Original Paper

doi https://doi.org/10.15826/recon.2022.8.1.005
UDC 331.5
JEL D40, L16, L50

Estimating the role of labor resources reallocation between sectors on the growth of aggregate labor productivity in the Russian economy

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ABSTRACT
Relevance. Economic growth can be achieved in two different ways: through technological improvements and reallocation of market shares from less to more productive units. Despite the significant research literature on innovation in Russia, the literature on market selection, especially at the sectoral level, is relatively scarce. This is the research gap that this study aims to address.
Research objective. The article assesses how labor resource reallocation between sectors has influenced the dynamics of aggregate labor productivity in the Russian economy over the past two decades.
Data and methods. For this purpose, the growth of aggregate labor productivity was decomposed into the growth of productivity within the sectors themselves and the reallocation of labor resources between them. This allowed us to conduct a quantitative estimation of the role of market selection at the sectoral level. For our study, we used data from Rosstat (from 2002 to 2018) and the World Input-Output Database (from 2000 to 2014).
Results. For Rosstat data, the ratio of the effect of changes in labor productivity and labor resource reallocation by sector on total labor productivity over the period was 0.71/0.29, and for WIOD data it was 0.44/0.56. This indicates that labor resources are more likely to be reallocated to related sectors (e.g. between manufacturing industries).
Conclusions. The results suggest that there is competitive market selection at the sectoral level and that labor has generally been reallocated to more productive sectors of the economy, contributing significantly to the growth of aggregate productivity in the economy. Our study shows the sectors of the economy where this reallocation has taken place, which may help to determine where this process is successful and where it needs additional stimulation.

KEYWORDS
competition, competitive selection, labor productivity, productivity growth, resource allocation, structural change, decomposition, value added

AWKNOWLEDGEMENTS
This research was supported by grant No. 19-18-00262, “Modeling of Balanced Technological and Socio-Economic Development of Russian Regions», from the Russian Science Foundation.

FOR CITATION
Savin, I.V., & Letyagin, D.K. (2022). Estimating the role of labor resources reallocation between sectors on the growth of aggregate labor productivity in the Russian economy. *R-economy*, 8(1), 57–67. doi: 10.15826/recon.2022.8.1.005

Оценка роли перетока трудовых ресурсов между секторами на рост совокупной производительности труда в российской экономике

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АННОТАЦИЯ
Актуальность. Экономический рост может быть достигнут двумя различными способами: за счет технологических усовершенствований и перераспределения доли рынка от менее производительных единиц к более производительным. Несмотря на значительный объем исследовательской литературы по инновациям в России, литература по выбору рынка, особенно на отраслевом уровне, относительно скудна. На устранение данного пробела и направлено данное исследование.
Цель исследования. В статье оценивается как переток трудовых ресурсов между секторами влиял на динамику совокупной производительности труда в российской экономике за последние два десятилетия.

КЛЮЧЕВЫЕ СЛОВА
конкуренция, конкурентный отбор, производительность труда, рост производительности, распределение ресурсов, структурные изменения, декомпозиция, добавленная стоимость

Данные и методы. С этой целью была осуществлена декомпозиция роста совокупной производительности труда на рост производительности внутри самих секторов и переток трудовых ресурсов между ними. Для проведения исследования нами были использованы данные Росстата (с 2002 по 2018 год) и Всемирной базы данных «затраты-выпуск» (с 2000 по 2014 год).
Результаты. По данным Росстата соотношение влияния изменений производительности труда и перетока трудовых ресурсов по секторам на совокупную производительность труда за указанный период составило 0,71/0,29, а для данных WIOD – 0,44/0,56. Это указывает на то что трудовые ресурсы более склонны перераспределяться в смежные сектора (например, между отраслями обрабатывающего производства).
Выводы. Полученные результаты свидетельствуют о наличии конкурентного отбора на уровне секторов экономики, а также о том, что трудовые ресурсы в целом перераспределялись в более производительные отрасли экономики внося весомый вклад в рост совокупной производительности труда в экономике. Наше исследование оценивает в какие именно сектора экономики это перераспределение происходило, что может помочь определить, где данный процесс успешен, а где этот процесс нуждается в стимулировании.

БЛАГОДАРНОСТИ
Исследование выполнено при поддержке гранта РНФ (проект №19–18–00262 «Моделирование сбалансированного технологического и социально-экономического развития российских регионов»).

ДЛЯ ЦИТИРОВАНИЯ
Savin, I.V., & Letyagin, D.K. (2022). Estimating the role of labor resources reallocation between sectors on the growth of aggregate labor productivity in the Russian economy. *R-economy*, 8(1), 57–67. doi: 10.15826/recon.2022.8.1.005

评估行业间劳动力资源流动对俄罗斯经济中总劳动生产率的作用

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摘要
现实性：经济增长可以通过两种不同的方式实现：技术改进；将市场份额从生产力较低的单位转移到生产力更高的单位。尽管俄罗斯有大量关于创新的研究，但关于市场选择，尤其是在行业层面的学术研究相对稀缺。本研究旨在填补这一空白。
研究目标：本文评估了在过去的20年里，行业间劳动力资源的流动是如何动态影响俄罗斯经济中总劳动生产率的。
数据和方法：因此，总劳动生产率的增长被分解为各行业内部的生产率增长和行业之间的劳动力资源流动。为了进行这项研究，我们使用了来自俄罗斯联邦国家统计局（2002年至2018年）和世界投入产出数据库（2000年至2014年）的数据。
研究结果：根据俄罗斯联邦国家统计局的数据，在此期间，各行业的劳动生产率和劳动力资源流动对总劳动生产率的影响比率为0.71/0.29，而世界投入产出数据库比率为0,44/0,56。这表明劳动力资源更有可能重新分配到相似行业（例如，制造业之间）。
结论：结果显示，在行业层面存在竞争性选择，劳动力通常流动到更有生产力的部门，这大大促进了经济总生产力的增长。我们的研究准确评估了这种劳动力流动发生在哪些经济部门。这有助于确定这一过程在哪些方面是成功的，以及在哪些方面需要优化。

关键词
竞争力，竞争淘汰，劳动生产率，生产率增长，资源分配，结构变化，分解，增加值

供引用
Savin, I.V., & Letyagin, D.K. (2022). Estimating the role of labor resources reallocation between sectors on the growth of aggregate labor productivity in the Russian economy. *R-economy*, 8(1), 57–67. doi: 10.15826/recon.2022.8.1.005

Introduction

One of the key determinants of economic development is labor productivity. Countries that have been able to move from the category of developing to developed economies are those that have been able to diversify their economies by redirecting resources from low-productivity sectors of the economy to more productive ones. The idea of this paper is to examine how the reallocation of labor between sectors of the economy has influenced labor productivity growth in Russia.

Numerous papers have been written on the impact of structural change on labor productivity in sectors of the economy (Bessonov, 2004; Gimpelson et al., 2014; Savin et al., 2020; McMillan and Rodrick, 2011; Savin, 2021; Tang and Wang, 2004; Timmer et al., 2014). One of the earliest articles to discuss labor shifts be-

tween economic sectors was written by Denison (1962), who found that significant job cuts in the agricultural sector of the economy and resource shifts to other sectors can significantly increase aggregate labor productivity and accelerate countries' development. Most of the literature on the effects of structural change on economic growth (Pasinetti, 1981; McMillan et al., 2014; Mironov and Konovalova, 2019) also emphasize that as resources are shifted from agriculture to modern and more productive sectors, economies grow and expand. The key factor that separates successful economies from laggards is the speed of these structural changes.

Russia is a country in transition which has great heterogeneity in labor productivity between different sectors. This feature is characteristic of many developing countries in Eastern Europe, Asia and Africa. Typically, the economies of such countries have high productivity in one or more sectors of the economy (e.g., natural resource extraction), while others remain at the same level of development or progress very slowly. At the same time, the difference in productivity between individual firms and entire sectors is much smaller in developed economies than in developing ones (McMillan et al., 2014; Dosi et al., 2015; Savin, 2020). What makes this heterogeneity in resource allocation special is that it has the potential to be an important engine of growth. When labor and other resources shift from less productive to more productive activities, the economy grows even if the sectors themselves do not gain in productivity. This situation is described by the "Simpson paradox" (Simpson, 1951), which has previously been discussed in terms of GDP growth (Ma, 2015) and energy consumption (Gross, 2012). For example, one-third to one-half of the lag in total factor productivity in countries such as India and China compared to the United States could be reduced if the inequality between the outsider and leader sectors in productivity were eliminated (Bartelsman et al., 2006; Hsieh and Klenow, 2009).

There are two factors that contribute to the growth in aggregate labor productivity: increases in productivity within sectors of the economy (the so-called "within-effect") and the flow of labor from less productive sectors to more productive ones (the so-called "between-effect"). The latter is also called the "competitive selection" factor (Savin, 2020; Savin et al., 2019; Simachev et al., 2018). If the between-effect turns out to be positive, we can conclude that there is competition between industries for labor resources, as more productive industries increase their share by taking employees from less productive industries (Savin et al., 2020). The first way of increasing labor productivity is more often seen in economically advanced countries because their economies are sufficiently balanced, and reallocation of resources does not increase productivity. However, reallocation of resources due to competitive selection can increase productivity in developing countries with stronger heterogeneity between the sectors. Such an effect is positive for the economy as a whole, as it increases both aggregate productivity and smooths out the inequalities between its individual sectors. This effect is also referred to in research literature as "structural change" (McMillan et al., 2014).

Labor productivity refers to the amount of value added per worker. Aggregate labor productivity is a measure of labor productivity for the economy as a whole. Competitive market selection is the process of competition between individual economic actors for market share (Savin et al. 2019, 2020), when the strongest and most adaptable firms in an industry survive and grow. The term was coined by an analogy with Charles Darwin's theory of evolutionary selection, and in economics it traditionally refers to the expansion of the market share of the most productive and efficient firms (Metcalfe, 1994).

In this research we study the influence of competitive selection between economic sectors for labor resources and labor productivity in different sectors on the change of aggregate labor productivity in Russian economy. By competitive selection we mean that economic sectors are to various degrees attractive for labor resources, and as workers migrate to more productive sectors of the economy, productivity of the whole economy increases.

This study has the following objectives: first, to conduct a quantitative assessment of the role of competitive selection on the growth of aggregate labor productivity, reflecting the flow of labor resources between the sectors of the economy, in Russia; and second, to identify the sectors of the economy where labor resources were predominantly reallocated in the period 2002–2018.

This paper is organized as follows: Section 2 deals with the data and methods of analysis; Section 3 describes the decomposition of labor productivity growth, and Section 4 presents our conclusions.

Methods

There are many approaches to decomposition of productivity in research literature (Baily et al., 1992; Olley and Pakes, 1996; Cantner et al., 2019). More common, however, are the approaches presented in Foster (2001) and Griliches and Regev (1995). Savin et al. (2019) show that the methods proposed by Griliches and Regev (1995) and Foster (2001) are essentially equivalent. Both approaches are distinguished by their analytical simplicity as well as the ability to compare the results to those obtained by many other researchers using the same approaches.

To conduct the decomposition of labor productivity, we apply the approach proposed by Griliches and Regev (1995), which has subsequently been used by many economists including McMillan et al. (2014), Dosi et al. (2015), Cantner et al. (2019), Foramitti et al. (2021a), Foramitti et al. (2021b), and Mundt et al. (2021). We preferred this method over alternatives as we can later compare our results with those of McMillan et al. (2014).

First, formula (1) calculates the total labor productivity of economy j over time t as a weighted sum of labor productivity for all sectors of the economy:

$$\Pi_{j,t} = \sum_{i \in j} r_{i,t} \pi_{i,t}, \tag{1}$$

where $r_{i,t}$ is a measure of the share of sector i in time t (measured by the number of employees employed in the sector); $\pi_{i,t}$ is a measure of labor productivity for sector i in time t.

The decomposition of the change in the aggregate index is calculated by using formula (2):

$$\Delta\Pi_{j,t} = \sum_{i \in j} \Delta r_{i,t} \overline{\pi_{i,t}} + \sum_{i \in j} \overline{r_{i,t}} \Delta\pi_{i,t}, \tag{2}$$

where

$$\sum_{i \in j} \Delta r_{i,t} \overline{\pi_{i,t}}$$

is the variable characterizing the redistribution of labor between sectors of the economy ("between" effect);

$$\sum_{i \in j} \overline{r_{i,t}} \Delta\pi_{i,t}$$

is the result of changes in productivity at the level of the sectors of economy themselves ("within" effect). The upper line above the variable denotes the average value for two consecutive years; delta (Δ) is the measure of the difference between the two years (subtract from the value for year $t + 1$ the value for year t). Finally, in order to compare the results obtained for two different data sets more conveniently, we calculate the proportion of between- and within-effects by normalizing their sum to unity as shown in formulae (3–4):

$$between = \frac{\sum_t \sum_{i \in j} \overline{r_{i,t}} \Delta\pi_{i,t}}{\sum_t \Delta\Pi_{j,t}}, \tag{3}$$

$$within = \frac{\sum_t \sum_{i \in j} \Delta r_{i,t} \overline{\pi_{i,t}}}{\sum_t \Delta\Pi_{j,t}}. \tag{4}$$

At this point it is worth mentioning the previously published studies which conducted the decomposition of labor productivity for the Russian economy. There was a study on competitive selection and efficiency which showed that for firms operating in Russia the between-effect is on average 8%, while everything else can be explained by the productivity growth in the firms themselves (Savin et al., 2020). Similar estimates were previously obtained for a subsample of firms from the Ural Federal District (Savin et al., 2019). Savin et al. (2020) conclude that the role of competitive selection for large firms is much lower than for small firms because small and medium-sized firms are less secure and the competition among large firms should be encouraged within the economy. However, it is worth noting that both studies investigating the effectiveness of competitive selection in Russia only cover industrial firms from 2006 to 2017.

For our study a different time period was chosen: from 2002 to 2018. Moreover, we are looking at all the sectors of the Russian economy (according to the OKVED2 classifier). We investigate competition not between enterprises, but between the entire sectors of the economy. We use decomposition to estimate the redistribution of resources between sectors of the economy and to measure the between- and within- effects. Since the study by Voskoboynikov and Gimpelson (2015) is the most relevant to our analysis, further in this paper we are going to compare our results with theirs.

Data

In the course of our work, we used two sets of data from different sources. The first data set was obtained from the database of the Federal State Statistics Service ("Rosstat"[1]) and contains information on gross value added, employment,

[1] https://rosstat.gov.ru/

Online ISSN 2412-0731

depreciation, and output in 13 economic sectors for the period from 2002 to 2018. The sectors used are agriculture, hunting and forestry, and fishing; mining; manufacturing; electricity, gas, and water production and distribution; construction; wholesale and retail trade; hotels and restaurants; transportation and communications; financial activities; real estate, rental, and service operations; public administration and military security; compulsory social security; education; health care and provision. All figures for value added as well as labor productivity were converted to constant prices in USD in 2005 prices using producer price indices as deflators[2].

In order to assess the robustness of our results, we also use as an alternative data source the World Input-Output Database (WIOD[3]), which contains more detailed information on 33 sectors of the Russian economy from 2000 to 2014[4]. Thus, the manufacturing sector in Rosstat is broken down in the WIOD into 24 subsectors. The data come from the latest available 2016 edition and supplementary socioeconomic accounts (WIOD SEA), which provides information on annual trade flows of intermediate goods, the amount of goods and services sold to final consumers, total gross output, value added, and employment. All these data are in U.S. dollars and adjusted for inflation using national price indexes with a base year of 2010.

Using a more disaggregated WIOD database, we will thus be able to get an estimate of labor reallocation not only between the large sectors such as agriculture and manufacturing, but also between the industries within manufacturing that vary widely in their level of productivity. This, in turn, will provide a more accurate estimate of the effect of competitive selection.

Table 1 presents descriptive statistics for the sectors of the Russian economy and thus allows the reader to form their first impression of the data which we will work with. This table shows that industries grow at an average rate of 2% per year (the median is 4%, indicating negative values in a number of sectors). The high value of the standard deviation of value-added growth (0.22) indicates significant heterogeneity in the growth rates between sectors of the Russian economy.

Looking at this table, we can conclude how unevenly labor productivity is distributed across different sectors of the economy. The standard deviation of the logarithm of labor productivity is 0.74. This means that an industry where labor productivity is by one standard deviation above the mean is four to five times more productive than an industry where labour productivity is by one standard deviation below that level ($e^{1.5} = 4.5$). If we consider the WIOD data instead of the Rosstat data, the spread is even larger, which can easily be explained by the fact that a more detailed division of the economy into subsectors increases the difference between its most and least productive industries.

All this clearly shows the high heterogeneity of labor productivity between sectors in the Russian economy which we discussed earlier. In the future we are planning to assess how this heterogeneity led to the overflow of labor resources between the sectors.

[2] Investing, https://ru.investing.com/

[3] https://www.rug.nl/ggdc/valuechain/wiod, release 2016.

[4] The global input-output database covers 56 sectors of the economy, but contains non-zero values for Russia for 33 sectors: Crop and livestock production, Mining, Food production, Clothing production, Timber production, Paper and paper products production, Coke production and production of petroleum products, Manufacture of chemical products, Manufacture of rubber and plastic products, Manufacture of other non-metallic mineral products, Manufacture of base metals, Manufacture of computers, Manufacture of machinery and equipment n.e.c., Manufacture of automobiles, Manufacture of furniture, Electricity, Construction, Retail trade, Wholesale trade, Land transport, Water transport, Air transport, Warehouse services, Accommodation and catering services, Telecommunications, Financial services, Operations with real estate, Administrative and support activities, Public administration and defense, Education, Human health and social work, Other service activities. Therefore, in the future, we will analyze only these 33 industries.

Table 1

Descriptive statistics of the data used

			Labor productivity			Value-added growth		
	Number of observations, in units	Average value, in USD	Median, in USD	Standard deviation, in logarithm	Number of observations, in units	Average value, in USD	Median, in USD	Standard deviation, in logarithm
Data Rosstat	221	21525.6	13995.99	0.74	208	0.020	0.04	0.22
Data WIOD	495	18997.9	11578.38	0.87	462	0.016	0.04	0.16

Own calculations based on Rosstat data https://rosstat.gov.ru/ and WIOD https://www.rug.nl/ggdc/valuechain/long-run-wiod?lang=en (accessed on 13.03.2021).

It is worth noting that many studies (de Vries et al. 2015; McMillan et al., 2014) show that high heterogeneity in labor productivity across sectors is a sign of a developing (but not yet developed) economy. They are the highest for the poorest countries and tend to decrease because of sustained economic growth and development. Based on these results, it can be argued that Russia can be classified as a still developing economy.

Following Dosi et al. (2015), we measure labor productivity as the amount of value added per employee, where value added, in turn, is defined as revenue minus production and sales costs excluding labor costs.

Results

Applying the decomposition described in equations (1-4), we produced the results presented in Table 2. The analysis based on Rosstat data shows that the within-effect in the Russian economy prevails. Its share is approximately 71% against 29% for the between-effect. This suggests that the growth of the economy is caused to a greater extent not by the reallocation of resources from one sector to another but by the growth in productivity in the sectors themselves. Nevertheless, the role of competitive selection in the growth of aggregate labor productivity is positive, which is good news, especially in view of the more modest (and sometimes close to zero) values obtained for firm-level data (Savin et al., 2020). It is worth noting that Voskoboynikov and Gimpelson investigating the data that are similar to ours but for an earlier period (1995–2012) came to similar conclusions (in their study, the share of between-effects was about 23%). This indicates that in the later period, the contribution of labor reallocation to the growth in aggregate labor productivity increased slightly.

Moreover, using the more disaggregated WIOD data, the total share for the between-effect becomes larger than for the within-effect, indicating that in the Russian economy the growth of aggregate labor productivity is still largely due to the reallocation of labor resources from low-productive activities to more productive ones. The difference in the results obtained by using different data sources can be explained by the fact that one sector of the economy from the Rosstat database is divided into several smaller sectors in the WIOD database. Thus, using the WIOD data, we can better estimate the flow of labor between sectors of the economy. Indeed, a person who used to work in metal production is more likely to move to a job in metal production than in mining or in the financial sector. This can be explained by the fact that the above transition will require a different set of knowledge and skills as well as work experience, which is difficult to obtain even by undergoing special training and advanced training. From this we can conclude that a more accurate assessment of labor reallocation on changes in aggregate productivity requires deeper sectoral detail in order to get a more accurate estimate of competitive selection.

Regardless of the level of detail of the sectoral classifier, the results obtained in Table 2 indicate that the Russian economy showed a positive dynamic of structural change in terms of reallocation of labor resources from less to more productive sectors. Previously, McMillan et al. (2014) showed that while most countries in Africa and Latin America over the period 1990–2005 exhibited a negative between-effect, indicating a negative structural change, only Asian countries have managed to consistently achieve effective reallocation of labor to more productive sectors. Our estimates place Russia in the latter group of countries.

There are several findings worth noting. First, the negative value of the between-effect can be interpreted as an indicator of the overall inefficiency of the economy: labor is transferred from more efficient sectors of the economy to less productive ones. Second, for some years a negative sign of the within-effect can be observed, which indicates a decrease in labor productivity in the sector of the economy itself. In some years such a sign can be explained by a sharp fall of the national currency against the U.S. dollar. This interpretation is also true for the shares of these two effects, but only when the sum of the absolute values is positive. Otherwise (for example, 2009 example for both databases) the interpretation of the signs of the shares is reversed (e.g. in 2009 the share of the within-effect was close to one, but in fact its contribution was negative).

To take a closer look at where the labor force was flowing from and to where, in Table 3 we calculated the ratios of employment in 2018 to the same figure in 2002 for all the 13 major sectors of the economy as well as the absolute change in the number of employed over the same period. We use Rosstat data here rather than the WIOD to get a more general picture of labor shifts among the major 13 sectors of the economy. Similar results can be obtained for the 33 sectors of WIOD.

We can see that the largest outflows were observed in agriculture and manufacturing. While the former is a natural process associated with the automation of production and characteristic of most transition economies, the latter is rather an unpleasant signal for the structure of the Russian economy given the large role of manufacturing in the creation of value added. The largest inflow of labor resources, in turn, was observed in construction, wholesale and retail trade as well as transport and communications. Construction and transport are sectors with relatively high labor productivity and it is a good signal to the Russian economy. Figure 1 shows the more detailed dynamics of employment in these sectors of the economy.

Table 2

Results of total labor productivity decomposition

Year	Rosstat				WIOD			
	Within-effect	Between-effect	Share of within effect	Share of between effect	Within-effect	Between-effect	Share of within effect	Share of between effect
2001	–	–	–	–	–140	160	–6.68	7.68
2002	–	–	–	–	–240	10	1.06	–0.06
2003	843	–5.69	1.01	–0.01	450	-20	1.06	–0.06
2004	1364	16.61	0.99	0.01	1010	100	0.91	0.09
2005	764	55.95	0.93	0.07	530	–070	1.16	–0.16
2006	1481	47.03	0.97	0.03	960	120	0.89	0.11
2007	1962	60.59	0.97	0.03	1390	170	0.89	0.11
2008	1038	92.97	0.92	0.08	2200	–140	1.07	–0.07
2009	–4944	–56	0.99	0.01	–3820	250	1.07	–0.07
2010	1099	24	0.98	0.02	760	–210	1.38	–0.38
2011	257	76.99	0.77	0.23	870	90	0.91	0.09
2012	10152	65	0.99	0.01	–500	180	1.56	–0.56
2013	–540	84	1.18	–0.18	–450	420	17.04	–16.04
2014	–4256	46.52	1.01	–0.01	–2040	150	1.08	–0.08
2015	–8058.2	11.25	1.00	0.00	–	–	–	–
2016	32.01	14.09	0.69	0.31	–	–	–	–
2017	791	29.13	0.96	0.04	–	–	–	–
2018	–570	9.36	1.02	–0.02	–	–	–	–
Total	**1416.48**	**572.86**	0.71	0.29	980	1230	0.44	0.56

Source: Own calculations based on data from Rosstat and WIOD.

Table 3

Changes in the amount of labor used in economic sectors from 2002 till 2018

	Share in the total amount of labor used in the economy in 2002, %	Share in the total amount of labor used in the economy in 2018, %	Absolute change in the amount of labor used
Agriculture, hunting and forestry, fishing	13.20	7.32	–3412562.00
Mining and quarrying	1.84	1.69	–21103.00
Manufacturing	19.11	14.92	–2015144.00
Production and distribution of electricity, gas and water	2.99	3.47	452949.00
Construction	7.05	9.47	1932901.00
Wholesale and retail trade	15.65	20.26	3777382.00
Hotels and restaurants	1.70	2.55	646203.00
Transportation and communications	8.09	10.11	1702070.00
Financial activities	1.13	2.05	670665.00
Real estate operations, renting and services	7.77	8.11	558955.00
Public administration and military security; compulsory social security	4.97	5.41	511493.00
Education	9.55	8.09	–581601.00
Health care and social services	6.95	6.53	6536.00

Source: Own calculations based on Rosstat data.

This result can be interpreted in different ways. On the one hand, the outflow of resources from manufacturing can hardly be called a positive trend for the Russian economy. On the other hand, the inflow of resources in transport and construction is a positive trend. Interestingly, mining has lost labor resources, while sectors such as financial activity and hotel business have increased. Overall, the resulting picture differs from the one obtained earlier by Voskoboynikov and Gimpelson (2015) for 1995–2012, where the labor reallocation was into manufacturing. Thus, we found that the role of competitive market selection for labor productivity growth has increased somewhat in Russia in recent years, but predominantly this reallocation occurs not in (but rather from) manufacturing but in construction, transport, and trade. This suggests that we should consider how to stop the outflow of labor from manufacturing by creating innovative directions in production and encouraging domestic enterprises to expand their market share both in the domestic market and by exporting their goods abroad (Savin and Winker, 2009; Savin and Winker, 2012).

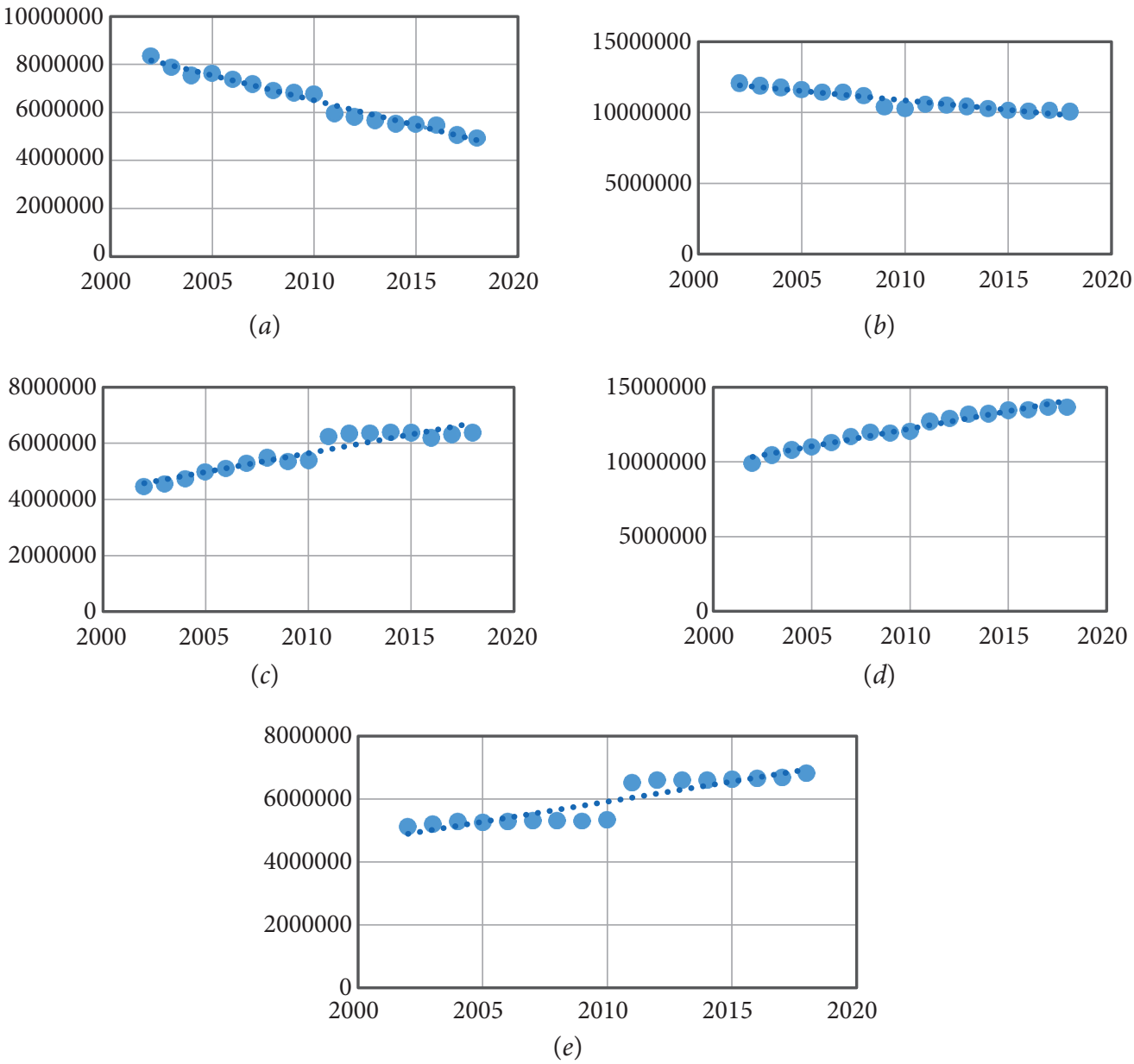

Figure 1. *Dynamics of the number of employed labor in various sectors:*
(*a*) agriculture, (*b*) manufacturing, (*c*) construction, (*d*) wholesale and retail trade, and (*e*) transportation and communications. The number of employed (people) is shown vertically, the years are shown horizontally.
Source: Our own calculations are based on Rosstat data. Accessed on 18.03.2021.

Conclusions

Labor productivity varies widely across sectors in the Russian economy. This indicates the potential for economic growth through the reallocation of labor from less productive sectors to more productive ones as well as the potential for productivity growth within the sectors themselves. We assessed the role of these two factors in changing the aggregate productivity of the Russian economy. To test the reliability of the results obtained, a decomposition was carried out on two data sets: Rosstat and WIOD.

The results of the decomposition lead us to a conclusion about the presence of competitive selection in the sectors of the economy, which indicates positive structural changes and the flow of resources from less to more productive sectors. For the Rosstat data, the ratio of the effect of changes in labor productivity and labor resource spillovers by sector on aggregate labor productivity over the period was 0.71/0.29, and for the WIOD data it was 0.44/0.56. This indicates that labor resources are more likely to be reallocated to related sectors (e.g., between manufacturing industries). It was found that as the granularity of sectors in the sample increases (from 13 to 33), the effect of resource spillovers begins to dominate the economy over productivity growth within the sectors themselves. Thus, we can conclude that for a more accurate assessment of labor reallocation on changes in aggregate productivity, a deeper sectoral detail is needed to obtain a more accurate estimate of competitive selection. We also determined that the largest outflows of labor were in agriculture and manufacturing, while the inflows were in construction, wholesale and retail trade.

This study can be useful in determining industrial policy priorities to maintain labor resources in productive sectors of the economy in the future.

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ARTICLE INFO: received *January 23, 2022*; accepted *March 18, 2022*

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ИНФОРМАЦИЯ О СТАТЬЕ: дата поступления *23 января 2022 г.*; дата принятия к печати *18 марта 2022* г.

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