

## **How demographic shocks affected the production-factor income and the institutional path of the Russian pre-industrial economy<sup>1</sup>**

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*Abstract.* The author considers several Russian cases of population-loss shocks in the 14th — 17th centuries and their consequences for the production-factor markets, comparing them with those in England. The article aims at verifying theoretical ideas and at tracing the institutional path of mediaeval Russia's development based on the empirical data represented in the research works, two chronicles and the legal act (Code of 1649). The author's review of narratives and statistical data contributes to the historical comparative studies of economic systems and of the path dependence in the institutional economic history. The article contributes to the explanation of the causes of the 'Little Divergence' between (North)western and (South)eastern Europe in the 15th — 19th centuries, and of the roots of the 'Great Divergence' between Europe and Asia in the 18th — 20th centuries. The author argues that the empirical evidence from the Soviet Marxist economic historiography is consistent with the recent findings of the neo-Malthusian structural-demographic theory supported by the Cliodynamics school of quantitative history. After the shocks, wages rose in Russia just as in England. The dynamics of the skill premia highlights the background for formation of human capital ingredients in the bowels of the pre-industrial societies. Contrary to England, serfdom, one of the most extractive institutions, remained in Russia as a response of landlords to the pressure from the disadvantageous combination of production-factor incomes, which led to an increase in land rent to wage ratio and to reliance on land-saving (versus labour-saving) technologies in agriculture.

*Key words:* land rent, real wage, skill premia, Black Death, Time of Troubles, serfdom, Malthusian growth regime, structural-demographic theory

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The covid-19 pandemic with its global economic disturbances revived interest in external shocks and their effects in the past<sup>2</sup>. Shocks (wars, epidemics, climate change) inevitably change the balance of production factors, affect economic agents' choices, and might also trigger subsequent patterns of economic growth and institutional development. The most obvious example of this type of shocks is the plague pandemic in the 14th century (Black Death).

In recent decades, economic historians have discussed the significance of the Black Death for the development of Western Europe<sup>3</sup>. Many argue that it was a turning point in the economic history of England and the West. They also consider it crucial for the 'Great Divergence' between Western Europe and East Asia (e.g.: Grinin, Korotayev, 2015). However, the importance of the Black Death varied by region — with extremely high mortality in England and with lower mortality in other parts of Europe, including Russia which faced other demographic shocks in the 14th — early 17th centuries under the centralizing imperial statehood.

The Black Death shock had different effects in various parts of Eurasia contributing to the 'Little Divergence' between Northwestern and Southeastern Europe (e.g.: Allen, 2001; de Pleit, van Zanden, 2013; Fochesato, 2018). In Northwestern Europe, wages rose, decreasing the land rent to wage ratio. This ratio is a key to identifying the unique pattern of the pre-industrial rural economy based on land cultivation<sup>4</sup>, while the production-factor incomes determined the paths of institutional development. Any change in the path is associated with high transaction costs and, therefore, is rare (North, 2005; Nureev, Latov, 2010).

Under the pre-industrial technological regime, various factors led to one-time rises in per capita GDP, although none seems to have led to the sustainable growth. Large drops in population caused by natural calamities, wars, conflicts and pandemics were not rare in pre-industrial societies with the predominantly rural economy. Their importance for the economic well-being was stressed by T. Malthus in the late 18th — early 19th century. The Malthusian regime implies a very weak trend to economic growth if any. It is rather a long-term stagnation, with oscillations depending on the population pressure on natural resources. In the pre-industrial era, land was the key production factor with limited supply, which implied that an average output per worker would fall as the labour supply increased, and, vice versa, an output would grow as the labour supply decreased, as long as the technology remained unchanged. In this framework, external

2. Translation of McNeill (1976) in Russian is a sign of interest.

3. Borsch, 2005; Pamuk, 2007; Campbell, 2009; Malanima, 2012; Clark, 2016; Jedwab et al., 2022.

4. Animal husbandry also needed pasture land.

### Waves of the Black Death

There were several waves of the Black Death in Russia (including the areas under the Golden Horde and Lithuania) from the mid-14th to the late 15th century (e.g.: Urlanis, 1941; Langer, 1975). Frequent high mortality was caused by diseases and natural calamities (drought, floods, storms), and Kahan's catalogue includes 19 cases of epidemics in the 14th century — more than in any other century (Kahan, 1968: 365). Russia's population losses caused by the Black Death (which mainly affected densely populated areas on its way from Western Europe) are somewhat moderate compared to Britain, while being roughly equal to that of non-British Western Europe. Langer (1975: 62) argues that Russia lost at least 25% of its population, not explaining whether as a result of a one-off event or as the cumulative effect of multiple smaller shocks. The latter is more likely as the pre-plague situation (of the mid-14th century) was restored only by 1500. However, negative effects of the plague were exacerbated by Russia's slow recovery from the Mongol invasions.

Nefedov (2002) cites Urlanis (1941: 347) to claim that in Russia, given lower population density than in Europe, the first wave of the Black Death in the mid-14th century did not lead to mortality exceeding 5% of the population, which could be restored in 3–4 years; moreover, in rural areas mortality was much lower. The subsequent wave of the Black Death (Nefedov, 2002; Turchin, Nefedov, 2009: 240–241) was even more disastrous, based on the archaeological findings — leather shoe remnants and birch scrolls in Novgorod cultural layers from the first half of the 15th century. In Northwestern Russia (Novgorod and Pskov, highly developed trade centres), the drop in population was caused by famines and epidemics, while in the central region (Moscow, the Upper Volga), the main causes were civil war and invasions, with famine and disease as secondary consequences of the social-political instability (Nefedov, 2002).

*The Chronicle of Novgorod* reports two outbreaks of plague in 1352–1360, three outbreaks in 1389–1406, and four — in 1417–1424. The most disastrous was probably the one in 1417: “The same summer and winter, there was a fearful plague in Novgorod, Ladoga, Russa, Porkhov, Pskov, Tver, Dmitrov, Torzhok, their districts and villages. And how can I explain the fearful and terrible misery during the whole plague? What grief the living had for the dead, the deaths increased so in towns and villages that the living had barely time to make the dead tidy for burial; so many died every day, that they had no time to bury them; and many houses were closed unoccupied. First of all it would hit one as if with a lance, choking, and then a

swelling would appear, or spitting of blood with shivering, and fire would burn one in all the joints of the body; and then the illness would overwhelm one; and many after lying in that illness died” (*The Chronicle*, 1914: 186).

*The Pskov 3rd Chronicle* reports more frequent outbreaks of plague (three in 1352–1370, four in 1390–1407, two in 1425–1426, and six in 1442–1487). Some of the outbreaks were the same as reported in *The Chronicle of Novgorod*, and related either to Pskov or Novgorod. *The Pskov 3rd Chronicle* provided more evidence than that of Novgorod, especially during the first outbreak (1352), with the most detailed report: “And so it was in those days: because of the great numbers of the dying, priests could not bring the dead from homes one at a time, so they gave orders that each person brought his dead to the churchyard. In one night, thirty or more corpses might accumulate to be buried from a single church. They all received a communal funeral service with hymns, but each man, woman or child was given individual absolution, and then three to five bodies were buried in a single grave. That is how it was at every church. There was nowhere to bury the dead, for all the graveyards were filled, so large tracts outside of the churches and graveyards were dug up and the dead were buried in them... No matter what class the sickness affected, be it rulers, the rich, common people or even the poor, it was terribly deadly: over half died quickly, very few survived, and the rest perished” (*The Pskov 3rd Chronicle*, 2016: 63).

These Chronicles provide insufficient information on wages to make conclusions on their dynamics, so we turned to the research works. Skilled labour was in short supply even before the plague due to the slow recovery after the Mongol invasion, which led to the peasants’ forced labour and the rise in urban slavery (Langer, 1975: 62–63). The plague facilitated expansion of monasteries, most were built not in towns or cities but in forest hinterlands. The growth of rural monastic estates was accompanied by an expansion of their urban branches which were generally exempt from the princely administration and taxation. Monasteries virtually dominated local labour markets for craftsmen and traders by attracting them to their tax-exempt urban enclaves, and they could also purchase slaves. Thus, non-ecclesiastical craftsmen were in a disadvantageous position.

Turchin and Nefedov (2009: 242, 246) argue that in the 1520s, an unskilled worker in Moscow received a relatively high wage (11 kg of rye and oats per day versus 3.6 kg in 1568), approximately the same in calories as unskilled workers in Germany in 1490–1510. As to land rents, in Central Russia, in the early 16th century, peasant family had to pay the lord one sixth of crops from the cultivated land.

This demographic cycle ended in the 1560s with the wars in the West (Livonia, Poland-Lithuania, Sweden) and in the South (Crimean Khanate), intra-elite terror by Ivan IV the Terrible (*oprichnina*) and excessive extraction from households. Famines and plague outbreaks

resulted in the population decline in the 1570s, which was not assessed nationwide but locally — a third, forty percent or even a half or more. Nefedov (2003: 68–70) argues that this led to a decrease in land rent by a factor of three on gentry estate lands and two on state-owned lands, and state extraction from peasant households declined three- or fourfold. Real wages increased by a factor of 2.5 for unskilled and of 2 for skilled workers (carpenters, tailors). Thus, the demographic shock led to smaller skill premia in Russia, which was the same in England after the Black Death (Clark, 2007: 180–181, 225, 276).

### Time of Troubles

A drop in population proportionally to England occurred in Russia in the early 17th century, after the “great famine” of 1601–1603, subsequent violent revolts, external military conflicts and state failure (“Time of Troubles”). Unfortunately, the quality of the Russian statistics was very poor until 1700. Therefore, only expert assessments are available. Turchin and Nefedov (2009: 256) argue that the famine of 1601–1603 caused by natural calamities and lack of food killed almost a third of the population.

Due to two demographic catastrophes over a hundred-year period — from the mid-16th to the mid-17th century, the Russian population decreased by about half, and the region around Moscow experienced the worst devastation, decreasing by 8–10 times (Turchin, Nefedov, 2009: 261). Such heavy losses were due not only to famines and diseases but also to the subsequent civil war and invasions.

As for quantitative estimates of the consequences of the “great famine” and other “troubles” for the Russian labour market, Turchin and Nefedov (2009: 258) mention that servant wages in monasteries increased by 50 percent compared to pre-famine years. Strumilin (1966: 36–39, 50–53, 56, 62) assessed the wages of artisans and hired workers as historically high compared with both Kievan Rus and the second half of the 19th century<sup>5</sup>. He represented the Soviet official Marxist historiography insisting on the trend of worsening living conditions and increasing extraction: he argued that in the 17th century even rural labour was relatively well-paid mainly due to its shortage.

The scholars cited above believed that pandemics, famines and invasions led to the substantial decrease in population and, thus, to an increase in relative wages (also through grain price deflation), cuts in skill premia and reduction in land rents in 15th, 16th and 17th century. These ideas were based on the published monastery records

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5. In Strumilin (1966: 23–99), who used both silver and consumer-basket measures to compare wages in pre-Revolutionary Russia, one can see the longest period of wages dynamics — from the early 11th to the early 20th century, and it covers mainly the European part and the Urals (since the 18th century).

and findings of other scholars in the 1920s and 1930s (B. D. Grekov, M. N. Tikhomirov).

Somewhat similar evidence can be found in Hellie (1999: 413–473) on early 17th-century Russia just after the Time of Troubles. He considered wages in silver rubles and did not apply any price index to the slightly rising (in most cases) nominal wages, although being aware of the inflation in the 17th century. However, even without the reduction in the silver weight of coins by a third in 1636 and the failed attempt to introduce copper coinage in the 1660s, prices were subject to inflation as the relative value of silver decreased. If we apply the price index from Strumilin (1966: 76, 168–169), we would see that after the Time of Troubles wages were significantly higher than in the mid-17th century, not to mention the end of the century. Skill premia (carpenters and smiths versus labourers and peasants) somewhat decreased throughout the period.

Some data on wages are compared with grain prices and converted to grain in Nefedov (2010: 26–29). They are also compared with prices in Western Europe at the start of the demographic cycle (early 16th century). Nefedov argues that wages in Russia were relatively high after the Time of Troubles, and real wages increased from the 1640s to the 1690s due to the colonisation expansion to the resource frontier both in the south, to fertile black soils, and in Siberia with its cold climate but low population density and abundant natural resources. This exacerbated labour shortage in the centre of the country and made the elite impose restrictions on labour mobility.

### **The path to serfdom and from it**

Turchin and Nefedov (2009: 254–255) argue that the root of the continuing instability, which eventually led to the state collapse and civil war, was an acute shortage of labour, economic distress of elites, and the financial crisis of the state, which made the nobility use coercive methods to maintain their income level. While in England and France these attempts failed, in Poland, Prussia and Russia the elites were successful in enserfing peasants, which supports the neo-Malthusian structural-demographic theory by Goldstone (1991)<sup>6</sup>. According to it, the state capacity cycle is determined by the demographic impact on the economic, political and social structures of the traditional agrarian societies. The key driver is that population usually grows faster than resources that are basically a function of the technological level. Population growth in excess of land productivity has a fundamental effect on social structures, and the typical changes are higher rents and land prices, increasing fragmentation of peasant

6. This theory was revitalised by the Cliodynamics school of quantitative history (e.g., Turchin, 2003).

households and number of landless peasants, i.e., peasant migration to cities — urbanization (Turchin, Nefedov, 2009: 7).

Thus, serfdom in Russia was a response to labour shortage, finally enshrined in the Law Code (*Sobornoe Ulozhenie*) of 1649<sup>7</sup> and abolished more than two centuries later, in 1861. In Russia, serfs were in private<sup>8</sup>, state and tsar-family property. Serfdom basically meant being of the lord, agricultural or manufacturing, in the European part of Russia, while in the sparsely populated Siberia and Far East serfdom rarely existed, as these regions were the frontier of colonization. Serfdom varied by region: in some areas (fertile soils with profitable grain production and large estates) it was closer to slavery, in other areas serfs could be engaged in entrepreneurial activities (sharing incomes with their lords). In proto-industry it meant forced (vs hired) labour, with dual payments (in cash and in kind), normally of a smaller size compared to the hired one. However, wages for forced labour were a matter of incentives.

Due to the long period of serfdom in Russia (from the second half of the 15th to the mid-17th century), the term “second serfdom” was introduced to identify these later medieval forms of peasant dependency. Such practices in Russia, Prussia, Lithuania, and some parts of Poland show that in general “second serfdom” was not so much a form of slavery as a set of legal limitations of labour mobility and was determined not so much by labour shortage as by increasing demand for agricultural labour (Stanziani, 2014: 137).

The economic explanation of the enserfment in medieval Russia was proposed in Domar (1989: 225–234) based on the narrative by the prominent pre-Revolutionary Russian historian V. O. Klyuchevsky (1960 [1906]). According to Domar (1989: 226), “the servitors tried to live off rents (in one form or another) from their estates. But the estates could not provide enough rent for the simple reason that land in Russia was not sufficiently scarce compared to labour, and ironically, was made even less scarce by Russian conquests. The scarce factor of production was not land but labour; thus, the ownership of peasants rather than of land could bring income to servitors or any non-working landed class’, thus, decreasing the land rent to wage ratio. As a rule, serfs were sold with land (often by villages), and otherwise was considered detrimental to the social order, which is why the emperors’ rescripts either limited or prohibited it. Therefore, it is not possible to directly separate two asset prices (land and human capital) before 1861. However, according to the available data<sup>9</sup>, the

7. The Muscovite Law Code..., Chapter 11.

8. With some temporary exceptions, only the nobility had the right to own serfs.

9. According to Domar (1989: 232–233), “In Pushkin’s *Dubrovsky*, old Dubrovsky is an owner of 70 souls, and Prince Vereisky of 3000; in *The Captain’s Daughter*, the commandant’s wife is impressed by Grinev’s father’s 300 souls; in Gogol’s *The Dead Souls*, Plyushkin owns more than 1000 souls; in

size of land was of less importance than the number of serfs ('souls') when the landlord's social status was concerned.

For Russia, Moon (2001: table 2.1) shows the dynamics of the state and private extraction in the 18th century. On average, estate owners increased peasants' obligations in both dues (basically in cash, rarely in-kind, payments to the lord — *obrok*) and corvée labour (cultivation of the landlord's land — *barshchina*) faster than the rate of inflation, measured in grain prices, while the state increased the direct taxes, including from nobles' serfs, much slower than the rate of inflation. Thus, throughout the 18th century, the average male serf's obligations in dues increased in real terms by 1.69 times and in labour by 2.5 times, while the average direct taxes fell in real terms by two-thirds, i.e., the growing part of the product of private serf labour was extracted by estate owners rather than the state.

These findings are consistent with the Marxist-Soviet historiography's emphasis on private extraction, both on peasants' dues and corvée labour<sup>10</sup>, and with Mironov's estimates (2018: 63) that in 1701-1800 private incomes from peasant's dues increased by 62% in real terms and then by 70-90% in 1801-1860. Domar (1989: 239-279) used the prices of land with and (theoretically) without peasants to argue that serfdom was profitable to the nobility until 1861. Thus<sup>11</sup>, the reasons for its abolition were mainly ideological and cultural rather than just economic<sup>12</sup>, which is similar to the ideas of Fogel and Engerman (1974) on slavery in the U. S. South.

Several measures were taken by the Imperial government in the first half of the 19th century to limit private serfdom to prepare its abolition. One such measure was the state peasant reform of 1837-1841 under the supervision of P. D. Kiselev (Andreeva, 2019: 27-45, 85-102)<sup>13</sup>. In the first half of the 19th century, 10% of serfs were emancipated from nobles' private ownership; a comparable number of

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Goncharov's *Oblomov*, the principal hero owns 350; in his *A Common Story*, Anton Ivanich has 12 mortgaged over and over again".

10. E.g.: Lyashchenko (1956: 498) documented the sample size of dues over time, that multiplied from the 1760s to the 1820s (especially in the 1760-1780s), even taking into account high inflation.
11. Co-authored with M. J. Machina.
12. In recent works, this idea is supported by Mironov (2018: 62-80).
13. Pavel Dmitrievich Kiselev, a staunch opponent of serfdom, was the head of the Ministry of State Properties, with multiple local branches, for eighteen years (1837-1854). The organization of the ministry reflected his initiative to improve the administration of state-owned peasants (about a third of the population). He and his proponents suggested reforms to introduce new mechanisms for the government administration of private serfs after their gradual emancipation. However, there is a historiographical debate about the impact of these bureaucratic activities on the subsequent emancipation of the serfs in 1861.

men were emancipated through the military service (Mironov, 2018: 61); thus, the share of private serfs decreased<sup>14</sup>.

However, after the emancipation of serfs in Russia (1861), restrictions on labour mobility were lifted very slowly, the Stolypin reform (initiated in 1906) was to enhance peasant mobility but its development took more than two decades. The limited access of individual peasants to land, compared to communes or households, in order to sell it or leave it in inheritance hindered economic growth even in the late 19th century (Leonard, 2011: 140).

Moreover, according to Buggler and Nafziger (2021), Russian serfdom generated persistent constraints on urbanization and structural change, resulting in slower city growth, industrial and infrastructure development, lower educational and income levels. This long-lasting effect can be seen not only in the late Imperial and Soviet periods but also in post-Soviet Russia. Markevich and Zhuravskaya (2018) identify negative effects of serfdom in the economic changes until 1897.

Considering the impact of serfdom on human development, Eklof (1986) provides convincing historical data that regions with harder serfdom had fewer schools per thousand inhabitants before emancipation. However, Buggler and Nafziger (2021: 14, appendix tables H1, H2) did not find such significant differences for about fifty years after the emancipation; although they agree that the serfdom did affect negatively educational level (years of schooling). Many authors insist on the relationship between labour coercion, income/wealth inequality, political institutions, and the provision of public services, including school education. Many such works follow the unified growth theory which stresses the key role of human capital under the reduced fertility rates due to the positive economic shocks, such as agricultural factors that increased output, during the transition to the modern economic growth regime (e.g., Galor et al., 2009). For Russia, this was proved by the comparison of measures for land concentration (that strongly related to serfdom before 1905) with numeracy (Baten, Hippe, 2018).

### **Land rent vs wage under the serfdom**

The difference in urbanization rates between Western Europe and Russia affected the wage structure as the growth of urban manufacturing is associated with higher wages. In the 17th and 18th centuries, nominal wages (in grams of silver) in the urban core of Western Europe (the Low Countries, England) were about three times higher than in the ‘periphery’ (Poland) (van Zanden, 1999).

A pattern of de-urbanization combined with a shift of handicraft industries from urban to rural areas can be identified in Russia.

14. From 51.7% in 1811 to 39.2% in 1857 (Mironov, 2018: 61, citing Kabuzan, 1971); from 50.11% in 1811 to 36.46% in 1857 (Moon, 2001: table 3.1a).

Strumilin (1966) found that both in the early 11th century and early 20th century the hired worker was paid almost the same consumer basket<sup>15</sup>. However, according to Strumilin (1966), in the 17th century, each kind of labour was paid its proper rate due to its shortage, which is consistent with the neo-Malthusian structural-demographic theory. Likewise, in the 18th century, hired labour in manufacturing<sup>16</sup> was paid relatively high despite declining labour market dynamics (for both hired and forced labour). After this period of income stability, according to Shipilov (2008), the real workers' wages at the end of the 19th century decreased significantly compared to the first half of the 18th century, with the main decrease from the middle of the 18th century to the early 19th century. The data in Shipilov (2008) supports the ideas of both Mironov (2012) and Nefedov (2011): some improvement in well-being in the late 19th — early 20th centuries was accompanied by its significant fluctuations and at first seemed to be a correction of the secular downward trend of real wages in manufacturing from the mid-18th to the early 20th century. The data in Strumilin (1966: 55–56) shows that skill premium in ironworks (near Moscow and in the Urals) declined over the two centuries: from 8.5 in the mid-17th century to 2.233 in the mid-18th century. According to Leonard (2011: 240–241), by the Emancipation (1861), the land rent to wage ratio was low due to the land abundance. Even if this was true for the country on average, there could be macro-regional differences.

Southern Russia with its black soils was colonized in the 17th–19th centuries, and wheat and rye were cultivated here, most extensively in the steppe since the mid-18th century. This is more capital intensive compared to non-black-earth regions; therefore, new labour-saving technologies might have been introduced in the black soil areas if factor prices were close to those in England. There were two major forms of extraction — labour and dues. In the 1850s, dues (associated with labour saving) prevailed in the low fertile non-black-earth regions (Moon, 2001: table 2.2), while labour services (associated with land saving) — in black-earth ones and in Western Borderlands (Ukraine, Belorussia, Lithuania), as productivity was enhanced predominantly in the Black Earth area, thus making labour more attractive. In less fertile non-black-earth areas, land was much less productive than capital, making money dues more attractive. Thus, the lower agricultural productivity in the non-black-earth regions

15. This consumer basket depends on the improvements in living conditions due to a number of new products, despite multiple devaluation of the silver currency and several times growth of labour productivity.

16. The share of serfs' forced labour in Russian manufacturing increased significantly during the Petrine reforms in the early 18th century, when the sector's development was boosted by the government efforts, and the trend remained until the end of the 18th century. While in the first half of the 19th century the opposite trend prevailed, and by 1861 the share of serfs had already been reduced to 12.6% (Strumilin, 1966: 52, 80).

made the major source of the dues the peasants' off-farm earnings (craft production, then part-time manufacturing employment).

However, we should not overestimate the technological progress in the black-soil areas, which at the initial stage was quite primitive. The available data shows that technologies used in the fertile black-earth regions with prevailing labour dues were not always labour saving and not all types of technologies were used there (Natkhov, Vasilenok, 2021): for instance, ploughs were accepted unlike carpentering. Lyashchenko (1956: 494, 498, 502, 506) argues that technologies used in the black-soil areas by peasants and in landlords' estates were not much different and were primitive in the first half of the 19th century. While labour productivity seemed to be stagnant, landlords tended to increase their income by expanding the cultivated land for grain production and sometimes for sugar beet. Milov (1998: 38, 64-65) adds some details for the 18th century — on the three-field system of agriculture and its modification under the struggle with weeds. Ostrovsky (2013: 88-94, 159) reports that even the two-field system dominated in the black-earth south until the early 20th century, while the three-field system with natural fertilizers was only introduced in the mid-19th century, later than in other provinces.

According to Clark (2016), in England land rents dropped significantly in the 14th century, with real wages going up — this trend was typical for Northwestern Europe (Pamuk 2007) and supported the development of labour-saving technologies, including an increase in farm size, which also required more technology to till land. Although there was a demand for labour-saving technologies in England, labour productivity in agriculture increased insignificantly from 1200 to 1500.

In agriculture, reliance on labour-saving technologies meant physical capital accumulation on the way to the growth of productivity of land and labour. On the contrary, reliance on land-saving or capital-saving technologies meant the sustainable labour-intensive agriculture. There was no way out of this poor equilibrium without external impact. In Russia, it was the state to ensure an escape from the Malthusian trap, however, the discussion of costs and benefits of Russia's path to the modern growth is beyond the scope of this article.

Thus, in some historical studies on England (Broadberry et al., 2015), the macroeconomic upheaval after the outbreak of the Black Death is associated with an attempt to overcome the Malthusian trap. Although the trend of accelerating real-output growth started only in the 17th century (around 1700, according to Clark, 2015), it was after the Black Death that the output started to grow faster than the population, thus ending the Malthusian phase. The institutional choices made under the consequences of the Black Death and other demographic shocks set the different paths of development for Russia and England (i.e., Central Eurasia and Western Europe). Russian mediaeval history shows that demographic shocks may either alleviate

intra-elite warfare (first half of the 15th century) or contribute to the intra-elite competition and state failure (late 16th century — early 17th century). In turn, social-political instability negatively affected the population dynamics by decreasing birth rates and increasing death rates and by undermining the production institutions.

The negative population shock was stronger in England than in Russia. Nevertheless, it affected the market rate of both land and labour in two countries. In Russia wages rose just as in England; skill premia declined in both countries; however, not necessarily increasing in the subsequent periods of the population recovery growth. In England, falling land rents and rising wages reduced the land rent to wage ratio considerably, resulting in more labour-saving technologies and capital-intensive farming. Contrary to England, in Russia land owners retained more power at the expense of labourers, which limited the decline in the land rent to wage ratio under the second serfdom. Unlike England, Russian serfdom, one of the most extractive institutions, survived in several waves of population shocks, which led to the elevated land rent to wage ratio (above the theoretical equilibrium without restrictions on labour mobility) and to the reliance on land-saving rather than labour-saving technologies in agriculture. All these factors hampered urbanization and human capital development and produced long-lasting negative effects, thus, contributing to the ‘Little Divergence’ between the (North)western and (South)eastern parts of Europe.

## References

- Allen R. (2001) The great divergence in European wages and prices from the Middle Ages to the First World War, *Explorations in Economic History*, vol. 38, no 4, pp. 411–447.
- Andreeva T.V. (2019) *Na dalnyh podstupah k Velikoi reforme: Krestijansky vopros v Rossii v tsarstvovanie Nikolaya I* [Distant Approaches to the Great Reform: The peasant question in Russia in the reign of Nicholas I], Saint Petersburg: Istoricheskaia illiustratsiia.
- Baten J., Hippe R. (2018) Geography, land inequality and regional numeracy in Europe in historical perspective. *Journal of Economic Growth*, vol. 23, no 1, pp. 79–109.
- Borsch S.J. (2005) *The Black Death in Egypt and England: A Comparative Study*, Austin: University of Texas.
- Broadberry S., Campbell B., Klein A., Overton M., van Leeuwen B. (2015) *British Economic Growth 1270–1870*, Cambridge: Cambridge University Press.
- Buggle J., Nafziger S. (2021) The slow road from serfdom: Labor coercion and long-run development in the former Russian Empire, *Review of Economics and Statistics*, vol. 103, no 1, pp. 1–17.
- Campbell B. (2009) Factor markets in England before the Black Death, *Continuity and Change*, vol. 24, no 1, pp.79–106.
- Clark G. (2007) *A Farewell to Alms: A Brief Economic History of the World*, Princeton: Princeton University Press.
- Clark G. (2015) Markets before economic growth: The grain market of medieval England. *Ciometrica*, vol. 9, no 3, pp. 265–287.
- Clark G. (2016) Microbes and markets: Was the Black Death an economic revolution? *Journal of Demographic Economics*, vol. 82, no 2, pp. 139–165.

- De Pleijt A. M., van Zanden J. L. (2016) Accounting for the “Little Divergence”: What drove economic growth in pre-industrial Europe, 1300–1800? *European Review of Economic History*, vol. 20, no 4, pp. 387–409.
- Domar E. D. (1989) *Capitalism, Socialism, and Serfdom*, New York: Cambridge University Press.
- Eklöf B. (1986) *Russian Peasant Schools: Officialdom, Village Culture, and Popular Pedagogy, 1861–1914*, Berkeley: University of California Press.
- Fochesato M. (2018) Origins of Europe’s north-south divide: Population changes, real wages and the ‘little divergence’ in early modern Europe, *Explorations in Economic History*, vol. 70, pp. 91–131.
- Fogel R. W., Engerman S. L. (1974) *Time on the Cross: The Economics of American Negro Slavery*, New York: W. W. Norton and Company.
- Galor O., Moav O., Vollrath D. (2009) Land inequality and the emergence of human capital promoting institutions. *Review of Economic Studies*, vol. 76, no 1, pp. 143–179.
- Goldstone J. A. (1991) *Revolution and Rebellion in the Early Modern World*, Berkeley–Los Angeles: University of California Press.
- Grinin L., Korotayev A. (2015) *Great Divergence and Great Convergence: A Global Perspective*, Heidelberg: Springer Cham.
- Hellie R. (1999) *The Economy and Material Culture of Russia, 1600–1725*, Chicago: University of Chicago Press.
- Jedwab R., Johnson N. D., Koyama M. (2022) The economic impact of the Black Death, *Journal of Economic Literature*, vol. 60, no 1, pp. 132–178.
- Kabuzan V. M. (1971) *Izmeneniia v razmeshchenii naseleniia Rossii v XVIII — pervoi polovine XIX v. (Po materialam revizii)* [Changes in the Distribution of the Russian Population in the 18th — First Half of the 19th Century (Based on the Population Count Records)], Moscow: Nauka.
- Kahan A. (1968) Natural calamities and their effect upon the food supply in Russia (an introduction to a catalogue), *Jahrbücher für Geschichte Osteuropas*, Bd. 16, H. 3, s. 353–377.
- Klyuchevsky V. O. (1960 [1906]). *A History of Russia*. Transl. by C. J. Hogarth, in 5 vols., New York: Russell and Russell.
- Langer L. N. (1975) The Black Death in Russia: Its effects upon urban labor. *Russian History*, vol. 2, no 1, pp. 53–67.
- Leonard C. S. (2011) *Agrarian Reform in Russia. The Road from Serfdom*, Cambridge University Press.
- Liashchenko P. N. (1956) *Istoriia narodnogo khoziaistva SSSR* [History of the Soviet National Economy], vol. 1, Moscow: IE RAN.
- Malanima P. (2012) The economic consequences of the Black Death. Ed. by E. L. Cascio. *L’impatto della ‘peste antonina’*. Bari: Edipuglia, pp. 311–328.
- Markevich A., Zhuravskaya E. (2018) Economic effects of the abolition of serfdom: Evidence from the Russian Empire. *American Economic Review*, vol. 108, no 4-5, pp. 1074–1117.
- McNeill W. H. (1976) *Plagues and Peoples*, New York: Anchor Books, Doubleday.
- Milov L. V. (1998) *Velikorussky pakhlar i osobennosti rossiiskogo istoricheskogo protsessa* [The Great Russia Plowman and Peculiarities of the Russian History], Moscow: ROSSPEN.
- Mironov B. N. (2012) *The Standard of Living and Revolutions in Russia, 1700–1917*. Ed. by G. L. Freeze, Abingdon: Routledge
- Mironov B. N. (2018) *Rossiiskaya imperiya: ot traditsii k modernu* [Russian Empire: From Tradition to Modernity], vol. 2, Saint Petersburg: Dmitry Bulanin.
- Moon D. (2001) *The Abolition of Serfdom in Russia, 1762–1907*. New York: Longman.
- Natkhov T., Vasilenok N. (2021) Skilled immigrants and technology adoption: Evidence from the German settlements in the Russian empire. *Explorations in Economic History*, vol. 81.
- Nefedov S. A. (2002) O demograficheskikh tsiklah v istorii srednevekovoi Rossii [On the demographic cycles in the history of medieval Russia], *Klio*, no 3, pp. 193–203.
- Nefedov S. A. (2003) O vozmozhnosti primeneniya strukturno-demograficheskoi teorii pri izuchenii istorii Rossii XVI veka [On the application of the demographic-structural

- theory to the study of the Russian history of the 16th century]. *Otechestvennaya istoriya*, no 5, pp. 63–72.
- Nefedov S. A. (2010) *Istoriia Rossii. Faktorny analiz* [Russia's History. Factor Analysis], vol. 2. Moscow: "Territoria Budushchego".
- North D. C. (2005) *Understanding the Process of Economic Change*, Princeton: Princeton University Press.
- Nureev R. M., Latov Yu. V. (2010) *Rossii i Evropa: effekt koleyi (Opyt institutsionalnogo analiza istorii ekonomicheskogo razvitiia)* [Russia and Europe: Effect of the Path Dependence (An Institutional Analysis of the History of Economic Development)], Kaliningrad: Immanuel Kant Russian State University.
- Ostrovsky A. V. (2013) *Zernovoe proizvodstvo Evropeiskoi Rossii v kontse XIX — nachale XX v.* [Grain Production in European Russia in the Late 19th — Early 20th Century], Saint Petersburg: Poltorak Ltd.
- Pamuk Ş. (2007) The Black Death and the origins of the 'Great Divergence' across Europe, 1300–1600. *European Review of Economic History*, vol. 11, no 3, pp. 289–317.
- Shipilov A. V. (2008) Uroven zhizni rabochih v Rossii v pervoi polovine 18 v. [Workers' standard of living in Russia in the first half of the 18th century]. *Voprosy istorii*, no 11, pp. 110–118.
- Stanziani A. (2014) *Bondage: Labor and Rights in Eurasia from the Sixteenth to the Early Twentieth Centuries*, New York — Oxford: Berghahn Books.
- Strumilin S. G. (1966) *Ocherki ekonomicheskoi istorii Rossii i SSSR* [Essays on Economic History of Russia and the USSR], Moscow: Nauka.
- The Chronicle of Novgorod, 1016–1471 (1914)* Transl. by R. Michell, N. Forbes, with an introduction by C. R. Beazley, and an account by A. A. Shakhmatov. Camden Third Series, vol. XXV, London: Offices of the Royal Historical Society.
- The Muscovite Law Code (Ulozhenie) of 1649 (1988)* Transl., ed. by R. Hellie, Irvine: Charles Schlacks.
- The Pskov 3rd Chronicle* (2016) Ed., transl., annot. by D. Savignac, Crofton: Beowulf & Sons.
- Turchin P. (2003) *Historical Dynamics: Why States Rise and Fall*, Princeton: Princeton University Press.
- Turchin P., Nefedov S. (2009) *Secular Cycles*, Princeton: Princeton University Press.
- Urlanin B. Ts. (1941) *Rost naseleniia v Evrope: Opyt ischisleniia* [Growth of Population in Europe: An Estimation], Moscow: OGIz — GOSPOLITIZDAT.
- Van Zanden J. L. (1999) Wages and the standard of living in Europe, 1500–1800. *European Review of Economic History*, vol. 3, no 2, pp. 175–198.

*D. V. Didenko*

How demographic shocks affected the production-factor income and the institutional path of the Russian pre-industrial economy

### **Воздействие демографических шоков на динамику доходов от факторов производства и институциональное развитие доиндустриальной экономики России<sup>17</sup>**

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17. Статья подготовлена в рамках гранта, предоставленного Министерством науки и высшего образования Российской Федерации (№ соглашения о предоставлении гранта: 075-15-2022-326). Автор благодарит Б. ван Леувена, М. Калабрезе, М. Ван за оригинальные идеи и плодотворные обсуждения, в том числе сравнительно-исторические материалы. Отдельная благодарность выражается И. А. Кузнецову за консультации по тематике доиндустриального сельского хозяйства. Автор статьи несет полную ответственность за итоговые исследовательские решения и их возможные недостатки.

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*Аннотация.* В данной статье автор исследует примеры нескольких шоков, связанных с потерями населения в России в XIV-XVII веков, их последствий для рынков и факторов производства, сравнивая с аналогичными примерами из истории Англии. Цель статьи — проверить теоретические закономерности и проследить формирование институционального пути развития средневековой России путем систематизации эмпирических свидетельств. Основные из них заимствованы из предшествующей исследовательской литературы. Используются также две русские летописи и нормативный акт (Уложение 1649 г.). Проведенный автором обзор нарративных и количественных свидетельств вносит вклад в историческую компаративистику экономических систем, в литературу об «эффекте колеи» в парадигме институциональной экономической истории. Кроме того, материал статьи способствует объяснению причин «малой дивергенции» между (северо-)западной и (юго-)восточной Европой с XV по XIX век, а впоследствии и корней «великой дивергенции» между Европой и Азией в XVIII — XX веках. Автор считает, что эмпирические данные советской марксистской экономической историографии сочетаются с недавними выводами неомальтузианской структурно-демографической теории и результатами количественных исследований школы клиодинамики. Сразу вслед за потрясениями в России заработная плата выросла, как и в Англии. Динамика доплаты за квалификацию свидетельствует о предпосылках формирования элементов человеческого капитала в недрах доиндустриальных обществ. Однако, в отличие от Англии, крепостное право, один из наиболее экстрактивных институтов, поддерживалось в России как ответ землевладельческой элиты на давление неблагоприятного для нее сочетания доходов от факторов производства. Это привело к повышению отношения земельной ренты к заработной плате и преимущественному использованию в сельском хозяйстве землесберегающих, а не трудосберегающих технологий.

*Ключевые слова:* земельная рента, реальная заработная плата, доплата за квалификацию, Черная смерть, Смутное время, крепостное право, мальтузианский режим роста, структурно-демографическая теория