Backwardness and Economic Development in Nineteenth Century Russia

by

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Nineteenth century Russia exhibited contradictory features in its economic and social development. Gerschenkron placed it at the ‘backward’ end of his European continuum since it was mainly an agricultural economy dominated by small scale peasant cultivators and handicraft fabricators. Income was low, serfdom was abolished only in 1861, the state was an autocracy. And yet, the economy—especially in comparison to India, China, the middle east or north Africa—showed signs of progress. There was a big industrial sector with large scale, capital intensive factories. Incomes were rising, a massive rail network was built, and the state used high tariffs to push industry forward. 1917, of course, saw the communist revolution that contemporaries imagined could only happen in an advanced economy. How did progress and retrogression fit together in late imperial Russia?

We can sharpen the question by posing it in terms of world system theory. Wallerstein divided the world into three categories—the core (the rich, highly developed economies that dominated the world economy), the periphery (the poor, low productivity economies that exported primary products and imported manufactures) and the semi-periphery composed of countries showing aspects of both development and underdevelopment. Russia in the nineteenth century was semi-peripheral. This theory has been criticized for the vagueness of its definitions and the lack of a quantitative base. We shall address these objections by presenting several quantitative indicators that show Russia’s intermediate status and a theoretical analysis that ties them together.

The hard question is: how can we explain why Russia was in this position. Wallerstein argued that a question like this can be answered only by considering it in terms of the global economy. He was criticized by Brenner for underplaying the importance of domestic factors, in particular, the class structure. We argue that it is necessary to consider both the world system and domestic factors in explaining the economic history of Russia. Two features of the world system were crucial in understanding Russian development. First, steamships and railways cut shipping
costs and produced a tightly integrated economy in which the principle of comparative advantage came forcefully into play. Second, new technology was invented in rich countries—Britain during the industrial revolution and later also the USA and western Europe. They invented technologies which suited their circumstances, and these included relatively high wages and cheap energy costs. While these were the technologies that poor countries needed to develop, they were not always profitable to adopt there since wages were much lower and energy costs higher than in the rich countries, so old fashioned hand technology was often still the cheapest way to produce. Under these circumstances, the rise in manufacturing productivity in the rich countries (the core) de-industrialized the poor countries, turning them into primary product exports (the periphery).

If globalization and technical change were the only developments affecting Russia, the country would have joined the periphery like India, China, and Egypt. Domestic factors were important in making Russia ‘semi-peripheral.’ An important one was agricultural organization, a theme often emphasized by Brenner. Serfdom up to 1861 and the repartitional commune that generally replaced it were rural agrarian institutions that profoundly affected Russian industrial development. They did not appear out of the blue, however. Serfdom can be seen as the result of the small size of the Russian population in relation to the great expanse of cultivable land. For the aristocracy to collect rents from its tenants, they had to be prevented from wandering off into unoccupied country out of the lords’ reach, and the autocratic state bound them in place (Domar). A vast country also influenced industrial development directly by presenting industry with boundless mineral and forest resources to exploit. Finally, state policy played a role in influencing Russian development by promoting railways, which brought virgin land into the ambit of commercial agriculture, and tariffs, which aimed to promote industry even as the country’s comparative advantage was shifting away from it. We will show how these factors interacted to produce a ‘semi-peripheral’ economic structure in nineteenth century Russia.
History needs a methodology and ours is wage and price history. This approach has been used previously to explain why the industrial revolution occurred in Britain in the eighteenth century (Allen) and to analyze how and why the development of the American economy in the nineteenth century differed from that of Britain, on the one hand, and Egypt and India, on the other (Allen 2014). We will extend those comparisons to include Russia. We will be measuring and comparing the prices of labour, capital, and natural resource products over the nineteenth century in these five countries to measure the degree of development and to test hypotheses about the sources of industrial growth and the incentives to adopt advanced technology. Finally, we shall analyze serfdom and the repartitional commune theoretically to show that they would be expected to have produced the wage and price patterns we observe and the dualistic economic structure of nineteenth century Russia, i.e. its semi-peripheralization.

To do these comparisons, it was necessary to develop a new data base of Russian wages and prices. Data were collected for two major cities—Moscow and St Petersburg—as well as Kursk, a provincial capital whose experience shows the generality of the trends we observe in the big cities. Data were collected from Moscow Historical Archives, Saint Petersburg State Archives, Russian National Library and Kursk Central Archives.

These data allow us to assess the strengths and weaknesses of Russian industry vis-a-vis its foreign competitors and thus to gauge its development prospects. Were Russian firms in a position to export manufactures? Could they hold their own against imports from the West? The competitiveness of Russian industry depended on the prices of inputs as well as on the efficiency of production. We will compare the prices of labour, capital, and natural resource products like energy, metals, and timber in Russia to the corresponding prices in other countries. Could Russian industry have developed by exploiting either cheap natural resources or cheap labour?
**Integration of the Russian economy**

We compare ‘Russia’ to other countries, but we do not have data from all regions of Russia. Were wages and prices across Russia sufficiently uniform for these comparisons to have general validity? Integrated markets would produce uniformity if transport costs were sufficiently low. How integrated were Russian markets in the nineteenth century?

This question has been investigated mostly completely for grain markets. Kovelchenko, Metzer studied the impact of railways built in the second half of the nineteenth century on the integration of grain markets. He concluded that railways led to the creation of a national market and slashed price differences across regions. By the end of our period, there were undoubtedly integrated national markets for wheat and rye with uniform prices across the country. Earlier in the nineteenth century, grain markets were less integrated.

Our concern, however, is with industrial and mineral products. For them, integration may have come earlier since the ratio of transport cost to price was lower. Thus, Kelly (1976) found that the prices of kerosene and heating oil converged within Russia as the railway network expanded. We can make a modest contribution to this discussion by comparing prices in Moscow with those in Kursk. While this involves only two cities, they are about 500 kilometers apart and spanned an important industrial region. Figures 1-3 plot prices of two kinds of iron as well as alabaster in the two cities. The data are not continuous enough for regression analysis but the data for the two cities overlap, thus exhibiting price uniformity.

The labour market is equally important in our comparisons. Some studies of labour market integration have already been made. Leonard, Granville, and Borodkin (2008) found that the market for unskilled labour in Moscow was integrated with agricultural labour markets in its vicinity. Our concern is more with urban wages, however. Figure 4 show the wages of carpenters and building
labourers in Moscow, St. Petersburg, and Kursk. It is reassuring that wages were similar in Moscow and St. Petersburg as they were major industrial centres. Wages in Kursk followed a similar pattern but were somewhat lower. This is not surprising as Kursk was a much smaller place. In our international comparisons, we shall rely on Moscow and St. Petersburg wages as these cities were centers of industry.

**Russia in global perspective: Natural resources**

Russians have frequently compared their country to the United States. Both countries were large and richly endowed with natural resources. From the seventeenth to the nineteenth centuries, they were both frontier economies where settlement was pushed into more and more remote areas as transportation improvements opened up regions for agriculture, mining, and forestry. Population expanded rapidly to settle the frontier. Did these similarities in geography and demography lead to similar development outcomes?

Historians have claimed wondrous consequences from the American frontier. The first relates to the labour market and wages. H.J. Habakkuk argued that the chance to homestead a farm on the frontier raised the wage of unskilled labour in eastern cities and led to labour augmenting technical change. Most people living in eastern cities came from Europe, however, and the marginal migrant was British or Irish, so that the wage on the east coast of the United States was determined in London and Manchester rather than in North Dakota (Allen 2014). In Russia, people left the central provinces of the country to settle on southern steppes or east of the Urals, so wages were determined in the overpopulated farming regions. The situation, in other words, looks more like that of South America, where the Malthusian demography of the native population kept wages low, than like North America (Allen, Murphy, Schneider).

The second relates to politics. Frederick Jackson Turner famously argued that the frontier experience was the basis of American democracy. The Latin
American frontier did not have the same effect nor did the Russian frontier. It is more likely that the Russian frontier led to serfdom than to freedom, as the state attached farmers to the soil so they could be forced to pay rent and work for their lords rather than slip away from their control into empty spaces (Domar). The American South is a closer parallel to Russia than the American North.

The third relates to natural resources and industrialization. The USA did have an abundance of natural resources once the transportation infrastructure was in place that allowed their profitable exploitation. As Wright has shown, the natural resource intensity of American manufactures was very high in the late nineteenth and twentieth centuries. Whether resources really promoted American manufacturing, however, is an open question. The problem was that the American economy was closely integrated with the British, so the prices of most products exported by the USA were very close to British prices. In cases like iron, where the USA imposed a high tariff on imports, American prices were higher than British prices. Russia was like America in having abundant natural resources. Did it face the same obstacles in reaping rewards in industrial development?

The answer is yes since the same factors affected resource prices in Russia as in the USA. The first was globalization. The steam ship slashed ocean freight rates, and the railway lowered inland shipping costs. Figure 5 illustrates the impact of cheaper ocean freights on the price of wheat in Odessa in Russia, Alexandria in Egypt, Cawnpore in India as well as on the average British import price and the USA export price. The British import price was the highest, and wheat was exported from the other locations to satisfy the British demand for food. In the early nineteenth century, the British price was several times the price in Russia, India or Egypt. The difference indicates shipping costs. By the 1850s the American and Russian prices had converged to each other. Along with the Indian and Egyptian prices, they converged to the British price by the end of the nineteenth century as technological progress in shipping reduced ocean transport costs almost to zero. The biggest gainers were British consumers who saw the price of their carbohydrate staple cut in half. Prices in Odessa, Alexandria, and
Cawnpore were moderately higher after 1900 than they had been in the 1840s, and that rise gave impetus to settling the frontier. Prices on the frontier probably rose even more as railways cut inland shipping costs. These patterns were repeated for many other commodities.

A second feature of the nineteenth century that affected the link between Russia’s resource ‘abundance,’ and the price of resource products was commercial policy. Russia, like many countries, used tariffs and import bans to promote industrial development. While globalization tended to equate prices across the globe, tariffs had the opposite effect—they counteracted globalization and reintroduced price differentials. The United States, for instance, used tariffs to promote the expansion of its iron industry (an industry for which it had abundant supplies of coal and ore). As a result, iron prices in the United States greatly exceeded prices in other countries and were far higher than they would have been in the absence of the tariff. Iron and steel fabricating industries like automobiles reaped no reward from the abundant supplies of iron ore and metallurgical coal. Did the Russian tariff have the same effect?

We study the prices of five commodities that are also building blocks in our later comparisons. The only product for which Russia had low prices was lumber. Figure 6 shows the price (in US dollars per thousand board-feet) of soft wood construction lumber in Russia, the UK, USA, and Egypt. Russia and the USA both had vast forests of pine, spruce, and fir, and those resources did translate into low prices in industrial districts (Buffalo in the case of the USA and Riga in the case of Russia). The UK and Egypt lack such resources and imported timber. The price was similar in both countries and twice the price in Russia and the USA. The low prices in the latter two countries benefitted wood fabricating industries and capital investment generally by lowering the cost of erecting buildings.

Russia was not so fortunate with respect to other resource products. Copper was more expensive in Russia than in the USA or Britain (Figure 7). The figure shows Egyptian copper to have been much more expensive than elsewhere, but it may be that the Egyptian price is for copper artifacts rather than ingots as in the
other countries. Copper was heavily protected in Russia, and that may explain its high price.

Iron provides an interesting parallel with the USA. Britain and Egypt had the lowest prices. Britain was an exporter, and Egypt had only a nominal tariff, so international trade equalized prices in the two countries. The USA imposed high tariffs on iron and steel products, as did Russia, and prices in both countries were twice British prices in the first half of the nineteenth century (Figure 8). American prices began to decline in the late nineteenth century and converged to the British level after 1900. Convergence was the result of conflicting trends. Productivity growth and the exploitation of Mesabi ore and Connellsville coke cut US costs far below British costs, but the US Steel merger meant that prices did not drop as much as costs. Steel producers reaped the benefits of high productivity and cheap resources by keeping prices at British levels (Allen 2014). Prices declined later and more modestly in Russia than they had in the USA and remained substantially above those in the UK and USA. High prices were only possible with high tariff protection. While the iron and steel industry benefitted, the development of metal using industries was held back.

Figure 9 shows the price of bricks in the USA, UK, Egypt, and Russia. Bricks were not traded internationally, so one would expect the price to reflect local conditions. Thus, prices were lowest in Egypt in view of the low wage, and prices were higher and similar in the USA and UK since wages were higher. Bricks were most expensive in Russia, and it is not immediately clear why since wages were much lower than in the advanced countries of the West.

Energy was a fundamental input in most industrial processes. Human effort, animal traction, and wind were of declining importance in the nineteenth century. Energy in the form of heat was required for many metallurgical and other processes. Motive power was derived from falling water and from burning fuels in steam engines. Water power was important in the early industrialization of the United States and Great Britain. It was also used in Russia. We cannot compare the cost of water power in these countries. In all locations where water power was
availability, its supply was limited, and so its cost rose as the number of water wheels and turbines was increased. Eventually, the cost matched the cost of power from wood or coal. These were backstop technologies that supplied energy (in the case of coal) at roughly constant cost over a broad range of output. We can measure the cost of energy from wood or coal in many countries and, thus, compare the long run supply price of energy from the backstop technology.

In the middle ages, wood, in the form of charcoal or firewood, was the principal source of heat energy. Britain was the first country to engineer a shift from wood to coal. This transition, which took place between the sixteenth and the eighteenth centuries, required inventing a host of new technologies ranging from a new style house to reverberatory furnaces. This new technology was necessary since the sulphur in most coal required new designs for its isolation and elimination. The shift from wood to coal was governed by the relative prices of energy of the two fuels. In Britain, once the price of energy from wood fuel rose to twice the level of the price from coal, it became profitable to invent new technologies that used coal. The shift from wood to coal in the United States did not require such a large price differential since British technology could be used, thus avoiding the costs of R&D, and since the coal found on the east coast of the USA was anthracite, which was a cleaner fuel than the bituminous coal that was generally available. In Philadelphia, it was not until the 1830s, soon after the opening of the Schukyull canal that connected the coal fields to the city, that the price of energy from coal dropped below the price from wood. In Boston the transition only occurred in the 1870s. The corresponding transition occurred at about the same time in Russia. We can follow the prices of charcoal and bituminous coal in Kursk over the nineteenth century, and we know that the price of coal, at any rate, was the same at Kursk as in major cities. Early in the century, charcoal was the cheaper source of energy. From 1840 to 1875 the two fuels were equally expensive, and from then on burning coal was the least expensive.

While the transition from charcoal to coal cut energy costs in Russia, the country was remarkable for the high cost of energy throughout the nineteenth
century. Figure 10 compares energy prices across countries. The UK had the cheapest energy until the late nineteenth century. Anthracite coal on the east coast of the US was significantly more expensive. The development of cheap bituminous coal in the USA produced very similar energy prices in the 1890s. Throughout this period, energy was much more expensive elsewhere. In the late nineteenth century, coal in Alexandria, which was largely imported from Britain, was double the British price. Charcoal in Cairo, whose price is not shown, was even more expensive since it was brought by camel from the Sinai. Energy from wood in India was twice the cost of energy from coal in Alexandria. What is most striking is that energy in Russia, initially from charcoal and later from coal, was as expensive as energy from wood in India. The competitive position of Russian industry in general was shackled by the high cost of energy.

This survey of natural resource product prices has shown that the only commodity that was cheaper in Russia than in other places was timber. Everything else was at least as expensive in Russia. Why was this so? One reason was policy. In order to promote the growth of coal mining and metal smelting, the Russian government either prohibited imports altogether or subjected them to very high tariffs. The protected industries benefitted but the industries that processed their products suffered.

Underlying this policy stance, however, was a more fundamental problem. As the industrial revolution unfolded in Britain, her comparative advantage in manufacturing continuously increased. By the same token, the comparative advantage of other countries shifted to agriculture. The new technology of the Industrial Revolution was tailored to Britain’s high wage economy and so was not readily transferable to low wage competitors. In the case of India, for instance, the result was the conversion of the country from one of the world’s largest manufacturing nations to a so-called underdeveloped country that specialized in agriculture and imported its manufactured goods. This was not the traditional economic structure of India, but the result of the labour saving bias of the new British technology and the drop in world shipping costs that integrated markets and
gave the principle of comparative advantage a central role in determining economic structure. The USA avoided this fate since it was always a high wage country, so British technology always paid there—once the tariff allowed industry to exist at all. Russia had lower wages than the USA and so advanced technology was less appropriate to its circumstances. The scope for profitably adopting capital intensive technology, however, was broader than in India or Egypt since the peculiar Russian agrarian institutions produced higher wages in the industrial sector. Serfdom and the repartitional commune meant that Russia was a semi-peripheral rather than a peripheral player in the global system.

**Russia in global perspective: wages**

Cheap natural resources did not provide Russia with a competitive advantage in industrial development. Perhaps, as a poor country, Russia could advance on the basis of low wage labour? The study of the labour market is also important for the light it throws on living standards during the nineteenth century. Maddison’s per capital GDP estimates are usually used for this purpose, but they are unreliable indicators of incomes two hundred years ago since they are backward extrapolations of 1990 aggregates expressed in 1990 prices. When nineteenth GDP comparisons are made using nineteenth century prices, country rankings change dramatically (Prados). Also GDP per head ignores distributional issues. Both problems can be avoided using real wages.

Figure 11 shows the history of the nominal wage of labourers across the nineteenth century. The wages of skilled craftsmen tell a similar story, for skill differentials were similar in all of these countries. Philadelphia had the highest wages throughout the century, followed closely by Lancashire. Other leading cities in these countries had similar wage levels. India had the lowest wages, and Egyptian wages were not much higher. Wages in Moscow and St. Petersburg were higher than in Egypt and India but still considerably below wages in the West. Low
wages would seem to have given Russian firms a competitive advantage, unless, of course, the low wage simply indicated poor quality workers.

How did Russian wages translate into living standards? To find out we must compare them to the cost of living. Price indices can be tailored to the circumstances of particular countries, but in this case we use a broadly comparable index for all five countries to produce as much consistency in the results as possible. Our consumer price index is based on the basket of goods shown in Table 1. It is intended to supply 2100 kcals per person per day, which equals the US Department of Agriculture food security line and exceeds FAO food security lines. 2100 is an average across the population and so is consistent with adult males receiving 3600 calories, which they need to work, while young children, who need less, receive less. The budget contains modest quantities of non-food items as well as a 5% allowance for rent. The budget is intended to be a minimal standard of living.

**Russia in global perspective: capital**

Capital is the third factor of production that we consider. To gauge capital using costs, we compare the rental price of capital across countries and over time. The rental price is the original acquisition cost of a standardized piece of capital multiplied by the sum of the interest rate and the depreciation rate. Our calculations use interest rates on government debt, although these probably understate the opportunity cost of business capital. We set depreciation at 5%, which is perhaps too high but compensates for the understatement of interest rates. Since we do not have the acquisition cost of a standard piece of capital for all of these countries, we compute a proxy for it. Our proxy is the geometric average of a building labourer’s wage rate and a simple average of the prices of construction lumber, bricks, bar iron, and copper. The wage rate and the prices of the four materials are all converted to US dollars and standardized by dividing all values by the average wage and prices prevailing in the USA in the 1850s.
Figure 12 shows the price of capital services across countries and over time. What is most surprising about the figure is how similar the values are. Poor countries did not have a high user cost of capital. There was very little difference between Russia and Britain, for instance, in this regard. The reason is clear from the details of the calculation. On the one hand, Russia had higher iron, copper, and brick prices than Britain (only timber was cheaper in Russia), so that average price of materials was higher in Russia. On the other hand, building wage rates were lower in Russia. Taking the geometric average of these components produced rough equality in the two countries. With similar interest rates, the price of capital services was similar.

**Relative factor prices and the incentives to mechanize production**

Factor prices have an important bearing on the evolution of industrial technology by leading firms to chose one technique of production over another. Economic growth requires a continuous rise in output per worker, and that is effected by firms’ using more capital and energy per worker. Their choice of technique in this regard is determined by the wage rate relative to the price of capital services and relative to energy. How did the incentives faced by Russian firms compare to those in the rich countries and the poor countries during the nineteenth century?

Figure 13 shows the wage rate relative to the price of capital services. Russia occupied an intermediate position between Egypt, on the one hand, and Britain and the USA, on the other. We do not have complete data for India, but conditions there were similar to those in Egypt.

Figure 13 implies that Russian industry should have been more capital intensive than Egyptian or Indian industry but less capital intensive than USA or British industry. This subject warrants much more research, but the available evidence points in this direction. In the nineteenth century, most cotton was woven by hand in India and Egypt. In contrast, the power loom was extensively
employed in Russia. Fully automatic looms like those coming into use in the USA in the late nineteenth century were not used in Russia, however. In this important industry, Russian occupied the intermediate position in capital intensity that Figure 13 would imply.

While Russian firms had stronger incentives to use machinery than their counterparts in Egypt or India, the same cannot be said for energy intensity. Figure 14 shows the wage rate relative to the price of energy in the five countries. Egypt and India had the lowest wage rates relative to energy prices, and the USA and Britain had the highest. The Russian ratio was slightly higher than that in Egypt and India but very much lower than the ratio in the USA or Britain. Russia’s relatively high wage (compared to India and Egypt) was offset by the very high prices of charcoal and coal in Russian cities. These high prices reduced the incentive of Russian firms to use steam technology and raised costs considerably in energy intensive industries like iron and steel production.

**Conclusion**

In this paper, we have highlighted the importance of four factors that governed the evolution of the Russian economy in the nineteenth century–geography, demography, rural institutions, and state poverty.

Geography includes the vast size of the country, the mineral and forestry resources, and the huge amounts of agricultural land that were in use and unused but capable of development.

Demography refers to the small size of the population in 1800 in comparison to the country’s agricultural land. The high land-labour ratio meant that Russia’s comparative advantage lay in agriculture. Demography also refers to the positive check Malthusian regime that generated high fertility and population growth even with very low incomes. This demographic regime meant that Russia would be a low wage country. In this respect, Russia was like India and Egypt.
State policy includes the creation of a railway network that continuously expanded the area that could be profitably cultivated. As a result the population could continue to grow. The continuous expansion of agricultural exports meant that the exchange would not fall enough to make manufacturing profitable: the extensive farmland, in other words, meant that Russia’s comparative advantage lay in agriculture. Again, Egypt and India were similarly placed.

A second policy response was high tariffs to encourage manufacturing, and they raised the prices of most resource products and manufactured goods substantially above world levels. The production of iron may have been encouraged, but firms that fabricated iron were disadvantaged. Egypt tried even more draconian investment policies in the early nineteenth century under the rule of Mohammed Ali, but these policies were eliminated by the imperialist powers. Imperialism also prevented India from using tariffs to promote industry. Egypt and India lacked the industrial development realized in Russia.

Russia’s peculiar agrarian institutions also played a role in shaping that development. Serfdom was rooted in geography since the nobility could collect rents from the peasants only if they were prevented from relocating to vacant land out of reach of the lords. Serfdom and the reparatitional commune that generally replaced it reduced the supply of labour to industry. As a result, urban real wages were considerably higher than wages in India and Egypt. Further effects included the expansion of handicraft production in the villages, and, at the same time, incentives to make industry more capital intensive and thus more ‘advanced’. Economic dualism was pronounced in Russia due to rural institutions that were responses to the country’s geography, an enduring determinant of Russian history.
Table 1.
Subsistence Basket

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Figure 1.

Figure 2.
Figure 5. Wheat prices around the world

Figure 6. Wood, $ / th Bdft
Figure 7.

![Copper $ / lb graph](image)

Figure 8.

![Iron $ / ton graph](image)
Figure 9.

Bricks $ / th

Figure 10.

Price of energy, $ / mil.BTU
Figure 11.

USA, UK, RUS, Egypt, wages $/day

Figure 12.

USA, UK, RUS, Egypt, pcap
Figure 13.

USA, UK, RUS, Egypt, w/pcap

Figure 14.

Wage / price energy
Figure 14.

References


Prados, Leandro