

EVALUATION OF THE IMPACT OF WAGE LEVEL ON THE LABOR RESOURCES REPRODUCTION IN RURAL AREAS OF URAL REGION

Ivan Borisov – Natalia Sharapova – Valentina Sharapova

Abstract

The problem of reproduction of the population of the territory is quite relevant for regional socio-economic systems. The main symptoms of this problem are the tendency for a steady decline in the population of almost all municipalities, with the exception of large regional centers and megacities. The situation is especially dramatic in rural areas, which, due to their characteristics, are particularly vulnerable and are rapidly losing their labor and human potential. One of the key factors in the loss of attractiveness of rural areas for the population is a significant lag in the level of wages from large cities, and this differentiation persists even taking into account the industry-specific employment. The purpose of this article is to develop a theoretical model for the reproduction of labor resources in rural areas, taking into account migration and demographic restrictions. Based on the theoretical model, a methodology for assessing the factors of reproduction of labor resources of the territory was developed and tested on the data of the Ural region. A significant effect of wage indicators on a number of key parameters of labor reproduction was established.

Key words: labor market, migration, labor resources reproduction, wages differentiation

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Introduction

The study of the reproduction of labor resources in rural areas is quite relevant for the modern Russian economy. From a scientific point of view, the study of the reproduction of labor resources is a difficult research task. The first direction of research on reproduction in

agriculture was the study of labor migration from the countryside. Modern models of the process of migration from rural areas are based on the methodology of G. Ranis and J. C. H. Fei (Ranis and Fei, 1961), D. W. Jorgenson (Jorgenson, 1966), M. P. Todaro (Todaro, 1969), O. Stark and D. Bloom (Stark and Bloom, 1991), and others. Most of these studies take into account Different characteristics of the donor territory and the host territory as important factors of migration, while the specific set of factors varies significantly. Among the last works should be mentioned works of J. Knight, L. Song (Knight & Song, 1999), F. Wang (Wang, 2013), V. Sharapova, I. Borisov, N. Sharapova (Sharapova, Borisov, Sharapova, 2020), D. Ge, and others (Long, Qiao, Wang, Sun, Yang, 2020), C. Imbert, J. Papp (Imbert, Papp, 2020) and others. The second direction of the methodology for analyzing the characteristics of the reproduction of labor resources in agriculture can be called the direction founded by G.S. Becker (Becker, 1964), W. E. (Huffman, 1998) R. E. Evenson (Evenson, 1988) and considered in their works the influence of education on the accumulation of human capital. Among the last works should be mentioned works of R. Tamura (Tamura, 2002), V. Sharapova, N. Sharapova, I. Borisov, (Sharapova, Sharapova, Borisov, 2019) and K. W. Deininger (Deininger, 2019) and others. The purpose of this article is to test the hypothesis about the significance of the influence of wages on the reproduction of labor resources in rural areas in comparison with non-price factors. In the first part of the article, a theoretical model will be proposed that describes the role of wages in the process of reproduction of labor resources. In the second part of the work, the results of an empirical study will be presented and discussed. In conclusion, the results will be summarized and directions for further research will be discussed.

1 Theoretical model of the impact of wages on the reproduction of labor resources in rural areas

The process of reproduction of labor resources is characterized by a high duration and multifactorial nature; in this case, it turns out to be rather difficult to describe a single formalized model of reproduction. The model of reproduction of labor resources is a system of equations describing the optimal solutions of each economic entity and the corresponding

market equilibrium. The first economic decision in the field of reproduction of personnel, which starts the reproductive cycle, is the decision on the birth of children. This decision is made in isolation by households. It should be noted that this decision is the most specific from the point of view of economic analysis, since, firstly, it is largely influenced by non-economic factors, which include national and religious traditions, state of health, age, etc., secondly, this decision is usually not associated with current costs and benefits and is fully determined by the expected. The only type of running costs here is the loss in earnings caused by maternity leave, as well as the payment of necessary medical services related to childbirth. Based on this, the condition for the birth of a child can be formally written as:

$$V_{ch}(X) - c_{ch} \geq 0 \quad (1)$$

where V_{ch} is the expected present value of the birth of the child, for the household, X is the vector of exogenous parameters, c_{ch} is the current cost of the birth of the child. The role of wages at the bottom stage is that it affects the expected value of having a baby, reducing the subjective estimation of the expected costs of raising a child: $\partial V_{ch} / \partial w > 0$. It should also be noted that this solution has a significant random component as it depends on the implementation of the state of nature. In particular, the effect of the random factor turns out to be decisive for the poorest developing countries where there are no planning and birth control tools. The second economic decision made by the household is to determine the amount of investment in raising children and their general education. This decision is made by the household in the form of demand in the market for relevant services and involves a choice of two strategies. The first strategy involves active participation in the upbringing of children, including by incurring additional costs associated with the mental and physical development of the child, such as payment for sports sections, additional education, etc. The second strategy involves a passive attitude to education through the use of free social benefits provided by the state. The condition for choosing the first strategy takes the form:

$$\begin{aligned} V_{ae}(X, ae^*) - c_{ae}(X, ae^*) &\geq V_0(X) \\ ae^* &= \arg \max_{ae} (V_{ae}(X, ae) - c_{ae}(X, ae)) \end{aligned} \quad (2)$$

where V_{ae} is the expected present value from the choice of the first strategy, ae is the amount of investment in education, $c_{ae}(X, ae)$ is the subjective cost of education, $V_0(X)$ is the expected present value in the case of choosing the second strategy. The role of wages in this case is determined similarly to the previous paragraph, reducing the subjective costs of education: $\partial c_{ae}(X, ae) / \partial w < 0$. The supply in this market is formed by the state in the form of the provision of free social benefits. In this case, the state makes a decision in isolation, focusing on political goals. The condition for determining the optimal amount of social benefits is:

$$x^* = \arg \max_x (V(x) + V_p \times p(x)) \quad (3)$$

where $x^* \in X$ is the optimal amount of social benefits, $V(x)$ is the subjective estimation of rents extracted by officials in power, V_p is the present estimation of the value of politicians in power, $p(x)$ is the likelihood of power remaining. Another segment of the proposal is formed on a commercial basis by both state and private firms, whose objective function is a standard condition for maximizing profits. The third decision made by the household is a decision on investment in vocational education, including the choice of level and profile of education received, as well as the choice of a learning strategy (form of training, sequence of educational levels, etc.). An essential feature of this stage is that if a positive decision is made to receive an education, its implementation involves the temporary withdrawal of a person who is educated from the territory. In its most simplified form, the household decision made at this stage of reproduction can be formally represented as:

$$\begin{aligned} i^* &= \arg \max_i \{V_i\} \\ V_i &= \max_{ee} (V_i(X, ee_i) - ee_i(X, ae^*)) \end{aligned} \quad (4)$$

where i^* is the optimal education profile, i is the training profile, V_i the present estimation of the profile's value, $ee_i(X, ae^*) : \partial ee_i(X, ae^*) / \partial ae^* < 0$ the costs of obtaining education, including the non-monetary component, $V_i(X, ee_i)$ is the monetary estimation of the benefits of getting an education. The level of rural wages affects this decision by reducing the cost of obtaining education and increasing the benefits of choosing agricultural training

profiles: $\partial e e_i(X, ae^*) / \partial w < 0, \partial V_{i \in r} / \partial w > 0$, where r is the set of agricultural training profiles. In addition to households, professional education organizations play an active role at this stage, making decisions about the parameters of the educational services provided and investments in career guidance. The role of the state is also active. At this stage, the state acts on the reproduction system through educational policy. The target functions of educational organizations and the state are similar to the target functions obtained at the previous stage of the analysis. The fourth active subject influencing the reproduction process is the employer. At this stage, he decides to participate in the training process, leading to the choice of one of three potential strategies. The first strategy involves active participation, by participating in the educational process, providing a basis for practices, laboratory exercises and other instruments involving investment. The second strategy involves non-participation in the training process. And finally, the third strategy involves formal participation in the preparation process without investment. The third stage concludes the stage of primary formation of human capital of agricultural personnel. The condition for choosing the strategy by the employer takes the form:

$$k^*, c^* = \arg \max_{k, c} (PV\pi(k, c) - c) \quad (5)$$

Where $k \in \{0, 1\}$ - non-participation / participation of the employer in the process of primary training of labor resources, c - costs associated with participation in the preparation process (equal to 0 for the third strategy), $PV\pi(k, c)$ - present value of future profit from participation in the preparation process. After completing the initial training, the employee makes a decision in entering the labor market. This decision presupposes, firstly, a decision on economic activity, i.e., on the readiness of the employee for employment. Secondly, this decision involves the choice of industry and territory of employment. Thirdly, this decision involves the choice of the employer and the vacancy of interest. In a formalized form, the employee's decision can be represented as:

$$t^*, j^* = \arg \max_{t, j} (V_t(X_t) + W_{jt} - ew_{jt} - C_t(X_t) - C_M(X_t | t \neq t_0)) \quad (6)$$

where t^*, j^* is the optimal territory of residence and the employer, respectively, $V_t(X_t), C_t(X_t)$ is the present estimation of the value and cost of living in the given territory,

$C_M(X_t | t \neq t_0)$ is the estimate of migration costs, in case of a change of territory, W_{jt}, ew_{jt} is the remuneration and expected labor costs, respectively, when choosing a particular employer. Note that in this case, wages have a double effect on decision making. Indeed, the choice of territory of residence is influenced by the expected level of wages, determining subjective assessments of the benefits and costs of living and migration. The choice of a specific employer is influenced by both the expected level of wages, which determines the optimal time for finding a job and the level of wages offered by a particular employer. The employer, in turn, decides on the demand for labor and qualifications. Also, at this stage, the state can play an active role through the implementation of various programs that ensure the consolidation of young specialists in rural areas. The target functions of the employer and the state in this case have a standard form. The next stage of reproduction of frames is the stage of use. At this stage, the most active role belongs to the employer. In this case, the employer decides on the use of the employee's working time, working conditions, actual remuneration for labor, which may differ from the declared one. This feature is reflected in the employer's investments in staff training in various forms. It should be noted that part of the human capital of workers is irretrievably depleted both in the process of use and in the course of human life. As a result of this, the value of personnel for the employer can change during the aging process of the employee and lead to his retirement from the reproduction process. The value of remuneration for labor can also change with the age of the employee and lead to a decrease in labor supply. Thus, the stages of use and exchange continue as long as there are conditions of employment on which the employee and employer are willing to interact with a given level of human capital. As soon as such conditions disappear, the worker ceases to be part of the agricultural workforce and leaves the reproductive cycle. As can be seen from the proposed model, the level of wages has a significant impact on all stages of the reproduction of labor resources. At the same time, it is clear that, in addition to the level of wages, the characteristics of Territory X also influence all stages of production.

2 Empirical evidence

In order to assess the comparative significance of the level of wages of the territory and its qualitative characteristics on the parameters of personnel reproduction, studies were conducted on municipalities of the Sverdlovsk region. For the purpose of comparability of units of observation, the data on urban districts as the most popular types of municipalities in the region were selected as a sample. The following indicators for were selected as dependent variables. Variables characterizing the age structure of the rural population, as well as indicators characterizing the movement of the population on the territory of the municipality. The following groups of variables were used as dependent variables: salary indicators in the municipality, indicators of social infrastructure, indicators of the economic development of the territory, indicators of the health status of the territory, and the share of the rural population in the municipality as a control variable. Multiple linear least squares regression analysis was used as the estimation method. According to the results of the assessment, a significant influence of wage indicators on some key parameters of reproduction was established. These include: the proportion of the working-age population in the total population, the total influx of the population, migration growth, the overall mortality rate, and indicators of the structure of the migration outflow. The impact of wage indicators on fertility indicators, the share of the population below working age and the relative outflow of the rural population, the influx from abroad and the population older than working age was not found. The influence of qualitative indicators of the territory was characterized by significant heterogeneity and multidirectionality. High significance was demonstrated by indicators of the state of public health in the territory, including the availability of medical personnel. In general, the results of empirical testing confirmed the hypothesis of the greater importance of wages as a factor in the reproduction of labor resources. Also, wages are a more reasonable tool for managing reproduction processes since its level has a significant positive effect on all reproduction variables, while the influence of quality indicators is often unstable and multidirectional.

Conclusion

The study found that wages have a significant impact on the reproduction of labor resources in rural areas both at the theoretical level and on the data of municipal statistics of the Sverdlovsk region. In general, the results obtained during the study are consistent with previous studies of Russian and world authors. A key feature of the study is the assessment of the impact of precisely the level of wages as an average market indicator. The use of the wage level is due to the idea of a theoretical model and the specifics of the data used for empirical testing. At the same time, it should be recognized that the level of wages is not the only tool for the distribution of labor resources. In particular, in addition to the level of wages, an important regulator of the system of reproduction of labor resources is the requirements of employers for the qualifications of workers, personal and other characteristics. In the course of further studies, it is planned to supplement the analysis with due regard for the impact on the reproduction of requirements for workers and the characteristics of local communities, including as a factor in the formation of the territory's wage level and the specifics of its distribution between workers.

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Contact

Ivan Borisov

Ural State University of Economics

Address: Russian Federation, st. March 8 / Narodnaya Volya, 62/45, Ekaterinburg, 620144

Borisovivan2006@yandex.ru

Natalia Sharapova

Ural State University of Economics

Address: Russian Federation, st. March 8 / Narodnaya Volya, 62/45, Ekaterinburg, 620144

Sharapov.66@mail.ru

Valentina Sharapova

Ural State University of Economics

Address: Russian Federation, st. March 8 / Narodnaya Volya, 62/45, Ekaterinburg, 620144

Sharapov.66@mail.ru