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MANAGING THE RATIO OF PRODUCTIVITY AND WAGES AT AGRICULTURAL ENTERPRISES

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Abstract

Labor productivity is a key phenomenon of economic activity. Labor productivity determines the capabilities of any economic object. In turn, labor productivity depends on a number of factors, among which one of the main ones is remuneration. This dependence is of a mutual nature, since the employee's remuneration in most cases depends on the achieved level of labor productivity, and earnings paid in a timely and adequate amount directly affect the productivity of further labor activity. The ratio between labor productivity and wages, as well as the ratio of the growth rates of these indicators, affect the state of economic systems at the macro and micro levels. It is quite easy to establish the optimal ratio of the level of remuneration and the rate of production, if you know the economic result of the work performed. Problems arise if the results of economic activity are influenced by unmanageable factors, which is typical of agricultural production. At agricultural enterprises, it is necessary to apply different approaches to managing the ratio of productivity and wages in periods of evolutionary development and in periods of revolutionary changes. It is important to link wage growth not only to productivity growth, but also to material resource savings.

Keywords: Economic boundaries, labor productivity, wages

1. Introduction

The problem of the rational ratio of labor productivity and wages is discussed in the analysis of the development of economic systems at various levels. In particular, Volgin (2020) asks the question: "What should grow faster – labor productivity in the field of material and non-material production or its payment? ... A few decades ago, the outstripping growth of labor productivity over wage growth has the rank of a social economic law. Now there are different positions and points of view that allow for opposite interpretations and solutions in this perspective. ... the discussions justify the possible outperformance of the growth rate of wages over their productivity in certain specific areas of activity, as well as at certain (not sufficient) levels of minimum, average or median wages" (par. 6, p. 5).

Bogatyreva and Ilyukhina (2020) cite data that average wages are growing faster than labor productivity in many countries, including Russia, the United States, and France. The disparity between productivity and wages also exists in some regions. Konings and Marcolin (2014) find that the wage-productivity gap reached 11% for Brussels and 4.2% for Wallonia in the years 2005-2012. At the same time, as Aranzhin (2020) notes, at present, labor productivity in the world as a whole is growing faster than wages.

Karaeva et al. (2021) draw attention to the need to establish a rational ratio of labor productivity and remuneration at each enterprise. Zhukov (2020) comes to the conclusion about the permissibility of outstripping the growth rate of wages over the dynamics of productivity and points to the negative consequences of outstripping the growth rate of labor productivity over the dynamics of wages.

Outstripping wage growth in comparison with labor productivity is not the most unfavorable development of events, and in certain situations, it is quite a rational phenomenon. The worst case scenario is a faster reduction in labor productivity compared to labor cost savings. Cirillo and Ricci (2020) in their study show that the use of short-term labor contracts reduces labor costs, but also reduces labor productivity and can cause a vicious cycle of low productivity.

The ratio of productivity growth rates to wages will always depend on the historical time period at which these indicators are evaluated. So, if we take as an example the activity of growing sugar beet, we can easily see that at present, compared with the 70s of the last century, labor productivity in the production of sugar beet root crops has increased more than 20 times (due to the introduction of single-growth varieties and other technological innovations), and the remuneration of beet growers – 2-3 times, which is an order of magnitude lower. During the period without revolutionary innovations, there will be, as a rule, outstripping wage growth. In this context, the change in the ratio of productivity growth rates to wages is consistent with the theory of cyclical development of economic systems (Kapinos et al., 2018).

The main subjects that determine the specific ratio of labor productivity and wages are employees and employers. Some functions are also performed by public authorities and trade unions. In contrast to countries where trade unions play an important role in establishing a rational level of wages (Guerrazzi, 2021), in Russia, the third party is mainly the public authorities. Nevertheless, over the past two decades, the level of remuneration of agricultural workers in most regions of Russia has been growing at a noticeable pace, as labor productivity has (Chirkova et al., 2020; Ilyin et al., 2020). High competition in the food market, as well as in the labor market, forces employers to implement measures to increase the

productivity and attractiveness of agricultural labor. At the same time, the question of achieving a rational ratio of productivity and wages remains open.

2.   Problem Statement

The growth rate of wages outstrips the growth rate of labor productivity during the evolutionary development of economic systems, characterized by minor improvements in the technology and organization of production. The introduction of revolutionary organizational and technological innovations leads to a surge in labor productivity growth, compensating for and covering the long-term lag behind the growth rate of wages.

It follows that at agricultural enterprises it is necessary to apply different approaches to the management of the ratio of productivity and wages during periods of evolutionary development and during periods of revolutionary changes. The problem is to determine the economic limits of a rational ratio of productivity and wages in both cases.

3.   Research Questions

In connection with the problem posed, the relevant research questions are: 1) analysis of the ratio of productivity and remuneration in the aggregate of modern agricultural holdings that actively introduce technological and organizational innovations; 2) modelling of the economic boundaries of the rational ratio of productivity and remuneration.

According to the results of 2019, the Belgorod region took the 3rd place in terms of agricultural production in the Russian Federation. A significant contribution to this result is made by agricultural holdings, which produce about 70% of the agricultural products of the Belgorod region. The high position of the Belgorod Region, which is occupied by a number of indicators of agro-industrial production, is largely due to the effective production and commercial activities of large agro-industrial formations. In this regard, the analysis of the ratio of productivity and wages in agricultural holdings of the Belgorod region has both practical and theoretical significance.

From the literature review, it follows that there is a significant variation in the ratio of productivity and remuneration, both in space and in time. In this regard, it is important to establish economically acceptable limits for changing this ratio.

4.   Purpose of the Study

The purpose of the study is to substantiate the theoretical provisions and develop practical recommendations for achieving a rational ratio of productivity and wages at agricultural enterprises.

5.   Research Methods

The study of the influence of variations in the ratio of productivity and wages on the results of economic activity of agricultural holdings was carried out by the method of statistical grouping and by means of correlation and regression analysis. The empirical basis for the conducted grouping was the data

of the Department of Agro-Industrial Complex and Environmental Reproduction of the Belgorod region. The aggregate of agricultural holdings (21 units) is ranked according to the size of the average monthly salary and is divided into three equal-sized groups. Each group includes 7 agricultural holdings (Table 01).

Table 1. Grouping of agricultural holdings in the Belgorod region by salary level

Groups of agricultural holdings by salary level	Number of agricultural holdings	Average monthly salary, thousand rubles		Output of gross output per employee, thousand rubles		Profit output per 1 ha of arable land, thousand rubles	
		2018	*2019*	*2018*	*2019*	*2018*	*2019*
lowest	7	26.6	30.1	2377.4	3360.9	5.3	8.7
medium	7	31.0	34.6	4671.3	4508.4	17.8	20.9
top	7	38.4	42.8	5197.8	4889.8	67.0	52.9

In the performed grouping, the indicator "Average monthly wage" is considered as a factor that affects labor productivity and profit output per 1 ha of arable land. For each group, the average values of the grouping attribute and the average values of the performance indicators are calculated. The data in Table 01 show that there is a direct relationship between the factor attribute and the performance indicators.

Table 02 shows the results of the paired correlation and regression analysis.

Table 2. Correlation coefficient and parameters of linear regression equations describing the relationship between the annual level of remuneration (thousand rubles) and the output of gross output per 1 employee (thousand rubles) in agricultural holdings of the Belgorod region

Years	Correlation coefficient	Intercept	B	Std. Err.	t(19)	p-level
2018	0.563	-4300	21.84	7.350	2.97	0.008
2019	0.321	-674.9	11.468	7.764	1.48	0.156

The regression coefficient according to the data for 2018 indicates that differences in the level of remuneration for 1 thousand rubles per year are associated with a differentiation in the output of gross output per employee in the amount of 21.8 thousand rubles. Consequently, the spatial differentiation of labor productivity among agricultural holdings in the Belgorod region is many times higher than the volatility of labor remuneration. The regression coefficient for the data for 2019 is slightly lower, and the observed level of significance does not allow us to reject the null hypothesis.

In general, there is a noticeable differentiation of agricultural holdings by the level of remuneration and by the level of labor productivity. These phenomena directly depend on each other. Moreover, the volatility of indicators of average labor productivity in the context of agricultural holdings is significantly greater than the volatility of average wages. In the economic space of agricultural holdings in the Belgorod region, there is a faster growth in productivity compared to wages, which is caused by significant differences in the technical equipment of agricultural holdings, technological development and the level of organization of production and commercial activities.

The level of remuneration has no less impact on the yield of profit per 1 ha of arable land (Table 3).

Table 3. Correlation coefficient and parameters of linear regression equations describing the relationship between the annual level of labor remuneration (thousand rubles) and the yield of profit per 1 ha of arable land (thousand rubles) in agricultural holdings of the Belgorod region

Years	Correlation coefficient	Intercept	B	Std. Err.	t(19)	p-level
2018	0.564	-132.6	0.424	0.142	2.98	0.008
2019	0.418	-80.5	0.251	0.125	2.00	0.060

In 2018, the increase in wages by 1 thousand rubles per year was accompanied by an increase in the yield of profit per 1 ha in the amount of 424 rubles. In 2019, there was also a direct relationship between the spatial volatility of the wage level and the spatial volatility of the profit output per 1 ha of arable land.

The prospects for increasing labor productivity and increasing the yield of profit per 1 ha of arable land in agricultural holdings are associated with the desire of entrepreneurs to realize their economic interests. As long as the market for agricultural products and food remains highly competitive, productivity growth and increased profits will be achieved by all available means, including wage growth.

To model changes in the company's performance indicators, using indicators of productivity growth and wages, we used the results published in (Anichin, 2001).

A reduction in the cost of production occurs if the inequality is met:

$$\frac{a-1}{b-1} > \frac{W_0}{C+W_0},\tag{1}$$

where a and b are the coefficients of productivity growth and wages, respectively; W_0 is the wage fund in the base period; C is fixed costs.

An increase in the mass of profit is achieved by observing the inequality:

$$\frac{a-1}{b-1} > \frac{W_0}{R_0-V_0},\tag{2}$$

where V_0 is variable costs without remuneration in the base period; R_0 is revenue in the base period (Anichin, 2001).

6. Findings

Table 04 shows an example of outstripping wage growth in comparison with productivity at a conditional enterprise. From the above data, it follows that the outstripping growth in wages is accompanied by an increase in the level of profitability and an increase in the mass of profits. From the data in Table 4, it follows that both inequalities are satisfied with a large margin:

$$\frac{1.15-1}{1.20-1} > \frac{350.0}{1260.0+350.0}, \ \ 0.75 > 0.22;$$

$$\frac{1.15-1}{1.20-1} > \frac{350.0}{3696.0-761.6}, \ \ 0.75 > 0.12.$$

Table 4. An example of outstripping wage growth in comparison with productivity at a conditional enterprise

Indicators	Base period	Reporting period	Growth rate, %
Revenue, million rubles	3696.0	4250.4	115.0
Labor costs, thousand pers. - h	1568.0	1568.0	100.0
Labor costs per 1 million rubles revenue, pers. - h	424.2	368.9	87.0
Salary level, rubles / pers. - h	350.0	420.0	120.0
Production costs, total, million rubles including:	2934.4	3213.0	109.5
fixed cost	1260.0	1260.0	100.0
variable costs without wages	1125.6	1294.4	115.0
wages	548.8	658.6	120.0
Profit, million rubles	761.6	1037.4	136.2
Profitability level, %	26.0	32.3	+6.3

The dynamics of the economic results of the company's operating activities depends on what is growing faster: revenue or costs. Production costs will increase more slowly than revenue if the absolute increase in unit labor costs is less than the absolute decrease in unit fixed costs (Table 5).

Table 5. The ratio of production costs and revenue (calculated according to Table 04)

Indicators	Base period	Reporting period	Growth rate, %
Production costs, total including:	0.794	0.756	95.2
fixed cost	0.341	0.296	87.0
variable costs without wages	0.305	0.305	100.0
wages	0.148	0.155	104.3

In our example, the increase in unit labor costs is 0.155 – 0.148 = 0.007. The absolute decrease in unit fixed costs is much greater: 0.341 – 0.296 = 0.045.

This indicates that there is no contradiction between the increase in the efficiency of the company's operating activities and the faster growth of wages in comparison with the growth of labor productivity.

An important indicator that should be taken into account when determining the boundaries of remuneration is profitability. It is desirable that not only the mass of profit increases, but also the level of profitability does not decrease. In the example considered (Table 4), the profitability of the enterprise increased by 6.3 percentage points.

In general, the growth of the wage fund in the reporting period will not lead to a decrease in profitability compared to the base period, if the following condition is met:

$$Q_1\left(P_1 - \left(1 + e_0\right)\left(v_1 + w_1\right)\right) - C_1\left(1 + e_0\right) \geq 0, \tag{3}$$

where P_1 is unit price in the reporting period; v_1 is unit variable costs (without wages) in the reporting period; Q_1 is output in the reporting period; e_0 is the basic level of profitability of all production costs (in shares of the unit); C_1 is fixed costs in the reporting period; w_1 is piecework remuneration per unit of production in the reporting period.

7. Conclusion

Outstripping the growth of labor productivity in comparison with its payment at a single enterprise will take place only with the introduction of appropriate organizational or technological innovations. In a period of organizational and technological stability, or with minor changes in the organization and production technology, it is necessary to use the opportunities that are created by outstripping wages.

At the same time, it is important to link wage growth not only with the growth of labor productivity, but also with the saving of material resources. This clearly follows from inequality (3), in which unit variable costs (without wages) and piecework wages per unit of output are combined when determining the economic boundary of wage growth.

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