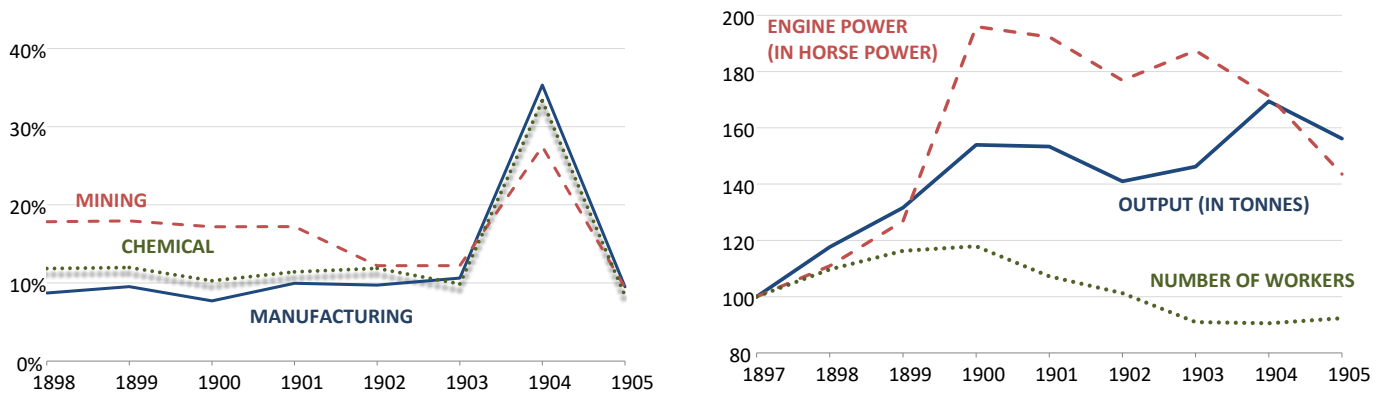


Figure 5a (left). Annual heavy industry profit margins (in percent), 1898-1905

Notes: Profit margin is net income divided by revenues.

Sources: Net income and revenues are from Ministry of Finance (1900-1907a)

Figure 5b (right). Annual physical output, machine power, and the number of workers in the ferrous metallurgical industry (index 1898 = 100), 1897-1905

Sources: Kafengauz (1994, pp. 505-16)

to ask is: did workers become more productive or more exploited over this period? It is known that during the financial crisis companies introduced higher-powered and more efficient steam and internal combustion engines (Kafengauz, 1994, pp. 79-80), so this may account for some increases in productivity. However, the fluctuations in physical output, as in the 16 per cent increase over 1903-4, could also indicate that the industry taking advantage of workers by shifting from capital intensive to labour intensive production. Indeed, during the war with Japan in 1904, overtime work became obligatory whenever companies had rush military orders to fulfil (Korelin et al., 2005, p. 138). According to factory inspectors introduced above, out of all work-related complaints the share related to forced overtime work increased steadily each year from 3.7 per cent in 1902 to 5.8 per in 1904.¹⁸

The advance of large companies discussed in Section 3 may also have had negative consequences on workers. Modern research indicates that large and monopolistic companies have stronger bargaining power over their employees than do perfectly competitive firms (Trigari & Rotemberg, 2006). In Russia,

¹⁸ Calculated from data in Ministry of Finance (1903-7c).

workers' bargaining power was weak because legal labour unions emerged only in 1903 (Vvedensky, 1956, pp. 463-4). Factory inspectors alone protected workers' rights (Pushkareva et al., 2011, p. 160).

Moreover, the financial crisis and the associated decline in demand led to some machinery being unused. In 1904, ferrous metallurgy underused its machine capacity by 43.2 per cent in rail production and by 28.3 per cent in iron production (Kafengauz, 1994, p. 86). Instead of incurring costly capital expenditures to refurbish idle machinery (Kafengauz, 1994, p. 86), industrialists could rely on cheap and abundant labour. Sometime later Stalin (1952) observed that '(c)apitalism stands for new technology when that offers the greatest profits. Capitalism stands against new technology and for the transition to manual labour when new technology does not promise the greatest profits anymore' (p. 40).

Taken together, the above evidence on the rise in strikes, workers' complaints and work-related casualties, as well as the evidence on the increase in corporate profitability despite collapsing sales and on the increase in physical output despite declining horsepower, suggests that industrialists' response to the crisis transferred a good portion of their financial burden to the working class. In the 1901 article entitled *The lessons of the crisis*, Lenin (1967) recorded the events he had been observing on the ground: 'during the industrial upturn ... workers gained concessions (from capitalists) more than once between 1894 and 1898; but with the coming of the crisis, the capitalists not only t[ook] back the concessions [the workers] ha[d] made, but also exploit[ed] workers' helplessness to further lower their wages' (pp. 84-5). In the next section, we see that the second part of this statement is not far from the truth.

4.2. Government and workers

Another economic participant with a direct impact on workers' well-being was the government. In response to the failure to find foreign buyers for government bonds, the authorities shifted part of the budget shortfall onto workers by imposing progressively higher taxes. I gathered data on taxes from a series of publications entitled *Government Revenues and Expenditures* (Ministry of Finance, 1899-1906b). These data reveal that the tax revenues from liquor sales, which in 1900 alone comprised 25.7 per cent of total government revenues, increased by an astonishing 35 per cent between 1900 and 1904.

Indirect taxes on daily consumer products, such as sugar, spiked by 26 per cent over the same period. Although workers' real wages outpaced inflation by five per cent in this period, what is important is that the authorities purposely chose to levy higher taxes on most basic consumer goods, when many workers did not even have enough money to maintain adequate nutrition (Kirjanov, 1979, pp. 154-212).¹⁹

Next, I determine how government treated companies compared to workers. To do so, I gathered the figures for corporate taxes from *Government Revenues and Expenditures* (Ministry of Finance, 1899-1906b). First, in 1899, the corporate taxes of 54.1 million rubles were small in absolute terms compared with liquor and other indirect taxes of 463.4 million rubles. Second, between 1899 and 1904 corporate tax rates stayed unchanged, implying that the government continued to favour the prosperity of companies over ordinary citizens.²⁰ As a result, Figure 6 shows that in this period the collected amount of corporate income tax increased by 14 per cent, a much smaller increase than that of liquor and other indirect taxes.

As shown in Figure 6, the levying of progressively higher taxes on daily products supported the strong growth in government revenues. The government then channelled taxpayer money to assist industry, as described in Section 3.3, above. The result was a distributional effect in the form of an income transfer from regular taxpayers to capitalists. To quantify this effect, I collect data on the flow of funds between major economic groups between 1900 and 1905, the period for which data are available for comparison. I rely on both primary and secondary sources. In particular, the data on taxes, government revenues and capital gains on investments come from *Government Revenues and Expenditures*. Corporate net income is taken from the *Yearbooks*. Nominal worker wages are taken from Pushkareva et al. (2011, p. 290). Physical output and the number of workers in the mining industry are retrieved from Izmesteva (2011).

Figure 6 shows that industrialists fared well at the expense of workers, those who paid the bulk of the indirect and liquor taxes. Between 1900 and 1904, the increase in liquor and indirect taxes of 28.5 per

¹⁹ Workers' real wages are from Pushkareva et al. (2011, p. 292).

²⁰ To determine corporate tax rates, I review all the tax-related laws in *Polnoe sobranie zakonov* (1902a, 1902b, 1903, 1904, 1905, 1907).

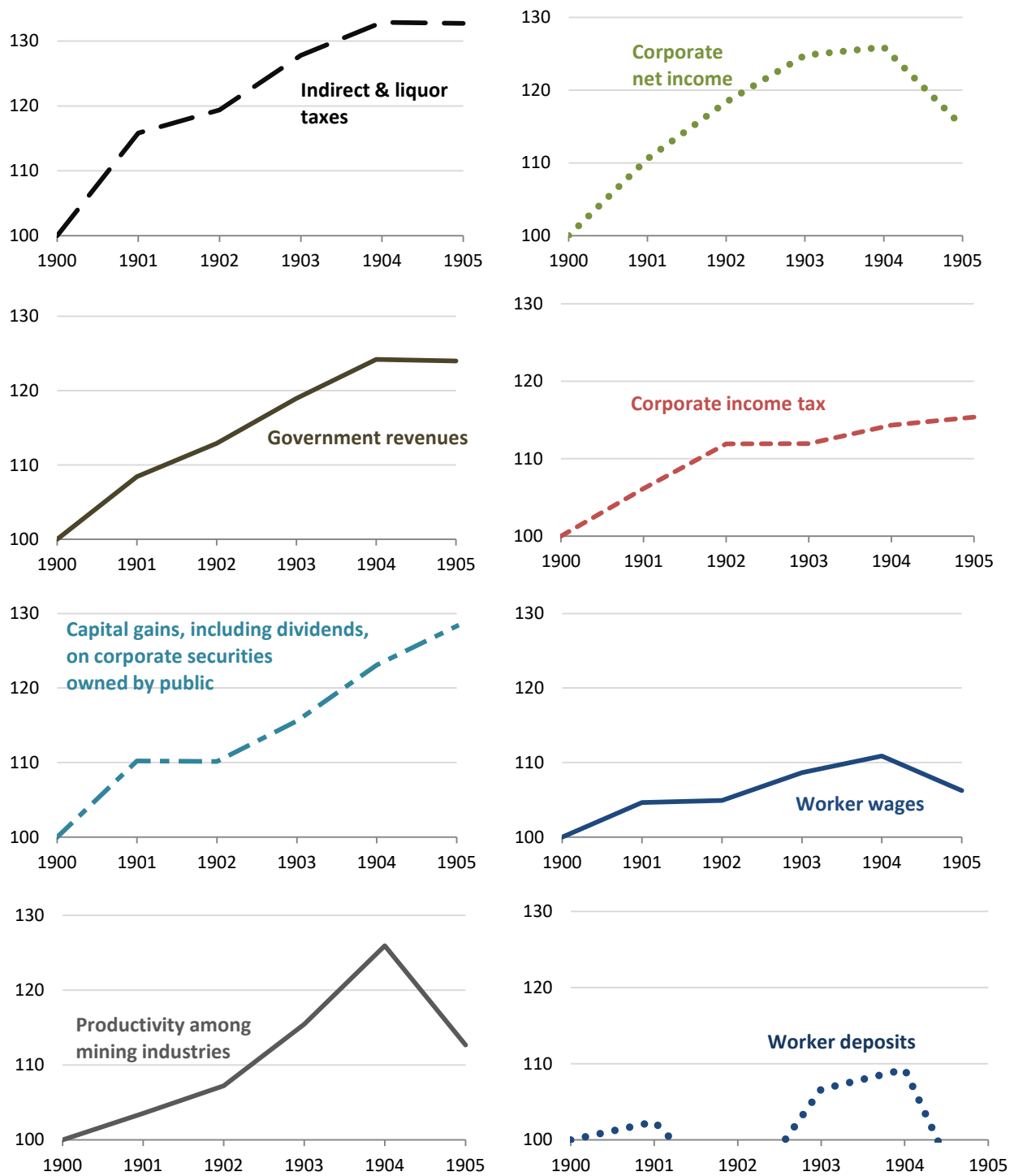


Figure 6. Financial conditions of key economic groups (index 1900 = 100), 1900-1905

Notes: Liquor taxes include indirect taxes on liquor and the taxes received by the government monopoly on the sale of liquor. Indirect taxes include the tax on tobacco, sugar, and matches.

Capital gains are calculated as the taxes collected from the corporate securities owned by the general public divided by the five per cent flat capital gains tax that was effective since 1885 (Polnoe sobranie zakonov, 1885). Productivity among mining industries is calculated as the change in physical output per the number of workers. To ensure that the estimation is conservative, I assume that the number of hours worked per worker stayed constant over the years. Mining industries include coal, iron ore, copper, oil, manganese, gray pyrite, silver-lead, zinc ore, chromium ore, asbestos, salt, gold, platinum, and peat; and do not include the coke industry (due to the lack of data), which represented 6.4 per cent of the aggregate monetary output of the mining industries. Worker wages are nominal average annual wages.

Sources: Taxes and government revenues are from Ministry of Finance (1899-1906b). Corporate net income is from Ministry of Finance (1900-1907a). Worker wages are from Pushkareva et al.(2011, p. 290). Physical output and the number of workers at mining industries are from Izmetseva (2011).

cent, which fell most heavy on the lower classes, outweighed the increase in corporate net income of 25.9 per cent. Note that in this period companies significantly understated their real financial performance to minimize taxable income (Gindin, 1964, pp. 140-3). Investors too fared well. I calculate the capital gains realized by investors from owning corporate securities as the capital gains tax collected by the government divided by the five per cent capital gains tax rate that had been in effect since 1885.²¹ Figure 6 shows that capital gains, which were mostly derived from dividends, increased by a striking 23.1 per cent.

Figure 6 also reveals that after benefiting from government assistance, industrialists did not pass a fair share of the profits to workers. The productivity of the mining industry, calculated as the industry's physical output per the number of workers employed, rose by 24.2 per cent.²² Corporate net income, as mentioned above, increased by 25.9 per cent. Yet workers' average annual wages lagged noticeably behind, increasing by only 10.9 per cent. Industrialists deliberately took the opportunity to underpay workers.

While industrialists and investors prospered, workers' wealth lagged behind. Lenin (1963, p. 283), who studied the data on state savings branches, by far the most popular state-owned financial institutions among the general public for depositing money, concluded that in 1899 only 8.3 per cent of all factory workers had a deposit account. A third of them had a net worth of 25 rubles or less, equivalent to 1.6 months of an average worker's pay.²³ The working class also ranked last as measured by the amount of savings in rubles per deposit account, without counting soldiers whose monetary needs were partially taken care of by the state (Lenin, 1963, p. 283). Even domestic workers with 143 rubles per account had more money than industrial workers with 136 rubles of savings (Lenin, 1963, p. 283). Using

²¹ The tax rate is from Polnoe sobranie zakonov (1885).

²² To keep on the conservative side, I assume that the hours worked per worker stayed constant over this period. The lack of data on the physical output of other industries does not allow me to estimate their productivity.

²³ An average worker's pay in 1900 was 15.6 roubles per month (Pushkareva et al., 2011).

data from the *Yearbooks*, I calculated an average worker's wealth, as measured by the amount of savings per deposit account. As shown in Figure 6, between 1899 and 1904 an average worker's wealth increased by nearly 10 per cent, but almost 40 per cent of this meagre increase was invalidated by inflation.²⁴

5. Conclusions

The mainstream literature has established that financial crises depress households' income and wealth. Their deteriorating material conditions can then lead to discontent and social unrest. The case of Russia between 1899 and 1905 supports an alternative view. I find that the response to the financial crisis by government and industry transferred income and wealth from ordinary workers to capitalists. The recipients of transfers profited during the recovery, while the workers' material conditions either fell behind or deteriorated. Some evidence also suggests that industry required the labour force to work more intensively, thus further damaging their physical well-being. From the extant literature we know that poor working and living conditions were the central reason behind the occurrence of labour strikes. Therefore, the inequitable sharing of the economic shocks appears to have made labour strikes more likely to happen.

If modern policy-makers take the side of the mainstream view, then their focus will predictably be on stabilising the banking system, the non-bank financial institutions and the financial markets, and then letting free markets determine the outcome. If, in contrast, policy-makers take the view that financial redistributions are not only crisis-made, then restoring stability to the financial system and ensuring that credit flows to the economy may not be enough to prevent social upheaval and political fallout.

These findings open up an avenue for future research. Using company-level data, in future work I hope to test empirically whether the strikes in the years leading up to the revolution were driven by the crisis-induced economic shocks or by the response to these shocks by businesses.

²⁴ Inflation statistics, based on a basket of 39 goods purchased in St. Petersburg and Moscow, are from Strumilin (1960, p. 115).

References

- Algan, Y., Guriev, S., Papaioannou, E., & Passar, E. (2017). The European trust crisis and the rise of populism. *Brookings Papers on Economic Activity*, 2017, 48(2), 309-400.
- Annaert, J., Buelens, F., & Cuyvers, L. (2019). Returns on foreign investment during the pre-1914 era: the case of Russia. *European Review of Economic History*, 23(1), 72-96.
- Bernanke, B. (1983). Nonmonetary effects of the financial crisis in the propagation of the great depression. *American Economic Review*, 73(3), 257-276.
- Bovykin, V. (1984). *Formirovanie finansovogo kapitala v Rossii konec XIX v. - 1908 g. [The formation of financial capital in Russia. The end of the XIX century to 1908]*. Moscow: Nauka.
- Brender, A. & Drazen, A. (2008). How do budget deficits and economic growth affect reelection prospects? Evidence from a large panel of countries. *American Economic Review*, 98(5): 2203-2220.
- De Bromhead, A., Eichengreen, B., & O'Rourke, K. (2013). Political extremism in the 1920s and 1930s: Do German lessons generalize? *The Journal of Economic History*, 73(2), 371-406.
- DiPasquale, D. & Glaeser, E. (1998). The Los Angeles riot and the economics of urban unrest. *Journal of Urban Economics* 43(1), 52-78.
- Fisher, I. (1933). The debt-deflation theory of Great Depressions. *Econometrica*, 1, 337-357.
- Franklin, J., Rostom, M., & Thwaites, G. (2015). *The banks that said no: banking relationships, credit supply and productivity in the United Kingdom* (Bank of England working paper No. 557).
- Friedman, M., & Schwartz, A. (1963). *A Monetary History of the United States, 1867-1960*. Princeton: Princeton.
- Funke, M., Schularick, M., & Trebesch, C. (2016). Going to extremes: Politics after financial crises, 1870-2014. *European Economic Review*, 88(1), 227-260.
- Gapon, G. (1905). *Peticija rabochih i zhitelej Sankt-Peterburga [The petition of workers and residents of St. Petersburg]*.
- Gefter, M. (1953). Carizm i monopolisticheskij kapital v metallurgii Juga Rossii do pervoj mirovoj vojny [Tsarism and monopoly capital in the metallurgy of the South of Russia before the First World War]. *Istoricheskie zapiski [Historical notes]*, 43, 70-130. Moscow: The USSR Academy of Sciences.
- Gefter, M. (1955). Jekonomicheskie predposylki pervoj russkoj revoljucii [The economic preconditions for the First Russian Revolution]. *Doklady i soobshhenija [Reports and messages]*, 6, 3-26.
- Goetzmann, W., Cabolis, C., & Radchenko, P. (n. d.a). *St. Petersburg Stock Exchange Index. SPSE and NYSE comparison* [Data set]. Retrieved from <http://som.yale.edu/sites/default/files/files/SPSENYSE18651917ind.xls>
- Goetzmann, W., Cabolis, C., & Radchenko, P. (n. d.b). *St. Petersburg Stock Exchange Index. Individual securities data* [Data set]. Retrieved from http://som.yale.edu/sites/default/files/files/St_%20Petersburg%20data%20Revised%20082010%281%29.xls

- Gindin, I. (1948). *Russkie kommercheskie banki. Iz istorii finansovogo kapitala v Rossii [Russian commercial banks. Based on the history of financial capital in Russia]*. Moscow.
- Gindin, I. (1950). Neustavnye ssudy Gosudarstvennogo banka i ekonomiceskaja politika carskogo pravitelstva [Extraordinary loans of the Bank and the economic policy of the Tsarist government]. *Istoricheskie zapiski [Historical Notes]*, 35, 87-126. Moscow: The USSR Academy of Sciences.
- Gindin, I. (1964). Balansy akcionerных predpriyatij kak istoricheskij istochnik [Balance sheets of joint-stock companies as a historical source]. In Alexey Novoselsky (Ed.), *Maloissledovannye istochniki po istorii SSSR XIX-XX vv.: Istochnikovedcheskij analiz [Scarcely-researched sources on the history of the USSR in the XIX-XX centuries]*. Moscow: Nauka.
- Gindin, I. (1980). Antikrizisnoe finansirovanie predpriyatij tjazheloj promyshlennosti (konec XIX - nachalo XX v.) [Anti-crisis financing of companies in the heavy industry (the end of XIX – beginning of XX century)]. *Istoricheskie zapiski [Historical Notes]*, 105, 105-149. Moscow: The USSR Academy of Sciences.
- Gindin, I. (1996). Jekonomicheskij krizis 1900-1903 goda i antikrizisnaja politika pravitelstva [The economic crisis of 1900-1903 and the state anti-crisis policy]. *Iz istorii jekonomicheskoy mysli i narodnogo hozjajstva Rossii [From the history of economic thought and the economy of Russia]*, 2, 1-153. Moscow: The Russian Academy of Sciences.
- Gindin, I. (2007a). Gosudarstvo i jekonomika v gody upravljenija S. Ju. Witte [The state and economy in the years of S. U. Witte's governance]. *Voprosy Istorii [Questions of History]*, 7, 64-93.
- Gindin, I. (2007b). Gosudarstvo i jekonomika v gody upravljenija S. Ju. Witte [The state and economy in the years of S. U. Witte's governance]. *Voprosy Istorii [Questions of History]*, 9, 62-96.
- Gregory, P. (1982). *Russian national income, 1885-1913*. Cambridge: Cambridge University Press.
- Gregory, P. (1994). *Before command: An economic history of Russia from emancipation to the first five-year plan*. Princeton: Princeton.
- Halac, M. & Schmukler, S. (2004). Distributional effects of crises: The financial channel. *Economia*, 5(1), 1-67.
- Hilt, E. (2017). *Banks, Insider Connections, and Industry in New England: Evidence from the Panic of 1873*. Working paper.
- Izmesteva T. (1998). *Dinamika rossijskoj promyshlennosti za 1887-1913 [The dynamics of the Russian industry 1887-1913]*. Retrieved from <http://www.hist.msu.ru/Labs/Ecohist/DBASES/INDUSTRY/index.htm>.
- Izmesteva T. (2011). *Dinamika razvitija dobyvajushhej promyshlennosti Rossii v 1887-1914 gg. [The dynamics of development of the mining industry of Russia during 1887-1914]*. Retrieved from http://www.hist.msu.ru/Dynamics/08_min.htm
- Jayadev, A. (2013). Distribution and crisis: reviewing some of the linkages. In Wolfson, M. & Epstein, G. (Eds.), *The Oxford handbook of the political economy of financial crises*. New York, NY: Oxford University Press.

- Kafengauz, L. (1994). *Jevoljucija promyshlennogo proizvodstva Rossii (poslednjaja tret XIX v. – 30-e gody XX v.) [The evolution of industrial production in Russia (the last third of the 19th century to the 1930s)*. Moscow: Epiphany.
- Kirjanov, U. (1979). *Zhiznennyj uroven rabochih Rossii (konec XIX - nachalo XX v.) [The living standard of workers in Russia (late XIX - early XX century)]*. Moscow: Nauka.
- Korelin, A., Pushkareva, I., Koroleva, N., Tyutyukin, S., Khristoforov, I. (2005). *Pervaja revoljucija v Rossii. Vzgljad cherez stoletie [The first revolution in Russia. A look through the century]*. Moscow: Pamjantniki Istoricheskoy Mysli.
- Lenin, V. (1963). *Polnoe sobranie sochinenij. Tom 6. Janvar – Avgust 1902 [Collected works. Volume 6. January – August 1902]*. Moscow: Gospolitizdat.
- Lenin, V. (1967). *Polnoe sobranie sochinenij. Tom 5. Maj – Dekabr 1901 [Collected works. Volume 5. May – December 1901]*. Moscow: Gospolitizdat.
- Lenin, V. (1969). *Polnoe sobranie sochinenij. Tom 26. Ijul 1914 – Avgust 1915 [Collected works. Volume 26. July 1914 – August 1915]*. Moscow: Gospolitizdat.
- Lenin, V. (1972). *Polnoe sobranie sochinenij. Tom 15. Fevral – Ijun 1907 [Collected works. Volume 15. February – June 1907]*. Moscow: Gospolitizdat.
- Lindert, P. & Nafziger, S. (2014). Russian Inequality on the Eve of Revolution. *Journal of Economic History*, 74(3), 767-798.
- Lindgren, K. & Vernby, K. (2016). The electoral impact of the financial crisis: Evidence using district-level data. *Electoral Studies*, 44(6), 214-224.
- Lyashchenko, P. (1956). *Istorija narodnogo hozjajstva SSSR. Tom 2 [The history of the national economy of the USSR. Volume 2]*. Moscow: Politicheskaja literatura.
- Malik, H. (2018). *Bankers and Bolsheviks: international finance and the Russian Revolution*. Princeton: Princeton.
- Mikhailovsky, V. (1921). Urozhai v Rossii 1801-1914 gg. [Harvests in Russia in 1801-1914]. *Bjulleten Centralnogo Statisticheskogo Upravlenija [Bulletin of the Central Statistical Bureau]*, 50, 4.
- Moyer, F., Jones, G., & Wrenn, V. (1952). *Injury experience in coal mining, 1948: Detailed analysis of factors influencing mine safety and related employment, production, and productivity data* (Bulletin 509). Washington, D.C.: U.S. Government Printing Office.
- Nevsky, V. (1922). Janvarskie dni v Peterburge 1905 goda [January days of 1905 in St. Petersburg]. *Krasnaja Letopis [The Red Chronicle]*, 1, 13-74.
- Ol, P. (1925). *Inostrannye kapitaly v narodnom hozjajstve dovoennoj Rossii [Foreign capital in the economy of pre-war Russia]*. Leningrad: Press of the All-Union Academy of Sciences.
- Owen, T. (2013). Measuring business cycles in the Russian Empire. *The Economic History Review*, 66(3), 895-916.

- Ozerov, I. (1905). *Jekonomicheskaja Rossija i ejo finansovaja politika na ishode XIX i v nachale XX veka* [Economic Russia and her financial policy at the turn of the XIX and early XX century]. Moscow: Kushnereva & Co.
- Piketty, T. (2014). *Capital in the twenty-first century*. Cambridge, MA: Harvard University Press.
- Polnoe sobranie zakonov Rossiiskoi Imperii* [The complete collection of laws of the Russian Empire] (1885), collection 3, vol. 5, law 2961. Retrieved from http://www.nlr.ru/e-res/law_r/search.php
- Polnoe sobranie zakonov Rossiiskoi Imperii* [The complete collection of laws of the Russian Empire] (1902a), collection 3, vol. 19. Retrieved from http://www.nlr.ru/e-res/law_r/search.php
- Polnoe sobranie zakonov Rossiiskoi Imperii* [The complete collection of laws of the Russian Empire] (1902b), collection 3, vol. 20. Retrieved from http://www.nlr.ru/e-res/law_r/search.php
- Polnoe sobranie zakonov Rossiiskoi Imperii* [The complete collection of laws of the Russian Empire] (1903), collection 3, vol. 21. Retrieved from http://www.nlr.ru/e-res/law_r/search.php
- Polnoe sobranie zakonov Rossiiskoi Imperii* [The complete collection of laws of the Russian Empire] (1904), collection 3, vol. 22. Retrieved from http://www.nlr.ru/e-res/law_r/search.php
- Polnoe sobranie zakonov Rossiiskoi Imperii* [The complete collection of laws of the Russian Empire] (1905), collection 3, vol. 23. Retrieved from http://www.nlr.ru/e-res/law_r/search.php
- Polnoe sobranie zakonov Rossiiskoi Imperii* [The complete collection of laws of the Russian Empire] (1907), collection 3, vol. 24. Retrieved from http://www.nlr.ru/e-res/law_r/search.php
- Ponticelli, J. & Voth, H. (2011). *Austerity and anarchy: Budget cuts and social unrest in Europe, 1919-2008*. Working paper.
- Pushkareva, I., Zheltova, B., Dodonov, B., Kalmykov, S., Michailov, N., Popolov, S., & Rusakova, M. (2005). *Rabochee dvizhenie v Rossii. 1895 - Fevral 1917. Hronika. Vypusk 9. God 1903* [The labor movement in Russia. 1895 - February 1917. Chronicle. Issue 9. Year 1903]. Moscow: The Russian Academy of Sciences.
- Pushkareva, I., Zheltova, B., Dodonov, B., Kalmykov, S., Michailov, N., Popolov, S., & Rusakova, M. (2008). *Rabochee dvizhenie v Rossii. 1895 - Fevral 1917. Hronika. Vypusk 10. God 1904* [The labor movement in Russia. 1895 - February 1917. Chronicle. Issue 10. Year 1904]. Moscow: The Russian Academy of Sciences.
- Pushkareva, I., Borodkin, L., Glazunov, S., Novikov, A., Potolov, S., & Shilnikova, I. (2011). *Trudovye konflikty i rabochee dvizhenie v Rossii na rubezhe XIX-XX vv.* [Labor conflicts and the labor movement in Russia at the turn of the XIX-XX centuries]. St. Petersburg: Aletheia.
- Rubakin, N. (1912). *Rossija v cifrah. Strana. Narod. Soslovija. Klassy.* [Russia in figures. A country. People. Classes]. St. Petersburg: Bitner.
- Shilnikova, I. (2012). Jekonomicheskie aspekty trudovyh konfliktov v promyshlennosti [Economic aspects of labor conflicts in industry]. *Industrialnaja istorija* [Industrial history], 2(17), 13-25.
- Shilnikova, I. (2013a). *Statisticheskie svedenija o neschastnyh sluchajah s rabochimi na gornozavodskih i promyslovyh rabotah v Rossii po rajonom i po rodam promyshlennosti, 1893-1903 gg.* [Statistical data on worker accidents at mining and manufacturing operations in Russia by region and by industry. Years 1893-1903]. [Data set]. Retrieved from http://www.hist.msu.ru/Strikes_factors/data/03_04.xls

- Shilnikova, I. (2013b). *Statisticheskie svedenija o neschastnyh sluchajah s rabochimi na kamennougolnyh kopjah Doneckogo bassejna, 1893-1903 gg.* [Statistical data on worker accidents in coal mines of the Donetsk basin. Years 1893-1903]. [Data set]. Retrieved from http://www.hist.msu.ru/Strikes_factors/data/03_05.xls
- Shpolyanski, D. (1953). *Monopolii ugolno-matallurgicheskoj promyshlennosti juga Rossii v nachale XX veka (k voprosu o soobnoshenii monopolii i konkurencii)* [Monopoly of the metallurgical industry in the south of Russia at the beginning of the 20th century]. Moscow: Academy of Sciences.
- Siegel, J. (2015). *For Peace and Money: French and British finance in the service of tsars and commissars.* New York, NY: Oxford University Press.
- Stalin, J. (1952). *Jekonomicheskie problemy socializma v SSSR* [The economic problems of socialism in the USSR]. Moscow: State Publishing House of Political Literature.
- Stiglitz, J. (2013). *The price of inequality: How today's divided society endangers our future.* New York, NY: W. W. Norton & Company.
- Strumilin, S. (1960). *Ocherki jekonomicheskoj istorii Rossii i SSSR* [Essays on the economic history of Russia and the USSR]. Moscow: Nauka.
- The Economist (newspaper). (1901, May). *The financial and commercial crisis in Russia.*
- Trigari, A. & Rotemberg, J. (2006). Cyclical wages in a search-and-bargaining model with large firms. *NBER International Seminar on Macroeconomics*, 3, 65-114.
- Valetov, T. (2017). *Denezhnye obemy jeksporta «glavnejshih» tovarov i tovarnyh grupp. 1802-1915* [Monetary volumes of exports of 'major' goods and commodity groups. 1802-1915]. [Data file]. Retrieved from http://www.hist.msu.ru/Dynamics/data/10_001.xls
- Vvedensky, B. (1952). Devjatoe janvarja 1905 [The ninth of January 1905]. In *Bolshaja sovetskaja jenciklopedija* [The Great Soviet Encyclopedia]. (Vol. 13, pp. 539-540). Moscow: Bolshaja Sovetskaja Jenciklopedija.
- Vvedensky, B. (1955). Revoljucija 1905-07 v Rossii [Revolution of 1905-07 in Russia]. In *Bolshaja sovetskaja jenciklopedija* [The Great Soviet Encyclopedia]. (Vol. 36, pp. 199-205). Moscow: Bolshaja Sovetskaja Jenciklopedija.
- Vvedensky, B. (1956). Sobranija Russkih Fabrichno-zavodskih rabochih g. S.-Peterburga [Meetings of the Russian Factory Workers of the city of St. Petersburg]. In *Bolshaja sovetskaja jenciklopedija* [The Great Soviet Encyclopedia]. (Vol. 39, pp. 463-464). Moscow: Bolshaja Sovetskaja Jenciklopedija.

Official publications

- Ministry of Finance. (1900-1907a). *Ezhegodnik Ministerstva Finansov. Vypusk 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906-1907* [The Yearbook of the Ministry of Finance. Issue 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906-1907]. St. Petersburg: Kirschbaum.
- Ministry of Finance. (1899-1906b). *Obshhaja gosudarstvennaja rospis dohodov i rashodov na 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906 god* [Government revenues and expenditures for the year 1898, 1899, 1900, 1901, 1902, 1903, 1904, 1905, 1906]. St. Petersburg.

Ministry of Finance. (1903-1907c). *Svod otchetov fabrichnyh inspektorov za 1901, 1902, 1903, 1904* [Summary of factory inspector reports for 1901, 1902, 1903, 1904]. St. Petersburg.

Russian State Historical Archive. Collection 587, inventory 56, file 296, pp. 10-11: State Bank (12 November, 1899), *O sodejstvii realizacii obligacij vypuskov solidnyz promyshlennyh predpriyatij* [On the assistance of the sale of bonds of sound industrial enterprises]. St. Petersburg.

State Bank of the Russian Empire. (1899-1903). *Otchet gosudarstvennogo banka za 1898, 1899, 1900, 1901, 1902 god* [The report of the State Bank for the year 1898, 1899, 1900, 1901, 1902]. St. Petersburg: State Bank.