

Wages Level and Labor Productivity Relationship in Different Russian Economy Segments in 2004-2018

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Abstract. The relationship between labor productivity, differentiation of wages of the population and a number of interdependent factors is an integral part of the development of long-term economic growth. Currently, the Russian economy does not have a direct relationship between wages and labor productivity in different sectors, while the rate of wage growth may not correspond to the growth of labor productivity, this tendency can have a negative impact on the result of economic activity. According to the labor productivity index, Russia lags far behind the EU countries (on average, throughout the economy by 2.9 times, and the most significantly in agriculture by 5.3 times), which necessitates the identification of cause-and-effect relationships between: wage growth rates and labor productivity, the impact of macroeconomic dynamics and foreign economic policy on the wage gap in various sectors of the economy.

1. Introduction

The relevance of the study is explained by the need to achieve sustainable growth of the country's economy while minimizing the risks of long-term macroeconomic stability. Such a scenario is possible only if the quality of the institutional environment of the Russian economy is improved, which is designed to equalize the opportunities of individuals and companies to receive a higher income or to extract profit in a competitive way. A special role in the differentiation of incomes of economic entities is played by the sectoral structure of the economy. Due to the influence of external and internal factors, different degrees of monopolization of industrial markets, there is also a different relationship between the growth rate of labor productivity and wages in the sectors of the Russian economy. The sectoral structure of the economy affects the level of stability of regional economic systems.

Research problem. Determination of factors affecting the level of inter-branch differences in labor productivity and average wages in the Russian economy; the establishment of relationships between wage growth and labor productivity growth in the sectors of the Russian economy.

Scientific novelty of the research is to identify sectors of the Russian economy, in which there is a pronounced direct relationship between the indicators of the economic condition of the economic entity (in particular income indicators), and indicators that reflect the result of activities, as well as industries in which this relationship is reversed or not traced. With regard to the latter, it is possible to identify the factors that influence the identified dependencies, as well as to suggest measures for possible adjustment.

Expected result:

- econometric interrelationships of labor productivity and wages growth rates in various sectors of the Russian economy, taking into account the external economic situation;
- indicators of differentiation of labor productivity and wages in the sectors of the Russian economy, the model of the relationship between the rate of wage growth in the sectors of the Russian economy with sectoral labor productivity and the level of education, taking into account the changing external environment.

2. Labour productivity and real wages in the Russian economy

The functioning of the economy requires more than just labor and increase in labor productivity. An important aspect of long-term economic growth is a well-structured strategy focused on stimulating productivity through wage growth and other interdependent factors. The growth of productivity of an individual employee, along with other factors, is influenced by wages as an incentive to develop the skills of workers and improve the quality of work performed. This means that special attention should be paid to the impact of wages on labor productivity [19, 20, 21].

For expanded reproduction, obtaining the necessary profit and profitability, it is necessary that the growth rate of output per employee outstrips the growth rate of its payment. If this principle is not observed, then there is an overspending of the wage fund, an increase in the cost of production and, accordingly, a decrease in the amount of profit.

As it's shown in Fig. 1, the influence of the average wages change rate on the labor productivity dynamics in the Russian economy is statistically stable, as evidenced by the value of the determination coefficient of the function R2 close to one (authors' calculations using [2, 4, 6, 8-11, 13-15]). At the same time, such influence is inelastic, i.e. with an increase in the average wage, labor productivity in the domestic economy increases at a slower pace.

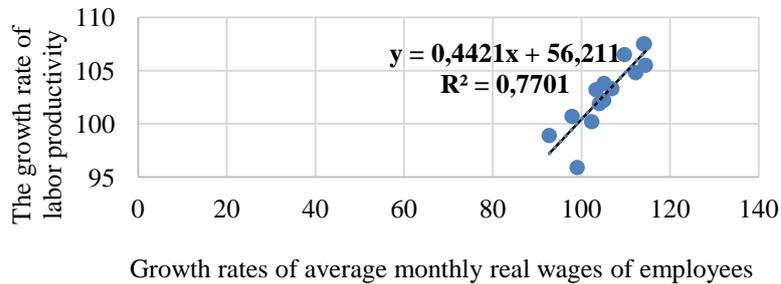


Figure 1. All sectors of the economy.

In our opinion, the main reasons for the insufficiently effective impact of the average wage on the efficiency of use of labor resources, measured by labor productivity, are the high degree of wage differentiation both in different sectors of the economy and in individual organizations.

3. Labour productivity and real wages by sectors of the Russian economy

The sectoral dependence of real wages and labor productivity in Russia was identified for the past few years from 2004 to 2018 (table. 1). We analyzed this dependence with econometric methods and estimated the following regression:

$$y_i = \beta_1 + \beta_2 x_i, \tag{1}$$

where y – labor productivity growth rate, x – real wage growth rate.

To precise the results we also tested the autocorrelation of the studied sequence on the residuals of the regression models obtained in the study using the Darbin-Watson criterion (DW).

Table 1. Influence of real wage rates on labor productivity by economic activities.

	Agriculture, hunting and forestry	Construction	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Wholesale and retail trade	Hotels and restaurants	Real estate activities	All sectors of the economy
Test on real wages growth rate									
β_2	0,32	0,57* **	0,19	0,55** *	0,13	0,39***	0,74* **	0,27* *	0,44***
P-value	0,16	0,000	0,42	0,001	0,25	0,007	0,001	0,015	0,0003
R ²	0,157	0,62	0,05	0,57	0,1	0,46	0,59	0,39	0,77
DW	3,03	1,77	1,39	1,015	2,86	2,036	2,78	1,91	2,11

Source: authors' calculations using [2, 4, 6, 8-11, 13-15]

In the *manufacturing industry* the wage growth rate of 1 percentage point leads to an increase in labour productivity of 0.55 percentage points (Fig. 2), the P-value of the variable x takes a value equal to 0.00173, which confirms the significance of the obtained research results. Thus, the growth rates of real wages outstrips the rate of labor productivity.

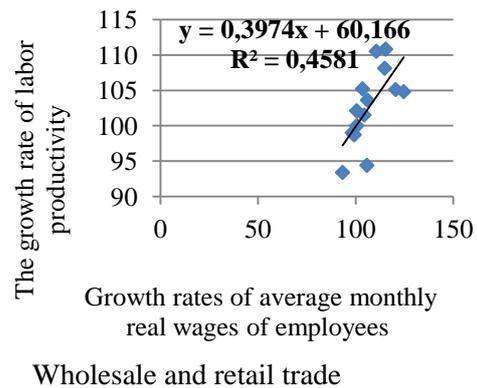
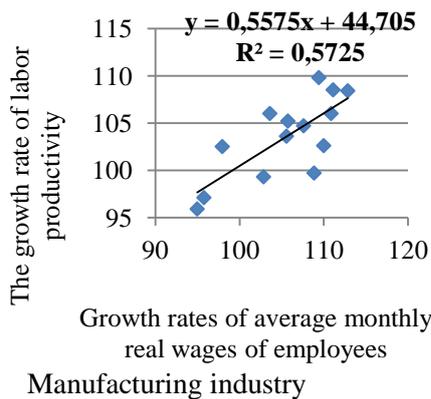


Figure 2. Manufacturing industry and Wholesale and retail trade.

In *wholesale and retail trade* the wage growth rate of 1 percentage point leads to an increase in labor productivity of 0.39 percentage points (Fig. 2), the P-value of the variable x takes a value equal to 0.007, which confirms the significance of the obtained research results (authors' calculations using [2, 4, 6, 8-11, 13-15]). Thus, the growth rates of real wages is also faster than the rate of labor productivity.

In *Hotels and restaurants* the wage growth rate of 1 percentage point leads to an increase in labor productivity of 0.74 percentage points (Fig. 3), the P-value of the variable x takes a value equal to 0.001, which also confirms the significance of the obtained research results. Thus, the growth rates of real wages is also faster than the rate of labor productivity.

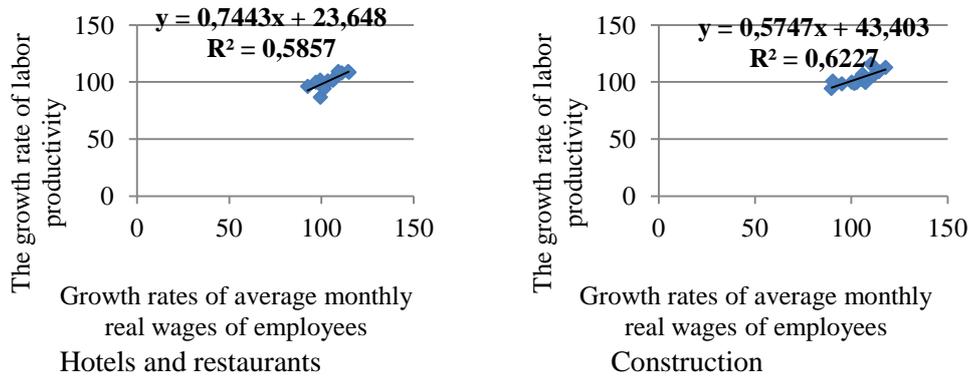


Figure 3. Hotels and restaurants and Construction.

In *Construction* the wage growth rate of 1 percentage point leads to an increase in labor productivity of 0,57 percentage points (Fig. 3), the P-value of the variable x takes a value equal to 0,0008, which also confirms the significance of the obtained research results (authors’ calculations using [2, 4, 6, 8-11, 13-15]). Thus, the growth rates of real wages is also faster than the rate of labor productivity.

The studied indicators don’t have a clear interdependence of wages and labor productivity in some sectors of the economy.

Surely, other factors, such as increased education and equipment upgrades, also affect productivity growth, in addition to wage incentives.

4. Labor productivity, real wages and level of education in the sectors of the Russian economy

In our research, we examined the effect of the growth rate of higher education in various sectors of the economy on labor productivity (Table 2). We analyzed this dependence with econometric methods and estimated the following regression:

$$y_i = \beta_1 + \beta_2 x_i + \beta_3 z_i \tag{2}$$

where y – labor productivity growth rate, x – real wage growth rate, z – higher education growth rate.

Table 2. Impact of higher education growth rates and real wages on labor productivity by economic activities.

	Agriculture, hunting and forestry	Construction	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Wholesale and retail trade	Hotels and restaurants	Real estate activities	All sectors of the economy
Test on real wages growth rate and higher education growth rate									
β_2	0,32	0,52*	0,23	0,52**	0,13	0,38	0,8***	0,29*	0,46**
P-value	0,17	0,009	0,34	0,003	0,27	0,01	0,0009	0,01	0,0002
z	0,08	0,16	0,19	0,17	0,002	0,12	0,27	0,04	0,59
P-value	0,75	0,58	0,33	0,37	0,91	0,68	0,19	0,4	0,15
Adjusted R ²	0,01	0,57	0,03	0,53	0,05	0,37	0,58	0,33	0,78

Source: authors’ calculations using [2, 4, 6, 8-11, 13-15]

The positive result was revealed in three sectors of the economy: such as construction sector, hotels and restaurants sector, and manufacturing sector.

5. Conclusion

In recent years, the government has repeatedly raised the issue of the labor productivity increase. The Russian Federation President Decree set the task to increase labor productivity by 1.5 times by 2018 compared to 2011 [17]. This task was not fulfilled: labor productivity was increased only by 5.5% instead of 1.5-fold growth (by 50%) [18]. One of the reasons, according to the research results was the excessive growth of the wage fund in the most sectors of the Russian economy, which leads to an increase in the production costs, a further increase in the consumer prices, and, consequently, a reduction in demand for it.

In this regard, a new task of labor productivity increase was set by one more President's Decree of 2018. The growth of labor productivity on mid-sized and large enterprises of basic non-primary sectors of the economy must be more than 5 percent per year.

The possible solutions to this problem can be:

- Stimulation of the advanced management, organizational and technological solutions to improve labor productivity and modernize fixed assets, including through the provision of tax preferences;
- Reduction of regulatory and administrative constraints that impede labor productivity growth;
- Formation of a system of methodological and organizational support to improve labor productivity at enterprises;
- Creation of a training system aimed at teaching the basics of improving productivity, including the use of digital technologies and platform solutions.

In order to ensure a steady growth in productivity, management must clearly associate wages and promotions with labor productivity indicators and output. Changes in the wage system, improving the welfare of workers, have an impact on productivity through increased job satisfaction, increased interest in its results.

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