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New Russian Economic History*

Ekaterina Zhuravskaya (r) Sergei Guriev (r) Andrei Markevich[†]

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Abstract

This survey discusses recent developments in the growing literature on the Russian economic history of the 19th and 20th centuries. Using novel data and modern empirical methods, this research generates new insights and provides important lessons for development economics and political economy. We organize the discussion around four strands of this literature. First, we summarize and put in comparative perspective research on the long-term trends in economic development and living standards, which shows that throughout history Russia significantly underperformed advanced economies. We also compile reliable quantifications of the human cost of Stalin's dictatorship. Second, we discuss new studies of imperial Russia that partially confirm Gerschenkron's classic conjecture on the institutional explanation for Russia's relatively low level of economic development and on the causes of the revolution. The third strand of the literature focuses on the Soviet period and explains its slowdown over time and the eventual collapse of the system by the command economy's inability to provide incentives to individual agents. The fourth strand documents the long-term economic, social, and political consequences of large-scale historical experiments that took place during both the imperial and the Soviet periods. We conclude by discussing the lessons from these four strands of the literature and highlight open questions for future research.

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[†]All authors contributed equally to the paper. The order of the authors is random and was determined by the AEA randomization tool, confirmation code: W ez_ tkQuZYKj. Ekaterina Zhuravskaya is from the Paris School of Economics, Sergei Guriev is from Sciences Po, Andrei Markevich is from the New Economic School.

1 Introduction

Empires matter long after they disappear. The postimperial syndrome of nostalgic illusions about the prospect of regaining lost grandeur often generates popular ideologies based on inward focus, xenophobia, and aggression toward the outside world. Understanding the roots of such ideas is impossible without knowing the history of the empires themselves and the reasons behind their fall. Russia is the home of not one, but two lost empires: the Russian Empire and the Soviet Union. Arguably, Russia's history is unique in terms of the scale and diversity of social experimentation that the two empires imposed on Russia's population. The serfdom that existed for more than two centuries and took a more severe form than anywhere else in Europe; the tsar's liberalization reforms, which came too late and did too little; the country's abrupt fall into the hands of Bolsheviks as a result of the 1917 revolution; the drastic economic and social transformation of the Communist project, with forced "Big Push" industrialization that made the Soviet Union a global superpower, but at an enormous human cost; and the eventual spectacular collapse of the Soviet empire are arguably among the largest social experiments in human history.

Social sciences have a long tradition of using Russia's historical experiments to draw out lessons relevant for other countries. For instance, the comparison between Russia's development path and that of the countries in Western Europe and nations outside Europe played an important role in the narrative of the development studies by [Rostow \(1960\)](#), [Gerschenkron \(1962\)](#), and [Kuznets \(1965\)](#). Their work helped shape the early progress in the field of development economics. Soviet industrialization motivated the literature on the Big Push as a strategy for developing countries (e.g., [Rosenstein-Rodan, 1943](#); [Murphy et al., 1989](#)). [Lewis \(1954\)](#) used Stalin's transformation to illustrate his model of structural change in a two-sector economy. Theoretical literature used the case of the Soviet economy to motivate modeling of the incentive schemes in large hierarchies (e.g. [Holmstrom, 1982](#); [Freixas et al., 1985](#)). Interest in the subject has only grown since these seminal studies. In this survey, we review the recent progress in research on the economic history of Russia in the 19th and 20th centuries.

1.1 Why Now?

[Gregory and Harrison \(2005\)](#) reviewed the state-of-the-art research on Russian economic history for this journal 17 years ago.¹ Since this survey, there has been a major burst of new

¹Because most of the literature that [Gregory and Harrison \(2005\)](#) surveyed researched the newly declassified

research on Russian and Soviet economic history. The number of papers on Russian and Soviet history published in economics journals grew modestly the 1990s, but this growth accelerated dramatically after 2005. Figure 1 illustrates this progress. In the first half of the 1990s, economics journals without a special focus on history published only four papers with the words “Russian” or “Soviet” in the title or abstract and with Economic History as a stated field (i.e., with the JEL classification code “N*”). In contrast, more than 80 such papers appeared in these journals in the second half of the 2010s. This growth is especially striking given the relatively stable dynamics of the number of publications about Soviet and Russian economic history in journals that do specialize in economic history: they published around ten papers every five years. Whereas not a single article on the economic history of the imperial Russia or the Soviet Union was published in the top-five general interest economics journals between 1991 and 2010, these journals have published six papers on this topic since 2011.

This growth is in part explained by a general increase in the quantity and quality of research in economic history, documented by Abramitzky (2015). First, economic history has benefited both from new econometric methods and new digitization technologies that have led to the dramatic growth of newly coded historical data available for empirical research. The relatively large body of high-quality archival data and published statistics volumes on Russia in the second half of the 19th and early 20th centuries, together with the opening of Soviet archives after the collapse of the Soviet Union, made the economic history of Russia an integral part of this trend.² Second, the “credibility revolution” made economists turn to history in their search for identifying variation from historical experiments. Because Russia’s history is rich in large-scale political and economic experimentation, it provides fertile ground for causal inference in studying the effects of institutions, culture, and economic policies in the short or medium run, as well as for examining their long-run persistence.³

Other reasons for the increase in research on Russia’s economic history are case-specific. Russian economic history has been empowered by the recent trend toward the micro-macro

Stalin’s Archives, naturally, their survey covered the Soviet period. Gatrell (2006) likewise surveyed historical literature focusing on Soviet history only.

²Recently constructed publicly available datasets on Russian history reflect the progress in digitalization of these data. The Electronic Repository of Russian Historical Statistics provides regional level data on economic output and inputs for several cross-sections over roughly the last two centuries, 1800-2000 (<http://www.ristat.org>, accessed October 26, 2021). The statistical appendix of *Demoscope Weekly* contains disaggregated data on Russian population censuses (<http://www.demoscope.ru/weekly/pril.php>, accessed October 26, 2021). An electronic resource on Russian social and economic dynamics in the 19th and early 20th centuries presents several annual time-series on various aspects of Russian development during the imperial period (<http://www.hist.msu.ru/Dynamics/>, accessed October 26, 2021).

³The persistence studies are of particular interest in the case of Russia given the sharp discontinuities of political regimes and economic policies occurring in 1917 and 1991.

synthesis in development economics (Buera et al., 2021). The quantitative micro-founded macroeconomic models have become a particularly useful tool for understanding the process of unbalanced growth and development, a salient characteristic of Russia’s history. These models allow for frictions (“wedges”) and therefore help in evaluating the performance of nonmarket economies, such as the Soviet Union, and building potential counterfactuals. In addition, the field of Russian and Soviet economic history has benefited greatly from recent insights in the literature on political economies of autocracies (see Gehlbach et al., 2016; Egorov and Sonin, 2020, for excellent surveys of this literature). Many findings of this literature are directly relevant for understanding Soviet economic history and the economic history of imperial Russia. Moreover, the opening of the Russian archives after 1991 has made the Soviet dictatorship one of the best-documented dictatorships in the world available for analysis by social scientists, which makes it a good testing ground for the predictions of modern political economics models.

1.2 The Scope and Structure of the Survey

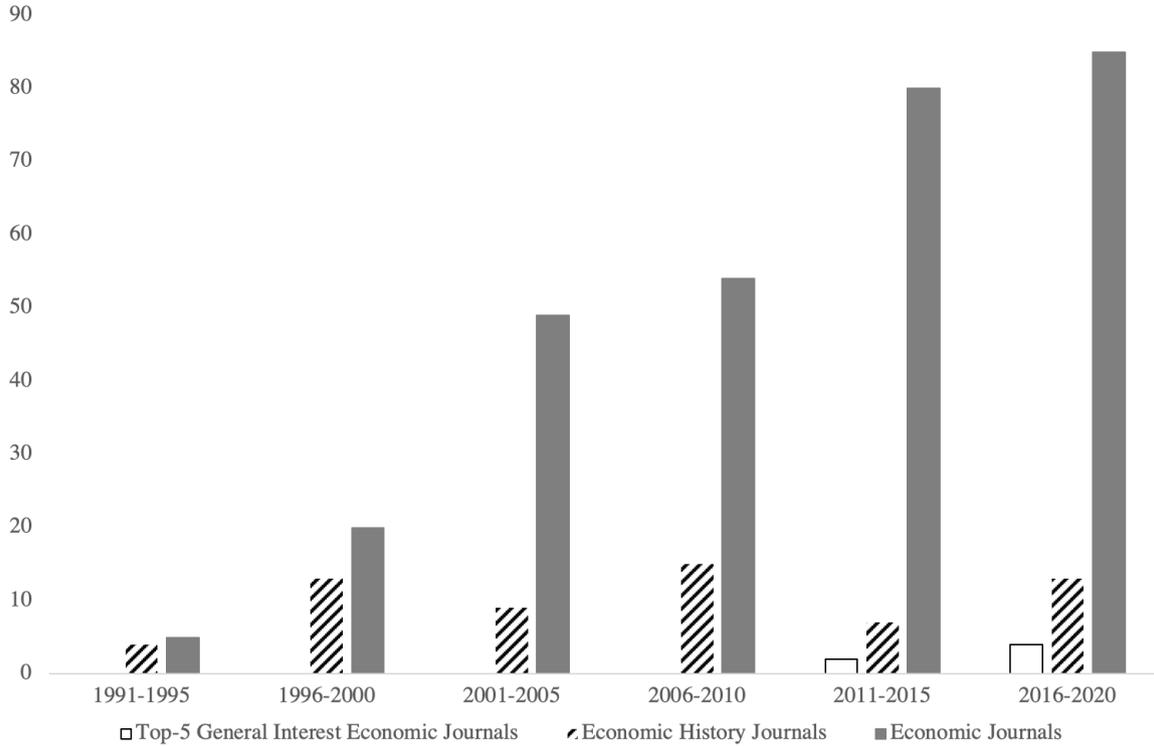
This survey covers research on the period from the early 19th century through the last years of the Soviet regime and on the territory within the historical borders of the Russian Empire and the Soviet Union. This starting point allows us to focus on the divergence in economic development across the globe triggered by the British Industrial Revolution. It is noteworthy that new research on the economic history of Russia in the early modern period is to this date limited. Pre-1800 Russia remains an important subject for future economic history research.⁴

The end-date of the scope of our survey is before the start of the transition from the Socialist system, because the literature on this distinct, recent period of Russia’s history addresses a different set of questions and deserves its own review (see, e.g., Olofsgard et al., 2018). Even though this survey will not cover the post-Soviet period, we do discuss the long-term economic consequences of the historical events that took place before the transition for today’s economic development.

We mostly consider the economic history of the Russian Empire and the Soviet Union within their historical borders. Multiple border changes mean that we cannot define the area precisely. The bulk of the research we survey is on the European parts of Russian Empire and of the Soviet Union. Analyses of the economic history of Russia’s and Soviet peripheries and

⁴We do discuss several recent studies of pre-1800 Russia, as they are relevant for understanding the 19th and 20th centuries.

Figure 1: Number of Articles on Soviet and Russian Economic History in Economics Journals



Note: Number of papers with words “Russian” or “Soviet” in the title or abstract and the code Economic History (N*) according to the JEL classification published in the top-five general-interest economics journals, economic history journals, and in economics journals (excluding economic history journals) by five-year periods. Top-five journals are *the American Economic Review*, *Econometrica*, *the Journal of Political Economy*, *the Quarterly Journal of Economics*, and *the Review of Economic Studies*. Economic history journals are *Cliometrica*, *Explorations in Economic History*, *the Economic History Review*, *the European Review of Economic History*, and *the Journal of Economic History*. Economics journals are all other economics journals indexed in EconLit. The list of all economics journals indexed in EconLit in alphabetical order is available at: https://www.aeaweb.org/econlit/journal_list.php, accessed October 26, 2021.

the role of its Eastern “frontier,” with their abundance of arable lands and natural resources, remain important avenues for future research.

We structure the survey around four main topics. Section 2 provides a bird’s-eye view of trends in the economic development of the Russian Empire and the Soviet Union and discusses new evidence on the evolution of the quality of life of the Russian and the Soviet population. In this section, we also compare the speed of Russian and Soviet development to that of other countries and consider a number of counterfactuals based on different policy scenarios. Section 3 discusses recent studies on causes and consequences of the Russian Empire’s relatively low level of economic development and late industrialization. Section 4 is devoted to the political economy literature on the Soviet dictatorship. Section 5 reviews studies of the long-run consequences of the Russia’s historical experiments. Finally, in Section 6, we discuss the lessons

from these four literatures and suggest open questions for future research.

2 Long-Term Trends in Income and Living Standards

We start with a review of quantitative reconstructions of Russian and Soviet economic development. Figure 2 combines available reconstructions of Russian and Soviet GDP per capita from 1860 through 2018. We use the 2020 version of the Maddison Project Dataset, to which we add Russian GDP per capita between 1860 and 1884 as reconstructed by Kuboniwa et al. (2019).⁵ For the purpose of this comparison, we plot the Russian series against the per capita GDP series of a group of selected comparator countries, all estimates are in 2011 international dollars.

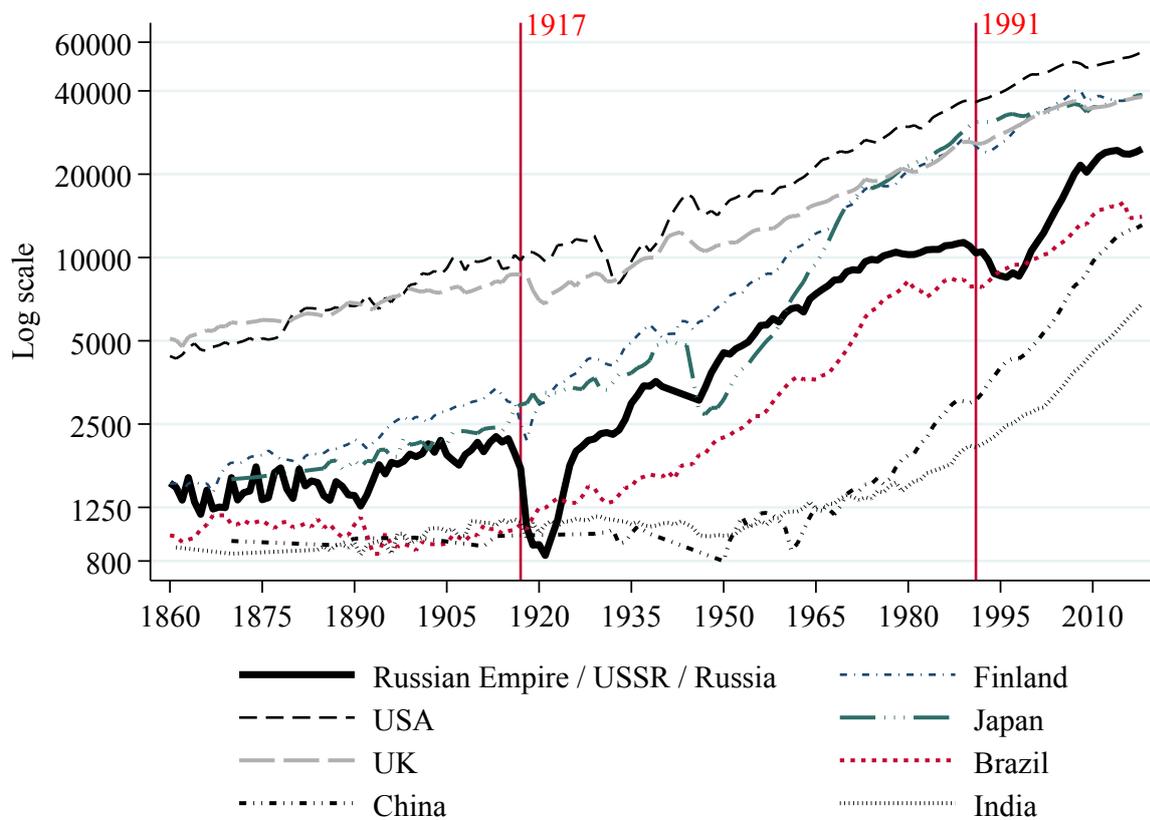
2.1 Per Capita GDP in the Russian Empire

Figure 2 starts in 1860 because data for the earlier period are at best sporadic. There are no reliable estimates of dynamics of Russian GDP in the first half of the 19th century and before the late 17th century. Broadberry and Korchmina (2021) calculate Russian GDP per capita in the 18th century at a decadal frequency. They find that Russia was a part of “little divergence” in income between Northern and Western Europe and the rest of the continent, which went along with the great divergence between continents (Allen, 2001; de Pleijt and van Zanden, 2016; Broadberry and Malinowski, 2021). In the 18th century, Russian national income per capita was about 40% to 70% of British per capita income, but it was higher than in Poland, the only other Eastern European country for which data are available in this period. According to Broadberry and Korchmina (2021), Russian national income per capita grew between the 1690s and the 1740s, when Russia was closing the gap with the most developed economies of Northern and Western Europe, but afterward it stagnated and then declined. As a result, GDP per capita was only 16% higher at the beginning of the 19th century than at the beginning of

⁵The Maddison Project Dataset is one of the most comprehensive datasets with reconstructions of historical GDP series widely used in economic history literature. Its aim is to produce standardized historical national accounts comparable across countries and over-time. The dataset is available here:

<https://www.rug.nl/ggdc/historicaldevelopment/maddison/releases/maddison-project-database-2020?lang=en>, accessed October 26, 2021. Bolt and van Zanden (2020) discuss potential biases in the reconstruction of income series for a large set of countries in the distant past. Because data at the regional level are not available for most of the period, we use the national series of per capita GDP in historical national boundaries. Namely, before 1913, we use GDP per capita in the Russian Empire outside Finland. For the period between 1913 and 1941, we use figures for the territory of the USSR in its interwar borders. For the years between 1945 and 1991, we use the figures for the USSR in its postwar borders. And, for 1992 forward, we use data for post-Soviet Russia. The differences in the geographical boundaries are an important caveat.

Figure 2: GDP Per Capita in Russia and Selected Countries, 1860–2018.
(2011 international dollars; log scale)



Note: For the Russian series, we combine estimates of Russian GDP per capita for the Russian Empire (without Finland), the Soviet Union, and the Russian Federation in their historical borders.

Sources: Russia, 1860–1884 – Kuboniwa et al. (2019); Russia/USSR, 1885–2006 – Bolt and van Zanden (2020), originally from Gregory (1982); Markevich and Harrison (2011) and Maddison (2010); Other countries – Bolt and van Zanden (2020), originally from Barro and Ursua (2008); Bassino et al. (2018); Broadberry et al. (2015a,b); Eloranta et al. (2016); Fukao et al. (2015); Sutch (2006); Wu (2014); Xu et al. (2016) and Maddison (2010).

the 18th century. Overall, the gap in income per capita between Russia and the most developed countries emerged before the 18th century.

The most authoritative reconstruction of the GDP series for the Russian Empire in the late 19th and early 20th centuries was done by Gregory (1982), who produced the annual macroeconomic data from 1885 to the start of WWI. Goldsmith (1961) reconstructed industrial and agricultural output since 1860. More recent studies are generally in line with these earlier estimates and extend the older series to cover the previously missing periods. Markevich and Harrison (2011) close the last gap in national accounts for Russia in the 20th century (1913–1928) and link the Imperial and Soviet GDP series. Kuboniwa et al. (2019) use data from Goldsmith (1961) to estimate GDP from the production side for 1860–1913.⁶

⁶Using the same source, Kopsidis and Schulze (2021) independently reconstruct Russian GDP series for 1860 to 1913. Their results are consistent with Gregory (1982) and Kuboniwa et al. (2019).

In 1860, GDP per capita in the Russian Empire (without Finland) was equal to 1,531 U.S. dollars, i.e., about one-third of that in the United Kingdom or the United States, the two most developed and industrialized economies in the middle of the 19th century. Relative to them, Russia was an economically backward late industrializer. At the same time, an average Russian, in terms of GDP per capita, was about twice as rich as an average Indian or Chinese in the 1860s and 1870s. In these years, Russian GDP per capita was at the level of Japan, another late industrializer that is often used in the literature as a benchmark for evaluating Russian economic development in the late 19th and early 20th centuries (Millar, 1970).

During the first three decades after the emancipation of Russia's serfs in 1861, Russian GDP per capita was highly volatile and did not demonstrate a substantial increase. Russia's steady growth, which started only in the 1890s, was accompanied by a structural transformation of the Russian economy away from agriculture toward industry. As a result, Russian income per capita was about one-and-a-half times higher in 1913 than in 1860. This development, however, was rather limited. In particular, structural transformation in the Russian Empire was never completed. At the beginning of WWI, more than one-half of the Russian national income was still produced in agriculture (Gregory, 1982). The country's relative economic position remained unchanged in the middle of the distribution of countries by income per capita, during the entire Imperial period (and, as we discuss below, also later). Despite the proverbial advantage of economic backwardness (Gerschenkron, 1962), the Russian Empire did not catch up with the U.S. or advanced European economies. It actually fell behind. Its per capita GDP was at 35% of the U.S. level in 1860 and at 22% in 1913. The comparison with the United Kingdom is only slightly better: 30% in 1860 and 27% in 1913. However, income per capita before WWI grew substantially faster in Russia than in Brazil, India, or China, at rates comparable with the economic development of Japan. The growth rate of Russia without Finland was lower than in Finland. Because Finland was a semiautonomous part of the Russian Empire before 1917, it is another commonly used benchmark with initial conditions similar to Russia's.

Markevich (2019) provides the only historical reconstruction of the geographical differences in the level of incomes for all regions within the Russian Empire. In particular, he builds data on per capita income at the subnational level for 97 provinces of the Russian Empire. Income per capita in the richest provinces, such as Saint Petersburg, was comparable to that of the most advanced European economies, including the United Kingdom. In contrast, the empire's poorest provinces, such as Turgaj (nowadays in modern Kazakhstan), had gross re-

gional product (GRP) per capita at the levels of per capita GDP in Peru or China. The spatial Gini index was higher in Russia than in any European country at that time. The geographical size of Russia cannot explain this difference, as a comparison with other big countries demonstrates. For example, around 1900, regional disparities in income in the Russian Empire were higher than in China. The between-region inequality within Russia was comparable only to the inequality within the New World’s countries such as the United States or Mexico (Markevich, 2019).

Overall, the newly available data confirm the premise of the classic work by Alexander Gerschenkron that the Russian Empire was lagging behind countries that industrialized early (Gerschenkron, 1962, 1965). Yet, these data also demonstrate that Russia in the late 19th and early 20th centuries was wealthier than many other developing countries at that time.

2.2 Per Capita GDP in the Soviet Union

Markevich and Harrison (2011) provide estimates of the annual GDP series of Imperial and Soviet Russia between 1913 and 1928. They document that the Russian Revolution in 1917 was an economic disaster. Output fell by almost 40% in the year following the revolution. This decline was concentrated in the sectors subjected to nationalization. The subsequent civil war and policy of “war communism” deepened the crisis further. By 1921, Russian GDP per capita was 63% below its 1913 level. Then there was the massive famine of 1921–1922. As Figure 2 shows, Russian GDP per capita fell below GDP per capita in India and China, two countries that demonstrated little progress in economic development in the 19th century and the first half of the 20th century. The New Economic Policy (1921–1928), also known under the acronym NEP, allowed the Russian economy to recover rapidly but, in per capita terms, the losses were not fully recovered by the start of Stalin’s five-year plans in 1928, not to mention lagging behind the prewar trend. The Soviet economy caught up with the Tsarist trend only by the late 1930s, returning to its relative position in the international development race.⁷

2.2.1 Did the Soviet Industrialization Outperform the Counterfactuals?

The central question of the debate on Soviet industrialization was first formulated by Nove (1964) as “Was Stalin necessary?” Recent literature revisits this question with new data

⁷Smirnov (2015) provides indices for selected sectors beginning in 1928. Kuboniwa et al. (2019) reconstruct annual GDP series for the Russian Federation (which accounted for about only one-half of the total population of the Soviet Union) beginning in 1913. To the best of our knowledge, there are no such reconstructions for other Soviet republics. Similarly, there are no estimates of GRP for administrative units of lower levels such as oblast or autonomous republic for the interwar or postwar Soviet periods.

and methods.

Given the great difference in labor productivity between agricultural and nonagricultural sectors, there was a “huge ... economic potential from reallocating ... labor from agriculture to industry” (Acemoglu and Robinson, 2012). Indeed, 87% of Soviet employment was in agriculture in 1928, but it produced only 48% of GDP (Cheremukhin et al., 2017). Under the assumption that there was no change in sectoral productivity, these numbers imply that simply moving 10% of the economy’s labor from agriculture to industry would increase GDP by $10 \times \frac{1-0.48}{1-0.87} - 10 \times \frac{0.48}{0.87} = 34\%$; moving 20% would raise GDP by 69%.

Stalin implemented a massive reallocation of resources from farms to factories, initiating a brutal policy of rapid industrialization and forced collectivization of agriculture (for a detailed description, see, e.g., Davies and Wheatcroft, 2004; Davies et al., 2014, 2018). Could such reallocation be achieved via more conventional policies? To explore the effectiveness of Stalin’s industrialization, Cheremukhin et al. (2017) build a two-sector neoclassical growth model with frictions (“wedges”). This model allows comparing a nonmarket economy to its market counterfactual. The wedges reflect the costs of intersectoral reallocation of capital and labor, as well as those of the intertemporal reallocation. In a market economy, they can reflect transaction costs, distortions due to missing markets or monopoly power—or costs of factor mobility. For example, differences between prices and marginal costs measure monopoly markups, while a wage gap between urban and rural sectors represents the cost of moving from farm to factory.

In a command economy, there are no market prices, wages, or interest rates; the quantitative targets for production and investment are set by the central planner. Still, the model in Cheremukhin et al. (2017) allows comparing the command economy to a market economy with wedges. Using actual Soviet data on quantities, this model helps with inferring the magnitudes of wedges that would generate the same outcomes in a market economy. Then, one can compare wedges in the Soviet economy and, e.g., in the Tsarist one or in other reasonable counterfactuals like Mao’s China or interwar Japan.

The quantitative analysis in Cheremukhin et al. (2017) and a comparison of wedges under Stalin and the Tsars suggest that Soviet industrialization was mostly achieved by reducing frictions caused by monopoly power in the industrial sector in the Tsarist economy. The relaxation of labor-mobility constraints played a relatively minor role.⁸ At the same time, a dramatic

⁸The analysis in Cheremukhin et al. (2017) is limited by data-availability constraints. The studies of misallocation in modern developing countries rely on disaggregated data and can provide a more nuanced view of the factors slowing down structural change; see, e.g., Herrendorf and Schoellman (2018); Gollin and Udry (2021); Adamopoulos et al. (forthcoming); and surveys in Restuccia and Rogerson (2017); and Lagakos (2020).

structural transformation of the Soviet economy and an increase in growth rates were also associated with substantial underperformance of sector-level productivities in both agricultural and manufacturing sectors (by 10% and 7%, respectively) that resulted in similar patterns of Soviet economic trajectory and the extrapolation of Tsarist trends. An economy with Tsarist wedges but without monopoly frictions in the industrial sector would significantly outperform that of Soviet Russia.⁹

[Cheremukhin et al. \(2013\)](#) compare Stalin's industrialization to two other counterfactuals: that of interwar Japan and that of continuing NEP after 1928. Japan was a market economy with substantial distortions ([Hayashi and Prescott, 2008](#)). In the interwar period, Japan managed to reduce the distortions and to accelerate total factor productivity (TFP) growth in manufacturing. The quantitative analysis suggests that a counterfactual with Japan's wedges and sectoral productivities would substantially outperform the Soviet GDP dynamics.

The performance of the NEP counterfactual crucially depends on assumptions regarding TFP growth. While continuation of the NEP was unlikely to result in disastrous TFP performance of Stalin's actual scenario, [Cheremukhin et al. \(2013\)](#) show that there is a substantial difference between assuming 0.5% annual TFP growth (the Tsarist trend) and 2% annual growth (the contemporaneous Japanese rate). In the former scenario, the actual performance would initially underperform the NEP counterfactual in terms of GDP per capita but would by the end of the 1930s catch up and even overtake it (although the NEP counterfactual would still result in higher welfare). The NEP scenario with 2% annual TFP growth would dramatically outperform Stalin's actual GDP dynamics.

[Cheremukhin et al. \(2015\)](#) carry out a similar wedge accounting of Chinese industrialization and compare the effectiveness of Stalin's and Mao's policies. They compare Soviet policies since 1928 and Chinese ones since 1957. This analysis shows that, relative to the Soviet counterfactual, Chinese policies were much slower in moving labor from farms to factories and resulted in a greater damage to agricultural TFP. However, Chinese policies produced faster TFP growth in manufacturing. The net effect is that the two scenarios produce similar outcomes in terms of GDP per capita.

[Castaneda Dower and Markevich \(2018\)](#) analyze Russian agriculture during the Great War. They take an advantage of natural experiment of WWI mobilization of peasants to

⁹While [Cheremukhin et al. \(2017\)](#) compare the actual and counterfactual performance in terms of GDP per capita, [Cheremukhin et al. \(2013\)](#) also look at welfare and, intuitively, find that Stalin's industrialization significantly underperformed the extrapolation of the trend of Tsarist economy in terms of welfare. Given similar GDP performance, a much higher investment-to-GDP ratio was achieved at the cost of lower consumption.

the army to discuss what the distortion that drives labor mobility, i.e., the ratio of earnings in industry relative to agriculture, would look like if massive withdrawal of labor from the Russian countryside would happen in a market rather than a command environment. They find sharper decrease in the labor wedge during WWI than in the 1930s. In this respect, Stalin’s policies performed worse than mass mobilization.

[Korolev \(forthcoming\)](#) focuses on the counterfactual without the Russian revolution, rather than without Stalin’s industrialization. Unlike [Cheremukhin et al. \(2017\)](#), he does not rely on theory-based simulations but uses the synthetic control method. He estimates the relationship between the Russian economy and economies of other countries during the three decades before 1917, and he makes his forecasts for Russia based on the development dynamics of other countries after 1917 assuming that the relationship would not have changed, had the 1917 Revolution not happened. His counterfactual suggests that without the 1917 Revolution, Russia would have steadily grown throughout the 1920s. His predictions for the 1930s are less clear because the forecasting horizon becomes longer. The results for this decade are sensitive to the choice of specification, but they generally imply that Russia would have attained a lower level of economic development than the Soviet Union actually did.

How does this recent analysis compare to the previous evaluations of Soviet development before WWII, like in, e.g., [Holland and Szyrmer \(1992\)](#) or [Allen \(2003\)](#)? Hunter and Szyrmer’s main argument that Soviet industrialization was too fast is generally in line with the findings of [Cheremukhin et al. \(2017\)](#). Similarly to [Allen \(2003\)](#), [Cheremukhin et al. \(2017\)](#) find that the main contribution of Soviet policies to industrialization and growth was the massive movement of both capital and labor from farms to factories. However, unlike [Allen \(2003\)](#), they show that Soviet industrialization resulted in disastrous underperformance of sectoral productivities relative to the Tsarist trend. This explains why in their analysis, on balance, the Soviet economy did not outperform the counterfactual.

Both earlier and recent studies agree on the large costs of collectivization. Both [Allen \(2003\)](#) and [Cheremukhin et al. \(2013\)](#) show that the continuation of NEP without collectivization would likely outperform the actual scenario while they do not model these costs explicitly.

2.2.2 GDP Per Capita in the Late Soviet Period

In the second half of the 20th century, the Soviet economy got into a “middle-income trap” ([Gill and Kharas, 2007](#)). Indeed, in the late 1940s Soviet per capita GDP crossed the 2,465 dollar threshold (in 1990s international Geary-Khamis dollars), which would make it an

upper-middle-income country according to the World Bank’s 1990s classification ([Fantom and Serajuddin, 2016](#)). The Soviet Union remained a middle-income country until its very end; its highest per capita income was 7,112 dollars reached in 1989, just below the 1990 high-income threshold of 7,620 dollars. In relative terms, as [Figure 2](#) demonstrates, the Soviet Union grew in parallel to the United States until the early 1970s. However, unlike Finland or Japan, the Soviet Union failed to catch up with the developed countries. In contrast, it started to stagnate and fell behind during the last two decades before its collapse, in 1991. After the postwar recovery, Soviet economic growth slowed steady: the average annual growth rate of GDP per capita decreased from 3.4% in the 1950s to 0.7% in the 1980s.

Overall, the new data confirm the Russian Empire’s relatively low level of economic development. The data also show that the 1917 Russian Revolution was an economic disaster. The new studies help document that, despite the acceleration of the Soviet economy during the Big Push, the gap with the advanced economies remained large, and it increased over time as the Soviet economy slowed. The recent research also shows that even during the period of intensified growth of Stalin’s industrialization, the Soviet Union did not outperform the counterfactuals, based on the extrapolation of the Tsarist trends under various reasonable scenarios.

2.3 Living Standards

In this section, we summarize historical research on the living standards both during the Imperial period and under Soviet rule, and we quantify the human losses under Stalin.

2.3.1 Living Standards in the Russian Empire

There is no consensus in the literature as to what extent prerevolutionary industrialization resulted in higher living standards for the median Russian citizen or how this industrialization affected inequality. Recent studies have collected interesting new data, but these data are insufficient to fully resolve the historical debate; we summarize these studies in this section.

[Mironov \(2012\)](#) uses the data on the height of Russian army draftees reconstructed from various archival and published sources and draws an optimistic picture of growing living standards dating back to the late 18th century. [Dennison and Nafziger \(2013\)](#) employ a micro-level approach and focus on the living standards in a small rural region in central Russia. Using a broad set of measures of well-being, they come to similar conclusion on growing living standards from at least as far back as the mid-18th century up until 1917.

Nefedov and Ellman (2016) question these results, arguing that Mironov (2012) does not account for changes in draft rules and uses height figures incorrectly. Focusing on consumption of grain and potatoes, Nefedov (2010, 2011b, 2017) provides a pessimistic view on rural living standards in the Russian Empire before 1917. According to his estimates, because of fast population growth, consumption in calories per capita stagnated at levels below the required biological minimum. These results depend on important assumptions about the quality of grain and potatoes output data, consumption of cereals by livestock, and the biological minimum number of calories. Some of these assumptions—such as whether Russian Imperial statistics underestimated grain output—have been debated in the historical literature for more than a century.

Using the disaggregated province- and district-level panel data on height of Russian army draftees, Markevich and Zhuravskaya (2018) provide evidence that the living standards of former serfs improved during the first decades after emancipation. They find that a higher share of serfs in an area before the abolition of serfdom was associated with a larger increase in the height of draftees born after the reform. This result—coupled with the stagnation of GDP per capita in the three decades following emancipation, i.e., the 1860s, 1870s, and 1880s, which we illustrate in Figure 2—suggests that there was some redistribution of income from landlords to their former serfs after emancipation. There is no comparable evidence for the late 19th and early 20th centuries. Allen (2003) documents stagnation of rural wages in this period and attributes any improvements in peasant well-being to growing returns on land rather than on labor.

Historical literature traditionally views a very high level of infant mortality in the Russian Empire—about 250 deaths per 1,000 births—as evidence of low living standards, particularly in the countryside. Natkhov and Vasilenok (2020) study the variation in infant mortality across districts. In a cross-sectional setting, they find that infant mortality was positively correlated with the share of ethnic Russians rather than with any socioeconomic characteristics. They argue that ethnic-specific childcare practices defined by culture and traditions explain these results. Early termination of breastfeeding, widely practiced by ethnic Russians, may have translated into higher infant mortality rates. These findings go against the argument that, in the Russian case, high infant mortality can be used as an indicator of poor economic development—they emphasize the role of culture instead.

For urban settlements, Allen and Khaustova (2019) collect annual data on prices of consumption goods and wages of industrial workers in Saint Petersburg, Moscow, and Kursk to

revise the dynamics of real industrial wages in Russia in the late 19th and early 20th centuries. In contrast to earlier reconstructions, they find that, with the exception of Saint Petersburg, real wages of industrial workers stagnated before 1917. The difference in wage dynamics between Saint Petersburg and the other two cities is puzzling, because the constraints on labor mobility were similar everywhere. [Cheremukhin et al. \(2017\)](#) find a large gap between industrial productivity and industrial workers' wages and attribute it to the employers' monopsony power.

A move of the labor force from agriculture into industry must have contributed to an increase in living standards of an average citizen of the Russian Empire due to higher wages in industry relative to the countryside. Furthermore, temporary rural-to-urban migration (*otkhod*) also directly increased living standards and consumption in rural areas, as documented by [Burds \(1998\)](#).

[Lindert and Nafziger \(2014\)](#) look beyond the evolution of average earnings and reconstruct income inequality in Imperial Russia around 1905. Their estimations show a relatively low Gini index by the international standards of that time. To study inequality, [Novokmet et al. \(2018\)](#) use top income shares, i.e., the shares of total income that belong to the richest 1% and the richest 10% of the population. They find that top income shares in Imperial Russia were slightly below similar measures for the United States or France in the same period. These results do not fit a conventional view that high income inequality was an important driver of the Russian revolutions in both 1905 and 1917.¹⁰ However, both studies reconstruct inequality for a single year before WWI (1905), i.e., we do not know the dynamic of inequality in Imperial Russia. Growing GDP per capita, together with some evidence on stagnating wages in the three decades before 1917, suggests that inequality was likely increasing in this period. Another important caveat is the large within-country differences in the local levels of inequality. In particular, inequality was relatively high in Saint Petersburg and Moscow provinces ([Lindert and Nafziger, 2014](#)), where most of the revolutionary events took place.

2.3.2 Living Standards in the Interwar Soviet Union

[Bergson \(1961\)](#) and [Chapman \(1963\)](#) in their pioneering work found a decrease in per capita consumption and real industrial wages during the Soviet industrialization. According to them, consumption reached the 1928 level only in the late 1940s and early 1950s. An increase in the share of working population and the reallocation of labor from farms to factories partially

¹⁰This, however, might be partially explained by the data limitations that do not allow [Lindert and Nafziger \(2014\)](#) to account for the inequality within the commune.

compensated for a decline in real wages in the 1930s, without which living standards would have been hit even harder. [Allen \(2003\)](#) revisited these calculations and suggested a more optimistic view. However, [Davies et al. \(2018\)](#) criticize Allen’s estimates of the residual agricultural production available for human consumption. Instead, they use the results of Soviet surveys to directly measure food consumption in Soviet households. They also document increases in unspent cash and in prices in collective farm markets in the late 1930s; they interpret this as evidence of an increasing scarcity of goods under state-controlled trade. [Allen and Khaustova \(2019\)](#) collect new data and trace the long-run dynamics of the living standards of industrial workers in the Russian Empire and the interwar Soviet Union. They find little progress in real wages between the prerevolutionary years and the mid 1930s.¹¹ [Allen and Khaustova \(2019\)](#) also show that Soviet industrial workers benefited from the revolution: industrial wages experienced a temporary increase in the 1920s.

[Wheatcroft \(2009\)](#) collects new data on various welfare indicators during the 1920s and 1930s. He uses Soviet annual budget survey data to document some decline in per capita calorie intake during the interwar decades.¹² However, Wheatcroft’s annual mortality series demonstrates a downward trend. His stature series also shows some progress in living standards, though at slower rates than before the 1917 Revolution or in the postwar years. Importantly, trends of all these indicators were interrupted by clearly marked crises in living standards during the 1921–1922 and 1932–1933 famines (and another crisis that was associated with WWII).

2.3.3 Human Costs of Stalin’s Dictatorship

As we discussed in the previous subsection, living standards during the interwar period showed at best modest growth on average. If one considers the scale of repression aggravated during Stalin’s dictatorship, a much gloomier picture emerges. In addition to the outright political repression and human losses associated with it, the Soviet population was subjected to a substantial tightening of Soviet criminal and labor laws, as well as their enforcement.

The opening of the Soviet archives after the collapse of the Soviet Union allowed for documentation of the social costs of Stalin’s rule. In [Table 1](#), we summarize the extensive historical research that quantifies human suffering caused by Stalin’s repressive policies in the

¹¹Little changed in this respect during the first postwar years. [Filtzer \(2010\)](#) documents low urban living standards in the last decade of Stalin’s rule. [Filtzer and Goldman \(2021\)](#) describe the suffering and the sacrifices made on the Soviet home front during WWII.

¹²Using the same source, [Nefedov \(2011a\)](#) independently comes to a similar conclusion. Considering the rural-farm population only, he finds a 20% decline in calorie intake for this group in 1937 relative to the mid 1920s.

period between 1922 and 1952, i.e., during Stalin’s term in office as the leader of the Soviet Communist party.¹³ To the best of our knowledge, this is the first such compilation.¹⁴ We report—according to our judgement—the most reliable among available estimates of the number of victims of Stalin’s repressions. Importantly, the historical literature continues to debate these figures, both because of the gaps in statistical records and as a result of the absence of consensus about the definition of what constitutes a victim. In the table, we report the point estimates; in the text, we discuss the ranges of estimates, where applicable. We exclude from this calculation the Soviet human losses associated with WWII, as it is impossible to accurately assess the share of these losses that should be attributed to Stalin’s policies.

We start with political executions. Using various documents of the Soviet secret police, [Okhotin and Roginskij \(2007\)](#) reconstructed annual dynamics of political executions.¹⁵ We sum up their annual figures between 1922 and 1952 to get 999,600 executions (which we round up to 1 million, as reported in the table).¹⁶ More than three-fourths of these executions took place in 1937 and 1938, the period known as the Great Terror. Note that estimates by [Zemskov \(2021, first edition 2015\)](#) yield a lower figure for the period 1922–1952: 789,600 executions. He refers to the annual dynamics of political executions summarized in internal reports from the Soviet secret police to the Soviet leaders after Stalin in the mid 1950s.¹⁷

¹³Stalin became the General Secretary of the Communist Party in April 1922. He occupied this office until his death in March 1953.

¹⁴[Khlevniuk \(forthcoming\)](#) also reviews this literature, but he covers only the period between 1929 and 1952 and he does not provide a summary table. Our own reading of the literature and that of [Khlevniuk \(forthcoming\)](#) are broadly consistent with each other.

¹⁵The Soviet secret police, despite the continuity of the organization, changed its name several times. It was called: VChK (*Vserossijskaya Chrezvychajnaya komissuya po borbe s kontrrevolutsiej i sabotazhem*, 1917–1922); GPU (*Gosudarstvennoe politicheskoe upravlenie*, 1922–1923); OGPU (*Obedinennoe gosudarstvennoe politicheskoe upravlenie*, 1923–1934); NKVD (*Narodnij komissariat vnutrennikh del*, 1934–1946); MGB (*Ministerstvo gosudarstvennoj bezopasnosti*, 1946–1953); and KGB (*Komitet gosudarstvennoj bezopasnosti*, 1954–1991).

¹⁶[Okhotin and Roginskij \(2007\)](#) view their reconstruction as a lower-bound estimate because it does not include unregistered executions.

¹⁷To arrive at his figure, one needs to sum up [Zemskov’s](#) annual figures, which give 682,000 for 1937–1938 and 108,000 outside this period. In a review paper on the Great Terror, [Khlevniuk \(2021\)](#) reports a figure of 740,000 death sentences in 1937–1938. [Mozokhin \(2018\)](#) counts the political executions for “counter-revolutionary” crimes; he arrives at a figure of 844,000 from 1922 through 1952.

Table 1: Human Losses, Imprisonments, Deportations, and Correctional Labor During Stalin’s Rule, 1922–1952.

	Number of victims by type, in 1000s of people				Correctional labor sentences and fines
	All affected	Deaths	Imprisonments	Deportations	
Political executions	1,000	1,000 ^A			
– The Great Terror, 1937–1938		765			
– Outside the Great Terror		235			
Gulag sentences	19,191	1,582 ^B	19,191 ^C		
– Political, narrow definition			3,700 ^D		
– Nonpolitical, broad definition			15,491 ^E		
Deportations to special settlements	5,809			5,809 ^F	
– Kulaks				2,496 ^G	
– Indiscriminate ethnic deportations				2,147	
– Other “anti-Soviet elements”				1,166	
Famine, 1932–1933	7,900	7,900 ^H			
Famine, 1946	1,250	1,250 ^I			
Convictions for work absences and violations of the labor code	13,082				13,082
Total, excluding nonpolitical (broad definition) Gulag sentences and convictions for work absences and violations of the labor code	19,659				
Total, excluding convictions for work absences and violations of the labor code	35,150				
Total	48,232	11,732	19,191	5,809	13,082

Notes: A: Okhotin and Roginskij’s lower-bound estimate (Okhotin and Roginskij, 2007); other estimates are in the range of 790,000–1 million. B: Gulag prisoners who died in the Gulag; data cover only 1930–1953. C: Including 1,582,000 of those who died in the Gulag. D: Zhemkova and Roginskij’s lower-bound estimate (Zhemkova and Roginskij, 2016); other estimates are in the range of 2,883,000–4 million; depending on methodology, estimates includes only those who were arrested by the Soviet secret police or only those whom officials classified as “political.” E: The broad definition of nonpolitical Gulag sentences includes all Gulag prisoners minus political prisoners, according to the narrow definition. F: This is the lower-bound estimate; the upper bound estimate is 6,700,000. G: Including deported kulaks from the newly acquired western regions of the USSR in the 1940s and early 1950s; H: Midpoint of an estimated range: 5,000,000–10,800,000. I: Midpoint of an estimated range: 1,000,000–1,500,000.

Sources: Political executions: Okhotin and Roginskij (2007). Total Gulag sentences: Vert and Mironenko, eds (2004, p. 58). We estimate the reported figure as 25 million arrested and deported minus the number of deported. Political Gulag sentences: Zhemkova and Roginskij (2016). Deaths in Gulag: Kokurin and Petrov, eds (2000, p. 442). Deportees: Zhemkova and Roginskij (2016). Correctional labor and fines: Vert and Mironenko, eds (2004, p. 624). 1932–1933 famine: Markevich et al. (2021). 1946 famine: Ellman (2000).

The literature derives the *total* flow of prisoners under Stalin either from the annual numbers of the stock of prisoners or their annual flows.¹⁸ We use the estimate of the total number of arrested and deported Soviet citizens as reported by the editors of the major publication of the archival statistical documents about the Gulag system of Soviet labor camps (Vert and Mironenko, eds, 2004, p. 58), from which we subtract the estimate of the number of deportees, to arrive at 19,191,000, as reported in the table. This estimate includes all Soviet citizens imprisoned in labor camps, colonies, and prisons.¹⁹ Available data on the incarcerations do not allow separating political prisoners from ordinary criminals. Any such separation depends on the definition of a political conviction. Conservative, “narrow,” estimates of the number of political prisoners—based either on counting only those who were arrested by the Soviet secret police or those whom officials classified as “political”—range between 2,883,000 and 4 million political arrests (Zhemkova and Roginskij, 2016; Mozokhin, 2018; Zemskov, 2021, first edition 2015). In the table, we report the lower-bound estimate of Zhemkova and Roginskij (2016). The narrow definition of political sentences makes the group of nonpolitical prisoners very broad. It includes, for instance, people who were convicted for picking a few wheat seeds during famine from a collective farm’s field or who pilfered something of no value from the state. They were not arrested for their political disloyalty, but they would not have been imprisoned in a different political environment, which makes them victims of Stalin’s regime. Importantly, Soviet “ordinary” criminals are also included in these group. Whether they should also be considered victims of the regime is subject to interpretation.

More than one-and-a-half million prisoners—1,582,000—died in the Gulag from 1930 on, as reported by Kokurin and Petrov, eds (2000, p. 442).²⁰ In addition, Nakonechnyi (2020) estimates that, on top of Gulag deaths, between 800,000 and 850,000 prisoners in 1930–1955 were released from labor camps for medical reasons and died shortly after their release. No reliable data are available on Gulag deaths for the 1920s, nor are there any detailed estimates of excess deaths or share of political-prisoner deaths in the total number of prisoner deaths.

Mass deportations and administrative restrictions on mobility were also an important tool in Stalin’s political-repression toolkit. They affected at least 5.8 million Soviet citizens. The

¹⁸In both cases, those who were imprisoned more than once are counted as many times as they were imprisoned. Kokurin and Morukov (2001, p. 101) argue that these people accounted for about 10% to 15% of all prisoners.

¹⁹Kokurin and Morukov (2001) report 18,924,000 as their own estimate, which is based on the annual numbers of imprisonments. This figure covers the 1930–1952 period only. For the 1929–1952 period, Khlevniuk (forthcoming) estimates 19.4 million people as the lower bound of total imprisonments. In addition, he estimates the number of arrests without convictions to be above 2 million.

²⁰Zemskov (2021, first edition 2015) gives a larger figure of Gulag deaths—about 1.8 million—for 1930–1953. Khlevniuk (forthcoming) refers to 1.7 million.

upper-bound estimate is 6.7 million (Zhemkova and Roginskij, 2016). These included three broad and distinct groups: (i) Two-and-a-half million kulaks—people who belonged to a class of wealthier peasants reluctant to join collective farms—were deported during the collectivization.²¹ (ii) More than 2 million people were deported only because they belonged to ethnic groups that Soviet authorities considered as having an increased risk of collaborating with foreign enemies. Most of these indiscriminate ethnic deportations occurred during WWII. The vast majority of these deportations was comprised of six ethnic groups: Germans, Chechens, Crimean Tatars, Koreans, Kalmyks, and Meskhetian Turks. (iii) About 1.2 million people were deported (or were forced to move) during the 1930s, 1940s and early 1950s because of their social status. They were labeled “anti-Soviet elements” and were also considered to be (potentially) disloyal to the Soviet regime such as, for instance, citizens of the western regions acquired in the late 1930s and 1940s. Many Poles and Finns, as well as representatives of other ethnic minorities, were deported within this group of deportees.

The estimates of the number of deaths during the 1932–1933 famine vary greatly. Historians provide a range between 5 million and 10.8 million famine deaths (Davies and Wheatcroft, 2004; Kondrashin, 2008; Polyakov and Zhiromskaya, eds, 2000). In the table, we report 7.9 million, which is the midpoint of this range. The largest number of famine deaths occurred in the Soviet Republic of Ukraine. The Ukrainian famine is known as the Holodomor. Other areas of the Soviet Union such as North Caucasus, the Volga region, and Kazakhstan were also strongly affected by this famine. The largest number of deaths as a share of republic’s population during this famine occurred in the Soviet Republic of Kazakhstan. Another famine occurred after WWII, in 1946. It affected western parts of the USSR, such as Ukraine, Moldova, and Belarus. The 1946 famine cost 1.0 million to 1.5 million lives (Ellman, 2000). We report the midpoint of this range in the table.²² In Section 4, we review research exploring the causal relationship between Stalin’s policies and famine deaths.

Finally, over 13 million people were fined and sentenced to correctional labor without being imprisoned, under the 1940–1941 labor edicts and war decrees (Vert and Mironenko, eds, 2004, p. 624).²³ These labor edicts were intended to increase workers’ effort and redistribute rents from workers to the state, in particular, via reducing tardiness, absenteeism, and job-

²¹Zemskov’s estimates are about 2.3 million deported kulaks and about 2.5 million de-kulakized kulaks in the 1930s (Zemskov, 2021, first edition 2015, p. 77). The figure reported in the table includes kulaks who were deported from the western regions of the USSR after WWII, as collectivization took place later in these regions.

²²We exclude losses from the 1921–1922 famine in Table 1, because this famine occurred before Stalin became Party Secretary.

²³Total number of court sentences without imprisonment from 1937 to 1952 was 19,896,000. Figures for the years before 1937 are not known (Vert and Mironenko, eds, 2004, pp. 616-617).

switching (“illegal labor turnover”) (Kragh, 2011). These edicts introduced imprisonment for unauthorized job switches and correctional labor for absenteeism. The wartime decrees also introduced penalties for “violations of labor discipline.”

Overall, during the Stalin’s rule, about 19.7 million people became victims of political executions, political imprisonments, deportations, and famines. Another 15.5 million were convicted and sent to Gulag on criminal charges and a further 13 million were subjected to fines and forced correctional labor on charges of violating the labor code.

2.3.4 Living Standards and Demographic Trends in the Late Soviet Period

Measuring Soviet living standards is difficult because of fixed state prices and shortages. For example, there are few reliable estimates of how much time Soviet citizens lost standing in lines, or of the total cost of shortages for the Soviet economy and Soviet citizens. Using archival records, Brainerd (2010) reconstructs dynamics of anthropometric indicators such as height and weight for the post-WWII period. She finds rapid growth of these indicators during the first postwar decades, when the Soviet Union was closing the gap with the United States. This progress turned into stagnation in the 1970s and 1980s.²⁴ Brainerd (2010) also documents that the last decades of the Soviet Union were characterized by a large, growing gap in infant and adult mortality between the Soviet Union and Western countries. These findings fit well with the reconstructed dynamics of Soviet GDP per capita, as well as the conventional wisdom on relatively low living standards in the late Soviet Union. Didenko et al. (2013) document a rapid accumulation of human capital in the Soviet Union in the 20th century; possible deterioration in the quality of education is an important caveat in this analysis, however.

Recent literature takes advantage of rich archival data on Soviet demographic indicators and makes several important contributions on Soviet demographic development after WWII. Harrison (2019) confirms earlier estimates that the Soviet Union lost about 26.5 million people during WWII, about one-sixth of its population. The war affected both short-term and long-term demographic patterns. Using regional-level archival data, Brainerd (2017) finds that gender imbalance generated by the higher mortality of men during the war was associated with lower rates of marriage and fertility, higher extramarital births, and reduced bargaining power of women within households in the postwar period. She argues that these effects were likely magnified by Soviet 1940s policies that aimed to promote nonmarital births and discourage

²⁴Using survey data on modern Russian households, Markevich (forthcoming) finds similar dynamics of height of Russian citizens by year of birth.

divorce.²⁵

WWII also sped up the growth of female labor-force participation. These changes had started before the war as, Stalin’s industrialization increased overall demand for labor (Kessler, 2005), and the universal employment for women was reached in the 1960s (Markevich, 2005b). The growing female labor-force participation, however, was not accompanied by changes in the traditional division of labor between genders within households that resulted in the “double burden” of paid work and household duties for women (Markevich, 2005b; Tyazhelnikova, 2006). Afontsev et al. (2008) document a remarkable stability in urban family formation and household structure in the Soviet Union: despite the tendency toward the formation of nuclear families, co-residence of three generations, often with just the grandmother (because of gender imbalance), was a common phenomena.

The WWII-related gender imbalances were further aggravated by the decrease in male life expectancy beginning in the late 1960s (a rare phenomenon during peace years in the modern times). Recent findings suggest that this post-1960s trend could be—at least partially—explained by growing alcohol consumption. In a regional-level panel setting, Bhattacharya et al. (2013) document that Gorbachev’s antialcohol campaign was associated with a substantial reduction of mortality from 1985 through 1988. Regions with higher precampaign alcohol consumption demonstrated larger decreases in mortality throughout the campaign. These results are robust to the inclusion of region-specific linear trends, local economic conditions, and local health-system controls (doctors per capita and hospital beds per capita). The estimates imply that the campaign saved about 400,000 lives, about 24% relative to the precampaign crude death rate.²⁶ These findings are in line with an earlier conjecture by Shkolnikov and Nemtsov (1997) based on an analysis of dynamics of alcohol consumption and mortality in the late Soviet Union and descriptive statistics of mortality by cohorts and causes of deaths.²⁷

Another important postwar demographic trend was the gradual decline in fertility rates.

²⁵Ironsides (2017) describes another policy from this period—a levy on bachelors, singles, and small families—that was introduced in 1944 to boost birth rates. This “bachelor tax” was universally perceived as unfair, regressive, and inefficient. However, though Khrushchev’s government wanted to get rid of it (together with all other direct taxes), the economic challenges of the early 1960s resulted in keeping the bachelor tax in place until the very end of the Soviet Union.

²⁶Kueng and Yakovlev (2021) show that the campaign also produced a persistent shift in popular preferences. They argue that the campaign affected mostly urban areas while rural residents still had unrestricted access to self-produced hard liquor. Using individual-level data from modern Russia, they show that Russians who resided in rural areas in their adolescence during the campaign consume a much larger share of their alcohol in the form of vodka today, compared to both their urban counterparts and other rural consumers who were in their adolescence shortly before or after the campaign.

²⁷Brainerd and Cutler (2005) and Bhattacharya et al. (2013) provide additional evidence that the termination of Gorbachev antialcohol campaign was at least partially responsible for the substantial increase in mortality in Russia in the early 1990s.

To counter this trend, the government introduced a maternity support program in the early 1980s that included cash payments and parental leaves. [Malkova \(2018\)](#) uses the fact that the program was rolled out across the country in two waves to carry out her quantitative evaluation of the program. With regional-level panel data, she shows that the program (which de facto decreased the cost of raising a child by 2.2%) increased fertility by 8.2% already in the first 12 months. The analysis identifies both short-term and medium-term positive effects up to ten years. The effect is stronger in less educated and less urbanized regions. The paper finds no impact on adult outcomes of the children—contrary to fears that increased fertility in less educated families could have reduced their education and incomes. In total, the program induced about 5 million births at a cost of roughly 2,830 rubles per birth.²⁸

Overall, data on living standards both during the Imperial period and under Soviet rule remain scarce. It is clear, however, that, in terms of living standards, the Russian Empire was a classical example of a poor developing country, whereas the Soviet Union during Stalin’s rule brought about unprecedented mass suffering and human losses. Living standards did substantially improve for the median Soviet citizen after Stalin, yet Soviet citizens still had substantially worse living standards relative to developed countries.

3 New Research on the Causes of the Russian Empire’s Relatively Low Level of Economic Development

A classical narrative of Imperial Russia’s development was introduced by Alexander Gerschenkron ([Gerschenkron, 1962, 1965](#)). According to Gerschenkron, the Great Reforms of Alexander II in the 1860s dramatically changed the institutional landscape in the country but had dubious effects on economic development. The abolition of serfdom in 1861 liberated over 20 million people (about a quarter of Russia’s population at the time) but also institutionalized the peasant commune associated with poorly defined property rights and excessive labor regulation. Poor property rights distorted individual incentives and harmed economic growth. Ultimately, slow economic development resulted in the 1917 Russian Revolution.²⁹ A closely related interpretation of Russian history was developed by [Pipes \(1974\)](#), who portrayed lack of secure property rights as the key problem of Russian development as far back as the middle of

²⁸In 1980, 2,830 rubles was about 1.4 times the national average yearly salary.

²⁹[Lenin \(1971, originally published in 1898\)](#) also blamed the design of emancipation reform for the slow development of the late Tsarist economy.

the second millennia.

Gregory (1982, 1994), in contrast, considers the Russian Empire as a dynamic developing economy whose growth was interrupted by the shock of WWI.³⁰

In this section, we review recent contributions to this debate and consider several fundamental causes of Russia’s relatively low level of economic development in the 19th and early 20th centuries. Recent research establishes the important role of culture, human capital, geography, and institutions, such as serfdom, commune, and entry barriers.

3.1 Institutions

Gerschenkron (Gerschenkron, 1962, 1965) explains Russia’s economic backwardness by highlighting the “bad” institutions and “wrong” or incomplete institutional reforms. The standard example is the abolition of serfdom in 1861, which, while freeing serfs, also strengthened the repartition commune. Similarly, the 1906 Stolypin reform, which finally allowed peasants to exit the commune and privatize land, may have come too late and was incomplete as well. Property rights in Russian industry also remained fragile, thus undermining incentives for capital accumulation.

In this section, we discuss new insights from recent research on the impact of institutions on the Russian Empire’s economic performance.

3.1.1 Serfdom and the Commune

We start with the discussion of key rural institutions such as serfdom and the peasant commune because Imperial Russia was a predominantly rural society with more than 85% of citizens living in the countryside even at the end of the 19th century, and where the agricultural sector produced almost 60% of GDP (Markevich, 2019).³¹

Serfdom was not unique to Russia. In other parts of Europe in some periods of history, peasants were also attached to land and had to fulfill obligations to their landlords. Serfdom disappeared in Western Europe by the end of the Middle Ages but (re)emerged in Central and Eastern Europe, where it was finally abolished only in the 18th and 19th centuries. Historical research has debated the similarities and differences between European serfdom and slavery (e.g., Stanziani, 2014).

³⁰Recent historical research by Mironov (2012, 2019) and Davydov (2010, 2016) shares this view.

³¹These figures are presumably even higher for the earlier period. The exact number of rural citizens employed in and outside of agriculture is not known for the late 19th century. Poor accounting of rural occupations is one of the major weaknesses of the 1897 census (the only population census conducted in Imperial Russia).

Forms of serfdom across countries and over time have been substantially heterogeneous (Ogilvie and Carus, 2014). Russian serfdom was one of the most severe and long-lasting incarnations of forced-labor institutions in European history. In Russia, landlords had substantial discretionary power over their serfs, including the right to arbitrarily change the amount and form of obligations the serfs had to fulfill. This had a significant effect on serfs' incentives. The possibility of an increase in future payments demotivated serfs to work hard due to the ratchet effect. Landlords could buy, sell, or mortgage serfs (usually with land). Serfs' decision-making was also constrained in their in many other ways. At least as far back as the late 15th century, the government restricted peasant mobility. The power of landlords over peasants who lived on their lands strengthened over time, and serfdom was legally codified in the Law Code of 1649. The institution reached its culmination during the reign of Catherine the Great in the second half of the 18th century. After Catherine, certain constraints on landlords' power to command serfs were imposed, but these constraints remained rather limited until the abolition of serfdom in 1861.

On the eve of emancipation, private serfs represented less than one-half of the rural population in the European part of the Russian Empire. The other major group comprised state peasants, who lived and worked on state land. State peasants were formally free; however, the government constrained and regulated their economic activities, including their migration decisions. There was no serfdom in the outskirts of the empire (i.e., Siberia, Central Asia, Finland). In the Baltic provinces and Poland, it had been abolished earlier, during the first two decades of the 19th century.

The debate on the impact of forced labor, and serfdom in particular, on economic development goes back at least to the 19th century (e.g., Cairnes, 1862; Zabolotskij-Desaytovskij, 1882, originally written in 1841). On the one hand, serfdom de incentivized serfs. On the other hand, being residual claimants, landlords were directly interested in the efficient organization of labor. Early literature argued that the new, postemancipation institutional environment was introduced too slowly to change much, preserving the legacy of serfdom (Zaionchkovskii, 1968). Nafziger (2012) uses new village-level data from Moscow Province to demonstrate that former serf communities continued to have smaller land endowments and bear higher obligations after emancipation than former state peasants. There are, however, no data for the pre-emancipation period, and therefore, one cannot estimate effects of the reform using this dataset.

The peasant commune was another institution that dominated the countryside in the Russian Empire. As in many other regions of Europe and all over the world, Russian peasants

implemented an open-field system of land use. Within a village, which normally constituted a commune, land was divided into several fields and each household got a strip in each field that provided the household some insurance against crop failure. Households cultivated their strips individually, but the commune coordinated some agricultural activities as well as some mutual assistance between its members. In contrast to many other traditional communes in other parts of the world, Russian peasant communes periodically implemented land repartitions between households within the commune (Gerschenkron, 1965).

The abolition of serfdom legally institutionalized and strengthened the commune. It was the peasant commune rather than individual peasants or households that got land titles after former serfs bought their land from landlords as a result of the land reform that followed emancipation. Peasants within a single commune were jointly responsible for paying taxes (Zaionchkovskii, 1968). The emancipation rules set up communes of two types: repartition communes, which had the right to redistribute land periodically, and hereditary communes, where households inherited their strips. In the European provinces of the empire, where the overwhelming majority of the population lived, repartition communes comprised about 80% of all communes. Hereditary communes were concentrated in the west of the country, in the provinces that Russia acquired as a result of partitions of the Polish-Lithuanian Commonwealth in the second half of the 18th century (Castaneda Dower and Markevich, 2019).

The commune could decrease agricultural productivity via several channels. Repartitions undermined incentives to invest; strips and the open-field system limited individual initiative; mutual tax responsibility constrained geographical mobility. However, these mechanisms might not work if commune regulations were not binding in practice. Indeed, Kopsidis et al. (2015) provide descriptive evidence that, from 1892 to 1913, the growth of grain productivity on commune lands was on average no worse than on private lands. However, they also show that grain productivity on commune lands was systematically lower than on private lands.

Leonard (2011) provides a broad overview of the transformation of Russian agriculture in the 19th and 20th centuries. She reconstructs a national time series of the economic development of agriculture and argues that the major reforms, i.e., abolishing serfdom and dismantling the peasant commune, resulted in growth in agriculture and narrowed the gap between Russia and the West.

3.1.1.1 Serfdom and the Commune: Impact on Economic Performance

To study the effects of serfdom and the commune, recent research has carried out difference-in-differences analyses comparing economic development in treated and untreated provinces before and after the two reforms: the abolition of serfdom (1861) and the demolition of the peasant commune by the Stolypin reform (1906).

[Markevich and Zhuravskaya \(2018\)](#) explore the consequences of the abolition of serfdom in 1861. They use novel province-level panel data to analyze the dynamics of agricultural productivity in 46 European provinces of the Russian Empire in the 19th century, before and after the abolition of serfdom. They find that provinces with a higher share of serfs in 1858 had, on average, lower productivity in grain production before emancipation and were partially catching up after the abolition of serfdom. To address potential endogeneity of the pre-emancipation prevalence of serfdom, the authors instrument the share of serfs in 1858 with the share of serfs who belonged to monasteries and clergy (monasterial serfs) before their nationalization by Catherine the Great, i.e., a century before the abolition of serfdom. This instrument is arguably excludable because the distribution of church lands, where monasterial serfs lived, was orthogonal to economic fundamentals, and monasterial serfs did not differ systematically from other private serfs.³²

A relatively quick positive effect of emancipation on grain productivity was likely driven by better peasant incentives due to the disappearance of the ratchet effect, which shaped peasant-landlord relationship under serfdom. [Markevich and Zhuravskaya \(2018\)](#) find no positive effect of the abolition of serfdom in provinces where landlords were able to commit to long-run implicit “contracts” with their serfs to mitigate the incentives problem before the reform. They also show that former serfs responded more strongly to changes in grain prices and weather shocks adjusting the composition of their crops accordingly.

In addition, [Markevich and Zhuravskaya \(2018\)](#) provide evidence that the land reform, which introduced communal land tenure on peasant lands after emancipation, undermined agricultural productivity growth. This effect was more pronounced in provinces with repartition communes.

Using a province-level panel dataset for the early 20th century, [Castaneda Dower and Markevich \(2019\)](#) analyze the impact of the 1906 Stolypin reform. The reform granted peas-

³²To account for the fact that serfdom was more prevalent closer to Moscow than in the outskirts of the empire (as documented, e.g., in [Nafziger, 2013](#); [Finkel et al., 2015](#); [Bugle and Nafziger, 2021](#)) [Markevich and Zhuravskaya \(2018\)](#) explicitly control for the distance from Moscow.

ants in repartition communes the right to privatize land strips they cultivated. On top of that, peasants in both repartition communes and hereditary communes got the right to consolidate separated land strips into a single privatized allotment. Peasants could initiate either single-household or village-wide consolidations. The authors describe three findings: first, the overall effect of the reform on land productivity was positive; second, the village-wide consolidations were positively associated with land productivity; but third, land titling without consolidation was negatively correlated with land productivity in the short run. They explain the positive impact of the village-wide consolidations (rather than single-household consolidations): the former enabled peasants to become independent in their production decisions from their neighbors and provided strong incentives to introduce new technologies. To identify causal effects, [Castaneda Dower and Markevich \(2019\)](#) use plausibly exogenous differences in the rollout of the reform: the shortage of land-survey engineers and the quality of local bureaucracy hindered the reform's implementation.

The productivity effects of the two reforms—the abolition of serfdom and the Stolypin reform—are comparable in magnitude. According to Markevich and Zhuravskaya's preferred specification, the abolition of serfdom in an average province with 45% of serfs led to an increase in grain productivity of 15.3%. [Castaneda Dower and Markevich \(2019\)](#) show that the net effect of the Stolypin reform in an average province in an average year led to 10% increase in productivity (p. 258). An important difference between the reforms is that the Stolypin reform remained unfinished: by the start of WWI when the Stolypin reform was de facto terminated, there were still many nonprivatized and nonconsolidated communal land plots. The authors' point estimates imply that there would have been a much larger increase in productivity had the reform been completed, i.e., if all households undertook village-wide consolidations. In this counterfactual scenario, Russian agriculture would have reached the technological frontier.

The two reforms not only resulted in higher agricultural productivity; they also affected other sectors of the Russian economy. [Markevich and Zhuravskaya \(2018\)](#) estimate the difference-in-differences specification for province-level industrial output as a outcome variable. They find a substantial increase in industrial output as a result of emancipation.

[Chernina et al. \(2014\)](#) consider the effect of the Stolypin reform on labor mobility. In particular, they study rural migration from the relatively densely populated European part of the empire to the land-abundant Asian part. Using annual province-level panel data, they find that privatization of communal lands promoted migration by easing financial constraints and decreasing opportunity costs for peasants. To identify causal effects, the authors use variation

in the implementation of the Stolypin reform driven by differences in (in)efficiency of the local bureaucracy. An improvement in land liquidity explains approximately 18% of West-to-East rural migration in the Russian Empire during this period. This reallocation of labor resulted in an increase of annual GDP growth by 0.65 percentage points (12% of GDP growth).

Because there are no reliable data on migration to cities, no similar studies exist on the effect of emancipation or the Stolypin reform on rural-to-urban migration.³³ However, recent research studies the role of “part-year” farm-to-factory mobility in Russian industrial development. [Gregg and Matiashvili \(2021\)](#) use rich firm-level manufacturing census data and show that the average duration of working years at a factory was negatively associated with the spread of repartition communes and soil fertility. In his classic study on Russian factories, [Tugan-Baranovsky \(1900\)](#) paid special attention to the stereotype of a typical Russian factory worker as “a peasant living on the land who makes up deficiencies of his agricultural income by occasional factory work” (p. 338). Indeed, barriers to rural-to-urban mobility associated with the repartition commune likely hampered Russian industrialization. [Gregg and Matiashvili \(2021\)](#) document that factories operating a smaller number of working days per year were less mechanized, less productive, more rural, and had higher shares of women and children in their workforce. The observed patterns suggest that part-year operations were likely to involve additional costs. Also, part-year factories were also less likely to survive.

An alternative approach to study serfdom and the communes is to focus on particular case studies. [Dennison \(2011\)](#) documents and analyzes day-to-day operations of a large estate using serfdom in the second half of the 18th and the first half of the 19th centuries. She takes advantage of rich archival sources on the Voshchazhnikovo estate belonging to the noble Sheremetev family. The author documents that serfs in this estate were heavily involved in markets. The Sheremetevs established private-order institutions to commit themselves to long-term serf-landlord relationships that improved serfs’ incentives and increased landlord rents along with serfs’ welfare. The Sheremetevs case represents an example of a long-term implicit contract between the landlords and the serfs that created good incentives for serfs. In line with the quantitative analysis by [Markevich and Zhuravskaya \(2018\)](#) on the importance of implicit contracts under serfdom, this case illustrates that when landlords managed to create good incentives for their serfs, the negative economic consequences of serfdom were substantially reduced. [Dennison \(2011\)](#) concludes that the implementation of serfdom was highly heterogeneous.

³³[Nafziger \(2012\)](#) provides suggestive evidence that in Moscow Province constraints on labor mobility during the first decade after emancipation were stronger among former serfs than among state peasants, especially among women.

In two related papers, [Nafziger \(2010, 2016\)](#) uses disaggregated data to study how the repartition commune functioned after emancipation. He explores various household-level and village-level data from Moscow Province to understand to what extent the commune restricted individual choices of its members. [Nafziger \(2010\)](#) considers mortality shocks to explore how households in repartition-commune villages of two subdistricts (*volosts*) of Moscow Province in the late 19th century adjusted the allocation of factor holdings, in particular land and labor. He concludes that Russian peasants “likely avoided many—but not all” (p. 382) communal restrictions. He recognizes, however, that his paper does not analyze efficiency of factor allocation within the communes. [Nafziger \(2016\)](#) studies correlates of frequency of repartitions per commune in subdistricts of Moscow Province during two the decades after emancipation. His cross-sectional results imply that repartitions were more likely in subdistricts with lower quantity and quality land per capita and in subdistricts with higher redemption and tax obligations per capita.

While the abolition of serfdom had a positive impact on productivity and living standards, most former serfs were dissatisfied with the redistributive implications of the reform. [Finkel et al. \(2015\)](#) study postabolition mass unrests using province-level annual data for a decade before and a decade after 1861. As in the studies of the reform’s impact on productivity, they use a difference-in-differences specification exploiting differential prereform province-level shares of serfs and state peasants (unaffected by the reform). They do find a large increase in unrest in provinces with a greater number of former serfs following the abolition of serfdom and argue that this was likely driven by grievances about the implementation of the reform and excessively high expectations about emancipation.

The Stolypin reform may have also had similar effects, but there is no systematic analysis of this in the literature. [Pallot \(1998\)](#) provides anecdotal evidence that the reform contributed to a rise in tensions in the Russian countryside and argues that many peasants misunderstood the reform and misinterpreted the government’s intentions. [Castaneda Dower and Markevich \(2014\)](#) document an increase in arsons in repartition commune areas after the Stolypin reform. Their data, however, do not allow identifying a causal relationship.

3.1.1.2 Origins of Serfdom and the Commune

If serfdom and the commune were inefficient and hurt economic growth, why were they introduced in the first place? This question is especially puzzling given that Russian serfdom was introduced in the late 16th and 17th centuries—after the decline of serfdom in Western

Europe.

The seminal paper by [Domar \(1970\)](#) explained Russian serfdom by the low population density in Russia. If the labor market were free, wages would be too high, thus depriving landowners of their rents. The landowners colluded to enserf the peasants in order to lower wages. This political economy explanation is, however, incomplete. Domar referred to [Kliuchevsky \(1937\(1906\)\)](#) and recognized the latter’s emphasis on military considerations. Kliuchevsky argued that the Russian government needed to provide incentives for landowners to settle at the border and thus created rents to pay for the landowners’ purchase of weapons and their military service.³⁴

Inspired by the Domar’s conjecture, [Matranga and Natkhov \(2019\)](#) explore local prevalence of serfdom in Russia in the 17th century. They find no link between the land-labor ratio and the share of serfs in a district but they do provide evidence in support of the importance of military considerations.³⁵ [Matranga and Natkhov \(2019\)](#) put forward Hellie’s hypothesis, referring to [Hellie \(1971\)](#), who underlined the role of middle-service-class cavalry—the backbone of the Russian army at that time. [Hellie \(1971\)](#) argued that serfdom allowed the state to compensate cavalymen for their service with populated land estates. [Matranga and Natkhov \(2019\)](#) build a geographical instrument for predicting the location of the serf-owning estates. They construct the optimal invasion routes by Russia’s nomadic enemies. They also use data on forest cover; forests provided construction material for defense fortifications as well as a natural shelter in case of unsuccessful defense. Their instrument turns out to be a strong predictor of the “Tula Defense Line” (the chain of fortifications against nomads), which was indeed the location with a much higher prevalence of servitors and serfs than other parts of Russia by 1678, the year of the earliest census-like data on Russia’s population. They also find that the Tula Defense Line area had a significantly greater number of small estates (up to five peasant households), i.e., estates sufficient to support one cavalryman and his family. Thus, the authors’ quantitative analysis suggests that security considerations were a key factor contributing to the prevalence of serfdom.

The origin of repartition commune remains an open question. There is still no clear evidence when and why Russian peasants started to redistribute land.³⁶ The first evidence goes

³⁴See also [Hammond \(2009\)](#) who describes a similar rationale for creating the early “*pomestie*” (estate) system in the 15th century. When Ivan III conquered Novgorod, he confiscated land owned by the local elite and gave it to 2,000 gentry in exchange for military service.

³⁵One could argue, however, that the Domar hypothesis could not be tested at the local level since Domar sought to explain the introduction of serfdom at the national scale.

³⁶[Darrow \(2018\)](#) describes in detail the evolution of ideas and state policy initiatives on the “peasant question” in Imperial Russia. However, the center of his analysis is peasant land allotment rather than the commune.

back to the 16th and 17th centuries (Milov, 1998). Historians agree that the introduction of mutual tax responsibility within the Russian village by Peter the Great in the first quarter of the 18th century strengthened the commune as a fiscal institution. The mutual tax responsibility increased peasants' incentives to engage in repartitions in areas where repartitions took place before and created such incentives in areas where there were no repartitions to start with. Indeed, repartition communes may have improved the land-labor ratio for an average household within the commune and thus improve productivity of the commune as a whole, which would ease the tax burden. Serfdom likely contributed to the spread of this practice because the landlord also maximized the output of an average household rather than being interested in the output of a particular individual household. Testing these hypotheses is an important avenue for future research.

3.1.2 Local Governance

While the Russian Empire was an autocracy where the tsar had full discretion over legislation and government, the country also had substantial experience with local democratic institutions, providing a unique example of the functioning of representative bodies within an autocracy. Following the abolition of serfdom, Alexander II introduced provincial and district *zemstvos* in 1864 and reorganized city parliaments (*dumas*) in 1870. They managed the provision of local public goods and had the right to collect local taxes. These bodies were elected by curia estate system based on an income census. The number of seats in the representative elected *zemstvos* for each curia (landlords, city dwellers, and peasantry) varied by province and by district. These formal institutions were not present everywhere; they were created only in a subset of cities, districts, and provinces.³⁷

To the best of our knowledge, there are no quantitative studies of the causal effect of these reforms on economic development. In a cross-sectional setting, Nafziger (2011) documents that higher representation of peasantry in local *zemstvos* was associated with a shift in local taxation away from communal property as well as higher public spending per capita, especially on education. While peasants were an absolute majority of the population, the curiae system made sure that in most districts peasants were not median voters; therefore, the changes in taxation and government spending were likely to be explained by interactions between the peasantry and liberal elements among the nobles.

Castaneda Dower et al. (2018) use the *zemstvo* reform to test the Acemoglu and Robinson

³⁷Provincial *zemstvos* were established in a geographically compact set of provinces in the European part of Russia. District *zemstvos* existed in all districts within provinces with provincial *zemstvos*.

(2005) theory of democratization that views this institutional change as a commitment device for future redistribution needed to avoid a costly revolution. To identify a causal relationship between unrests before the reform and peasant representation according to the 1864 law, the authors instrument peasant revolts with the share of serfs in a district before emancipation and by local religious polarization. They find that the reform granted more seats in *zemstvos* to peasants in areas with lower prereform unrest. This finding is consistent with the Acemoglu-Robinson theory, i.e., in places with many prereform revolts there were permanent credible threats of protests, so there was no need to introduce democratic institutions. This relationship, however, does not shed light on the commitment mechanism which is central to the Acemoglu-Robinson model. To test for this mechanism, [Castaneda Dower et al. \(2018\)](#) explore the link between prereform unrest and redistribution in the postreform period in areas affected and not affected by the *zemstvo* reform. They find that the relationship between earlier unrest and later redistribution was more negative in non-*zemstvo* areas, which they interpret as evidence against the commitment mechanism of the Acemoglu-Robinson model.

The representative democratic institutions were limited to local governance. The central government and the regional governors were appointed by the tsars.³⁸ The governors had no local accountability. However, even the governors of peripheral provinces, where *zemstvo* was not instituted, were constrained by the threat of revolt. [Gokmen and Kofanov \(2020\)](#) analyze promotions and demotions of about 300 regional governors in 91 provinces of the empire between 1895 and 1914. They show that governors of peripheral provinces (*oblasts*) were rewarded for having fewer peasant revolts or industrial worker strikes. They find no such relationship for the governors of central provinces (*gubernias*). They explain the difference by the special status of the *oblasts* in the empire: these were the peripheral territories with a high share of non-Russian minorities; their governors were given wide military and civil powers (unlike those in *gubernias*). Interestingly, [Gokmen and Kofanov \(2020\)](#) find no evidence that political connections mattered for the career prospects of regional governors in the Russian Empire. This may be explained by the fact that the connections that did matter are unobservable.

Using district-level data, [Charnysh \(2021\)](#) studies the distributional implications of the relief policy conducted jointly by the central government and local *zemstvos* during the most severe imperial famine of 1891 and 1892. The author finds that the state aid to the areas

³⁸[Hartwell \(2020\)](#) studies changes in the formal political institutions in Russia between 1788 and 1914. Using novel econometric techniques to account for the slow-moving nature of these changes, he provides evidence that individual acts of terror against the tsars were associated with gradual liberalization of the regime, whereas large-scale unrest and external conflicts, if anything, were associated with turns toward more oppressive political institutions.

affected by the famine was less generous in districts with a higher share of Muslim minorities, which, in turn, resulted in higher mortality and lower fertility in these areas during the famine years. She argues that it was the lower state capacity in these districts rather than religious prejudice that caused the difference in outcomes. In particular, local *zemstvo* officials lacked detailed information about Muslim communes and collected lower fiscal revenues from them. Consequently, lower fiscal revenues were interpreted as a lack of guarantees for the repayment of food loans, resulting in the reallocation of famine relief toward areas with more legible population.

3.1.3 Barriers to Entry and Industrial Development

The low productivity of agriculture relative to industry's potential provided a strong rationale for a structural change. However, Russian industrialization was proceeding at a rather slow pace. From 1885 to 1913, real nonagricultural product per capita was growing at an average annual rate of 2.3%, i.e., not much faster than agricultural per capita product, at 1.3% per year (Cheremukhin et al., 2017).

The earlier literature has suggested multiple explanations for Tsarist Russia's slow industrialization (Markevich and Nafziger, 2017). First, Gerschenkron (1965) hypothesized that the crucial factor was the commune, which constrained supply of labor by limiting labor mobility both in space and across sectors. Also, as the commune kept Russian agriculture relatively backward, it reduced the growth of demand for industrial goods and thus hindered industrial development. Second, Kahan (1967) argued that long-term development objectives contradicted the immediate fiscal needs, which were high given the oversized and inefficient bureaucracy. The Russian government taxed both consumption and imports, including imports of capital goods, which was essentially equivalent to taxing industrialization.³⁹ Third, Pipes (1974) discussed that poor protection of property rights in the Russian Empire and excessive inefficient regulation were the major obstacles to capital accumulation in this part of the world.⁴⁰

More recent work of business historians stresses the prevalence of corruption and red tape of the imperial bureaucracy that imposed an extra levy on entrepreneurs (e.g. Owen, 2005). Cheremukhin et al. (2017) argue that industrialization and development were slowed by the

³⁹Kotsonis (2014) draws a more complex picture of the evolution of fiscal policy in the Russian Empire and the early Soviet state, documenting the urban-rural differences in policies. In line with many contemporary states, the Russian government gradually developed mechanisms for the individual-level assessment of incomes and taxation in urban areas. In contrast, more indirect and collectivist fiscal practices were applied to the peasantry, which constituted the overwhelming majority of the population.

⁴⁰Pravilova (2014) tells a story of the emergence of property rights in Russia from Catherine the Great (who essentially introduced private property rights in Russia) to World War I.

lack of competition policy. Trusts and syndicates were not only legal but also encouraged by the government, leading to monopolization in both product and factor markets.

One of the most notorious entry barriers was the concession system of incorporation: establishment of every single public joint stock company required the personal signature of the tsar or his finance minister. This resulted in much slower growth of the corporate sector: by 1914, Russia had only 2,263 corporations—substantially lagging behind Germany and England, which had 5,488 and 65,700 corporations, respectively (Shepelev, 1973, p. 232).⁴¹

To quantify the role of entry barriers, Gregg (2020a) estimates the returns to incorporation. Using firm-level data from three Imperial Russia manufacturing censuses on the eve of the 19th and 20th centuries, she finds that plants owned by corporations were larger, more capital-intensive, and more productive than unincorporated factories, consistent with the argument that there were high barriers for incorporation. Controlling for plant fixed effects, the author shows that incorporation did not raise TFP, but did increase capital intensity. To identify the causal effects, Gregg (2020a) instruments the probability of incorporation by preincorporation labor productivity: the larger and more productive factories chose to pay the (fixed) cost of incorporation to get access to cheaper long-term capital. Meanwhile, Kulikov and Kragh (2019) study the large Russian businesses and show that as of 1914 the vast majority of large companies were incorporated. Only two of the 50 biggest companies were family firms.

Gregg’s findings suggest that Imperial Russia’s incorporation system was costly for economic growth. To explore the channels through which incorporation affected firm performance, she studies the differences between two types of Russian corporations: A-corporations (*aktsionerniie obshchestva*) and share partnerships (*tovarishchestva na paiakh*). Russian commercial law treated these two forms of corporations equally, but differences emerged in practice. In particular, the former were more likely to issue shares in the stock market. Gregg and Nafziger (2018) document that share partnerships paid larger dividends, issued fewer bonds, and had larger accounts payable than A-corporations. However, Gregg (2020a) finds only small differences between A-corporations and share partnerships in terms of the number of workers, revenue, and total machine power. She concludes that access to financial markets was not the only driver of returns to incorporation. The corporate form itself provided a set of advantages, such as legal personhood, limited liability, and locking in capital in the firm, which explain the superior performance of corporations of both types relative to other firms. Gregg and Nafziger

⁴¹England and Germany introduced general incorporation in the middle of the 19th century and by 1871, respectively (Guinnane et al., 2007, pp. 697, 703).

(2018) also find no differences in return on equity between the two type of corporations. They interpret this result as evidence of flexibility of choice of organizational type: once the firms overcame the barriers to incorporation, they could optimally choose one of the two corporate forms.

Gregg (2016) explores the effect of the major reform of corporations that strengthened minority shareholder rights. In 1901, the government introduced more transparency, and increased small shareholders' ability to attend meetings, to call for holding a meeting, and to control the meeting's agenda. The reform also reinforced small shareholders' voting power at the meetings. The reform affected the newly established corporations only, and among them mostly influenced A-corporations. In a difference-in-differences setting, Gregg (2016) finds that corporations affected by the reform had smaller total share capital, fewer shares, and higher par values of shares. This is consistent with corporations becoming more conservative in attracting minority shareholders due to an improvement of their property rights. The Ministry of Finance considered the reform a failure. Indeed, large shareholders continued to dominate corporations after the reform. However, Gregg's findings (2016) can also be interpreted as evidence that controlling shareholders operated in a monopolized rather than competitive environment; keeping control over their rents could have been more important than growing their business while sharing their rents with minority shareholders.

Gregg and Nafziger (2020) carry out a descriptive analysis of births and deaths of Russian corporations using annual firm-level panel data. They document that the rates of entry and exit of Imperial Russian corporations, 11.8% and 5.7%, are at the level of those in the contemporaneous United States and Europe, suggesting at least some competitive pressure within the corporate sector. At the same time, they show that corporations with politically connected founders entered with weaker observable characteristics—and were not more likely to exit afterward. They also find no correlation between the dynamics of corporate entry and exit and the business cycle, providing further evidence on how costly and time-consuming incorporation was.

Lack of competition also slowed industrialization through increasing returns to vertical integration. Using firm-level manufacturing census data on the cotton textile industry in the late 19th century, Gregg (2020b) documents that factories were less vertically and horizontally integrated in European Russia, where product markets were arguably more accessible. The author measures vertical integration by the number of distinct activities or functions performed by a factory; horizontal integration is measured as the number of factories owned by the same

firm. In regions with harder access to markets, factories more often added activities outside cotton production (e.g., bread baking). In capital-intensive cotton industries, like spinning, capital accumulation was positively associated with vertical integration. She also shows that vertically integrated factories were on average more productive in terms of revenue per worker and that on average they were larger and older.

[Chuchko \(2021\)](#) provides a quantitative analysis of the impact of Russian business on policy making, focusing on the 1891 tariff reform as the outcome. The author evaluates the extent to which proposals about tariffs made by various actors—such as the Ministry of Finance, the Department of Railroads, experts, and business associations—explain the outcome. She finds that the state had an overriding influence on tariff formation, whereas accounting for the impact of business associations leads to only a seven-percentage-point increase in the explained variance in tariffs. She also provides suggestive evidence that the structure of business-representation institutions—endogenous to Imperial industrial policy—was an important factor in the success of lobbying. These findings are consistent with the view that the Russian bourgeoisie had a limited influence of the government before 1917.

3.1.4 Market Institutions

Despite the barriers to incorporation, Russia experienced rapid development of its product and financial markets in the late 19th and early 20th centuries. On the eve of WWI, there were more than 90 commodity and stock exchanges in the Russian Empire. The history of the oldest and largest exchange, in Saint Petersburg, goes back to the early 18th century ([Lizunov, 2004](#); [Borodkin and Konovalova, 2010](#)).

The Russian financial market was closely connected with the European markets. [Borodkin and Konovalova \(2010\)](#) document that prices of Russian shares traded on the Saint Petersburg, Paris, and Brussels stock exchanges in the late 19th and early 20th centuries were highly correlated. [Opitz \(2017\)](#) finds that the Saint Petersburg stock exchange was well integrated with Berlin's.

Politics and political (in)stability were important factors shaping dynamics of the Russian financial market. Using the event-study methodology on Russian sovereign bonds, [Opitz \(2017\)](#) shows that the market responded to political events such as the 1905 revolution and the Russo-Japanese War (1904–1905). [Mauro et al. \(2002\)](#) and [Grosfeld et al. \(2020\)](#) demonstrate that fluctuations in Russia's sovereign-bond yield spread (against British sovereign bonds) reflected the level of Russia's political uncertainty. [Dempster \(2006\)](#) explores the series of monthly

Russian bond yields from July 1906 to June 1920 for structural breaks: two major events, the start of WWI and the fall of Russia's first provisional government, in April 1917, changed the market confidence in Russia's ability to eventually repay its debt.⁴²

There is little causal analysis on the banking system's contribution to industrialization and growth. [Salomatina \(2004\)](#) and [Proskuryakova \(2012\)](#) describe the history of commercial banks and land mortgage banks in the late Russian Empire. [Grigoriadis and Suesse \(2021\)](#) test Gerschenkron's conjecture that the State Bank of the Russian Empire (which was not an independent body and which acted as both the central bank and a commercial bank) was an important driver of industrialization. Using data on the location of the State Bank's branches and industrial establishments, they find that access to the State Bank branch was positively associated with the growth rate of factory-level output, mechanization, and labor productivity, especially when other financial alternatives were less developed. [Antonov \(2016\)](#) describes a culture of private credit and debt in 19th century Imperial Russia. He argues that the Russian Empire's reasonably efficient legal system made personal credit an important factor of Russian daily economic life.

The Imperial economy was well integrated into international markets. Foreign trade and investment played a major role in Russian economic development. [Kotilaine \(2005\)](#) shows that already by the 17th century, the Russian economy critically depended on imports, which were paid for by exports of raw and processed agricultural goods. [Goodwin and Grennes \(1998\)](#) show that Tsarist Russia in the late 19th and early 20th centuries was the largest grain exporter in the world and that since the 1880s, Russia's wheat markets were integrated into global wheat trade. [Kulikov and Kragh \(2019\)](#) show that 75% of Russian big businesses in the late Russian Empire relied on foreign investment and managerial know-how at least to some extent, including 25% that were dominated by foreign owners and managers. The evidence of the significant impact made by foreigners and foreign capital on Russian industrialization remains mostly descriptive. Conducting more systematic quantitative research on the role of foreign business in the economic development of the Russian Empire is an important task for future research.

⁴²[Dempster \(2006\)](#) also cannot reject the hypothesis that time series of government expenditures and revenues for 1859 to 1913 are cointegrated, which is consistent with the view of the Russian state as financially sustainable.

3.2 Culture

With several noticeable exceptions, evidence on the role of culture in the economic development of the Russian Empire remains scarce. A larger body of work focuses on the long-term effects of culture; we survey this work in Section 5. Importantly, the existing studies, focusing on both the short run and the long run, mostly rely on the measures of culture that are relatively easy to observe, such as religious and ethnic differences. The analyses of the origins and consequences of other cultural traits, including culture-driven daily economic practices, is an important avenue for future research.

[Raskov and Kufenko \(2017\)](#) analyze the role of the “Old Believers”—a religious minority group that split from the Orthodox Christians in the 17th century—in 19th-century industrialization. Old Believers are often viewed as Russian Protestants, because of their entrepreneurial spirit. Using statistical records for the Moscow region, [Raskov and Kufenko \(2017\)](#) document that Old Believers were overrepresented in the textile industry up to the early 1870s but their presence diminished in the latter decades.⁴³ [Raskov and Kufenko \(2017\)](#) hypothesize that social capital and within-group trust could explain the initial success of the Old Believers. Formally testing this conjecture is an important task for future research.

[Aldashev and Guirkinger \(2016\)](#) study consequences of Russian colonization of modern Kazakhstan for the indigenous population. Massive government-led migration of Russian peasants to the region in the late 19th and early 20th centuries increased land pressure in the Kazakh Steppe. Russians brought new institutions and technologies, as well as their culture. This affected the traditional way of living: Kazakhs gradually transitioned from nomadic pastoralism to semisettled agriculture. The authors find strong cross-sectional correlations between these changes and clan identity. Controlling for geography, extended families that belonged to the same clan (i.e., unions of related extended families) behaved similarly in terms of the length of seasonal transhumance (changing physical location of household and its livestock), rules of fodder production for winter, and the acquisition of equipment needed for settled agriculture. Clan norms were an important determinant of the rules of fodder production for the winter.

The average speed of the changes in Kazakhs’ way of life was fast. In ten years, about 10% of extended families abandoned traditional collective hay making in favor of allocation of hay plots between individual households of the extended family. [Aldashev and Guirkinger \(2017\)](#) use data on the distance to local centers of Russian colonization and show that many innovations

⁴³[Raskov \(2012\)](#) draws a similar picture in a broader context that considers Saint Petersburg and Novgorod Provinces in addition to Moscow region.

and new practices, such as crop cultivation, and individualized hay plots, were adopted by the local population from Russian migrants. The authors also document an increase in the size of Kazakh extended families and a decrease in the size of the clans during the years of Russian colonization. They interpret this as evidence of a shift away from the traditional clan system and the growing importance of extended families.

[Aldashev and Guirkinger \(2012\)](#) study the implications of Russian colonization for gender discrimination among the indigenous population. They document a low and worsening sex ratio for Kazakhs in this period, particularly among poor households. They argue that missing women were a result of discrimination within households driven by the increased scarcity of food.

3.3 Human Capital

Slow accumulation of human capital is another potential explanation for economic underdevelopment. According to the 1897 census, only 28% of Russians aged 9 or older were literate. In the late 19th century, the literacy rate was above 96% in the most developed European countries (such as France, Germany, the Netherlands, and the United Kingdom) and 88% in the United States ([O'Rourke and Williamson, 1997](#)). Despite rapid expansion of primary education (the share of the school-age population enrolled in school grew from 5% in 1861 to 20% on the eve of WWI), the Russian Empire remained one of the least educated countries in Europe ([Chaudhary et al., 2012](#)). [Chaudhary et al. \(2012\)](#) speculate that imperial institutions slowed accumulation of human capital. They argue that local elites in the Russian Empire—like their counterparts in other large developing countries at the time—captured local representative bodies and distorted allocation of public goods (including schools) in their favor. Resources were funneled away from primary schooling to higher-level education, which mostly benefited elites rather than the masses. Russian central authorities became directly active in subsidizing the local provision of primary schooling only after 1900. Systematic quantitative testing of this conjecture remains an important topic for future research.

In addition to formal education, accumulation of human capital also took place through horizontal transmission. [Natkhov \(2015\)](#) finds a positive impact of Russian settlements on literacy of the indigenous population in the North Caucasus in the late 19th century. To identify causal effects, Natkhov instruments the settlement of Russians in the North Caucasus with the distance to the coast, arguing that the primary purpose of Russian colonization in the region was to protect the country's access to warm-water ports. The resulting increases in

literacy of the indigenous population have had persistent positive effects on income, educational attainment, and the quality of local governance.

[Natkhov and Vasilenok \(2021\)](#) study the transmission of human capital from Volga Germans to Russians. The former were invited to the region by Catherine the Great in the second half of the 18th century. In Saratov Province in the early 20th century, distance to German settlements was positively associated with the prevalence of relatively advanced technologies of that time among Russians, such as heavy iron ploughs, fanning mills, and wheat sowing. The effect was arguably causal. A placebo test reveals no correlation of adoption of new technologies with the distance to abandoned German colonies. The most plausible channel of transmission was the exchange of knowledge at German fairs. Interestingly, the adoption of new technologies resulted in higher labor productivity but was not accompanied by an increase in skill-intensive employment among Russians. [Natkhov and Vasilenok \(2021\)](#) provide descriptive evidence that communication barriers prevented accumulation of human capital in skill-intensive occupations among Russians.

Using cross-sectional variation in late 19th century Russia, [Malein \(2021\)](#) documents a positive association between the presence of ethnic Germans and various local economic development indicators. He shows that areas with a higher share of Germans exhibited a higher share of industrial occupations, per capita local expenditures, urbanization, firm-level TFP, capital intensity, and the rates of adoption of modern technologies. The author also shows that Germans set up schooling infrastructure in their settlements as early as the first half of the 19th century in sharp contrast to the villages populated by ethnic Russians. This resulted in Germans having the highest literacy rate in Russia compared to other ethnic groups and arguably in faster development of areas with German presence by the turn of the 19th century. To establish causality, [Malein \(2021\)](#) uses an arguably exogenous historical location of German settlements in Russia. Using panel data, he shows that the presence of Germans resulted in higher economic development only after 1890, i.e., during the period of relatively rapid industrialization and technological change.

3.4 Geography and Climate Shocks

Given the size of the Russian Empire, its geography is another natural candidate for explaining the country's development trajectory. Scholars have discussed the role of geography at least since [Baykov \(1954\)](#), who speculated that major Russian rivers flow in the wrong direction (south to north, rather than west to east), which prevented mining in the inner

territories and weakened trade. Empirical studies of the role of geography remain scarce, probably due to the lack of comprehensive historical data at the subnational level. There is only one snapshot of gross regional product and labor productivity of all 97 provinces of the Russian Empire in 1897; it was recently reconstructed by [Markevich \(2019\)](#). Using these data, the author finds that geography (in addition to institutions) predicts regional differences in incomes and labor productivity within the Empire. Provinces with access to the sea and rich in mineral resources were wealthier and had higher labor productivity. In addition, access to markets in other provinces and foreign countries—measured as a sum of their regional and national incomes weighted by inverse distance—was positively associated with local economic development.

[Grosfeld et al. \(2020\)](#) reexamine the premise of the vast economic literature that agro-climatic shocks that trigger economic crises lead to ethnic violence by examining the drivers of anti-Jewish pogroms in the 19th-century Russian Empire and right after the Empire's fall. They use newly constructed panel data on pogroms between 1800 and 1927 and combine them with data on seasonal agro-climatic shocks as a proxy for agricultural income, grain yields and prices, occupations, and education levels by ethnic group, and the periods of political turmoil. They show that agro-climatic shocks were on average significantly associated with pogroms. Yet, this relationship masks two important sources of heterogeneity that allows shedding light on the mechanism. First, pogroms occurred at times when the negative agro-climatic shocks coincided with episodes of increased political uncertainty (i.e., political turmoil). Neither economic crises (including the most severe grain shortages, such as the Russian famine of 1891–1892) nor political crises (such as the Napoleonic invasion or the Crimean war) alone caused pogroms. Second, pogroms primarily affected localities where Jews dominated middleman occupations, in particular, moneylending and trading, as opposed to artisanal or other occupations. Economic shocks together with political shocks did not result in pogroms in localities where the Jewish community specialized in other occupations, including middleman occupations unrelated to agriculture, such as trading in nonagricultural goods.

[Grosfeld et al. \(2020\)](#) consider a number of potential mechanisms and reject several prominent explanations of pogroms, such as the traditional “scapegoat” theory, according to which Jews were blamed for all misfortunes of the majority, the decrease in the probability of punishment during political turmoil, or the view that pogroms were an example of violence against economic elites. Instead, they argue that the unique combination of the interaction between economic shocks and political turmoil led to a breakup in the mutually beneficial implicit con-

tracts between Jewish middlemen and the majority that were based on repeated interactions: on a regular basis, creditors lent to peasants and grain traders extended credit both to peasants in rural areas and to urban buyers of grain. When economic shocks occurred in times of political stability, rolling over or forgiving debts was an equilibrium outcome, because both sides valued their future relationship. In contrast, during political turmoil, debtors could not commit to paying in the future, and consequently, moneylenders and grain traders had to demand immediate (re)payment. It was this break in the repeated relationship between the majority and Jewish middlemen that ignited the ethnic violence.

3.5 The Causes of the 1917 Russian Revolution

The vast historical and social science literature on the 1917 Revolution offers two competing explanations of why the regime change took place. One view argues that the revolution was eventually caused by fundamental internal problems of Russian socioeconomic development (e.g., [Gerschenkron, 1965](#); [Allen, 2003](#)). The alternative view highlights exogenous shocks such as WWI that massively transformed Russian society (e.g., [Gregory, 1994](#)). Despite extensive historical literature on the subject, systematic quantitative evidence remains limited.⁴⁴

Evidence from the most recent research is mixed. [Castaneda Dower and Markevich \(2021\)](#) use district-level voting data to study the determinants of support for the Bolsheviks in 1917. In November 1917, Russia held a vote for the Constituent Assembly in what turned out to be its only free and universal national election until the 1990s. They find a positive correlation between the share of industrial workers in a district and voting for Lenin’s party. To identify the causal effect of industrialization on the rise of the Bolsheviks, the authors instrument the share of industrial workers in a district with the presence of Carboniferous-Period rock strata, which were rich in coal and therefore were a strong predictor of industrialization at the time. They also provide evidence that industrialization not only shifted voters’ preferences to the left but also polarized the electorate.

[Finkel et al. \(2017\)](#) study 1917 protest activity by the peasants, who greatly outnumbered industrial workers. Using province-level cross-sectional data on peasant unrests between the abdication of the tsar in February 1917 and the Bolsheviks’ coup d’état in October of the same year, the authors find that soil quality and the historical prevalence of serfdom are positively associated with discontent in the countryside during that revolutionary year. These results are

⁴⁴See, e.g., [Grinin et al., eds \(2010\)](#), who provide a recent example of this debate. For reviews of the historical literature on the 1917 Russian Revolution, see, e.g., [Smith \(2015\)](#); [Wade \(2016\)](#); [Petrov \(2017\)](#).

in line with the conventional view in the historical literature that peasant protests were driven by the demand for (good) land and freedom (Zajonchkovskij, 1968).

Kofanov (2020) explores the relationship between industrialization and conflict in the countryside in the late 19th and early 20th centuries, arguing that *a priori* the relationship is ambiguous. On the one hand, industrialization generated material gains for peasants, which could promote social peace in rural areas. On other hand, if industries relied on local raw materials, industrialization may have increased competition for land and other resources used in both agriculture and industry, which could have provoked peasant unrest. The author compares textile manufacturing, asserting that it does not draw on local resources, with such food-processing industries as sugar production and alcohol refining, which draw on local resources. He hypothesizes that for textile manufacturing, the first effect should dominate, whereas for sugar and alcohol production, the second effect is expected to dominate. Using district-level panel data, the author finds that the number of textile workers is negatively correlated with peasant unrest, whereas the food-processing industry is positively associated with unrest. He replicates the results for food processing using more granular cross-sectional subdistrict data in Kursk Province during the 1905 revolution, finding a weaker effect in areas with a higher share of peasant-owned commune land, where the access of peasants to subsistence farming was guaranteed by the institution of the commune.

Castaneda Dower and Markevich (2018) consider the military draft during the WWI as a massive negative labor shock in the rural economy. Using district-level panel data on grain production, they show that the draft decreased areas of cultivated land, but farms in the commune demonstrated greater resilience to the shock than private farms. Peasants tended to reallocate labor in favor of the commune, where agriculture was less productive than on private farms, arguably because of the increased attractiveness of commune nonmarket access to land and social insurance during times of turmoil. Indeed, risk-sharing is often viewed as a key feature of the commune. These results support an institutional explanation of misallocation of labor in the Imperial Russian economy that became more pronounced during WWI. Given lower integration of commune farms than private farms into grain market, these results also provide insight into the origins of food shortages in urban areas during the war. These shortages, in turn, triggered urban unrest in February 1917, which resulted in the abdication of the tsar.

Taken together, these findings imply that deficiencies of the tsarist economic development model did contribute to the revolution. However, WWI also played an important role in aggravating their impact.

Overall, recent Russian economic history research sheds new light on the fundamental causes of the sluggish economic development of Russia in the 19th and early 20th centuries.

4 Political Economy of Soviet Dictatorship

One of the most exciting recent developments in political economy is the growth of theoretical and empirical research on the political economy of nondemocratic regimes. As shown in surveys by [Gehlbach et al. \(2016\)](#) and [Egorov and Sonin \(2020\)](#), real-world autocracies are much more complex than their caricature versions featured in earlier models of dictatorships. Recent literature emphasizes the many challenges and trade-offs faced by autocrats related to the economic costs of repression, the need to provide incentives within the system, the difficulty of collecting information, and the lack of commitment. Recent research on the Soviet dictatorship provides important insights into these questions.

4.1 Planning

The first wave of research that used information from the declassified Soviet archives, summarized in [Gregory and Harrison \(2005\)](#), showed that the role of planning in the Soviet economy was—perhaps surprisingly—rather limited (see also [Gregory, 2003](#); [Markevich, 2005a](#)). This is in line with earlier conjecture by Western observers (e.g., [Lewin, 1973](#); [Zaleski, 1980](#)). First, while plan targets were set up in advance, comprehensive final plans appeared often with significant delays, if at all; second, plans for different sectors and enterprises were not always mutually consistent and were regularly corrected ex post; third, plan targets were often not achieved.⁴⁵ Furthermore, central planning covered only a limited number of products.

Money was supposed to “follow the plan”: financial plans were supposed to mirror production tasks formulated in kind. The state enterprises therefore faced “soft budget constraints,” knowing that their potential losses would be covered by the government ([Kornai, 1986](#)). The coexistence of soft budget constraints in the enterprise sector with hard budget constraints for households required separating of “cash” and “noncash” monetary flows. State enterprises could not use the noncash to pay their workers more than was prescribed by the plan. Using various series on money supply in the Soviet economy collected from the archives, [Nakamura \(2011\)](#)

⁴⁵[Lazarev and Gregory \(2003\)](#) describe the actual practices of the allocation of scarce resources in the command economy. They use a unique dataset on agents’ requests for vehicles in 1933 and decisions of central authorities on each single petition. They test two distinct explanations of allocation outcomes: an economic planning model and a political gift exchange model. They reject the planning model.

argues that the lack of correlation between cash and bank loans suggests that this separation was generally effective. However, he also shows that cash was issued in greater amounts than planned for nearly the entire Soviet period. [Nakamura \(2017\)](#) uses a TVP-VAR approach to study the relationship between the real sector and the financial sector in the Soviet context. He finds that the contribution of money supply to economic growth was limited and declining over time; this result confirms a view expressed in the earlier literature that the Soviet monetary system management was not economically efficient.

4.2 Incentives, Monitoring, and Coercion

Economic theory predicts that both moral hazard and asymmetric information are particularly acute in a command economy, where there are fewer independent sources of information on costs and prices due to the absence of market benchmarks. The first wave of literature based on the declassified Soviet archives (reviewed by [Gregory and Harrison, 2005](#)) provides ample evidence in support of this theoretical argument. More recent studies are also consistent with this view. The government did not manage to overcome informational asymmetries and opportunistic behavior of agents, even in the “priority” sectors, such as the defense industry ([Harrison, 2008](#)). [Markevich and Harrison \(2006\)](#) and [Harrison and Markevich \(2008\)](#) describe the system of special military agents in the Soviet defense industry who had to regulate procurement of weapons. While these agents represented the army in terms of monitoring quality of weapons, they had to collude with the producers because, constrained by the army’s strategic considerations, they simply could not reject everything that the industry offered them. To ensure the quality of the procured weapons, the military agents also agreed to falsify their quantity (at the expense of the central government).

To reduce moral hazard, the Soviet dictatorship relied heavily on monitoring. [Markevich \(2011\)](#) examines the control system that Stalin established to enforce his orders. He provides descriptive evidence on the multiplication of Soviet monitoring agencies due to the dictator’s worry over potential collusion between inspectors and subjects they were supposed to inspect. He also shows that, at the same time, Stalin deliberately limited the growth of his control system at several occasions and stimulated whistle-blowing in an attempt to mitigate the system’s operating costs and, arguably, to maximize its cost-effectiveness. Using declassified Soviet Lithuania secret police (KGB) archives, [Harrison and Zaksauskiene \(2016\)](#) describe the role of the counterintelligence service in the Soviet economy. They show that the KGB was designed to enforce the monopoly of the ruling party. Though they find that the direct costs of maintaining

the counterintelligence service were relatively small, they argue that the overall costs were substantial due to economic distortions that this service created. They conclude that the regime was willing to pay these large costs because of the security benefits the service provided.

Coercion and repression represented another solution to create incentives for economic agents in the Soviet economy. Forced labor was an important part of the Soviet economy from the 1930s to the 1950s (Khlevniuk, 2004; Borodkin et al., 2005). Gregory (2008) documents that Stalin personally designed state security, and he carefully planned and monitored the implementation of his repression policies. Gregory (2008) and Belova and Gregory (2009) argue that the key stylized facts on crime and punishment under Stalin—preferences for harsh sanctions, higher incarceration rates, greater use of severe punishment, lack of tolerance for crime against state property—could be explained by the preferences of a rational dictator who does not internalize the social and private costs of punishment.

It is, however, often difficult to estimate the costs and benefits of coercion and punishment in the Soviet command economy. For example, according to Gulag managers, labor productivity of prisoners, who accounted for 2% of the Soviet labor force in the early 1950s, was about 50% to 60% lower than that of free labor. The level of mechanization and, more generally, working conditions, however, were very different, complicating such comparisons. Accounting for possible externalities of forced labor would make such cost-benefit analyses of forced labor even more complex (Gregory and Lazarev, eds, 2003). Miller and Smith (2015) build a model that rationalizes the Soviet forced labor system, arguing that the threat of imprisonment allowed the government to extract a greater share of worker surplus.

Stalin used repression against his enemies as well as his supporters, including the former executors of his own brutal policies. Using individual-level data on secret police officials in 1935–1940, Saijo (2021) finds that the probability of repression for a low-ranking employee was higher if he or she had connections with purged higher-rank officials. The author argues that the dictator sought to destroy social networks within his repressive apparatus, as is necessary in a low-information environment with poor monitoring.

4.3 What Did Stalin Maximize?

An important source of complexity in measuring the economic effectiveness of coercion is that Soviet repressions were likely driven by both the political and economic reasoning. Markevich (2016) uses panel data on annual plan fulfillment by the Soviet industrial ministries during the postwar years and finds that the number of penalties imposed on employees was nega-

tively correlated with their production achievements. This is in line with a view that economic considerations drove punishment in the Soviet system. The author also shows that data are consistent with the political explanation of Stalin's repression. Using a unique individual-level dataset on the Great Terror in the Soviet ministry in charge of metallurgy, he shows that individual characteristics related to politics, such as party membership or a high position in the Soviet hierarchy, predict the probability of arrests.

Whichever factors drove the extensive use of repression and coercion, these factors increased the stability of the Soviet command system only when the regime was relatively strong. Once the regime looked weak, repression backfired, causing counteractions. Using district-level data on excess mortality in Ukraine in the early 1930s, [Rozenas and Zhukov \(2019\)](#) find that districts that were more exposed to the famine were more loyal toward Moscow when, as during the post-WWII decades, the regime could credibly threaten retribution in response to opposition. But when such threat was no longer credible, as under Nazi occupation during WWII or in the last years of existence of the Soviet Union, districts that historically were more exposed to the famine were more hostile toward Moscow. To establish a causal relationship between the famine—which [Rozenas and Zhukov \(2019\)](#) interpret as intended repressions via deaths by starvation—and loyalty, they instrument excess mortality by weather shocks.

[Rozenas et al. \(2021\)](#) argue that repressions translated into higher loyalty on the battlefield but at the expense of lower initiatives of military personnel. Using individual records of Soviet soldiers during WWII, they show that individuals from territories exposed to higher rates of political repression before the war were more likely to fight until death and less likely to flee, but they received fewer decorations for individual bravery. To address the potential measurement problem of Stalin's victims, the authors use access to railways and discontinuities in arrests along Soviet administrative borders as alternative sources of exogenous variation in the scope of repression.

A number of studies model Stalin's objective function directly. [Gregory et al. \(2011\)](#) build a rational-choice model explaining the repression of innocent citizens with political objectives. The model predicts that when the quality of information about the regime's enemies is low, mass repression that would also affect innocents is a rational response of the dictator maximizing his chances of staying in power.

[Castaneda Dower et al. \(2021b\)](#) calibrate a model of Stalin's preferences regarding repression and economic growth. Using stylized facts from [Harrison \(2008\)](#) and [Khlevnuk \(2010\)](#), they argue that the regime faced a trade-off between political stability and economic development.

The elimination of potentially disloyal citizens increased the chances of the regime’s political survival but resulted in a loss of economic output. Using regional variation in victims of the policy of statistical repression, i.e., when victims were selected from particular social or ethnic groups at random, an integral feature of the Great Terror, [Castaneda Dower et al. \(2021b\)](#) estimate parameters of their model. Then, they calculate the monetary value the dictator placed on a statistical life of a Soviet citizen, which they interpret as the economic opportunity cost of repression. The results imply that Stalin would have been willing to accept about USD 85,000 in 2019 prices for a reduction in citizens’ fatality risk equivalent to saving one life of a random Soviet citizen. This number is substantially smaller than the estimates of citizens’ willingness to pay for a reduction in their own fatality risk. There are no estimates of citizens’ willingness to pay for saving a statistical life in Russia or the Soviet Union, thus, this comparison relies on estimates from the literature on other countries.

[Kontorovich and Wein \(2009\)](#) and [Kontorovich \(2015\)](#) argue that Soviet leaders, Stalin in particular, should not be evaluated in terms of economic outcomes. These leaders were first and foremost interested in increasing their military might.⁴⁶ [Davies et al. \(2018\)](#) document that, by 1939, the Soviet Union had become one of the two world’s largest producers of weapons. However, because GDP growth, industrialization, and military strength are highly interconnected, it is difficult to distinguish between them empirically. [Khlevnuk \(2010\)](#) hypothesizes that the main explanation for the Great Terror is the political and military reasoning of the Soviet government preparing for a big war. Yet, [Davies \(2006\)](#) argues that the Great Terror weakened the Soviet Union economically due to negative shock it caused to the management of Soviet enterprises. [Kontorovich and Wein \(2009\)](#) and [Kontorovich \(2015\)](#) provide descriptive analyses of both the official statements made by Soviet leaders and their fiscal priorities. They find that, in some speeches, Soviet leaders emphasized living standards and economic growth, while in others, they referred to building self-sufficiency and military capacity. The lack of detailed data on defense spending after WWII—the available figures are estimates—prevents a formal econometric test of Kontorovich’s conjecture. Qualitatively, one can assert that the Soviet Union became the only strategic rival of the United States during the Cold War. It managed to build a first-rate military power, though its economy was smaller than one-half of the U.S. economy.

The tragedy of the Great Soviet famine of 1932–1933 provides another opportunity to shed light on the revealed preferences of the Soviet government. To speed up the accumulation of physical capital, investments, and industrialization, Stalin’s government confiscated grain from

⁴⁶In a short essay, [Harrison \(2017\)](#) expresses a similar view about the objectives of the Communist leaders.

rural citizens, leaving them at or below subsistence. The government also used food shortages in the early 1930s to sell grain to Soviet citizens for gold, which it used to pay for imports [Osokina \(2019\)](#).

First, the recent literature sheds light on the historical debate about the extent to which the Great Famine was caused by the Soviet industrialization strategy.⁴⁷ In particular, historians long debated whether the 1932–1933 famine deaths could be attributed to the victims of Stalin’s Big Push policies, or whether they were driven by negative weather shocks and resulting poor harvests ([Conquest, 1986](#); [Tauger, 2001](#); [Davies and Wheatcroft, 2004](#); [Graziosi, 2015](#)). [Naumenko \(2021\)](#) resolves this debate with newly available data. Using district-level cross-sectional and regional-level panel datasets on mortality in Ukraine, she finds that both faster collectivization and excess grain procurement are positively associated with mortality for the Holodomor famine years. Controlling for weather indicators and prefamine local characteristics, collectivization explains up to 52% of excess mortality. Another important famine-mortality correlate is the local economy structure: regions with industries prioritized by the Soviet government had lower excess mortality. In contrast, weather changes explain no more than 8% of excess mortality. Moreover, when the author estimates the grain production function using pre-1917 data and predicts the 1933 harvest, she finds that the predicted harvest is close to officially reported figures, which are no worse than an average harvest from 1924 to 1929.

Second, [Markevich et al. \(2021\)](#) show that the 1932–1933 famine disproportionately hit areas populated by ethnic Ukrainians. The authors construct new regional-level and district-level panel datasets that cover the bulk of the territory of interwar Soviet Union to explore whether ethnic Ukrainians experienced higher mortality during the famine. They find that, controlling for the urban share and lagged grain output predicted by weather and geography, excess mortality during the famine was positively associated with ethnic Ukrainian population share (measured by the 1926 census), both across regions and across districts within regions. Importantly, this is true only for the famine years; in nonfamine years, a correlation between the share of ethnic Ukrainians and mortality is negative. The findings are robust to adding a large set of geoclimatic, demographic, and prefamine institutional and political controls, as well as to alternative measures of Ukrainian population share and severity of famine.

[Markevich et al. \(2021\)](#) also find that ethnic rather than administrative boundaries mattered for the famine. The positive association between excess famine mortality and the share

⁴⁷There are no quantitative studies of the 1921–1922 or 1946–1947 famines. Examining whether and how they were linked to Soviet policies is an important task for future research.

of ethnic Ukrainians holds even after excluding the Soviet Republic of Ukraine from the sample. District-level data demonstrate a significant decline in excess mortality rates at the border between Ukraine and Russia; however, this border discontinuity disappears once one accounts for the ethnic Ukrainian population share of each district. All these results are in line with a view that there was systematic repression against ethnic Ukrainians during the famine. A back-of-the-envelope calculation implies that ethnic bias against Ukrainians explains up to 92% of total famine mortality in Ukraine and up to 77% in the whole sample.

[Markevich et al. \(2021\)](#) hypothesize that the regime's objective to control grain was combined with a motivation to punish the stronger resistance of ethnic Ukrainians to the Bolsheviks. The authors document that Ukrainians resisted collectivization more than other ethnic groups in the years preceding the famine. They also show that excess mortality during the famine was significantly higher in Ukrainian regions that produced more grain. The latter result is robust to controlling for political loyalty to the regime as well as the state capacity and its interaction with the share of Ukrainians, which have no effect in such specification. This is consistent with a view that political factors unrelated to grain do not explain Ukrainian famine mortality. In addition, the authors study collectivization and grain procurement as policy outcomes and find that implementation of these policies during the famine was more intense in Ukrainian regions that produced more grain. They also show that the government allocated fewer tractors to such regions in 1933.

The official "nationalities" policies of the Soviet state also illustrate the government's objectives. Communist ideology condemned imperialism, but for ideological, economic, and military reasons, the Bolsheviks were determined to keep control over as much territory of the Russian Empire as was possible. [Castaneda Dower et al. \(2021a\)](#) study how and at what cost the institution of the Central Asian states by the Bolsheviks in the 1920s helped them achieve this objective. The indigenization reform in Central Asia consisted of the national delimitation that created the borders of Soviet nations in Central Asia and of political empowerment of the "titular nation" in each republic. In particular, each autonomous Soviet Republic in Central Asia gave political power to one ethnic group among those residing in their territory. The authors assemble novel detailed historical panel data on local insurgency against the Soviet state and intergroup conflict in Central Asia. In particular, they use text-as-data techniques as well as manual coding of the text of the recently declassified reports of the Soviet secret police to construct the main outcome variables. They supplement these data with the historical census data on local group composition. Their analysis shows that the indigenization policy reduced

the level of insurgency activity against the Soviet power, allowing the center to keep control over the former Russian Empire colonies. It also, on average, lowered conflict between local groups. The authors show that the division of the Central Asian territory into Republics resembled closely an “ideal” territorial division into states based on the stated principles of the Soviet nationalities policy, i.e., to minimize group segregation within states subject to not allowing noncontiguous parts. The authors design a machine-learning algorithm with nice convergence properties that uses data on the prereform local group composition to draw the ideal borders of Central Asia. These ideal borders differ from the actual borders drawn by the Bolsheviks in one important respect: the algorithm singles out the area in North Kazakhstan with a large presence of European migrants, i.e., Russians, Ukrainians, Germans, etc. [Castaneda Dower et al. \(2021a\)](#) show that the main effect of the reform comes from the areas that comply with the “ideal-division” rule. The Europeans in North Kazakhstan, in contrast, revolted against the reform. Overall, the results suggest that the Bolsheviks’ indigenization policy helped them keep control of the periphery of the Soviet empire.

4.4 Hierarchy of the Soviet Governance System

To run state enterprises and collectivized farms, the Soviet government developed a complicated hierarchy of governing bodies. Throughout a long period of the Soviet history, this governance system was organized along production lines, known in the theoretical literature as a U-form (unitary-form) hierarchy. A hierarchy of this type consists of a number of functional departments implementing complementary tasks on the same territory. In the Soviet case, these were the separate ministries, or chief administrations, each of which ran a single branch of the national economy. The theoretical literature suggests that U-form hierarchical structures arguably better utilize gains from specialization and the economy-of-scale effect but suffer from relatively poor incentives for managers ([Maskin et al., 2000](#); [Qian et al., 2006](#)).

The Stalin’s successor, Nikita Khrushchev, experimented with creating incentive schemes for agents by changing the structure of the system. In the mid 1950s, he attempted to reform the whole Soviet system of governance, moving away from a U-form hierarchy to an M-form (multidivisional-form) hierarchy, which consisted of comparable territorial divisions (*Sovnarkhozs*) implementing the same tasks. Such M-form hierarchical organization allowed the utilization of yardstick competition between units and introduced relative-performance evaluation. The rationale was to provide career incentives to Soviet regional leaders. A similar approach to the organization of governing hierarchy and incentives for officials worked well later

in modern China (Qian et al., 1993). The Soviet experiment, however, failed. Khrushchev lost power in 1964, and the traditional Soviet U-form hierarchy was reinstated. Using panel data on Soviet regions before, during, and after the *Sovnarkhozs* period, Markevich and Zhuravskaya (2011) show that the reform indeed provided stronger incentives for regional leaders: relative regional industrial development was a significant determinant of career advancements of regional party secretaries during the reform years but not outside the reform period. However, the reform resulted in faster growth only in regions with sufficiently diversified and, therefore, self-contained economies, and it resulted in lower growth in highly specialized regions, arguably because relative performance evaluation created uncooperative behavior of regional leaders that hit the economic development of specialized regional economies. More generally, these results suggest that an important flaw of the design of this reform that arguably predetermined its failure was that it created a large number of small, highly specialized regional units instead of a small number of self-contained units. In particular, over 100 *Sovnarkhozs* were created in the Soviet Union in contrast to about 30 self-contained units in China. This difference is striking, because the population of the Soviet Union was less than one-third of the Chinese population: 199.1 million versus 621.5 million in 1956 (Bolt and van Zanden (2020), originally Maddison (2010)).

Was the Soviet governance system obsolete, or did it play its role well and beyond the will of the dictator? Belova and Lazarev (2013) summarize studies on the role of the Communist Party in the one-party dictatorship. Indeed, if all other parties are suppressed what is the role of the ruling party? Lazarev (2005, 2007) builds a model assuming that the major roles of the Communist Party were to recruit political activists and to create stronger incentives in the hierarchy as, again, was later done by the Communist Party of China under Deng Xiaoping. Lazarev (2007) takes advantage of the republic-level data on party membership between 1956 and 1968 to show that the evidence is consistent with the predictions of his implicit promotion contract model. The supply of activists, expressed as the number of party candidates, is positively related to the size of the income gap between the party bureaucracy and workers.

Interestingly, in contrast to China, the Soviet Communist Party gradually evolved from a pure hierarchical mechanism which created career incentives to a business enterprise that was supposed to generate profit rather than promote public interest. Analyzing new data on party finances between 1938 and 1965 and additional records from the 1980s, Belova and Lazarev (2007, 2008) document that the party depended on state subsidies until the mid 1950s and became financially independent afterward. They argue that the party gradually transformed

from an economic agent of the state into an increasingly self-sustaining institution.

4.5 Why Did the Soviet Economy Slow Down After Stalin?

4.5.1 Economic Policies After Stalin

Recent literature revisits the old debate on whether the post-Stalin slowdown was due to decreasing or even negative TFP growth or due to a low elasticity of substitution between capital and labor in planned economies. In the latter case, once abundant labor resources were exhausted, even large capital investments would generate little growth. Using new estimation methods based on the CES production function, [Nakamura \(2015\)](#) finds that the Soviet economic slowdown is explained by both a decreasing trend in productivity growth and a low elasticity of substitution. This finding is in line with [Ofer \(1990\)](#), who argued that the explanations based on the slowdown of productivity growth and the low elasticity of substitution do not exclude each other.

[Voskoboynikov \(2021\)](#) uses official statistics extracted from the Soviet archives to revisit capital series for the Soviet economy after 1960. The author's growth-accounting exercise indicates slower accumulation of capital than previously thought, and, accordingly, higher contribution of TFP growth to Soviet growth. However, the author still finds TFP deceleration in the Soviet economy after 1960 and negative TFP growth in Soviet industry from 1974 to 1985.

Earlier literature (e.g., [Allen, 2003](#)) suggested that underperformance of Soviet TFP could be explained by inefficient capital investment. Indeed, the Soviet government invested a disproportionately high share of capital in the Eastern and Northern regions of the country. [Hill and Gaddy \(2003\)](#) and [Mikhailova \(2004\)](#) argue that these investments were too high relative to what they would have been in a market economy. Using Canada as a counterfactual market economy, [Mikhailova \(2004\)](#) finds that at least 14 million people, or about 35% of the population in regions with a harsh climate, would not have settled there. Arguably, such overinvestment resulted in lower economic growth.

Another potential explanation is the high and growing inefficiency of Soviet agriculture, which increasingly relied on governmental subsidies. There is, however, no systematic econometric evidence on this. Also, the slowdown in TFP growth could have been driven by the difficulty of providing incentives for innovation and adopting new technology in the Soviet system—and the increasing role of new technology in economic growth in middle-income economies. We come back to this conjecture in the next subsection.

After Stalin, the Soviet government started moving away from mass repression toward buying loyalty with economic benefits. [Ironsides \(2021\)](#) documents Soviet efforts to recover from the damage of WWII and move toward a promised state of abundance. These changes foreshadowed a recent global shift of authoritarian regimes from dictatorships based on coercion and repression, which dominated the world in the 20th century, to informational autocracies based on manipulation of information, censorship, and propaganda ([Gurieff and Treisman, 2019](#)). This brought about challenging new trade-offs. [Egorov et al. \(2009\)](#) develop a model of “Gorbachev’s dilemma” (this term was first introduced by [Methvin, 1987](#)) where an autocrat chooses the degree of media freedom which, on one hand, is needed to provide feedback on performance of his bureaucracy and thus helps to improve quality of governance, but, on the other hand, is dangerous because it facilitates coordination among the opposition. Using a cross-country panel spanning 1993 to 2007, [Egorov et al. \(2009\)](#) show that resource-rich dictators are more likely to opt for lower media freedom, thus eschewing feedback information and suppressing efficiency within the hierarchy. This is consistent with continuing censorship in the 1970s and 1980s (when oil prices were high and growing) and Gorbachev’s perestroika, which started when oil prices collapsed.

There are, however, no empirical papers that study the role of ideology, propaganda, mass media, and indoctrination in the formation of the Soviet state and in the stability of the Communist regime. This is an important avenue for future research.

4.5.2 Command Economy and Incentives to Innovate

The neo-Schumpeterian growth framework ([Aghion and Howitt, 1992](#); [Aghion et al., 2014](#)) implies that low-income countries that are far from the productivity frontier should rely on an “investment-based” growth model, mobilizing capital and adopting existing technologies. However, as the economy gets closer to the frontier, further convergence has to rely on the “innovation-based” growth model. Instead of adopting existing technologies, the economy should invent new ones in order to catch up with its more advanced peers. This, however, requires different institutions than those of the investment-based growth stage.⁴⁸ The neo-Schumpeterian framework therefore predicts that middle-income countries that fail to change their institutions and to create incentives for innovation may get stuck in a slow-growth trap.

⁴⁸[Aghion et al. \(forthcoming\)](#) document the transition from investment-based to innovation-based growth in South Korea due the pro-competitive reforms implemented in the wake of the 1998 financial crisis. The reforms resulted in faster productivity growth, especially in industries previously dominated by large conglomerates (chaebols).

Soviet economic agents had limited incentives to introduce innovations because of the ratchet effect inherent in planning (Weitzman, 1976; Holmstrom, 1982). However, the central authorities attempted to introduce some elements of competition within the system to encourage technological progress. For example, in the 1930s, competition was introduced in the R&D of steam power for aviation (Harrison, 2003).

Beyond case studies, there is no systematic evidence on the performance of Soviet R&D, especially in the postwar period, or on the lack of innovation contributing to stagnation and the ultimate collapse of the Soviet economy. Both theoretical and descriptive work suggest that the failure to adopt innovation was an inevitable consequence of the Soviet system. Graham (2016) traces the history of Russian and Soviet innovations and argues that Russia has been unique in the gap between its success in creating new ideas and its failure to broadly adopt and use them. He attributes this failure to structural factors in both pre-Soviet and Soviet times. He also discusses the three “exceptions”—space, nuclear, software—that prove the rule. The space and nuclear industries benefited from extremely generous funding during the Cold War and have been in decline ever since. The software industry took off due to major Cold War investment in mathematics and post-Soviet reforms that created competition and openness to global trade and investment.⁴⁹ Graham’s analysis is therefore similar to that of Dearden et al. (1990), who show that Soviet top-down economic decision-making created major disincentives for adopting innovation—including moral hazard, adverse selection, and the ratchet effect. Soviet hierarchy responded to the predominance of the ratchet effect with transfers of potentially highly productive employees across jobs, thus destroying valuable job-specific human capital (Ickes and Samuelson, 1987). Empirical testing of these arguments is a task for further research.

4.5.3 Export Performance

In the post-Stalin era, the Soviet government had to increasingly rely on imports to satisfy the growing demand of households for consumer goods. Using data from Treml and Kostinsky (1982) and Dohan (1976), Sanchez-Sibony (2015) shows that Soviet trade grew substantially—from below 10% of GDP in the 1950s to about 25% of GDP in the 1980s.⁵⁰ What could the Soviet Union export to pay for the growing imports? Collectivization undermined agricultural productivity so—unlike in pre-Soviet times—Russia no longer had comparative advantage in

⁴⁹The recent empirical studies by Ganguli (2014, 2017) and Borjas and Doran (2012, 2015a,b) analyze the productivity of Soviet mathematicians but focus on the post-Soviet brain drain; thus they are outside the period of our survey.

⁵⁰On Soviet imports in the interwar years, see Shpotov (2013), who provides a history of American business in the Soviet Union in the 1920s and 1930s.

grain. [Sanchez-Sibony \(2015\)](#) documents dramatic problems with the quality of Soviet manufacturing goods, including aircraft. The central monopoly on foreign trade did not provide enterprise managers with incentives to export. Export revenues were appropriated by the Ministry of Trade, while domestic sales—especially of potentially exportable goods—provided enterprise managers with bargaining power vs. their counterparts. [Gaidar \(2007\)](#) and [Gaddy and Ickes \(2013\)](#) argue that the discovery of West Siberian oil in the 1960s and the dramatic growth of global oil prices after 1973 helped pay for the “Red Globalization,” until oil prices declined suddenly in the 1980s.

4.5.4 The Collapse of the Command Economy

The recent literature on the collapse of the Soviet economy is mostly based on insights from the new political economics. [Gaidar \(2007\)](#) argues that the Soviet Union was doomed once Stalin’s terror machine was dismantled: without fear, the government had to provide income growth to ensure political legitimacy. This worked as long as oil prices were high; but once they collapsed in the 1980s, the Soviet Union went bankrupt. [Harrison \(2002\)](#) develops a similar argument, that the Soviet economy was stable when the dictator had a brutal reputation and collapsed once workers learned that the threat of punishment was no longer credible.

In a recent book, [Miller \(2016\)](#) explores Gorbachev’s attempts to reform the Soviet economy in its last years, carrying out a more nuanced political analysis by identifying three major interest groups: the defense industry, the energy industry, and agriculture. The author contrasts Gorbachev’s efforts with those of Deng Xiaoping in China. He shows that Gorbachev was keenly aware of Deng’s approach and even tried to follow it. However, the Soviet and Chinese political economies were very different. Unlike Deng, Gorbachev faced powerful vested interests. The power of these interest groups was proven by the fact that Communist hardliners put Gorbachev under house arrest during the 1991 coup, which led to the disintegration of the Soviet Union. These interest groups strongly preferred the status quo (see [Fernandez and Rodrik, 1991](#)) and blocked many reform efforts.

[Guriev \(2019\)](#) suggests that Miller’s list of Soviet interest groups is incomplete. First, there was also the central party apparatus joined by security services, which understood that Deng-like reforms would create an economic base for independent players and thus weaken their hold on power. Second, there were subnational elites that saw who reforms gave them an opportunity to demand independence or, at least, compensation for staying loyal. If the Soviet economy were strong—due to productivity growth or, at least, high oil prices—this political

economy conundrum would be resolved via Coasian bargaining. With cash, Gorbachev would be able to reform the economy, compensate the losers, and gain political support from the future winners. However, economic stagnation and low oil prices ruled out this option. For a few years, Gorbachev maintained his popularity with the median voter by printing money and taking out foreign loans. But hidden inflation resulted in shortages, and excess foreign borrowing led to bankruptcy. The global superpower ceased to exist.

The analyses described above in this section are descriptive. Using the results of Granger causality tests performed on the Soviet macroeconomic series from 1965 to 1992, [Suesse \(2019\)](#) argues that the oil shock is not of first-order importance in explaining the collapse of the Soviet economy in the late 1980s and early 1990s. Instead, other factors, such as failed policies and territorial disintegration, are likely to have played a more important role. [Suesse \(2018\)](#) analyzes the dissolution of the Soviet Union empirically, taking the theoretical model from [Alesina and Spolaore \(2003\)](#) to the data. [Alesina and Spolaore \(2003\)](#) argue that the optimal size of the state is determined by the trade-off between the economies of scale in provision of public goods and heterogeneity of preferences. [Suesse \(2018\)](#) uses data on separatist protests in Soviet regions and shows that larger regions that were more different from the center had more protests per capita. He further explores the correlation between mass protests and separatism of regional elites proxied by the count of secessionist declarations. He shows that the correlation between protests and elite separatism exists but is not causal: once protests are instrumented by temperature shocks, the impact of protests on elite separatism becomes a precisely estimated zero. [Suesse \(2019\)](#) uses republic-level nationalism (proxied by its history) to predict its secessionism in order to explore the secessionism's causal impact on bilateral trade between the republics. He finds that secessionism results in a major decline in trade after the collapse of the Soviet Union and in a deeper output fall in the former republics.

A one-sentence summary of the recent research on the political economy of the Soviet dictatorship is that it documents that the key reason for the slowdown and the eventual collapse of the system was the command economy's inability to provide incentives to individual agents.

5 Persistence and Convergence

In this section, we first discuss recent research on the long-run effects of various historical experiments carried out in the Russian Empire and the Soviet Union. This research finds that historical policies and institutions—such as serfdom, the Pale of Settlement, deportations,

repression, and the top-down allocation of human capital—have lasting effects on today’s outcomes. It also highlights that market forces, external shocks, and the institutional transformation between these historical experiments and the present may substantially attenuate the long-run persistence.

Second, we make use of the only available historical snapshot of interregional distribution of incomes—Markevich’s reconstruction of regional GRP per capita for Russian Empire provinces in 1897—to examine whether the geographic differences in economic development within the Russian Empire have persisted to this date despite the massive relocation of labor and capital during the Soviet era. We find that incomes in different Russian regions have converged in the long-term, though the speed of this convergence has been rather low by international standards.

5.1 Long-Run Consequences of Historical Shocks

Russia has witnessed many large (quasi)-natural historical experiments. In this subsection, we survey the recent literature that analyzes their implications for today’s socioeconomic outcomes. We relate findings of this literature to a broader literature on the long-run consequences of history (see surveys in [Nunn \(2009\)](#) and [Michalopoulos and Papaioannou \(2020a\)](#)).

5.1.1 Institutions

The recent research sheds light on the impact of historical institutions on today’s economic and political outcomes. [Bugle and Nafziger \(2021\)](#) find that greater exposure to serfdom in the past is associated with lower economic well-being today. Using district-level variation in geography of serfdom just prior to emancipation and data on modern household characteristics, they show that per capita consumption in today’s Russia is significantly smaller in areas that had a larger share of serfs. This finding is robust to controlling for modern household characteristics and district-level geographical variables, as well as for fixed effects for historical provinces or modern countries; it is also unlikely to be driven by selection on unobservables. The effect was more pronounced in the areas with a larger share of serfs under the *corvée* system, which allowed serfs less autonomy to engage in nonagricultural activities than the *quitrent* system. The authors also find no evidence of serfdom legacy for modern individual attitudes. They examine such outcomes as generalized trust, xenophobia, institutional preferences, and political participation. They argue that these factors cannot explain the long-term difference in economic development caused by serfdom. Instead, the authors show that less urban agglomeration

in areas with higher shares of serfs, arguably due to historical constraints on labor mobility, created persistent negative economic effects of serfdom. They argue that cultural, ethnic, or racial characteristics of the former serfs could hardly produce this negative effect because, in Russia, serfs largely did not differ from nonserf peasants or landlords in these respects.

These results are somewhat at odds with the studies of the African slave trade or long-run consequences of other forms of forced labor such as the mita system in the Latin American context (e.g., [Nunn \(2008\)](#), [Dell \(2010\)](#), [Acemoglu et al. \(2012\)](#)). Indeed, [Nunn and Wantchekon \(2011\)](#) and [Nunn and Puga \(2012\)](#) find that the slave trade had a persistent negative impact on generalized trust—which in turn results in a lower level of development in today’s Africa. These findings are especially striking because the slave trade was more intensive in places with better geography. Therefore the negative relationship between slave trade and today’s income in Africa is explained by the impact of trust. As shown by [Algan and Cahuc \(2010\)](#), the effect of generalized trust on income is large: if Russia’s historical level of trust between people were as high as Sweden’s, Russia’s per capita income today would be 70% higher. However, low generalized trust in Russia does not seem to be explained by serfdom; as we discuss below, it may have been driven by Soviet legacies. Overall, the interaction between institutions and cultural traits—and the impact of both on modern Russia’s social, economic, and political outcomes—remains an exciting avenue for future research.

5.1.2 Culture

Recent research on Russian economic history has also shown that differences in culture have had persistent long-run effects. Using a natural experiment generated by the quasi-arbitrary border of the Pale of Settlement, the area where Jews were allowed to live in the Russian Empire, [Grosfeld et al. \(2013\)](#) study how group diversity intertwined with group animosity can affect the emergence of certain cultural traits, which, in turn, can have a persistent effect on economic and political outcomes. The authors explore the discontinuity at the border of the Pale (which does not coincide with the borders of modern countries, or even with subnational regions) and show that anti-Semitism of the non-Jewish majority contributed to their self-identification in opposition to what a stereotypical Jew represented in their eyes, i.e., a person engaged in nonagricultural and market activities. This led to creation of a persistent antimarket culture and bonding trust among non-Jews in areas where Jews and non-Jews coexisted in the Russian Empire. Today, there is virtually no Jewish population in the Pale. However, current residents of the Pale have lower support for market institutions and are less

entrepreneurial compared to those outside the Pale. Moreover, antimarket attitudes and trust decrease with distance to pogroms, controlling for historical Jewish presence. The authors find no effect of the Pale on such economic outcomes as consumption, income, or education levels, but the Pale does affect entrepreneurship rates, which are related to self-identification.

Similarly, [Grosfeld and Zhuravskaya \(2015\)](#) test for the long-term persistence of a number of economic and cultural variables using the Partitions of Poland among three European empires, including the Russian Empire. Again, they explore the discontinuity at the (plausibly exogenous) Partition borders and show that differences in incomes, industrial production, education, corruption, and trust in government institutions disappeared over time, as they were smoothed by economic forces and policy interventions. In contrast, differences in intensity of religious practices and in democratic capital—the set of beliefs in the importance of democratic values ([Persson and Tabellini, 2009](#))—persisted.

Using district-level data from the 1897 Imperial Census and modern outcomes, [Lankina and Libman \(2021\)](#) document a correlation between the historical prevalence of the Imperial social class of *meshchane*, which comprised various categories of townspeople such as craftsmen, petty traders, low-level white-collar workers, and homeowners—whom the authors interpret as a proxy for the middle class before 1917—and the post-Communist democratic competitiveness and media freedom.⁵¹ They also find that the presence of *meshchane* in the Russian Empire is positively associated with contemporary education levels and modern entrepreneurship.

[Castaneda Dower and Markevich \(2014\)](#) show persistence in spatial patterns of attitudes toward private property in Eastern Europe over the 20th century. They find a positive correlation between the intensity of peasant resistance to land privatization during the Stolypin reform in the early 20th century and the prevalence of support for state ownership today. The authors argue that cultural differences deeply rooted in the past could explain some but not all of these patterns. In particular, they find a positive correlation between negative experiences with the implementation of the Stolypin reform and beliefs on the procedural unfairness of the privatization in the 1990s. They argue that this is likely due to a direct effect of privatization-related conflicts in the past on attitudes toward how recent privatization was conducted.

5.1.3 Legacies of Policy Interventions: Human Capital

Massive top-down policy interventions can drastically change the trajectory of economic development. Soviet central planners carried out a number of such experiments, most of which

⁵¹[Smith \(2014\)](#) provides a historical study tracing the continuity and the changes in the imperial class system (or so-called estate system, *sosloviya*), including the *meshchane* class, over the 19th century.

would be unthinkable in market economies.

Ivanov (2016) studies the legacy of geographical allocation of human capital in the Soviet Union. This allocation was driven by considerations that were arguably orthogonal to those of a market economy. Yet, the location of post-Soviet human-capital-intensive production turns out to be strongly correlated with Soviet legacies. In particular, regions with more R&D personnel inherited from the Soviet era performed better after 1991 in terms of development of knowledge-intensive business services such as engineering and IT. The author argues that geographical economies of scale and scope common in human-capital accumulation result in persistence—even if the initial locations were chosen due to considerations that are no longer relevant.

Schweiger et al. (forthcoming) study the legacy of a particular Soviet policy of human-capital allocation, the so called “science cities.” The government established these for specific technological purposes, mostly driven by military considerations. Again, these are likely to be orthogonal to the factors driving allocation of human capital in a market economy. During the Soviet times, these cities received various subsidies and preferential treatments—which were lost after the collapse of the Soviet Union. The authors match science cities and other localities with similar characteristics at the time of the designation of science-city status. They find that Soviet-era science cities still employ more high-skilled workers and are more innovative and productive; there is little or no evidence of reversion to the mean.

5.1.4 The Legacies of Soviet Repressions and Deportations

As we discussed in Sections 2 and 4, the Soviet regime relied extensively on repression and coercion, especially under Stalin. These policies shaped the economic and political environment in the Soviet Union and continue to affect individual behavior in the post-Soviet states. While the repression and deportations have major implications for today’s human capital and culture, we survey the research on those in this separate section—rather than in the two previous sections—as these unprecedented repressions were a unique Soviet experience.

The Soviet government widely used forced labor to radically transform the economy. Mikhailova (2012) documents that cities located closer to Gulag camps grew significantly faster than similar cities without forced labor camps. To account for the other variables’ effects on city growth, the author uses matching. She finds that World War I shocks also affected development of Soviet urban settlements but, in contrast to the Gulag effect, the effects of WWII were short-lived: exposure to the front line and to evacuation affected city growth, but

these effects disappeared completely in 25 years. Note that the author’s results are different from those in [Acemoglu et al. \(2011\)](#), who find that the persecution of Jews during WWII has had persistent effects: localities with greater exposure to the Holocaust have worse economic outcomes, even today.

As the choice of Gulag camp locations could potentially be endogenous, [Vezina and Toews \(2020\)](#) explore variation within populations of prisoners—differentiating between political prisoners and common criminals. They argue that Soviet officials did not strategically place political prisoners in particular camps. In the long run, this quasi-random allocation has important consequences: within the Gulag system, areas with a larger share of political prisoners are more prosperous today relative to areas with a larger share of criminal convicts. The authors hypothesize that this is due to the higher human capital of political prisoners who were relocated to camps by force. They also provide evidence on persistence on human-capital formation across generations: modern descendants of political prisoners are more likely to be tertiary educated, and they outmigrated less often from the former exile settlements than other citizens. These findings are in line with those from [Chen et al. \(2020\)](#), who show that forced resettlement of 16 million urban youth to the countryside during China’s Cultural Revolution raised the education level of rural children in the receiving villages. The effect persisted even after the resettled youth left; the cohorts exposed to the “sent-down” youth grew up with higher probability to choose a skilled occupation.

Deportations also affected human capital via attitudes and beliefs. [Becker et al. \(2020\)](#) explore unique historical setting of mass resettlement of Poles in the middle of the 1940s from the eastern territories of interwar Poland, which became a part of the Soviet Union after WWII, to the western territories acquired by Poland from Germany. Prewar data demonstrate a relatively low level of development of the eastern Poland in terms of literacy. In contrast, cross-sectional analysis of individual educational attainment today shows that descendants of forced migrants have one extra year of schooling. The indiscriminate forced migration setting allows one to rule out endogenous selection of migrants. The authors also provide evidence consistent with the following mechanism: the deportees experienced a shift in preferences from material possessions toward investment in human capital, arguably driven by the devastating experience of forced migration.

[Charnysh \(2019\)](#) argues that the heterogeneity within resettlements mattered for local economic development. Using the context of post-WWII population transfers in Poland, she documents that municipalities in the formerly German territories that were more homogeneous

in terms of resellers' origins were initially more successful in local public goods provision via informal channels whereas, heterogeneous migrant communities relied more on public goods provision by the state. However, the heterogeneous migrant communities demonstrated better economic outcomes during the Polish transition to a market economy in the 1990s. She argues that a higher demand for state interventions in heterogeneous communities contributed to the accumulation of state capacity that eventually contributed to economic success.

[Nikolova et al. \(2019\)](#) find a relationship between Soviet repression and today's attitudes and beliefs. Using a modern survey and historical location of Soviet labor camps, they show that individuals in localities closer to the historical camps have lower levels of institutional and social trust nowadays. [Ananyev and Poyker \(2021\)](#) find that the exposure to a mass of former Gulag prisoners after they were released following Stalin's death is positively associated with homophobic sentiments in modern Russia. They argue that an antigay masculine prison culture is behind this effect.

[Miho et al. \(2021\)](#) present evidence that deportations not only affect preferences of victims and their descendants but also led to a diffusion of cultural traits across groups that were exposed to the victims. Stalin's ethnic deportations during WWII resulted in a transmission of gender norms from the deportees—the majority of whom were Germans and Chechens—to the locals that led to changes in attitudes and behavior of the latter. Interestingly, gender equality norms diffused more than gender discrimination norms. Again, as Stalin's ethnic deportations were indiscriminate and affected all members of target ethnicities, there is no concern of endogenous selection of migrants. The authors' identification is based on the fact that the allocation of ethnicities across destinations was arguably exogenous and did not correlate with the gender norms of the natives or other characteristics of the destination locations. They provide an extensive set of balancing tests to support their identification strategy.

Stalin's repression policy casts a long shadow on today's political outcomes as well. [Kapelko and Markevich \(2016\)](#) document a negative association between the geography of the Gulag archipelago and voting for the Communists after 1991 at the district level. Similarly, [Talibova and Zhukov \(2018\)](#) show systematically lower election turnout in post-Soviet times in areas that suffered a higher level of repression under Stalin. In addition to cross-sectional regressions, they show that their results hold if one instruments terror with travel distance to Soviet labor camps. [Rozenas et al. \(2017\)](#) explore Stalin's violence in western Ukraine and show that greater repression in 1940 is associated with lower vote shares for pro-Russian parties today.

5.2 Persistence of Geographical Differences and Convergence

As the literature that we reviewed in the previous subsection shows, historical shocks have affected modern political and economic outcomes, as well as culture, human capital, and institutions of modern states located in the territory of the Russian Empire. Many of these shocks took place during Soviet rule. In a “normal” geographically large and diverse country that did not go through a Communist experiment, one could expect geographical differences in the level of development to persist over centuries. In the Russian Empire, despite its vast size and large initial differences in the level of development across provinces, it is not clear *ex ante* whether such persistence should prevail over the multitude of historical shocks and interventions. On the one hand, the forced mass geographical reallocation of labor and capital (e.g., Hill and Gaddy, 2003; Mikhailova, 2004) must have had a significant effect on the geographical distribution of incomes. On the other hand, as Gregory (2003) demonstrates, during the Soviet regime, industrial composition actually changed rather slowly. Moreover, as we discussed in Section 4, Soviet planners developed plans based on past performance, which may have resulted in the Soviet planning system mechanically reproducing the existing patterns of economic development.

We empirically test whether the levels of per capita incomes across Russian Empire provinces have any predictive power for the modern level of development of the same areas by comparing two cross-sections of regional per capita incomes in 1897 and in modern times. In particular, we use the historical estimates of regional income per capita across all 97 provinces of the Russian Empire in 1897, reconstructed by Markevich (2019). This reconstruction provides the largest geographical coverage (for example, it covers Polish and Finnish provinces of the empire as well as Siberia, Central Asia, and the Caucasus). We merge them to the 2014 regional per capita incomes from the official statistics on gross regional product at the subnational level in the modern countries of Estonia, Finland, Latvia, and Lithuania, as well as for Belarus, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, Ukraine, and Uzbekistan, where subnational regions are called *oblasts*, and for Poland, where subnational regions are called *województvos*. We supplement these figures by the official national per capita GDP figures for Armenia, Azerbaijan, Georgia, Moldova, and Turkmenistan.⁵² To overcome the problem

⁵²We derive these figures from the official webpages of national statistical offices. Armenia: Statistical Committee of the Republic of Armenia, <http://www.armstat.am/en/>; Azerbaijan: The State Statistical Committee of the Republic of Azerbaijan, <https://www.stat.gov.az/?lang=en>, Artsakh Republic National Statistical Service, <http://stat-nkr.am/en>; Belarus: National Statistical portal of the Republic of Belarus, <http://www.belstat.gov.by/en/>; Estonia, Finland, Latvia, Lithuania, Poland, Russia: OECD Regional Statistics and Indicators database, https://stats.oecd.org/Index.aspx?DataSetCode=REGION_ECONOM; Georgia:

of the changes in administrative borders, we reestimate modern regional incomes in historical boundaries using the area overlap criterion.⁵³

Ideally, to test separately for the impact of WWII and Soviet policies during and after Stalin, one should compare the 1897 spatial distribution of development with a cross-section measured right after Stalin’s industrialization and WWII, i.e., around the mid 1950s, and another one on the eve of the collapse of the Soviet empire, i.e., in 1985 or 1989. However, to the best of our knowledge, there is no reconstruction of the spatial distribution of incomes before the collapse of the Soviet Union for any date except 1897.⁵⁴ This important work is still to be done. Thus, we can only compare the estimates of per capita incomes for two cross-sections at the end of the 19th century and in modern times, i.e., more than two decades after the fall of the Soviet Union. Figure 3 visualizes this comparison. It presents the scatterplots of the estimates of log per capita GRP in 1897 and 2014 across areas within the borders of the Russian Empire provinces. Panel A uses all 97 provinces, whereas Panel B focuses on the 41 provinces that belong to post-Soviet Russia. Though the breakup of the Soviet Union could be an endogenous outcome of the long-run historical processes, one could argue that, after the dissolution of the Soviet Union, the former Soviet republics took different development paths converging toward those typical of each post-Communist state’s neighborhood, driven by modern geopolitical and economic forces (Shleifer and Treisman, 2014). This is why, in addition to the full sample, we report the results for the subsample of regions that used to be in Russia and today remain in Russia. Regardless of which sample we use, we find that the level of development in 1897 has little predictive power for the level of development today. To make sure that this absence of persistence is not driven by regions that were not populated before the Soviet policy of development of the remote regions in the East and the North, we first illustrate the relative population size of each province as of 1897 with the size of the circles and, second, we present the best linear fit in a bivariate relationship, both with and without 1897

National Statistics Office of Georgia, <https://www.geostat.ge/en/modules/categories/22/national-accounts>; State Statistical Agency of Abkhazia republic, <http://ugsra.org/>; Kazakhstan: Committee on Statistics at the Ministry of National Economy, <https://stat.gov.kz>; Kyrgyzstan: National Statistical Committee of the Kyrgyz Republic, <http://stat.kg/en/>; Moldova: National Bureau of Statistics of the Republic of Moldova, <http://www.statistica.md/index.php?l=en>; Tajikistan: Agency of Statistics under President of the Republic of Tajikistan, <http://www.stat.tj/en/>; Ukraine: State Statistics Service of Ukraine, <http://www.ukrstat.gov.ua/>; Uzbekistan: State Committee of the Republic of Uzbekistan on Statistics, <https://www.stat.uz/en/>. All accessed November 10, 2021.

⁵³We sum up modern figures of corresponding geographical units over each historical province with shares of the corresponding province in 1897 borders belonging to modern units as weights. To estimate weights, we use a modern administrative map and the 1897 historical map from Kessler and Markevich (2020).

⁵⁴For the 1990s, there are many gaps in national accounting in the newly independent states in the outskirts of the former Soviet Union.

population weights. We find that, if anything, weighting by Imperial population size makes the relationship even flatter. The R-squared is below 10% without weights and below 1% with 1897 population weights in both samples.

Columns 1 and 2 of Table 2 present the corresponding regression results for the specification without population weights with an adjustment of standard errors for spatial correlation within 2,000 km using Conley (1999) correction.⁵⁵ The coefficients on the 1897 per capita income in a bivariate log-linear regression that considers the 2014 per capita income as the outcome variable are small and statistically insignificant, both in the full sample and in the sample restricted to provinces that belong to post-Soviet Russia.⁵⁶

In Column 3, we test whether this absence of overall persistence in the geographical pattern of the level of development could be a result of a measurement error arising from merging different administrative units that are 125 years apart. To check this, we add the share of serfs before emancipation, i.e., as of 1858, taken from Markevich (2019) as an additional covariate.⁵⁷ The coefficient on the share of serfs is negative and highly statistically significant, confirming the results of the previous literature about the negative long-term effects of serfdom on Russia’s development (Bugge and Nafziger, 2021). If the measurement error in matching provinces of the Russian Empire to modern-day subnational regions was too high, the results of the long-term legacy of serfdom would have been attenuated. Thus, we conclude that the revolutions, the civil war, Soviet industrialization, WWII, Soviet attempts to develop the periphery, and the transition experience after the collapse of the Soviet Union erased the legacy of the differences in the level of development that existed 125 years ago. However, all these shocks were not sufficient to break the long-term negative effect of the institution of serfdom.

Is the absence of the correlation between the geographical distribution of the levels of per capita income in 1897 and 2014 driven by random shocks to the level of regional development,

⁵⁵The mean province width in our sample is slightly less than 450 km.

⁵⁶To abstract from the influence of a potential change in dispersion, we also perform a nonparametric rank correlation test. In both samples, the magnitude of the rank correlation is small in magnitude. It is statistically significant at the 5% level in the full sample and insignificant in the Russia-only sample. In the full sample, the Spearman’s ρ equals 0.23 and the Kendall’s τ is 0.15; in the Russia subsample, the magnitude of the rank correlation is even smaller: $\rho = 0.14$ and $\tau = 0.09$. These results confirm that the persistence of geographical distribution of incomes overall is small.

⁵⁷Markevich and Zhuravskaya (2018) and Bugge and Nafziger (2021) find that, within European Russia, the share of serfs before emancipation was negatively correlated with the distance from Moscow. Our sample is larger, as it covers the whole of the Russian Empire. We find that in our sample the share of serfs before emancipation was negatively correlated with the province’s longitude and has no relationship with its latitude. All coefficients in Column 3 of Table 2 preserve their signs, magnitudes, and statistical significance if we add this additional control to the list of covariates. As discussed by Bugge and Nafziger (2021), there could also be other observable and unobservable correlates of the prevalence of serfdom, which could drive these cross-sectional results. This is an important caveat for interpreting these results.

or can it be explained by the economic convergence due to the faster growth of initially poorer areas? It is not an obvious question, as the 1897 cross-section captures Russia at the moment of industrial take-off, when only a limited number of regions were affected by modern economic growth. At the same time, one could expect to observe some convergence, as the Soviet government’s egalitarian preferences should have guided the central planner’s capital investments into the relatively underdeveloped regions (Markevich and Mikhailova, 2013).

We shed light on this question with a simple convergence exercise. Figure 4 presents the scatterplots of the bivariate cross-province relationship between the average annual growth rate between 1897 and 2014 and the logarithm of the 1897 per capita income. The figure has a similar structure to Figure 3: two panels present results for all of the Russian Empire and for the subsample of provinces that belong to post-Soviet Russia; the size of the circles illustrates the initial population, and the two lines indicate the best linear prediction with and without population weights. Regardless of the sample and weights, we find a negative relationship, which is, if anything, stronger in specification with population weights. In the full sample, R-squared is 17% without weights and 28% with weights; in the Russia-only sample, the initial level of development explains 32% of the variation in regional growth rates over the following century if one does not weight by initial population size, and 54% if one uses the population weights.

Columns 4 and 5 of Table 2 present the regression results of the test of convergence for the specification without population weights and with Conley correction, as above. We regress the average annual growth rate in per capita GRP between 1897 and 2014 across Russian Empire provinces on the initial 1897 level of development. Column 4 considers all provinces, and Column 5 considers only provinces in post-Soviet Russia. The coefficient on the initial 1897 log income per capita is negative and statistically significant in both samples. Thus, we find significant evidence of convergence in economic development: poor areas on average grew significantly faster than rich areas over the past century in both samples.⁵⁸

To compare the speed of convergence with other convergence studies, we follow Barro and Sala-i Martin (1992) and use nonlinear least squares to estimate the rate of convergence. To be precise, we estimate the coefficient β in the following equation:

$$\frac{1}{T} \log(GRP_{it}/GRP_{it-T}) = \alpha - \frac{1 - e^{\beta T}}{T} \log(GRP_{it-T}) + \varepsilon_{it}, \quad (1)$$

⁵⁸In Column 6, we verify that the legacy of serfdom, discovered by Buggle and Nafziger (2021) and present in our data, does not substantially change in magnitude of the coefficient on the regional income per capita in 1897. These results also hold if we add the longitude of the province as an additional control.

where GRP_{it} and GRP_{it-T} are the gross regional products per capita in province i in year t and $t - T$, respectively. α is the intercept and β is the parameter indicating the rate of β -convergence.

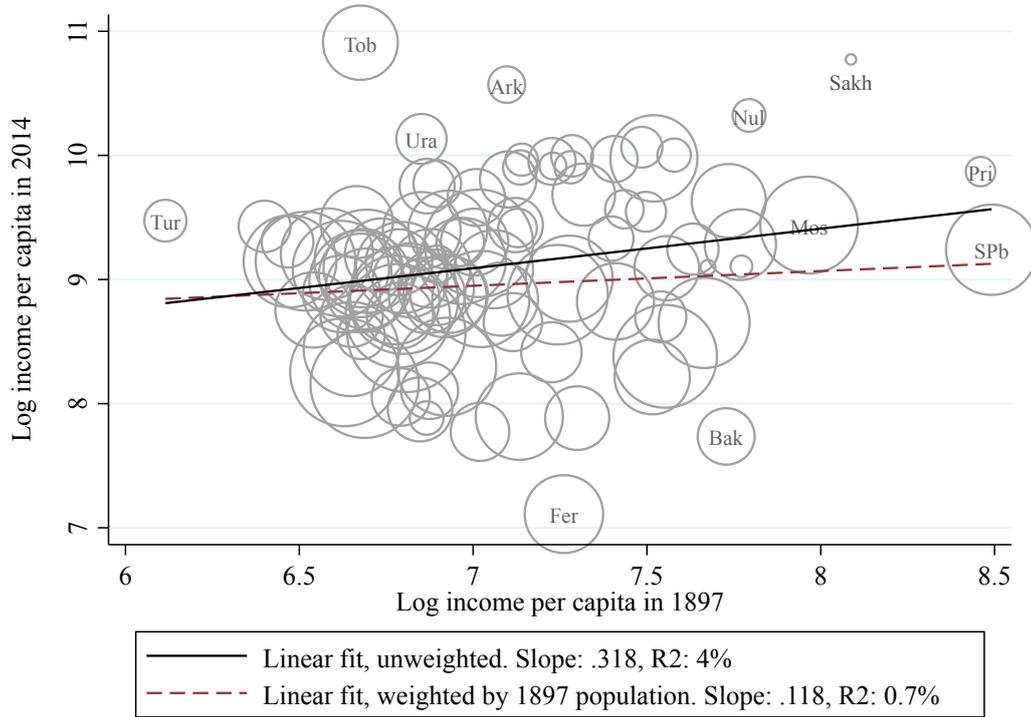
We report the results of the estimation in the bottom row of Table 2. The estimates of β are statistically significant and similar in magnitude in both samples. The rate of β -convergence is about 1%. Though the Russian Empire had a relatively high level of inequality in incomes per capita across provinces, the rate of convergence equals only to one-half of the 2% rate that Barro and Sala-i Martin (1992) found for the United States in the 20th century. Regions in Sweden, which in terms of the initial level of income per capita in the late 19th century was closer to the Russian Empire than to the United States, demonstrated an even higher convergence rate of about 4% (Persson, 1997).⁵⁹

Overall, these results imply that the drastic economic, social, and political experimentation that took place in Russia during the Soviet period of Russia's history has played a significant role in breaking the persistence of the interregional differentials in the levels of development between today and the late 19th century. As we discuss in the previous subsection, this experimentation, in turn, has left its own long-lasting effects. Our results suggest that some of this effect could have contributed toward equalization of incomes across territories. Yet, to test this proposition formally, one needs to reconstruct a cross-section of regional incomes for the Soviet Union before 1991: the positive convergence which we observe could have occurred both before and after the fall of the Soviet Union. However, despite their gravity, the Soviet shocks to the level of development have not erased the shadow of the key institution of the Russian Empire, serfdom.

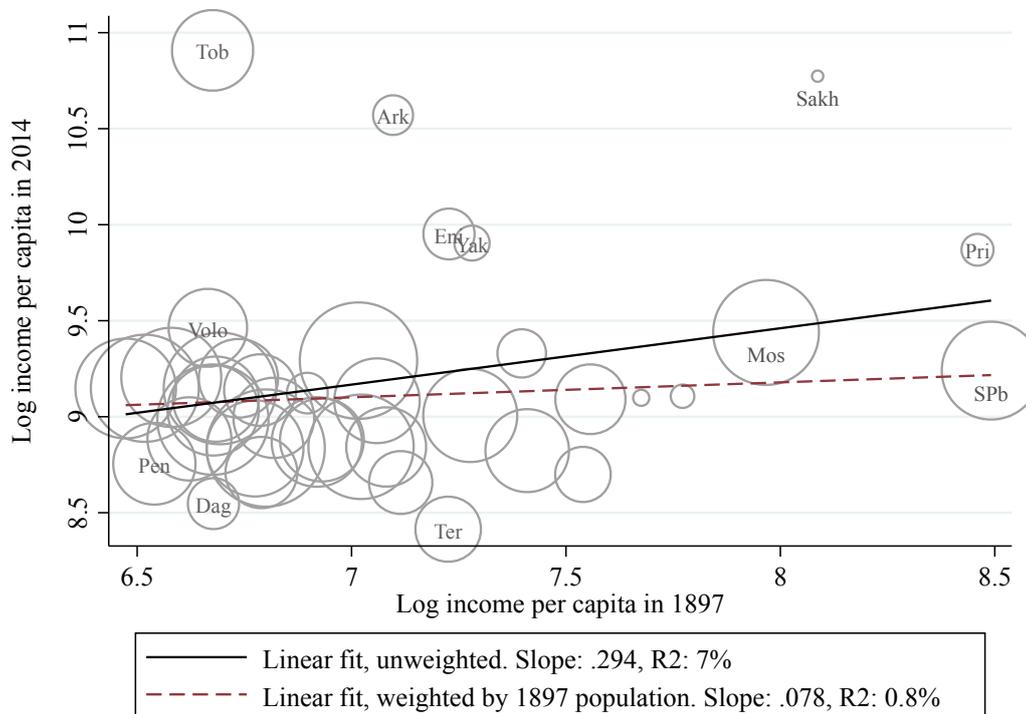
⁵⁹We have also tested for and found no evidence of the sigma-convergence in Russia. The standard deviations of log GRP per capita are 0.44 in 1897 and 0.69 in 2014.

Figure 3: The Test of Persistence of Geographical Differences in the Level of Development, 1897–2014

Panel A. Sample: All Provinces of the Russian Empire



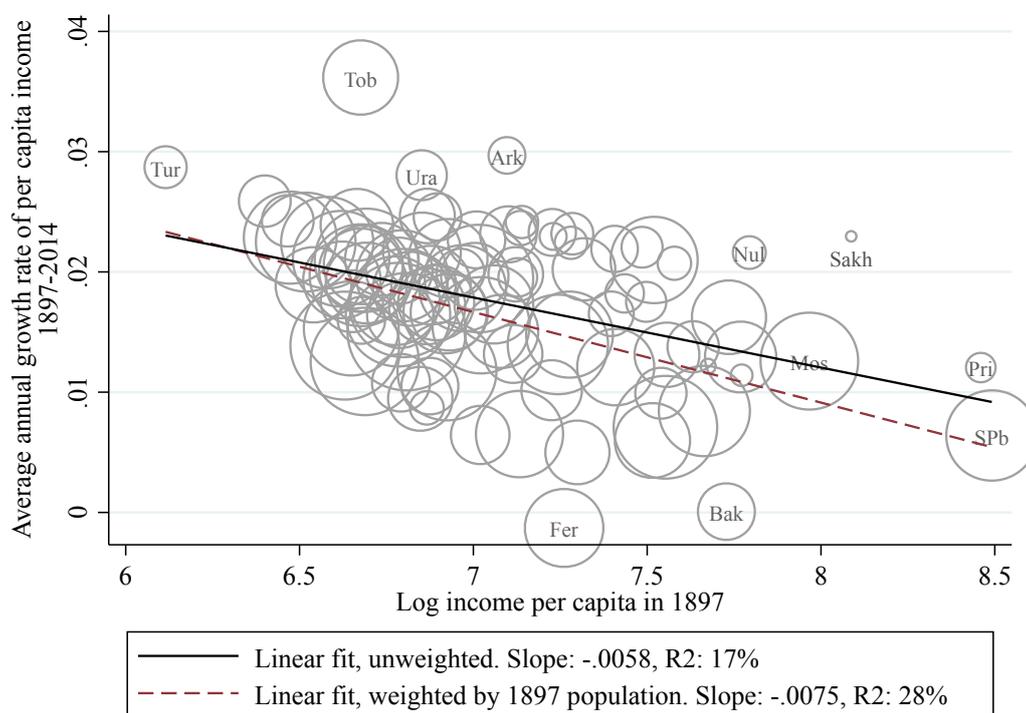
Panel B. Sample: Provinces of the Russian Empire That Belonged to Russia in 2014



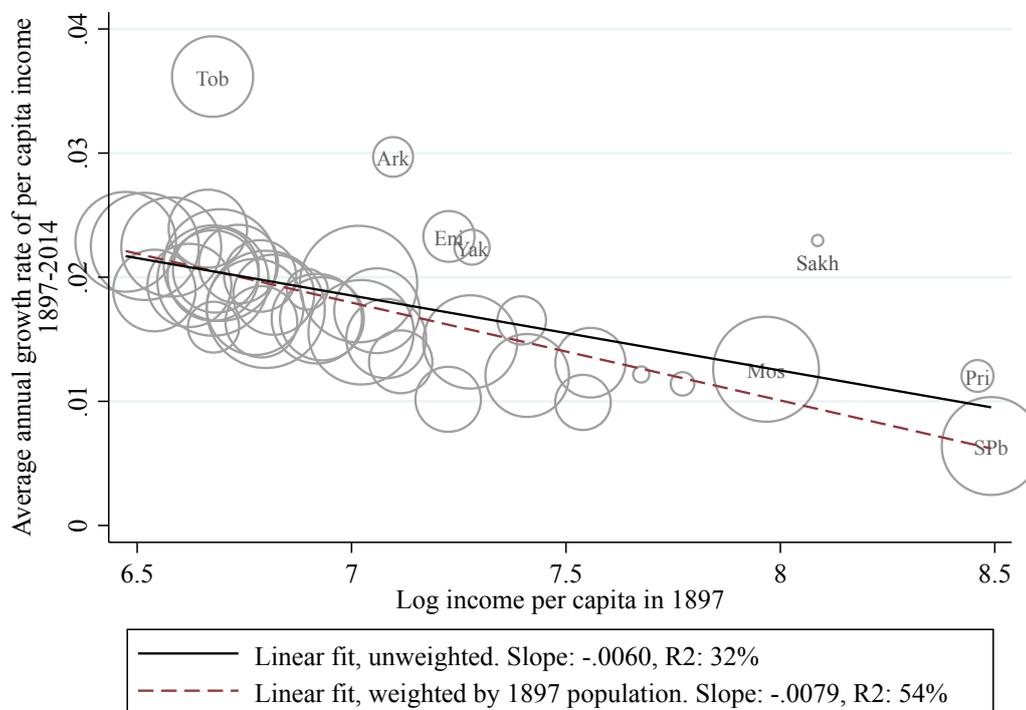
Note: Scatterplot of the two cross-sections of the log GRP per capita, measured in 1897 and in 2014, both expressed in 1990 USD. Sample in Panel A: all 97 provinces of the Russian Empire. Sample in Panel B: 41 provinces that were in Russia as of 2014. The size of the circle represents the 1897 population of each province. Marked provinces: Ark – Arkhangelskaya; Bak – Bakinskaya; Dag – Dagestanskaya; Eni – Enisejskaya; Fer – Ferganskaya; Mos – Moscovskaya; Nul – Nyulandskaya; Pen – Penzenskaya; Pri – Primorskaya; Sakh – Sakhalin; SPb – Sankt-Peterburgskaya; Ter – Terskaya; Tob – Tobolskaya; Tur – Turgajskaya; Ura – Uralskaya; Yak – Yakutskaya.

Figure 4: The Test of Income Convergence, 1897–2014

Panel A. Sample: All Provinces of the Russian Empire



Panel B. Sample: Provinces of the Russian Empire That Belonged to Russia in 2014



Note: Scatterplot of the annual growth rates in 1897–2014 and log GRP per capita in 1897 in 1990 USD. Sample in Panel A: all 97 provinces of the Russian Empire. Sample in Panel B: 41 provinces that were in Russia as of 2014. The size of the circle represents the 1897 population of each province. Marked provinces: Ark – Arkhangelskaya; Bak – Bakinskaya; Eni – Enisejskaya; Fer – Ferganskaya; Mos – Moscovskaya; Nul – Nyulandskaya; Pri – Primorskaya; Sakh – Sakhalin; SPb – Sankt-Peterburgskaya; Tob – Tobolskaya; Tur – Turgajskaya; Ura – Uralskaya; Yak – Yakutskaya.

Table 2: Geographical Persistence of the Level of Development and Income Convergence Across Provinces of the Former Russian Empire, 1897–2014

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
	Log income per capita, 2014			Annual growth rate, 1897–2014		
Sample, Empire provinces:	All	Post-Soviet Russia	All	All	Post-Soviet Russia	All
Log income per capita, 1897	0.318 (0.208)	0.294 (0.191)	0.195 (0.139)	-0.0058*** (0.002)	-0.0060*** (0.002)	-0.0069*** (0.001)
Share of serfs, 1858			-0.790*** (0.303)			-0.0067*** (0.003)
Constant	6.86*** (1.42)	7.11*** (1.32)	7.89*** (0.97)	0.0587*** (0.012)	0.0608*** (0.011)	0.0675*** (0.008)
Observations	97	41	97	97	41	97
R-squared	0.041	0.074	0.110	0.165	0.317	0.225
Mean, dependent variable	9.118	9.194	9.118	0.0174	0.0180	0.0174
St. Dev., log income p. c., 1897	0.437	0.512	0.437	0.437	0.512	0.437
Rate of β -convergence				0.0098** [0.0042]	0.0105** [0.0048]	

Note: Data on the 1897 income per capita and the share of serfs is from [Markevich \(2019\)](#). Modern regional incomes are from official national statistics; they are reestimated in historical boundaries as discussed in the text. The standard errors in parentheses are adjusted for spatial correlation within a 2,000 km radius of each province’s centeroid ([Conley, 1999](#)). The standard errors for the rate of β -convergence presented in brackets are not adjusted for spatial correlation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

6 Concluding Remarks and Open Research Questions

Russia’s economic history provides important lessons for political economy and economic development. Many dramatic institutional and policy experiments that took place in Russia over the past two centuries are unique in global history and therefore provide invaluable insights.

Having benefited from the previously unavailable data and the use of modern empirical methods, the recent research into Russian economic history sheds new light on the long-lasting debate on the causes of the Great Divergence in economic development between Western Europe and the rest of the world (e.g., [Landes, 1998](#); [Pomeranz, 2000](#); [Acemoglu and Robinson, 2012](#); [Broadberry and Fouquet, 2015](#)). As applied to Russia, earlier literature mostly emphasized the role of institutions in national development ([Domar, 1970](#); [Gerschenkron, 1965](#)). The new literature formally tests the conjectures formulated in these classic studies and confirms the important role of institutions in the relatively low level of economic development of the Russian Empire, highlighting a causal negative effect of serfdom, peasant communes, and excessive regulatory barriers.

New studies of the Soviet command system provide useful insights on the functioning

of large hierarchies and the political economy of nondemocratic regimes. They quantify the inefficiencies in resource allocation in the command economy and highlight the severity of the principal-agent problem in the command economy. The concentration of power in the hands of the dictator and the extensive use of coercion did not solve these problems. With novel data and advanced empirical methodology, the recent literature also shows that, in contrast to conventional wisdom, Stalin's industrialization did not do better economically than the extrapolation of the imperial trend or comparator market economies, despite the enormous human costs during Stalin's Big Push.

The recent research also studies the long-run consequences of the many quasi-natural historical and policy experiments, such as central planning and command allocation of resources, forced collectivization, industrialization, mass repressions and deportations during the Soviet period, border changes, top-down imposition of values and norms, and devastating wars. The results strongly support the view that history casts long shadows (Nunn, 2009; Michalopoulos and Papaioannou, 2020b). This is especially true for historical events that shaped cultural traits, institutions, and human capital, while the effects of WWII were overcome in about 25 years. In terms of comparative importance of the various historical periods, the Soviet period, when decision-making was often unrelated to supply and demand forces, generated an especially large number of shocks that continue to influence the behavior of economic agents and the institutional environment in modern Russia and other former Soviet republics. Serfdom, abolished half a century before the Soviet period, also remains an important impediment to growth even 150 years since emancipation, despite the shocks that occurred during the Soviet era.

Despite the substantial progress made in recent studies, many open questions remain. Here we list our five most important avenues for further research.

First, while recent research provides multiple insights on the impact of political and economic shocks on culture and human capital, less research has been done on the implications of these changes for economic development. Similarly, the literature on the role of geography in economic growth is rather limited in application to Russia. There are few studies on economic history of the periphery of the Russian and Soviet empires, such as the Baltics, the Caucasus, Central Asia, Siberia, and the Far East.

Second, many historical institutions that could have an important impact on economic development are still waiting for a rigorous empirical evaluation. This applies to the *artel*, a cooperative association of craftsmen living and working together, small credit cooperatives, and

other financial institutions (e.g., commercial banks, city banks, pawn shops), the institutions of local governance such as rural societies (*selskie obshchestva*), governing bodies at the level of townships (*volosti*), district and provincial boards of peasant affairs, and the land captains, as well as associations of various social classes (*soslovie*), the personal property institution in the Communist state, the informal institution of private connections in the shortage economy, and many others. Many important questions about the origins and persistence of these institutions are also still to be answered.

Third, recent literature has demonstrated that the Soviet government used coercion to reach both political and economic goals. However, our knowledge of the exact objectives, mechanisms of pursuing them, and the results, i.e., whether repression enhanced or constrained the realization of the regime's goals, remains relatively limited. We also do not know much about the political economy of propaganda and censorship in the Soviet context—in particular, whether propaganda and coercion were substitutes or complements in the dictator's toolkit. Further explorations in this direction should yield useful insights on the functioning of autocratic regimes.

Fourth, research on late-Soviet economic stagnation remains rather limited. Both old and new theoretical and descriptive studies argue that the most likely cause of the stagnation and subsequent bankruptcy of the Soviet Union was the lack of reform and the failure to provide incentives for innovation and productivity growth. However, there is a dearth of empirical studies that would document the causes of the failure to adopt and diffuse new technology. There is no quantitative research into Soviet R&D and innovation using disaggregated firm-level or inventor-level data.

Fifth, while there is substantial evidence on the importance of foreign trade in all periods of Russian history, including the Soviet period, the existing literature is mostly descriptive. There is a clear need for quantitative evidence on the integration of Russia into the global economy. Furthermore, the role of Russia's transportation and communication infrastructure, e.g., navigable rivers, canals, railroads, telegraph, telephone, roadways, for its domestic and international trade and more broadly for economic development remains unexplored. The recent papers on railroad development demonstrate their importance for the integration of factor and product markets in such large economies as the United States and India ([Donaldson and Hornbeck, 2016](#); [Donaldson, 2018](#)). There are no such studies on either Imperial or Soviet Russia.

In an addition to these five known unknowns, there must be many more unknown un-

knowns. New insights could be drawn from the unexplored data that the Russian archives must contain. The Russian Empire kept excellent statistical records at the national level and at the lower levels (province, district, city, etc.), in the second half of the 19th century and the early 20th century. During that period, Russian statisticians followed the Western European norms of bookkeeping. This makes the Russian Empire a unique example of developing country with a developed-country quality of statistics, a trove that is waiting to be studied by a new generation of historians and social scientists. The Soviet archives are also underexplored. The Soviet Union was a bureaucratic state where officials had to document everything they did. Though they did not publish what they gathered, these state-collected figures and reports do exist and either are or will eventually be available in the archives. With the new, much-improved methods of text-as-data analysis, the reports of Soviet bureaucrats should become an important source of data and ideas for future research.

References

- Abramitzky, Ran**, “Economics and the Modern Economic Historian,” *Journal of Economic History*, 2015, 75 (4), 1240–1251.
- Acemoglu, D., T. Hassan, and J. Robinson**, “Social Structure and Development: A Legacy of the Holocaust in Russia,” *The Quarterly Journal of Economics*, 2011, 126, 895–946.
- Acemoglu, Daron and James A. Robinson**, *Economic Origins of Dictatorship and Democracy*, New York: Cambridge University Press, 2005.
- and –, *Why Nations fail: The Origins of Power, Prosperity, and Poverty*, New York: Crown Publishing Group, 2012.
- , **Camilo García-Jimeno, and James A. Robinson**, “Finding Eldorado: Slavery and long-run development in Colombia,” *Journal of Comparative Economics*, 2012, 40, 534–564.
- Adamopoulos, Tasso, Loren Brandt, Jessica Leight, and Diego Restuccia**, “Misallocation, Selection, and Productivity: A Quantitative Analysis with Micro Data from China,” *Econometrica*, forthcoming.
- Afontsev, Sergey, Gijs Kessler, Andrei Markevich, Victoria Tyazhelnikova, and Timur Valetov**, “The Urban Household in Russia and the Soviet Union, 1900-2000. Patterns of Family Formation in a Turbulent Century,” *The History of the Family*, 2008, 13, 178–194.
- Aghion, Philippe and Peter Howitt**, “A Model of Growth Through Creative Destruction,” *Econometrica*, 1992, 60 (2), 323–351.
- , **Sergei Guriev, and Kangchul Jo**, “Chaebols and firm dynamics in Korea,” *Economic Policy*, forthcoming.
- , **Ufuk Akcigit, and Peter Howitt**, “What Do We Learn From Schumpeterian Growth Theory?,” Technical Report 18824, NBER 2014. Working paper.
- Aldashev, Gani and Catherine Guirking**, “Deadly anchor: Gender bias under Russian colonization of Kazakhstan,” *Explorations in Economic History*, 2012, 49, 399–422.
- and –, “Clans and Ploughs: Traditional Institutions and Production Decisions of Kazakhs under Russian Colonial Settlement,” *Journal of Economic History*, 2016, 76 (1), 76–108.
- and –, “Colonization and changing social structure: Evidence from Kazakhstan,” *Journal of Development Economics*, 2017, 127, 413–430.
- Alesina, Alberto and Enrico Spolaore**, *The Size of Nations*, Cambridge, MA: MIT Press, 2003.
- Algan, Yann and Pierre Cahuc**, “Inherited Trust and Growth,” *American Economic Review*, 2010, 100 (5), 2060–92.
- Allen, R.C.**, “The great divergence in European wages and prices from the middle ages to the first world war,” *Explorations in Economic History*, 2001, 38 (4), 411–47.
- Allen, Robert and Ekaterina Khaustova**, “Russian real wages before and after 1917,” *Explorations in Economic History*, 2019, 72, 23–37.

- Allen, Robert C.**, *Farm to Factory: A Reinterpretation of the Soviet Industrial Revolution*, Princeton, N.J: Princeton University Press, 2003.
- Ananyev, Maxim and Michael Poyker**, “Prisons and Homophobia,” *Working paper*, 2021.
- Antonov, Sergei**, *Bankrupts and Usurers of Imperial Russia. Debt, Property, and the Law in the Age of Dostoevsky and Tolstoy*, Harvard University Press, 2016.
- Barro, R.J. and J.F. Ursua**, “Macroeconomic Crises since 1870,” *Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution*, 2008, 39 (1), 255–350.
- Barro, Robert J. and Xavier X. Sala i Martin**, “Convergence,” *Journal of Political Economy*, 1992, 100, 223–51.
- Bassino, Jean-Pascal, Stephen Broadberry, Kyoji Fukao, Bishnupriya Gupta, and Masanori Takashima**, “Japan and the Great Divergence, 730-1874,” Technical Report 2018. CEI Working Paper Series 2018-13, Center for Economic Institutions, Institute of Economic Research, Hitotsubashi University.
- Baykov, Alexander**, “The Economic Development of Russia,” *Economic History Review*, 1954, 7 (2), 137–49.
- Becker, S., I. Grosfeld, P. Grosjean, N. Voigtlander, and E. Zhuravskaya**, “Forced Migration and Human Capital: Evidence from Post- WWII Population Transfers,” *American Economic Review*, 2020, 110 (5), 1430–63.
- Belova, Eugenia and Paul Gregory**, “Political economy of crime and punishment under Stalin,” *Public Choice*, 2009, 140, 463–478.
- **and Valery Lazarev**, “Why party and how much? The Soviet State and the party finance,” *Public Choice*, 2007, 130 (3-4), 437–56.
- **and –**, “Secret Public Finance: Revenues and Expenditures of the Soviet Communist Party, 1938–1965,” *Europe-Asia Studies*, 2008, 60 (3), 455–482.
- **and –**, *Funding Loyalty: The Economics of the Communist Party (Yale-Hoover Series on Authoritarian Regimes)*, Yale University Press, 2013.
- Bergson, A.**, *The Real National Income of Soviet Russia since 1928*, Cambridge, Mass: Harvard University Press, 1961.
- Bhattacharya, Jay, Christina Gathmann, and Grant Miller**, “The Gorbachev Anti-Alcohol Campaign and Russia’s Mortality Crisis,” *American Economic Journal: Applied Economics*, 2013, 5 (2), 232–260.
- Bolt, Jutta and Jan Luiten van Zanden**, “Maddison style estimates of the evolution of the world economy. A new 2020 update,” Technical Report 2020. Maddison Project Database, version 2020.
- Borjas, George J. and Kirk B. Doran**, “The Collapse of the Soviet Union and the Productivity of American Mathematicians,” *Quarterly Journal of Economics*, 2012, 127 (3), 1143–1203.
- **and –**, “Cognitive Mobility: Labor Market Responses to Supply Shocks in the Space of Ideas,” *Journal of Labor Economics*, 2015, 33 (3), S109–S145.

- **and** –, “Which Peers Matter? The Relative Impacts of Collaborators, Colleagues, and Competitors,” *Review of Economics and Statistics*, 2015, 97 (5), 1104–1117.
- Borodkin, Leonid and Anna Konovalova**, *Rossiiskij fondovijj rynok v nachale XX v.: faktory kursovoj dinamicii*, Saint-Petersburg: Aletejya, 2010.
- Borodkin, L.I., Gregory P., and Khlevnuk O.V.**, *Ekonomika prinuditelnogo truda [Economics of forced labor]*, Moscow: Rosspen, 2005.
- Brainerd, Elizabeth**, “Reassessing the Standard of Living in the Soviet Union: An Analysis Using Archival and Anthropometric Data,” *Journal of Economic History*, 2010, 70 (1), 83–117.
- , “The Lasting Effect of Sex Ratio Imbalance on Marriage and Family: Evidence from World War II in Russia,” *Review of Economics and Statistics*, 2017, 99 (2), 229–242.
- **and David M. Cutler**, “Autopsy on an Empire: Understanding Mortality in Russia and the Former Soviet Union,” *The Journal of Economic Perspectives*, 2005, 19 (1), 107–130.
- Broadberry, S.N., B. Campbell, A. Klein, M. Overton, and B. van Leeuwen**, *British Economic Growth 1270-1870*, Cambridge: Cambridge University Press, 2015.
- , **J. Custodis, and B. Gupta**, “India and the great divergence: an Anglo-Indian comparison of GDP per capita, 1600–1871,” *Explorations in Economic History*, 2015, 55, 58–75.
- Broadberry, Stephen and Elena Korchmina**, “Russian Economic Growth During the Eighteen Century,” *Working paper*, 2021.
- **and Mikołaj Malinowski**, “Living standards in the very long run: the place of Central, Eastern and South-Eastern Europe in the divergence debate,” in Matthias Morys, ed., *The Economic History of Central, East and South-East Europe*, London and New York: Routledge, 2021.
- **and Roger Fouquet**, “Seven Centuries of European Economic Growth and Decline,” *Journal of Economic Perspective*, 2015, 29 (4), 227–44.
- Buera, Francisco, Joseph Kaboski, and Robert Townsend**, “From Micro to Macro Development,” Technical Report 15775, Discussion Paper, London 2021. Working paper.
- Buggle, Johannes and Stephen Nafziger**, “The Slow Road from Serfdom: Labor Coercion and Long-Run Development in the Former Russian Empire,” *The Review of Economics and Statistics*, 2021, 103 (1), 1–17.
- Burds, Jeffrey**, *Peasant Dreams and Market Politics: Labor Migration and the Russian Village, 1861–1905*, Pittsburgh: University of Pittsburgh Press, 1998.
- Cairnes, John Elliot**, *The Slave Power: Its Character, Career, and Probable Designs: Being an Attempt to Explain the Real Issues Involved in the American Contest*, London: Parker, Son, and Bourn, 1862.
- Castaneda Dower, Paul and Andrei Markevich**, “A History of Resistance to Privatization in Russia,” *The Journal of Comparative Economics*, 2014, 42 (4), 855–873.
- **and** –, “Labor Misallocation and Mass Mobilization: Russian Agriculture during the Great War,” *The Review of Economics and Statistics*, 2018, 100 (2), 245–59.

- **and** –, “The Stolypin Reform and Agricultural Productivity in Late Imperial Russia,” *European Review of Economic History*, 2019, 23 (3), 241–67.
- **and** –, “Did Industrialization Increase Support for the Radical Left? Evidence from the 1917 Russian Revolution,” Technical Report 2021. Working paper.
- , – , **and Ekaterina Zhuravskaya**, “Control Through Empowerment: Evidence from Soviet Nation-Building in Central Asia in the 1920s,” *mimeo*, 2021.
- , – , **and Shlomo Weber**, “Value of Statistical Life in Dictatorship: Evidence from Stalin,” *European Economic Review*, 2021, 133.
- , **Evgeny Finkel, Scott Gehlbach, and Steven Nafziger**, “Collective Action and Representation in Autocracies: Evidence from Russia’s Great Reforms,” *American Political Science Review*, 2018, 112 (1), 125– 147.
- Chapman, J.**, *Real Wages in Soviet Russia since 1928*, Cambridge, Mass: Harvard University Press, 1963.
- Charnysh, Volha**, “Diversity, Institutions, and Economic Outcomes: Post-WWII Displacement in Poland,” *American Political Science Review*, 2019.
- , “Explaining outgroup bias in weak states: religion and legibility in the 1891-92 Russian famine,” *Working paper*, 2021.
- Chaudhary, Latika, Aldo Musacchio, Steven Nafziger, and Se Yan**, “Big BRICs, weak foundations: The beginning of public elementary education in Brazil, Russia, India, and China,” *Explorations in Economic History*, 2012, 49, 221–240.
- Chen, Yi, Ziyang Fan, Xiaomin Gu, and Li-An Zhou**, “Arrival of Young Talent: The Send-Down Movement and Rural Education in China,” *American Economic Review*, 2020, 110 (11), 3393–3430.
- Cheremukhin, Anton, Mikhail Golosov, Sergei Guriev, and Aleh Tsyvinski**, “Was Stalin Necessary for Russia’s Economic Development,” Technical Report 19425 2013. NBER Working paper.
- , – , – , **and** –, “The Economy of People’s Republic of China from 1953,” Technical Report 21397 2015. NBER Working paper.
- , – , – , **and** –, “The Industrialization and Economic Development of Russia through the Lens of a Neoclassical Growth Model,” *Review of Economic Studies*, 2017, 84 (2), 613– 64.
- Chernina, Eugenia, Paul Castaneda Dower, and Andrei Markevich**, “Property Rights and Internal Migration: The Case of the Stolypin Agrarian Reform in the Russian Empire,” *The Journal of Development Economics*, 2014, 110, 191–215.
- Chuchko, Marina**, “Business Representation in an Autocratic Regime: Tariff Policy and Exchange Committees in late Tsarist Russia,” *Economics History Review*, 2021.
- Conley, Timothy G.**, “GMM estimation with cross sectional dependence,” *Journal of Econometrics*, 1999, 92 (1), 1–45.
- Conquest, Robert**, *The Harvest of Sorrow: Soviet Collectivization and the Terror–Famine*, Oxford, UK: Oxford University Press, 1986.

- Darrow, David W.**, *Tsardom of Sufficiency, Empire of Norms: Statistics, Land Allotments, and Agrarian Reform in Russia, 1700–1921*, Montreal: McGill-Queen’s University Press, 2018.
- Davies, R. and S. Wheatcroft**, *The Industrialisation of Soviet Russia Volume 5: The Years of Hunger: Soviet Agriculture, 1931–1933*, Basingstoke: Palgrave Macmillan UK, 2004.
- Davies, Robert**, “The Soviet economy and the launching of the Great Terror,” in Melanie Ilic, ed., *Stalin’s terror revisited*, Houndmills: Palgrave Macmillan, 2006, pp. 11–37.
- Davies, R.W., M. Harrison, O. Khlevniuk, and S.G. Wheatcroft**, *The Industrialisation of Soviet Russia Volume 7: The Soviet Economy and the Approach of War, 1937–1939* 2018.
- , **O. Khlevniuk, and S.G. Wheatcroft**, *The Industrialisation of Soviet Russia, Volume 6: The Years of Progress: The Soviet Economy, 1934–1936*, Basingstoke: Palgrave Macmillan, 2014.
- Davydov, M.A.**, *Vserossiiskij rynek i zhelezodorozhnaya statistika v kontse 19 – nachale 20 vv. [Russian market and railways statistics.]*, Saint Petersburg: Alateya, 2010.
- , *Dvadtsat let do velikoj vojny. Rossijskaya modernizatsiya Vitte-Stolypina. [Twenty years before the Great war. Russian modernization of Vitte and Stolypin]*, Saint Petersburg: Alateya, 2016.
- de Pleijt, Alexandra M. and Jan Luiten van Zanden**, “Accounting for the “Little Divergence”: What drove economic growth in pre-industrial Europe, 1300–1800?,” *European Review of Economic History*, 2016, 20 (4), 387–409.
- Dearden, James, Barry W. Ickes, and Larry Samuelson**, “To Innovate or Not to Innovate: Incentives and Innovation in Hierarchies,” *American Economic Review*, 1990, 80 (5), 1105–1124.
- Dell, Melissa**, “The Persistent Effects of Peru’s Mining Mita,” *Econometrica*, 2010, 78, 1863–1903.
- Dempster, G.**, “The fiscal background of the Russian Revolution,” *European Review of Economic History*, 2006, 10, 35–50.
- Dennison, T.K.**, *The Institutional Framework of Russian Serfdom*, Cambridge: Cambridge University Press, 2011.
- Dennison, Tracy and Steven Nafziger**, “Micro Perspectives on Russian Living Standards, 1750–1917,” *The Journal of Interdisciplinary History*, 2013, 42 (3), 397–441.
- Didenko, Dmitry, Peter Fodvary, and Bas Van Leeuwen**, “The spread of human capital in the former Soviet Union area in a comparative perspective: Exploring a new dataset,” *Journal of Eurasian Studies*, 2013, 4, 123–135.
- Dohan, M.**, “The Economic Origins of Soviet Autarky 1927/28–1934,” *Slavic Review*, 1976, 35 (4), 603–635.
- Domar, Evsey D.**, “The Causes of Slavery or Serfdom: A Hypothesis,” *The Journal of Economic History*, 1970, 30 (1), 18–32.

- Donaldson, Dave**, “Railroads of the Raj: Estimating the Impact of Transportation Infrastructure,” *American Economic Review*, 2018, *108* (4-5), 899–934.
- **and Richard Hornbeck**, “Railroads and American Economic Growth: A ‘Market Access Approach,’” *Quarterly Journal of Economics*, 2016, *101* (7), 799–858.
- Egorov, Georgy and Konstantin Sonin**, “The Political Economics of Non-democracy,” Technical Report 2020-142, University of Chicago, Becker Friedman Institute for Economics 2020. Working paper.
- , **Sergei Guriev, and Konstantin Sonin**, “Why Resource-Poor Dictators Allow Freer Media: A Theory and Evidence from Panel Data,” *American Political Science Review*, 2009, *103* (4), 645–668.
- Ellman, Michael**, “The 1947 Soviet famine and the entitlement approach to famines,” *Cambridge Journal of Economics*, 2000, *24* (5), 603–630.
- Eloranta, J., M. Voutilainen, and I. Nummela**, “Estimating Finnish Economic Growth Before 1860,” Technical Report 2016. mimeo.
- Fantom, Neil and Umar Serajuddin**, “The World Bank’s Classification of Countries by Income,” Technical Report 7528, Policy Research Working Paper, Washington, DC 2016. Working paper.
- Fernandez, Raquel and Dani Rodrik**, “Resistance to Reform: Status Quo Bias in the Presence of Individual-Specific Uncertainty,” *The American Economic Review*, 1991, *81* (5), 1146–1155.
- Filtzer, Donald**, *The Hazards of Urban Life in Late Stalinist Russia: Health, Hygiene, and Living Standards, 1943-1953*, Cambridge: Cambridge University Press, 2010.
- **and Wendy Z. Goldman**, *Fortress Dark and Stern. The Soviet Home Front during World War II*, Oxford: Oxford University Press, 2021.
- Finkel, Evgeny, Scott Gehlbach, and Dmitrii Kofanov**, “(Good) Land and Freedom (for Former Serfs): Determinants of Peasant Unrest in European Russia, March–October 1917,” *Slavic Review*, 2017, *76* (Special Issue 3), 710–721.
- , – , **and Tricia Olsen**, “Does Reform Prevent Rebellion? Evidence from Russia’s Emancipation of the Serfs,” *Comparative Political Studies*, 2015, *48* (8), 984–1019.
- Freixas, Xavier, Roger Guesnerie, and Jean Tirole**, “Planning under Incomplete Information and the Ratchet Effect,” *The Review of Economic Studies*, 1985, *52* (2), 173–191.
- Fukao, K., J.-P. Bassino, T. Makino, R. Paprzycki, T. Settsu, M. Takashima, , and J. Tokui**, *Regional Inequality and Industrial Structure in Japan: 1874-2008*, Tokyo: Maruzen Publishing, 2015.
- Gaddy, Clifford and Barry Ickes**, “Russia’s Dependence on Resources,” in Michael Alexeev and Shlomo Weber, eds., *The Oxford Handbook of the Russian Economy*, Oxford university press, 2013.
- Gaidar, Yegor**, *Collapse of an Empire: Lessons for Modern Russia*, Brookings Institution, 2007.

- Ganguli, Ina**, “Scientific Brain Drain and Human Capital Formation After the End of the Soviet Union,” *International Migration*, 2014, 52 (5), 95–110.
- , “Saving Soviet Science: The Impact of Grants When Government R&D Funding Disappears,” *American Economic Journal: Applied Economics*, 2017, 9 (2), 165–20.
- Gatrell, Peter**, “Feet of Clay? The Soviet Economic Giant in Recent Historiography,” *The Historical Journal*, 2006, 49 (1), 299 – 315.
- Gehlbach, Scott, Konstantin Sonin, and Milan W. Svoblik**, “Formal Models of Nondemocratic Politics,” *Annual Review of Political Science*, 2016, 19 (1), 565–584.
- Gerschenkron, Alexander**, *Economic backwardness in historical perspective, a book of essays*, Cambridge, Massachusetts: Belknap Press of Harvard University Press, 1962.
- , “Agrarian Policies and Industrialization: Russia, 1861–1914,” in “Cambridge Economic History of Europe,” Vol. 6, Cambridge: Cambridge University Press, 1965.
- Gill, Indermit and Homi Kharas**, *An East Asian Renaissance: Ideas for Economic Growth*, Washington, DC: World Bank, 2007.
- Gokmen, Gunes and Dmitrii Kofanov**, “Career incentives in political hierarchy: evidence from Imperial Russia,” *European Review of Economic History*, 2020, 24 (2), 264–287.
- Goldsmith, R.**, “The Economic Growth of Tsarist Russia 1860–1913,” *Economic Development and Cultural Change*, 1961, 9 (3), 441–475.
- Gollin, Douglas and Christopher Udry**, “Heterogeneity, Measurement Error, and Misallocation: Evidence from African Agriculture,” *Journal of Political Economy*, 2021, 129 (1), 1–80.
- Goodwin, Barry and Thomas Grennes**, “Tsarist Russia and the World Wheat Market,” *Explorations in Economic History*, 1998, 35 (4), 405–430.
- Graham, Lauren**, *Lonely Ideas: Can Russia Compete?*, MIT Press, 2016.
- Graziosi, Andrea**, “The Uses of Hunger: Stalin’s Solution of the Peasant and National Questions in Soviet Ukraine, 1932 to 1933,” in Lubomyr Luciuk Declan Curran and Andrew G., eds., *Famines in European Economic History: The Last Great European Famines Reconsidered*, Routledge, 2015.
- Gregg, Amanda**, “Shareholder rights and share capital: the effect of the 1901 Russian Corporation Reform, 1890–1905,” *Economic History Review*, 2016, pp. 1–25.
- , “Factory Productivity and the Concession System of Incorporation in Late Imperial Russia, 1894–1908,” *American Economic Review*, 2020, 110 (2), 401–27.
- , “Vertical and Horizontal Integration in Russian Cotton Textiles, 1894 – 1900,” *European Review of Economic History*, 2020, 24 (1), 157–191.
- **and Steven Nafziger**, “Capital Structure and Corporate Performance in Late Imperial Russia,” *European Review of Economic History*, 2018, 23 (4), 446–481.
- **and** – , “The Births, Lives, and Deaths of Corporations in Late Imperial Russia,” Technical Report 2020. Working paper.

- **and Tamar Matiashvili**, “Modernization in Progress: Part- Year Operation, Capital Accumulation, and Labor Force Composition in Late Imperial Russia,” Technical Report 2021. Working paper.
- Gregory, Paul, Phillip Schroder, and Konstantin Sonin**, “Rational Dictator and the Killing Innocent: Data from Stalin’s Archives,” *The Journal of Comparative Economics*, 2011, 39, 34–42.
- Gregory, Paul R.**, *Russian National Income, 1885–1913*, New York: Cambridge University Press, 1982.
- , *Before Command: An Economic History of Russia from Emancipation to the First Five-Year*, Princeton: Princeton University Press, 1994.
- , *The Political Economy of Stalinism: Evidence from the Secret Soviet Archives*, Cambridge: Cambridge University Press, 2003.
- , *Terror by Quota*, Cambridge: Cambridge University Press, 2008.
- **and Mark Harrison**, “Allocation Under Dictatorship: Research in Stalin’s Archives,” *Journal of Economic Literature*, 2005, 43 (3), 721–61.
- **and Valery Lazarev, eds**, in Paul R. Gregory and Valery Lazarev, eds., *The economics of forced labor*, Stanford, California: Hoover Institution Press, 2003.
- Grigoriadis, Theocharis and Marvin Suesse**, “Financing Late Industrialization: Evidence from the Imperial Russian State Bank,” Technical Report 2021. Working paper.
- Grinin, L.E., A.V. Korotaev, and S.Yu. Malkov, eds**, in L.E. Grinin, A.V. Korotaev, and S.Yu. Malkov, eds., *O prichinakh Russkoj revoliutsii*, Moscow: LKI, 2010.
- Grosfeld, I., A. Rodnyansky, and E. Zhuravskaya**, “Persistent Anti-Market Culture: A Legacy of the Pale of Settlement after the Holocaust,” *American Economic Journal: Economic policy*, 2013, 5 (3), 189–226.
- **and E. Zhuravskaya**, “Cultural vs. economic legacies of empires: Evidence from the partition of Poland,” *Journal of Comparative Economics*, 2015, 43, 55–75.
- Grosfeld, Irena, Seyhun Orcan Sakalli, and Ekaterina Zhuravskaya**, “Middleman Minorities and Ethnic Violence: Anti-Jewish Pogroms in the Russian Empire,” *The Review of Economic Studies*, 2020, 87, 289–342.
- Guinnane, Timothy, Ron Harris, Naomi R. Lamoreaux, and Jean-Laurent Rosenthal**, “Putting the Corporation in its Place,” *Enterprise & Society*, 2007, 8 (3), 687–729.
- Guriev, Sergei**, “Gorbachev versus Deng: A Review of Chris Miller’s The Struggle to Save the Soviet Economy,” *Journal of Economic Literature*, 2019, 57 (1), 120–46.
- **and Daniel Treisman**, “Informational Autocrats,” *Journal of Economic Perspectives*, 2019, 33 (4), 100–127.
- Hammond, Vincent E.**, *State Service in Sixteenth Century Novgorod. The First Century of the Pomestie System*, University Press of America, 2009.

- Harrison, Mark**, “Coercion, Compliance, and the Collapse of the Soviet Command Economy,” *Economic History Review*, 2002, 55 (3), 397–433.
- , “The Political Economy of a Soviet Military R&D Failure: Steam Power for Aviation, 1932 to 1939,” *The Journal of Economic History*, 2003, 63 (1), 178–212.
- , *Guns and Rubbles. Soviet Military Industrial Complex under Stalin*, Yale University Press, 2008.
- , “The Soviet Economy, 1917-1991: Its Life and Afterlife,” *The Independent Review*, 2017, 22 (2), 199–206.
- , “Counting the Soviet Union’s War Dead: Still 26-27 Million,” *Europe-Asia Studies*, 2019, 71 (6), 1036–1047.
- **and Andrei Markevich**, “The Soviet Market for Weapons,” in Mark Harrison, ed., *Guns and Rubles: The Defense Industry in the Stalinist State*, Yale University Press, 2008.
- **and Inga Zaksauskiene**, “Counter-Intelligence in a Command Economy,” *Economic History Review*, 2016, 69 (1), 131–158.
- Hartwell, Christopher**, “Shooting for the Tsars: Heterogeneous political volatility and institutional change in Russia,” *Terrorism and Political Violence*, 2020.
- Hayashi, F. and E. Prescott**, “The Depressing Effect of Agricultural Institutions on the Prewar Japanese Economy,” *Journal of Political Economy*, 2008, 116, 573–632.
- Hellie, Richard**, *Enserfment and Military Change in Muscovy*, Chicago: University of Chicago Press, 1971.
- Herrendorf, Berthold and Todd Schoellman**, “Wages, Human Capital, and Barriers to Structural Transformation,” *American Economic Journal: Macroeconomics*, 2018, 10 (2), 1–23.
- Hill, Fiona and Clifford Gaddy**, *The Siberian Curse. How Communist Planners Left Russia Out in the Cold*, Brookings Institution Press, 2003.
- Holland, Hunter and Janusz Szyrmer**, *Faulty Foundations: Soviet Economic Policies, 1928-1940*, Princeton, N.J.: Princeton University Press, 1992.
- Holmstrom, Bengt**, “Design of Incentive Schemes and the New Soviet Incentive Model,” *European Economic Review*, 1982, 17 (2), 127–148.
- Ickes, Barry W. and Larry Samuelson**, “Job Transfers and Incentives in Complex Organizations: Thwarting the Ratchet Effect,” *Rand Journal of Economics*, 1987, 18 (2), 275–286.
- Ironside, Kristy**, “Between Fiscal, Ideological, and Social Dilemmas: The Soviet ‘Bachelor Tax’ and Post-war Tax Reform, 1941-1962,” *Europe-Asia Studies*, 2017, 69 (6), 855–877.
- , *A Full-Value Ruble: The Promise of Prosperity in the Postwar Soviet Union*, Cambridge, Massachusetts: Harvard University Press, 2021.
- Ivanov, D.**, “Human Capital and Knowledge-Intensive Industries Location: Evidence from Soviet Legacy in Russia,” *Journal of Economic History*, 2016, 76 (3), 736–768.

- Kahan, Arcadius**, “Government Policies and the Industrialization of Russia,” *Journal of Economic History*, 1967, 27 (4), 460–477.
- Kapelko, Natalia and Andrei Markevich**, “Political legacy of Gulag Archipelago,” Technical Report 2016. Working paper.
- Kessler, Gijs**, “Work and the household in the inter-war Soviet Union,” *Continuity and Change*, 2005, 20 (3), 409–442.
- **and Andrei Markevich**, “Electronic Repository of Russian Historical Statistics, 18th - 21st centuries, Version I,” Technical Report 2020. available at <https://ristat.org/>.
- Khlevniuk, Oleg**, *The History of the Gulag. From Collectivization to the Great Terror*, Yale, NH: Yale University Press, 2004.
- Khlevniuk, Oleg V.**, “Archives of the Terror. Developments in the Historiography of Stalin’s Purges,” *Kritika: Explorations in Russian and Eurasian History*, 2021, 22 (2), 367–85.
- , “Kto i skol’ko. Mashtabi i struktura gosudarstvennogo nasiliya v stalinskoj sisteme,” *Cahiers du monde de Russe*, forthcoming.
- Khlevnuk, O.V.**, *Hozyain. Stalin i utverzhdienie stalinskoj diktaturi. [The Master. Stalin and formation of Stalin’s dictaturoship]*, Moscow: Rosspen, 2010.
- Kliuchevsky**, *Kurs Russkoj Istorii*, Moscow: Gosudarstvennoe sotsialno-ekonomicheskoe izdatelstvo, 1937(1906).
- Kofanov, Dmitrii**, “Land Inequality, Industrialization and Unrest: Evidence From the Late Russian Empire,” Technical Report 2020. Thesis submitted for the degree of Doctor of Philosophy in Political Science. University of Wisconsin-Madison, WI, USA.
- Kokurin, A.I. and N.V. Petrov, eds**, in A.I. Kokurin and N.V. Petrov, eds., *GULAG (Glavnoe upravlenie lagerej). 1917-1960*, Moscow: MFD, 2000.
- **and Yu.N. Morukov**, “Gulag struktura i kadry,” *Svobodnaya mysl-XXI*, 2001, 2001 (12), 99–101.
- Kondrashin, V.**, *Golod 1932–1933 godov: Tragediya Sovetskoj derevni*, Moscow: Rosspen, 2008.
- Kontorovich, Vladimir**, “What Did the Soviet Rulers Maximise? ,” *Europe-Asia Studies*, 2015, 57, 669–692.
- **and Alexander Wein**, “The Military Origins of Soviet Industrialization,” *Comparative Economic Studies*, 2009, 61 (9), 1579–1601.
- Kopsidis, Michael and Max-Stephan Schulze**, “Economic Growth and Sectoral Development, 1800–1914,” in Matthias Morys, ed., *The Economic History of Central, East and South-East Europe*, London and New York: Routledge, 2021.
- , **Katja Brusch, and Daniel Bromley**, “Where is the backward Russian peasant? Evidence against the superiority of private farming, 1883–1913,” *The Journal of Peasant Studies*, 2015, 42 (2), 425–447.
- Kornai, Janos**, “The soft budget constraint,” *Kyklos*, feb 1986, 39 (1), 3–30.

- Korolev, Ivan**, “How Could Russia Have Developed without the Revolution of 1917?,” *Annals of Economics and Statistics*, forthcoming.
- Kotilaine, J.T.**, *Russia’s Foreign Trade and Economic Expansion in the Seventeenth Century: Windows on the World*, Leiden: Brill Academic Publishers, 2005.
- Kotsonis, Yanni**, *States of Obligation: Taxes and Citizenship in the Russian Empire and Early Soviet Republic*, University of Toronto Press, 2014.
- Kragh, M.**, “Stalinist Labour Coercion during World War II: An Economic Approach,” *Europe-Asia Studies*, 2011, 63 (7), 1253–1273.
- Kuboniwa, Masaaki, Yoshisada Shida, and Shinichiro Tabata**, “Gross Domestic Products,” in Masaaki Kuboniwa, Yasushi Nakamura, Kazuhiro Kumo, and Yoshisada Shida, eds., *Russian Economic Development over Three Centuries: New Data and Inferences*, Palgrave Macmillan, 2019.
- Kueng, Lorenz and Evgeny Yakovlev**, “Long-Run Consequences of Temporary Policies: Tastes and Mortality,” *American Economic Journal: Economic Policy*, 2021, 13 (1), 294–328.
- Kulikov, Volodymyr and Martin Kragh**, “Big business in the Russian empire: A European perspective,” *Business History*, 2019, 61 (2), 299–321.
- Kuznets, Simon**, *Economic Growth and Structure: Selected Essays*, New York: W.W. Norton and Co., 1965.
- Lagakos, David**, “Urban-Rural Gaps in the Developing World: Does Internal Migration Offer Opportunities?,” *Journal of Economic Perspectives*, 2020, 34 (3), 174–192.
- Landes, David S.**, *The Wealth and Poverty of Nations: Why Some are So Rich and Some So Poor*, New York: W.W. Norton and Co., 1998.
- Lankina, Tomila V. and Alexander Libman**, “The Two-Pronged Middle Class: The Old Bourgeoisie, New State-Engineered Middle Class, and Democratic Development,” *American Political Science Review*, 2021, 115 (3), 948–966.
- Lazarev, Valery**, “Economics of One-Party State: Promotion Incentives and Support for the Soviet Regime,” *Comparative Economic Studies*, 2005, 47 (2), 346–363.
- , “Political labor market, government policy, and stability of a non-democratic regime,” *Journal of Comparative Economics*, 2007, 35 (3), 546–563.
- and **P. Gregory**, “Commissars and cars: A case study of the political economy of dictatorship,” *The Journal of Comparative Economics*, 2003, 31 (1), 1–19.
- Lenin, Vladimir Ilich**, *Polnoe sobranie sochinenij. Vol. 3 Razvitie kapitalizma v Rossii*, Moscow: Izdatelstvo Politicheskoy literatury, 1971, originally published in 1898.
- Leonard, Carol**, *Agrarian Reform in Russia: The Road from Serfdom*, Cambridge: Cambridge University Press, 2011.
- Lewin, Moshe**, “The Disappearance of Planning in the Plan,” *Slavic Review*, 1973, 32 (2), 271–287.

- Lewis, W. Arthur**, “Economic Development with Unlimited Supplies of Labor,” *Manchester School*, 1954, *22*, 139–192.
- Lindert, Peter and Steven Nafziger**, “Russian Inequality on the Eve of Revolution,” *The Journal of Economic History*, 2014, *74* (3), 767–798.
- Lizunov, Pavel Vladimirovich**, *Sankt-Petersburgskaya birzha i rossijskij rynek tsennikh bumag (1903-1917)*, Saint Petersburg: Blitz, 2004.
- Maddison, Angus**, “Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD,” Technical Report 2010. Maddison Database, version 2010.
- Malein, Viktor**, “Human Capital and Industrialization: German Settlers in Late Imperial Russia,” Technical Report 2021. EHES Working Paper, No. 221.
- Malkova, Olga**, “Can Maternity Benefits Have Long-Term Effects on Childbearing? Evidence from Soviet Russia,” *Review of Economics and Statistics*, 2018, *100* (4), 691–703.
- Markevich, Andrei**, “Soviet Planning Archives: the Files That Bergson Could Not See,” *Comparative Economic Studies*, 2005, *47*, 364–386.
- , “Soviet urban households and the road to universal employment, from the end of the 1930s to the end of the 1960s,” *Continuity and Change*, 2005, *20* (3), 443–473.
- , “How Much Control is Enough? Monitoring and Interventions in the Stalinist Command Economy?,” *Europe-Asia Studies*, 2011, *63* (8), 1449–1468.
- , “Repressions and Punishment under Stalin: Evidence from the Soviet Archives,” in J. Eloranta, E. Golson, A. Markevich, and N. Wolf, eds., *Economic History of Warfare and State Formation*, Springer, 2016.
- , “A Regional Perspective on the Economic Development of the late Russian Empire,” Technical Report 2019. Working paper.
- , “Ekonomiki pozdnego SSSR (1953-1985): popytki reform i zastoj,” in Yu. M. Baturin, M.A. Krasnov, K.Yu. Rogov, and G.A. Satarov, eds., *90-e: Istoriya Velikogo povorota*, forthcoming.
- **and Ekaterina Zhuravskaya**, “M-form Hierarchy with Poorly-diversified Divisions: A Case of Khrushchev’s Reform in Soviet Russia,” *The Journal of Public Economics*, 2011, *95* (11-12), 1550–1560.
- **and** – , “Economic Effects of the Abolition of Serfdom: Evidence from the Russian Empire,” *The American Economic Review*, 2018, *108* (4-5), 1074–1117.
- **and Mark Harrison**, “Quality, Experience, and Monopoly: the Soviet Market for Weapons under Stalin,” *The Economic History Review*, 2006, *59* (1), 113–142.
- **and** – , “The Great War, Civil War, and Recovery: Russia’s Real National Income: 1913 to 1928,” *The Journal of Economic History*, 2011, *71* (3), 672–703.
- **and Steven Nafziger**, “State and Market in Russian Industrialization, 1870-2010,” in Kevin O’Rourke and Jeffrey Williamson, eds., *The Spread of Modern Industry to the Periphery since 1871*, Houndmills: Palgrave Macmillan, 2017, pp. 33–62.

- **and Tatyana Mikhailova**, “Economic Geography of Russia,” in Michael Alekseev and Shlomo Weber, eds., *The Oxford Handbook of the Russian Economy*, Oxford: Oxford University Press, 2013.
- , **Natalia Naumenko, and Nancy Qian**, “The Political-Economic Causes of the Soviet Great Famine, 1932–33,” *Working paper*, 2021.
- Maskin, E., Y. Qian, and C. Xu**, “Incentives, information, and organizational form,” *Review of Economic Studies*, 2000, *67* (2), 359 – 378.
- Matranga, Andrea and Timur Natkhov**, “All Along the Watchtower: Defense Lines and the Origins of Russian Serfdom,” Technical Report 2019. Mimeo, Higher School of Economics.
- Mauro, Paulo, Nathan Sussman, and Yishay Yafeh**, “Emerging Market Spreads: Then Versus Now,” *Quarterly Journal of Economics*, 2002, *117*, 695–733.
- Methvin, Eugene**, “Gorbachev’s Dilemma,” *National Review*, 1987, *XXXIX* (23), 42–45.
- Michalopoulos, Stelios and Elias Papaioannou**, “Historical Legacies and African Development,” *Journal of Economic Literature*, 2020, *58* (1), 53–128.
- **and –**, “Historical Legacies and African Development,” *Journal of Economic Literature*, 2020, *58* (1), 53–128.
- Miho, Antonela, Alexandra Jarotschkin, and Ekaterina Zhuravskaya**, “Diffusion of Gender Norms: Evidence from Stalin’s Ethnic Deportations,” Technical Report 2021. Working paper.
- Mikhailova, Tatiana**, “Essays on Russian Economic Geography: Measuring Spatial Inefficiency.” PhD dissertation, The Pennsylvania State University 2004.
- , “Gulag, WWII and the Long-run Patterns of Soviet City Growth,” Technical Report 2012. Working paper.
- Millar, James R.**, “Soviet Rapid Development and the Agricultural Surplus Hypothesis,” *Soviet Studies*, 1970, *22* (1), 77–93.
- Miller, Chris**, *The Struggle to Save the Soviet Economy Mikhail Gorbachev and the Collapse of the USSR*, University of North Carolina Press, 2016.
- Miller, Marcus and Jennifer C. Smith**, “In the shadow of the Gulag: Worker discipline under Stalin,” *Journal of Comparative Economics*, 2015, *43* (3), 531– 548.
- Milov**, *Velikorusskij pakhar i osobennosti rossijskogo istoricheskogo protsessa*, Moscow: Rosspen, 1998.
- Mironov, B.N.**, *Rossijskaya modernizaciya i revolyuciya*, Saint-Petersburg: Dmitriy Bulanin, 2019.
- Mironov, Boris**, *The Standard of Living and Revolutions in Russia, 1700- 1917*, Abingdon, UK: Routledge, 2012.
- Mozokhin, O. B.**, *Repressii v tzifrakh i dokumentakh. Deyatelnost’ organov VChk–OGPU–NKVD–MGB (1918-1953)*, Moscow: Veche, 2018.

- Murphy, Kevin M., Andrei Shleifer, and Robert W. Vishny**, “Industrialization and the Big Push,” *Journal of Political Economy*, 1989, 97 (5), 1003–1026.
- Nafziger, Steven**, “Peasant Communes and Factor Markets in Late Nineteenth Century Russia,” *Explorations in Economic History*, 2010, 47 (4), 381–402.
- , “Did Ivan’s Vote Matter? The Case of the Zemstvo in Tsarist Russia,” *European Review of Economic History*, 2011, 15, 393–441.
- , “Serfdom, Emancipation, and Off-Farm Labor Mobility in Tsarist Russia,” *Economic History of Developing Regions*, 2012, 27 (1), 1–37.
- , “Russian Serfdom, Emancipation, and Land Inequality: New Evidence,” *Working paper*, 2013.
- , “Communal Property Rights and Land Redistributions in Late Tsarist Russia,” *Economic History Review*, 2016, 69 (3), 773–800.
- Nakamura, Yasushi**, “Did the Soviet Command Economy Command Money? A Quantitative Analysis,” *Europe-Asia Studies*, 2011, 63 (7), 1133–1156.
- , “Productivity versus elasticity: a normalized constant elasticity of substitution production function applied to historical Soviet data,” *Applied Economics*, 2015, 47 (53), 1–19.
- , “The Relationship between the Real and Financial Economies in the Soviet Union,” *Explorations in Economic History*, 2017, 66, 65–84.
- Nakonechnyi, Mikhail**, “Factory of invalids’ : mortality, disability and early release on medical grounds in GULAG, 1930-1955,” Technical Report 2020. Thesis submitted for the degree of Doctor of Philosophy in History. Oxford.
- Natkhov, Timur**, “Colonization and development: The long-term effect of Russian settlement in the North Caucasus, 1890s–2000s,” *Journal of Comparative Economics*, 2015, 43 (1), 76–97.
- **and Natalia Vasilenok**, “Infant Mortality in late Imperial Russia: Patterns and Explanations,” Technical Report 2020. Working paper.
- **and** —, “Technology Adoption in Agrarian Societies: the Effect of Volga Germans in Imperial Russia,” Technical Report 2021.
- Naumenko, Natalya**, “The Political Economy of Famine: the Ukrainian Famine of 1933,” *Journal of Economic History*, 2021, 81 (1), 156–197.
- Nefedov, S.A.**, “Uroven’ potrebleniya v Rossii nachala 20 veka I prichiny russkoj revoliutsii [Consumption in early 20th century Russia and causes of the Russian revolution],” *Obshchestvennye nauki I sovremennost*, 2010, 5, 126—137.
- , “Izmenenie urovnya potrebleniya produktov pitaniya v rezultate kollektivizatsii [Changes in consumption levels as a result of collectivization],” *Vestnik TGU. Gumanitarnie nauki. Iztoriya i politologiya*, 2011, 6 (98), 208–213.
- , “K diskussii oburovne potrebleniya v poreformennoj i predrevoliutsionnoj Rossii [To the discussion on the level of consumption in post-emancipation and pre-revolutionary Russia],” *Rossijskaya istoriya*, 2011, 2011 (1), 73–86.

- , *Uroven' zhizni naseleniya i agrarnoe razvitie Rossii [Living standards and Russian agrarian development in 1900 - 1940]*, Moscow: Delo, 2017.
- Nefedov, Sergei and Michael Ellman**, “The Development of Living Standards in Russia Before the First World War: An Examination of the Anthropometric Data,” *Revolutionary Russia*, 2016, 29 (2), 149–168.
- Nikolova, Milena, Olga Popova, and Vladimir Otrachshenko**, “Stalin and the Origins of Mistrust,” 2019. IZA Discussion Papers 12326.
- Nove, Alec**, *Was Stalin Necessary? Some Problems of Soviet Economic Policy*, Routledge, 1964.
- Novokmet, Filip, Thomas Piketty, and Gabriel Zucman**, “From Soviets to Oligarchs: Inequality and Prosperity in Russia, 1905-2016,” *Journal of Economic Inequality*, 2018, 16, 189–223.
- Nunn, Nathan**, “The Long-Term Effects of Africa’s Slave Trades,” *The Quarterly Journal of Economics*, 2008, 123, 139–176.
- , “The Importance of History for Economic Development,” *Annual Review of Economics*, 2009, 1 (1), 65–92.
- **and Diego Puga**, “Ruggedness: The Blessing of Bad Geography in Africa,” *Review of Economics and Statistics*, 2012, 94 (1), 20–36.
- **and Leonard Wantchekon**, “The Slave Trade and the Origins of Mistrust in Africa,” *American Economic Review*, 2011, 101, 3221–3252.
- Ofer, Gur**, “Macroeconomic issues of Soviet reforms,” *NBER Macroeconomic Annual*, 1990, 5, 297–342.
- Ogilvie, S. and A.W. Carus**, “Institutions and economic growth in historical perspective,” in P. Aghion and S. Durlauf, eds., *Handbook of Economic Growth*, Amsterdam: North-Holland, 2014.
- Okhotin, N.G. and A.B. Roginskij**, “O mashtabe politicheskikh repressij v SSSR, 1921–1953,” *Demoscope-Weekly*, 2007, 2007 (313-314).
- Olofgard, Anders, Paul Wachtel, and Charles Becker**, “The economics of transition literature,” *Economics of Transition*, 2018, 26 (4), 827–840.
- Opitz, Alexander**, “"Comrades, Let’s March!". The Revolution of 1905 and its impact on financial markets,” *European Review of Economic History*, 2017, 22 (1), 28–52.
- O’Rourke, Kevin and Jeffrey Williamson**, “Around the European periphery 1870-1913: Globalization, schooling and growth,” *European Review of Economic History*, 1997, 1, 153–190.
- Osokina, E.A.**, *Alkhimiya sovetskoj industrializatsii. Vremya Torgsina. [Alchemy of soviet industrialization. Time of Torgsin]*, Moscow: Novoe literaturnoe obozrenie, 2019.
- Owen, Thomas C.**, *Dilemmas of Russian Capitalism: Fedor Chizhov and Corporate Enterprise in the Railroad Age*, Cambridge, MA: Harvard University Press, 2005.

- Pallot, J.**, *Land reform in Russia, 1906–1917: peasant responses to Stolypin’s project of rural transformation*, Oxford: Oxford University Press, 1998.
- Persson, J.**, “Convergence Across the Swedish Countries, 1911–1993,” *European Economic Review*, 1997, 41, 1835–1852.
- Persson, Torsten and Guido Tabellini**, “Democratic capital: the nexus of political and economic change,” *American Economic Journal: Macroeconomics*, jun 2009, 1 (2), 88–126.
- Petrov, Ya. A.**, “Rossiya nakanune Velikoj revolutsii 1917 g.: sovremennie istoriographicheskie tendentsii,” *Rossijskaya istoriya*, 2017, 2017 (2), 3–16.
- Pipes, Richard**, *Russia under the Old Regime*, New York: Charles Scribner’s Sons, 1974.
- Polyakov, Yu.A. and V.B. Zhiromskaya, eds**, *Naselenie Rossii v XX veke: istoricheskie ocherky Vol. 1 1900-1939*, Moscow: Rosspen, 2000.
- Pomeranz, Kenneth**, *The Great Divergence: China, Europe, and the Making of the Modern World Economy*, Princeton University Press, 2000.
- Pravilova, Ekaterina**, *A Public Empire: Property and the Quest for the Common Good in Imperial Russia*, Princeton University Press, 2014.
- Proskuryakova, N. A.**, *Zemel’nye banki Rossijskoj imperiii*, Moscow: Rosspen, 2012.
- Qian, Yingyi, Gérard Roland, and Chenggang Xu**, “The M-form Hierarchy and China’s Economic Reform,” *European Economic Review*, 1993, 37 (2-3), 541–548.
- , – , and – , “Coordination and Experimentation in M-Form and U-Form Organizations,” *Journal of Political Economy*, 2006, 114 (2), 366–402.
- Raskov, Danila**, *Ekonomisheckie instituty starobryadstva*, Saint Petersburg: SPbGU, 2012.
- and **Vadim Kufenko**, “Religious minority in business history: The case of Old Believers,” *Business History*, 2017, 59 (6), 951–974.
- Restuccia, Diego and Richard Rogerson**, “The Causes and Costs of Misallocation,” *Journal of Economic Perspectives*, 2017, 31 (3), 151–174.
- Rosenstein-Rodan, Paul**, “Problems of Industrialization of Eastern and South- Eastern Europe,” *Manchester School*, 1943, 53 (210/211), 202–11.
- Rostow, Walt Whitman**, *The Stages of Economic Growth: A Non- Communist Manifesto*, Cambridge University Press, 1960.
- Rozenas, Arturas and Yuri Zhukov**, “Mass Repression and Political Loyalty: Evidence from Stalin’s Terror by Hunger,” *American Political Science Review*, 2019, 113 (2), 569–583.
- , **Roya Talibova, and Yuri M. Zhukov**, “Fighting for Tyranny: State Repression and Combat Motivation,” *Working paper*, 2021.
- , **Sebastian Schutte, and Yuri Zhukov**, “The Political Legacy of Violence: The Long-Term Impact of Stalin’s Repression in Ukraine,” *Journal of Politics*, 2017, 79 (4), 1147–1161.
- Saijo, Harunobu**, “Fending Off Shield and Sword: How Strategic Purges of State Security Personnel Protect Dictators,” *Working paper*, 2021.

- Salomatina, S.A.**, *Kommercheskie banki v Rossii: dinamika i struktura operacij, 1864–1917 gg.*, Moscow: Rosspen, 2004.
- Sanchez-Sibony, Oscar**, *Red Globalization: The Political Economy of the Soviet Cold War from Stalin to Khrushchev*, Cambridge University Press, 2015.
- Schweiger, Helena, Alexander Stepanov, and Paolo Zacchia**, “The Long-Run Effects of R&D Place-Based Policies: Evidence from Russian Science Cities,” *American Economic Journal: Economic Policy*, forthcoming.
- Shepelev, Leonid**, *Aksionernye Kompanii v Rossii. [In Russian: Joint Stock Companies in Russia]*, Leningrad: Nauka, 1973.
- Shkolnikov, Vladimir and Alexander Nemtsov**, “The Anti-Alcohol Campaign and Variations in Russian Mortality,” in Jose Luis Bobadilla, Christine A. Costello, and Faith Mitchell, eds., *Premature Deaths in the New Independent States*, Washington, DC: National Academy Press, 1997.
- Shleifer, Andrei and Daniel Treisman**, “Normal Countries: The East 25 Years after Communism,” 2014. Available at: https://scholar.harvard.edu/files/shleifer/files/normal_countries_draft_sept_12_annotated.pdf, accessed October 26, 2021. A shorter version of this article appeared in *Foreign Affairs*, November/December, 2014.
- Shpotov, B.M.**, *Amerikanskij biznes i Sovetskij Soyuz, 1920—1930-e gody: labirinty ekonomicheskogo sotrudnichestva*, Moscow: LIBROKOM, 2013.
- Smirnov, Sergey**, “Economic Fluctuations in Russia (from the late 1920s to 2015),” *Russian Journal of Economics*, 2015, 1, 130–153.
- Smith, Alison K.**, *For the Common Good and Their Own Well-Being: Social Estates in Imperial Russia*, Oxford University Press, 2014.
- Smith, S. A.**, “The historiography of the Russian Revolution 100 years on,” *Kritika: Explorations in Russian and Eurasian History*, 2015, 16 (4), 733–749.
- Stanziani, Alexander**, *Bondage. Labor and Rights in Eurasia from the Sixteenth to the Early Twentieth Centuries*, New York, Oxford: Berghahn Books, 2014.
- Suesse, Marvin**, “Breaking the Unbreakable Union: Nationalism, Disintegration and the Soviet Economic Collapse,” *The Economic Journal*, 2018, 128 (615), 2933–2967.
- , “Adjusting the Size of Nations: Empirical Determinants of Separatism and the Soviet Breakup,” *Journal of Comparative Economics*, 2019, 47 (1), 50–64.
- Sutch, R.**, “National Income and Product,” in S. B. Carter, S. S. Gartner, and M. R. Haineset, eds., *Historical Statistics of the United States: Earliest Time to the Present*, Cambridge University Press, 2006.
- Talibova, Roya and Yuri M. Zhukov**, “Stalin’s terror and the long-term political effects of mass repression,” *Journal of Peace Research*, 2018, 55 (2), 267–283.
- Tauger, Mark B.**, “Natural Disaster and Human Actions in the Soviet Famine of 1931–1933,” Technical Report, PA: University of Pittsburgh 2001. The Carl Beck Papers in Russian and East European Studies (1506).

- Tremel, Vladimir and Barry L. Kostinsky**, “Domestic Value of Soviet Foreign Trade: Exports and Imports in the 1927 Input-Output Table,” Technical Report 1982. Foreign Economic Report N 20. US Government Printing Office, Washington DC.
- Tugan-Baranovsky, Mikhail**, *Russkaya fabric v proshlom i nastoyashchem*, Saint Petersburg: Izdatelstvo Popovoj, 1900.
- Tyazhelnikova, Viktoriya**, “The value of domestic labour in Russia, 1965–1986,” *Continuity and Change*, 2006, 21 (1), 159–193.
- Vert, N. and S.V. Mironenko, eds**, in N. Vert and S.V. Mironenko, eds., *Istoriya stalin-skogo Gulaga. Konetz 1920-kh - pervaya polovina 1950-kh godov. Sobranie dokumentov v 7 tomakh. Vol. 1. Massovie repressie v SSSR*, Moscow: Rosspen, 2004.
- Vezina, Pierre-Louis and Gerhard Toews**, “Enemies of the people,” Technical Report 2020. Working paper.
- Voskoboynikov, Ilya B.**, “Accounting for growth in the USSR and Russia, 1950–2012,” *Journal of Economic Surveys*, 2021, 35, 870–894.
- Wade, Rex A.**, “The Revolution at One Hundred: Issues and Trends in the English Language Historiography of the Russian Revolution of 1917,” *Journal of Modern Russian History and Historiography*, 2016, 9 (1), 9–38.
- Weitzman, Martin**, “The New Soviet Incentive Model,” *Bell Journal of Economics*, 1976, 7 (1), 251–257.
- Wheatcroft, Stephen G.**, “The first 35 years of Soviet living standards: Secular growth and conjunctural crises in a time of famines,” *Explorations in Economic History*, 2009, 46 (1), 24–52.
- Wu, Harry X.**, “China’s growth and productivity performance debate revisited – Accounting for China’s sources of growth with a new data set,” Technical Report 2014. The Conference Board Economics Program Working Paper Series EWP 14-01.
- Xu, Y. Z., B. Shi, van Leeuwen, Y. Ni, Z. Zhang, and Ma Y.**, “Chinese National Income, ca. 1661-1933,” *Australian Economic History Review*, 2016, 57 (3), 368–393.
- Zabolotskij-Desaytovskij, Andrei Parfenovich**, “O krepostnom prave,” in Andrei Parfenovich Zabolotskij-Desaytovskij, ed., *Graf P.D. Kiselev i ego vremya. Materialy duly istorii imperatorov Aleksandra I, Nikolay i Aleksandra II*, Saint Petersburg: tipografiya Akademii nauk, 1882, originally written in 1841.
- Zaionchkovskii, Petr Andreevich**, *Otmena krepostnogo prava v Rossii*, Moscow: Prosveshchenie, 1968.
- Zajonchkovskij, P.A.**, *Otmena krepostnogo prava v Rossii*, Moscow: Prosveshchenie, 1968.
- Zaleski, Eugene**, *Stalinist Planning for Economic Growth, 1933–1952*, Chapel Hill, University of North Carolina Press, 1980.
- Zemskov, V.N.**, *Stalin i narod. Pochemy ne bylo vosstaniya*, Moscow: Prosveshchenie, 2021, first edition 2015.

Zhemkova, Elena and Arsenij Roginskij, “Mezhdu sochustviem i ravnodushiem - reabilitatsijya zhertv sovetskikh repressij,” *Working paper*. Available at <https://www.memo.ru/ru-ru/history-of-repressions-and-protest/chronology-stat/>, 2016, 2016.