NATIONAL ACADEMY OF AGRARIAN SCIENCES OF UKRAINE
ALC "INSTITUTE OF ACCOUNTING AND FINANCE"
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EMPLOYMENT IN THE AGRICULTURAL SECTOR OF THE UKRAINIAN ECONOMY: MANAGERIAL, ECONOMIC AND ACCOUNTING ASPECTS

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The monograph is devoted to substantiating the theoretical and methodological foundations and developing practical recommendations for improving the mechanism of employment regulation in the agricultural sector. A conceptual approach to the implementation of the organisational and economic mechanism for regulating employment in the agricultural sector of the economy at the institutional level is developed. A structural-component approach to the implementation of the organisational and economic mechanism for regulating employment in the agricultural sector of the economy has been improved, which takes into account factors of the macro-, meso- and micro-level, optimises the process of making managerial decisions on effective employment regulation. Approaches to identifying the components and sequence of implementation of the strategy for de-shadowing employment in the agricultural sector of the economy have been supplemented, which, along with the existing ones, includes the impact of institutional, economic, motivational, scientific, innovative, organisational and managerial imperatives to overcome shadow employment and provides for achieving a balanced system of labour relations, overcoming budget deformation, and creating a favourable business climate to increase investment attractiveness. The essential content of the category of "employment" and the organisational and economic mechanism for regulating employment in the agricultural sector of the economy are reviewed. The basis of accounting and information support for labour and its remuneration is analysed, and the key aspects of labour remuneration accounting are investigated. A methodological approach to establishing employment trends is developed, based on the differentiation of the analysis of the impact of factors at the national, regional and sectoral levels, which, together with the existing ones, provides for a system of sectoral analysis of employment, the establishment of its structural changes and the determination of the coefficient of localisation of the employed. The article substantiates the concept of decent wages in agriculture, which provides for a revision of its place in the structural and logical chain of households' functioning and its consideration as a dominant economic factor in the formation of employment in the agricultural sector of the economy.

It is intended for specialists of agricultural enterprises, public authorities, researchers, teachers, postgraduate students and applicants for higher education.

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CONTENT

Introduction

Structural shifts in the economy of the country as a whole and its regions lead to differentiation in the national and regional labour market and changes in the structure of employment. Employment is one of the most important macroeconomic indicators that, together with gross domestic product, reflects the current standard of living and welfare of each citizen. Today, building an effective organisational and economic mechanism for regulating employment in Ukraine is an essential component of the state's economic and social policy. Particular attention should be paid to the regulation of employment in the agricultural sector, a strategic industry that contributes to food security.

The problem of low material well-being of rural residents is a widely recognised reality. The reasons for the low interest of workers in the agricultural sector include the crisis of agriculture as an industry, the decline in rural employment, the devaluation of agricultural labour, external labour migration, and the loss of rural areas' identity and exclusive functions in terms of increasing labour, natural, cultural and spiritual potential.

The problems of regulating employment and overcoming unemployment are at the centre of research by domestic scientists studying labour economics and social and labour relations. Solving these problems will increase the efficiency of agricultural enterprises and contribute to the welfare of the population, which in turn will solve many socio-economic issues that currently concern the rural population. These issues are reflected in a number of scientific studies and publications by such scholars as: S.I. Bandura, I.V. Bilyk, D.P. Bohynia, O.H. Bulavka, O.V. Velychko, I.F. Hnybidenko, V.K. Horkavyi, O.V. Hridin, O.A. Hrishnova, V.S. Diiesperov, M.V. Zos-Kior, A.M. Kolot, E.M. Libanova, Yu.O. Lupenko, M.B. Makhsma, L.I. Mykhailova, I.P. Mosiiuk, T.I. Oliinyk, V.M. Onehina, V.M. Petiukh, M.S. Ponomarova, P.V. Savchenko, M.V. Semykina, L.V. Tranchenko, I.V. Khlivna, O.V. Khodakivska, L.V. Shaulska, O.H. Shpykuliak, K.I. Yakuba, V.V. Yarova and others. The following researches paid attention to the problem of improving the organisational and economic mechanism of functioning and development of the agricultural sector: V.H. Andriichuk, I.V. Honcharuk, M. Derhaliuk, Y.S. Zavadskyi, M.I. Malik, L.L. Melnyk, O.V. Oliinyk, P.T. Sabluk, O.V. Ulianchenko. The results of the scientific work made it possible to obtain a powerful

theoretical and practical basis for solving numerous problems in the labour market. However, certain aspects of the problem of regulating employment in the agricultural sector remained unresolved and necessitated further research, which led to the formulation of the topic, content, purpose, objectives and practical orientation of the study.

The purpose of the study is to substantiate the theoretical and methodological foundations and develop practical recommendations for improving the mechanism of employment regulation in the agricultural sector. The object of the study is the process of employment regulation in the agricultural sector of the economy. The subject of the study is a set of theoretical and methodological provisions and practical principles for the formation and ways to improve the organisational and economic mechanism for regulating employment in the agricultural sector of the economy. The legal basis of the study is the Constitution of Ukraine, laws of Ukraine, regulations of executive authorities, and decrees of the President of Ukraine. The empirical basis of the study is the official materials of the State Statistics Service of Ukraine, the State Employment Service, the Main Department of Statistics in Kharkiv Region, the Ministry of Economy of Ukraine, the National Agency for the Prevention of Corruption, etc. The scientific and theoretical basis of the monograph is the scientific work of leading research institutions, including the Institute of Accounting and Finance of the National Academy of Sciences of Ukraine, the Federation of Auditors, Accountants and Financiers of the Agricultural Complex of Ukraine, scientific works of domestic and foreign scholars, official Internet resources, as well as the author's own research and generalisations.

The authors express their sincere gratitude to the reviewers: Doctor of Economic Sciences, Professor, Head of the Department of Accounting and Taxation of the Lviv National Environmental University, L.B. Hnatyshyn; Doctor of Economic Sciences, Associate Professor, Professor of the Department of Marketing and Business Management of the National University of Kyiv Mohyla Academy, M.M. Mohylova; Doctor of Science in Public Administration, Professor, Professor of the Department of Management, Business and Administration of the State Biotechnological University, H.P. Pasemko for their comments and constructive suggestions.

We hope that the proposed monograph will help scientists, public authorities, specialists of agricultural enterprises, teachers and students of educational institutions.

Chapter 1.
SCIENTIFIC FOUNDATIONS AND PREREQUISITES FOR ORGANISATIONAL AND ECONOMIC REGULATION OF EMPLOYMENT IN THE AGRARIAN SECTOR OF THE ECONOMY

1.1. The economic essence of the category of "employment" and its role in the management of the agricultural sector

It is difficult to overestimate the place and role of the agricultural sector in the country's economy, as agro-industrial production is an important budget-forming link of the economy, provides the population with food and provides industry with a strong raw material base. The importance and necessity of this industry should be clearly defined at the state, regional and local levels and should continue to develop, which primarily requires the construction of an effective management process that is formed by the interconnection of natural, economic and social factors. The works of M. Balji state that "management is an art and science aimed at ensuring the successful functioning of any production and economic unit under conditions of risk" [12, p. 198].

We believe that the opinion of academician P.T. Sabluk that "management of the agricultural sector is an integral part of ensuring the effective functioning of the agricultural sector" is correct [212, p. 240].

However, the current state of functioning of the agricultural sector indicates that the management system is not capable of achieving high results, which will be an obstacle to making rational management decisions.

At the same time, scientists O. Ulyanchenko and V. Titova noted in their work that "the agricultural sector is a complex combination of many production and organisational structures into a certain system, the purpose of which is to meet the needs of society. Understanding of processes and phenomena as systems makes it possible to study the whole and its independent (within certain limits) structures and develop general principles of optimal management of such objects" [240, p. 123].

An important element in the process of managing the agricultural sector is employment. Employment is a socio-economic phenomenon that includes social and economic components. However, this category is multifaceted and characterised by contradictions in its essence and practical orientation, so it is necessary to identify the main stages of

evolution of the interpretation of employment as a phenomenon of social development and a category of economic science.

The economic basis of employment is the creation of national income: the more people are employed in production, the more material and spiritual values society produces, which forms the corresponding standard of living and well-being of the population. This approach was formed in accordance with the content of the publication "An Inquiry into the Nature and Causes of the Enrichment of Nations" by the famous English economist Adam Smith. In his work, the scientist noted that the wealth of a country is determined by the goods of material production. Their volume, in turn, depends on the share of the population involved in production and on labour productivity [223]. In particular, the reason for the lagging development of agriculture compared to industry is the underdevelopment of the division of labour, which is due to natural factors.

W. Pettit is rightly considered the founder of a powerful political doctrine. The researcher formed a central thesis for the entire school of political economy classics: the wealth of a nation is created in all spheres of material production, and labour is the basis of wealth. His famous phrase "Labour is the father and active principle of wealth, and land is its mother" has become quite widespread in the scientific community. French economist Jean Baptiste Say defined labour, land and capital as the main factors of production [102, p. 7].

It should be noted that after the industrial revolution, the concepts of "employment" and "labour" were supplemented by the concept of "portfolio of activities", i.e., in addition to hired labour, other forms of human activity appeared: housekeeping, self-employment, individual entrepreneurs, etc.

The representative of neoclassical economic theory A. Marshall viewed employment as the key to the wealth of a country and its people. He understood employment as a systematic sphere of human activity. The researcher argued that an employee has a direct dependence on labour, and proved that hard, low-paid work does not allow an individual to develop and improve himself [132].

According to the scientific work "The General Theory of Employment, Interest and Money" by J.M. Keynes, the labour market and employment are permanent and fundamental phenomena of equilibrium. According to the theory of employment, the unemployment rate should not exist if the state pursues an active policy of aggregate demand [92].

In contrast to the Keynesian theory of employment, M. Friedman introduced the concept of monetarism. According to this theory, the economy is a system that independently determines the rational level of employment. The unemployment rate should be influenced by monetary policy, and the state should reduce this indicator to a natural level [245].

We believe that special attention should be paid to scientific hypotheses K. Marx's scientific hypotheses, in particular those reflected in his important scientific work Capital. Marx's theory was based on the concepts that all material goods, including capital (the value of the means of production), are passively transferred to the value of goods and on the perception of production through reproduction and the theory of labour value [131].

At different stages of the development of socio-economic thought, employment acquired new features of fundamentality, permanence, rationality, necessity and the desire for continuous development, which gave grounds to transform its essence as an integral part of the process of economic management at the macro-, meso- and micro-levels.

Thus, the category of "employment" characterises social relations concerning the inclusion of human labour force in social production. In this regard, scholar V.G. Kostakova notes that employment is a socio-economic process based on the social division of labour, and is the use of different groups of the population in various spheres of socially useful activity [106].

The researcher V.M. Yagodkin understands employment as the provision of all able-bodied population with work [265]. That is, employment is an economic category caused by the actions of a certain system of economic laws that correspond to the general economic formation [26].

From the point of view of modern economic theories, the category of employment occupies one of the leading positions in the system of the national economy and, together with the GDP indicator, reflects the real standard of living and welfare of each citizen. Employment in the agricultural sector of the economy, as well as in other areas of production, is a purposeful activity of a person who directs his or her labour force to modify or adapt objects to meet his or her own needs and the needs of society.

Thus, the study of the essence and content of the category of "employment" is an important component of a comprehensive analysis of the current state of the labour market in order to respond in a timely

manner to the changes taking place and to develop ways of developing this market.

Scientist O.I. Kremen notes that for quite a long time the category of "employment" was almost never used in domestic scientific works, statistical and sociological studies [113, p. 86]. The reason for this was the existence of the principle of universality of labour, i.e. the guaranteed right to work was considered to be a confirmation of the absence of employment problems. According to the scientist, "given the peculiarities of the labour management system under socialism, the science of employment, including statistics, was at the initial stage of development: it was characterised by one-dimensional theoretical foundations and an attempt not to contradict official requirements. All this limited the possibilities of an in-depth study of the peculiarities of employment" [114].

However, at the end of the XX century, the situation changed: there were changes in our country's economy, characterised by deep crisis phenomena that led to massive bankruptcies, hyperinflation, and insolvency. It was at that time that the economy faced such previously unknown phenomena as high unemployment, shadow employment, etc.

The legal framework for regulating employment in the agricultural sector is provided by the Constitution of Ukraine [104], the Labour Code of Ukraine [98], the Commercial Code [52], the Civil Code [252], the Law of Ukraine "On Employment" [189], the Law of Ukraine "On Compulsory State Pension Insurance" [187], and the Law of Ukraine "On Remuneration of Labour" [194], The Law of Ukraine "On Compulsory State Social Insurance in the Event of Unemployment" [188], the Law of Ukraine "On Social Dialogue" [197], the Law of Ukraine "On Promoting Social Formation and Development of Youth in Ukraine" [198], the Law of Ukraine "On Professional Development of Employees" [195], the Law of Ukraine "On Trade Unions, Their Rights and Guarantees of Activity" [196], etc. These legal acts create a powerful basis for further regulation of employment as an important component of the national economy management process.

In order to regulate and ensure employment at the state level, the Law of Ukraine "On Employment of the Population", which is no longer in force, was adopted in 1991, stating that employment is the activity of citizens related to the satisfaction of personal and social needs and which, as a rule, brings them income in cash or other forms. However, changes in the economy and the transformation of the labour market have shown

that this category was not fully disclosed and had certain inaccuracies that could be interpreted ambiguously. As a result, in 2013, a new Law of Ukraine "On Employment of the Population" was adopted, which states that employment is the activity of persons not prohibited by law related to the satisfaction of their personal and social needs in order to receive income (wages) in cash or other form, as well as the activity of members of the same family who carry out economic activities or work for business entities based on their property, including free of charge [189].

On 27 January 2017, the State Statistics Service adopted the Methodological Regulation on the Classification and Analysis of Labour Force and Certain Forms of Labour Activity, which identifies five forms of labour activity, including employment. According to this regulation, employment is a labour activity performed in exchange for payment or profit [137].

The rapid analysis of the legal and regulatory framework for employment gives rise to the conclusion that, on the one hand, it is viewed as an indisputable right to work enshrined in the highest legislative level, which provides for equality in the choice of profession and activities not prohibited by law, and, on the other hand, as effective employment, which confirms its multidimensional and contradictory nature.

In the English-Ukrainian dictionary by R.V. Yakovenko, the term "employment" is translated as follows: 1) realisation by an employee of his/her abilities, skills and experience to receive income in the form of wages; 2) a set of economic, legal, social, national and other relations related to the provision of economically active population with jobs and their activities in social production [273, p. 31].

From the point of view of scientific analysis, taking into account the diversity of its modalities, employment can be viewed as a system, on the one hand, and as a process, on the other, which has a duration and can be divided into stages (discrete employment based on internal and external mobility) [62].

In our opinion, the statement of M.Y. Khomyak that "employment of the population is the foundation in society that changes the social position of a person in society, as well as forms his/her socio-professional portrait as a person" is correct [249, p. 144].

Thus, employment is a generalised category, the content of which has been defined differently by scholars in different periods and in the process of economic development they have developed their own

approaches to its definition, which are summarised and systematised in Table 1.1.

Table 1.1

Definitions of the category of "employment" and their content in selected literature sources

№	Author, year	Definition of the category "employment"
1	2	3
1	Economic encyclopedia. Political economy (in 4 volumes), 1980, [271]	a set of economic relations related to jobs and participation in economic activities.
2	S.V. Mochernyi, 1996, [142]	a set of socio-economic relations between people regarding the provision of working-age population with jobs, formation, distribution and redistribution of labour resources with the aim of their participation in socially useful work and ensuring expanded, normal reproduction of labour force.
3	I.P. Mosiiuk, 1999, [141]	the ability of an employee to sell his/her labour power to ensure its expanded reproduction in relation to the achieved level of development of productive forces and production relations, social division of labour, specifics of production and exchange of labour results.
4	V.M. Petiukh, 1999, [173]	a set of economic, legal, social, national and other relations related to the provision of jobs to the able-bodied population and their participation in socially useful activities that generate earnings or income.
5	H.T. Zavinovska, 2000, [77]	reflects the level of economic development achieved and the contribution of live labour to production. Employment combines production and consumption, and its structure determines the nature of their interrelationships.
6	B.O. Balasynovych, 2005, [11]	a multifunctional, multi-level socio-economic system that synthesises a complex set of economic, social, organisational, legal and other relations in society regarding the participation of an individual in all types of activities to meet personal and social needs in order to ensure the development of professional qualifications and skills in accordance with the moral and psychological qualities and attitudes of the individual.
7	H.I. Chepurko, 2006, [255]	a complex system of links between the division of labour between spheres of social production and types of economic activity, covering an integral set of spheres, relations, forms and methods of organising labour activity of the economically active population and aimed at creating material and social products and services and ensuring the reproduction and development of human capital.
8	O.V. Volkova, 2007, [42]	is a socio-economic category that synthesises a set of relations concerning people's participation in social production and is related to ensuring the scale, conditions and forms of people's involvement in socially useful work, and the processes of formation, distribution and use of labour resources.

Continuation of Table 1.1

1	2	3
9	A.M. Kolot, O.A. Hrishnova, O.O. Herasymenko ta in. 2009, [72]	the foundation of the country's economic growth, a decisive factor in the creation of gross national product, material and spiritual well-being of people, the leading sphere of realisation of their vital interests, the main means of satisfying various needs.
10	O.O. Akhmedova, 2010, [9]	is a socio-economic phenomenon that consists of socially useful activities of citizens aimed at realising their labour potential and generating income.
11	S.A. Kharchuk, 2011, [247]	is a complex and rather multifaceted socio-economic category that reflects a person's desire for self-expression and satisfaction of material, physical and spiritual needs through motivational remuneration.
12	M.B. Makhsma, 2017, [133]	aimed at ensuring a decent income, long and healthy life, comfortable living conditions, social security and broad opportunities for the formation, development and realisation of human, social, intellectual and creative capital.
13	O.S. Nesterovych, 2022, [144]	a resource for the functioning of society, an important component of the country's socio-economic development, which shows how the able-bodied population (including young people) is provided with jobs in the system of public labour cooperation, and also shows the level of social protection in the exercise of the right to work.

Employment, as a concept, is not only an economic component, but also an important social category that affects the quality of life and development of society as a whole. Interpretations of employment offered by different scholars provide an opportunity to see this concept in different contexts, but they all emphasise the importance of the role that employment plays in shaping the social and economic landscape.

Employment not only stimulates economic growth, but also affects people's psychological state, self-esteem and overall happiness. Every citizen has the right to work and to realise their abilities and potential, which creates a prosperous and sustainable social situation.

The need for employment is closely linked to personal development and social interaction. It provides people not only with financial stability, but also with the opportunity to feel useful to society, to realise their values and achieve their goals.

Employment is therefore a key factor not only for economic development, but also for social well-being and personal development. It helps to strengthen social ties, expand opportunities for self-expression, and ensures the stability and prosperity of society as a whole.

Employment is a category that reflects various aspects of society: economic, social, demographic, cultural, and legal, which are fully

interdependent. According to these aspects, the functional content of this category is important.

The economic function of employment is that human labour, together with the means of production, participates in social production, ensuring the creation of gross national product. The level of economic development of a region or country depends on the level of employment. This opinion was formed in accordance with the research of J. Tinbergen, who, when developing a model of social production development, included eight variables in the objective function, including the amount of labour expended or the number of employees [234].

Scientist O. M. Radionova noted that in the late 1980s and mid-1990s the situation changed and only two tasks were faced – full employment and the fight against inflation. It should be noted that the implementation of the economic function of employment is a priority task in macroeconomic policy [200, p. 7].

The essence of the social function is the possibility of self-realisation and self-improvement of each individual in accordance with his/her professional qualification level through socially useful activities.

In addition, employment is an important aspect of a person's identity. Through their professional activities, people define themselves in society, reveal their talents and abilities, establish contacts with other people and feel that they belong to a certain professional and social community. Employment also stimulates continuous self-improvement. By acquiring new skills, abilities and knowledge in the course of work, a person expands his or her potential and improves professional qualifications. This contributes not only to personal growth, but also increases competitiveness in the labour market.

The key aspect of the cultural function is to combine all the basic principles, values, and norms into a single entity within society. Awareness of the importance of certain principles and norms allows us to form a society that will be determined to succeed, to increase productivity, and will be open to change and value-oriented.

The legal function is to ensure that the state provides regulatory and legal acts and other organisations that will allow each employee to preserve his or her potential and be protected in the course of employment. Having characterised the views of scholars on the essence of the category "employment", we consider it necessary to pay attention to the concepts of employment (Fig. 1.1).

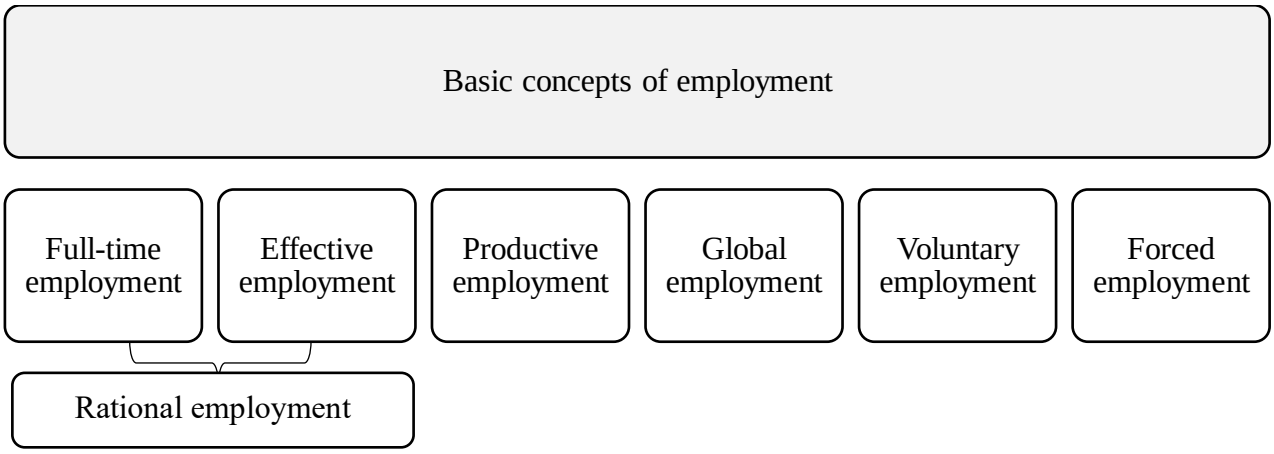

Fig. 1.1. Generalized classification of employment concepts
Source: compiled by the authors.

The team of authors led by Professor A.M. Kolot defines the following concepts of employment: full, productive, effective and rational. The authors also noted that the concepts that cover its various aspects help to clarify the content of employment [72]. Researcher V.S. Vasylchenko conceptually divides employment into the following forms: full, global, and forced [35]. Scholar V.M. Petiukh distinguishes the following concepts: full, global, forced, voluntary [173]. Scientist O.V. Volkova characterises employment by three concepts: full, effective and rational [42].

Researcher J. Kornai studies the issue of full employment, which does not accidentally and temporarily reach a high level. In his work "Deficit", the researcher draws attention to the shortage of labour as a negative phenomenon that occurs in an economic system with limited resources [105].

According to N.P. Kazyuka, "full employment should be a priority for public policy, because, according to the thesis, it will provide the necessary number of jobs for the working population, and effective employment is aimed at a specific industry or type of production" [89, p. 15].

Analysing scientific views, full employment is understood as the maximum possible level at which the able-bodied population is involved in social production and meets the real need for jobs with economically justified productivity.

According to O.O. Kiselova, the concept of "effective employment" is ensured by such distribution of labour resources in the territorial and sectoral areas, which establishes the labour market conditions that are as

consistent as possible with the level of natural unemployment acceptable for certain socio-economic conditions [95].

We fully agree with O.V. Volkova, who believes that rational employment is a combination of full and effective employment [42].

The concept of rational employment "provides for the provision of economically and socially feasible jobs to all those willing to work in accordance with the rational structure of employment and a balanced structure of social needs, which ensures the quality use and comprehensive development of human resources" [142, p. 224]. We share the view that although rational employment combines full and effective employment, it cannot fully provide jobs for the economically active population, as it is based on the principle of reasonable participation.

Productive employment is characterised by a high intensity of use of production factors, maximisation of newly created results that have social utility [89].

According to L.M. Ilyich, "productive employment is inherent in an efficient economy, characterised by a decrease in energy and material intensity, an increase in capital productivity, high rates of innovation in society, a highly competitive labour force, increased investment in human capital development, etc." [83, p. 100].

Scholar V.M. Petiukh notes that in the capitalist world, the concept of full employment prevailed until the mid-1970s and was based on the state's stimulation of labour demand [173]. The further functioning of full employment was inefficient, the material and technical base was changing, and the unemployment rate tended to increase, which necessitated the creation of a global concept of employment.

According to M. Tulenkov, a flexible labour market requires new approaches and various forms of employment and labour force use, which is reflected in the so-called concept of global employment. This concept is based on the needs of the entire working-age population in terms of labour activity, and also provides for the standardisation of the total amount of work and its distribution among those who want to get a job [237, p. 124].

Under global employment, T.I. Pavliuk understands all types of useful activity both in and outside of social production, i.e. household management, child and patient care, temporary employment of citizens [165, p. 28]. The concepts of employment also include voluntary and forced employment.

Thus, the analysed sources allow us to conclude that there is no single concept and understanding of employment that would take into account all the features and current state of employment in our country, in particular in the agricultural sector, in the process of integration and implementation of the national economic system into the European space.

On this basis, summarising the results of research on the essence of the category "employment" and its place in the management system, we propose to define employment as a sphere of industrial relations of employees which does not contradict the law, which ensures the realisation of potential opportunities and rights of employees to use their labour force, realisation of human capital, to create benefits, meet needs and form a useful effect in the economic, social and legal spheres and is the foundation of economic development of the economy. We believe that the proposed definition takes into account the nature and manifestations of the modern content of the category under study and allows developing directions for improving employment management through the implementation of an organisational and economic mechanism and satisfying the interests of key stakeholders in the effective development of the agricultural sector.

The content of the category "labour market" has an independent characteristic and is not limited to the concepts of "employment" and "unemployment". The Law of Ukraine "On Employment of the Population" defines the labour market as follows: "a system of legal, social, labour, economic and organisational relations that arise between job seekers, employees, trade unions, employers and their organisations, public authorities in the area of meeting the needs of employees for employment, and employers for hiring employees in accordance with the law" [189].

According to V.O. Rubezhanska, "the labour market is a multidimensional phenomenon characterised by a hierarchical open system in which socio-economic, psychological, legal and other relations between the employee, employer and intermediary take place, with the aim of mutually beneficial use of labour and taking into account market changes, national traditions, mentality" [206, p. 45].

The most thorough definition of the essence of the labour market was given by E.M. Libanova: "the labour market is a system of socio-economic relations between employers – owners of the means of production – and the population – owners of labour force – to meet the

demand of the former for labour, and the latter – for jobs, which are their source of livelihood" [124, p. 12].

Employment is an important outcome of the functioning of the labor market because it determines how labor resources are allocated and redistributed according to supply and demand in that market. The labor market mediates between workers who offer their labor and employers who need labor.

In fig. 1.2 presents the relationship between the "labor market" category and the results of this market: the employment and unemployment rate.

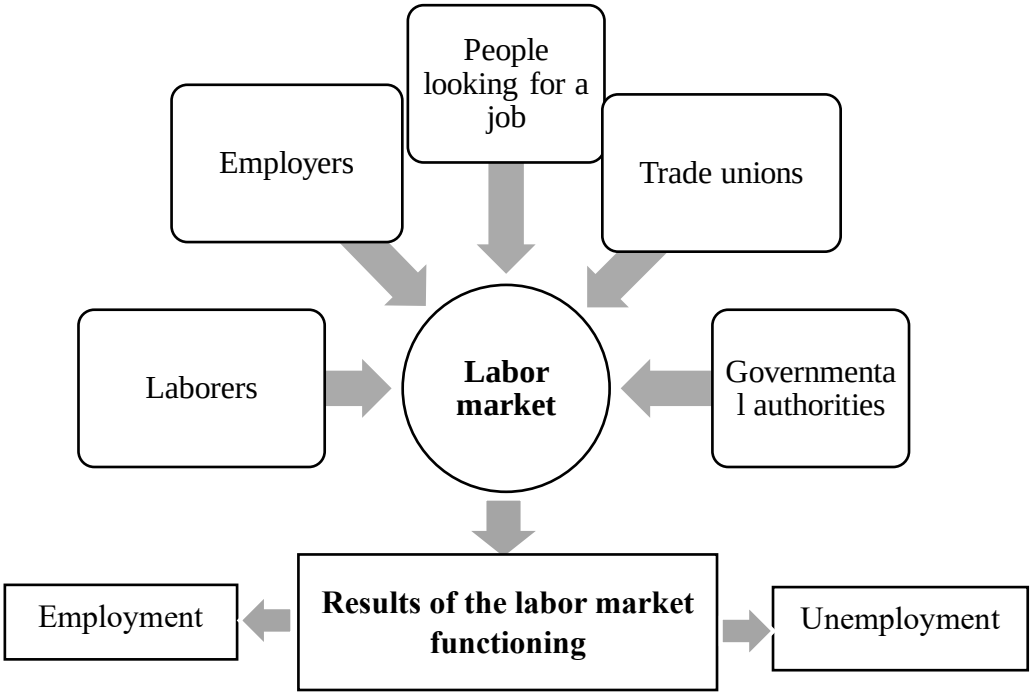

Fig. 1.2. Labor market and employment ratio

Source: compiled by the authors based on [189].

In the process of research, we came to the conclusion that in order to reveal the economic meaning of the category "employment", it is necessary to provide a qualitative description of its main elements (Fig. 1.3).

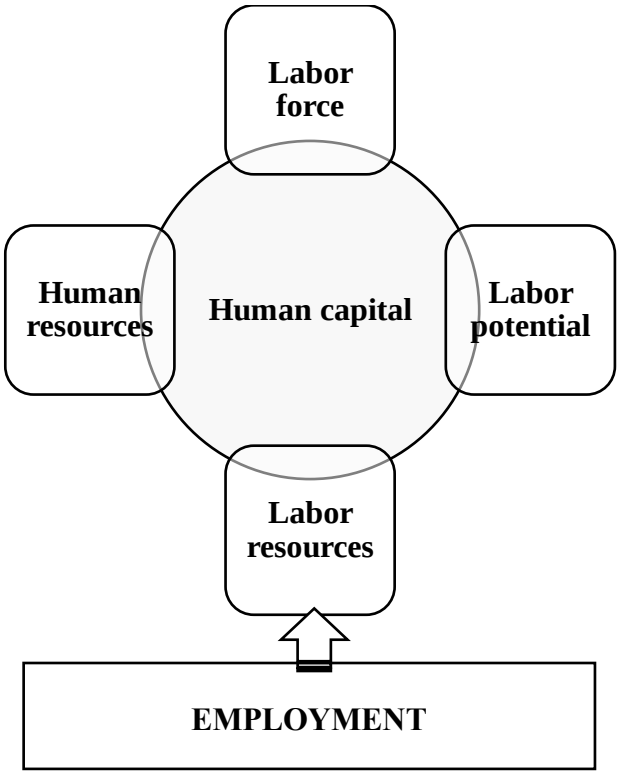

Fig. 1.3. Components of the qualitative characterization of the category "employment"

Source: compiled by the authors.

Researchers L.V. Balabanova and O.V. Sardak defines human resources as "a set of social, psychological and cultural qualities of its employees" [10, p. 9]. V.S. Researcher of the Institute of Agrarian Economics of the NSC. Diesperov notes that "the most socially tangible indicator of the situation with the use of labor resources is the employment of the population" [68, p. 116].

In the Soviet encyclopedic dictionary, labor resources are defined as the part of the population that has the necessary physical development, knowledge and practical skills for work in the national economy [224].

Analyzing economic activity, researcher G.V. Savytska notes that the efficiency of the use of labor resources is an important factor that affects the competitiveness of products and their quality, contributes to the improvement of economic activity, the reduction of personnel costs and the growth of employee incomes and the overall profitability of the enterprise [213].

Academician V.G. Andriychuk specifies that the bulk of the labor resources of enterprises "are employees of working age: men – from 16 to 60 years old, women – from 16 to 55 years old" [5]. It should be noted that today, in accordance with the legislative framework, this structure has changed and persons of working age are persons aged 16 and older who

have not reached the retirement age established by Article 26 of the Law of Ukraine "On Compulsory State Pension Insurance" [187].

At the same time, scholars V.Y. Shiyan and I.V. Gorkovenko have determined that it would not be entirely logical to associate labor potential with persons of working age only, especially in rural areas. They are of the opinion that "the value of labor potential is formed by the number of labor resources, and at the level of level – by the number of personnel and its existing features that make it possible to increase the value of the potential with the same or even smaller number of labor resources" [267, p. 8].

Researcher O. V. Velychko believes that labor resources should be considered in two ways: as a socio-economic category and as a planning and accounting indicator, depending on the purpose for which this concept is used [37]. We fully agree with the opinion that in order to ensure the efficient use of labor resources, it is necessary to characterize the concept of "labor potential" in more depth.

Scientist L.V. Shaulska has formed her own vision of the category "labor potential" – these are labor resources that determine the totality of the population's capabilities for active labor, entrepreneurial, innovative activities in combination with the conditions and quality of their use in the field of labor [262, p. 26].

In his scientific works, T. Belorus characterizes the labor potential of a society (country) as "a synthesis of the aggregate abilities of the economically active population, which are modified in the process of labor activity and are used or can be used to create gross domestic product" [17, p. 43]. Scientist O. Bulavka notes that the reason for the negative dynamics of the reduction of labor potential in the agricultural sector is the reduction of its natural basis – the population [25].

Based on the analysis of a number of scientific papers, we conclude that labor potential is a complex multi-level category that combines several qualitative characteristics that define a person and can be used in the course of labor activity.

We fully support the opinion of S.E. Sardak that the concepts of "labor force" and "labor resources" are distinct concepts and have different quantitative characteristics [216].

Labor force is an important indicator that qualitatively characterizes employment. Prior to the adoption of ILC Resolution 19, the labor force was defined as "economically active population". According to this Resolution, the labor force is the population of both sexes of a certain age,

which during a certain short accounting period (week) provides the supply of labor in the labor market [295].

In the first volume of Capital by Karl Marx, labor force (ability to work) is defined as a set of physical and spiritual abilities possessed by a living organism, a living human personality, and which it uses every time when production of use value is carried out [131].

According to L.I. Mikhailova, "labor force is a person's ability to work, i.e. a set of his/her physical and spiritual forces used in the production process" [138, p. 15]. Researcher A.V. Kalyna notes that "labor force is a special commodity, on the production qualities of which the efficiency and competitiveness of the economy, its ability to create high quality goods and comfortable services, the scale and pace of scientific, technical, innovative and organizational transformations entirely depend" [91, p. 34].

We agree with the opinion of T. V. Davidyuk that the analyzed categories of "human resources", "labor resources", "labor potential", "labor force" are used to explain the nature of the concept of "human capital" [63].

The first mention of the concept of "human capital" dates back to 1962 – the year of publication of the scientific work by Gerry S. Becker entitled "Investments in Human Capital: A Theoretical Analysis" [278]. Having studied the concept of human capital, Gerry S. Becker, together with T. Schultz, drew attention to the importance of the investment approach in assessing the effectiveness of human capital [296].

From the point of view of the historical approach, researchers T. Kiryan and Y. Kulikov thoroughly characterize the category of "human capital". In general, this category is presented as "the self-growing value of the entire set of abilities belonging to the employee, which are naturally obtained (health, creative inclinations, etc.), independently accumulated (as well as acquired by life experience) and developed by him as a result of investing in education, professional training, health improvement and motivation" [93, p. 31].

On the basis of the genesis of the main value – the human being and changes in the environment in which he or she operates, the scientist N.I. Verkhoglyadova considers human capital as a socio-economic form of the human factor capable of ensuring economic growth [40].

Using a systematic approach, N.V. Golikova interprets human capital as "the value of the stock of abilities, experience, knowledge

involved in the economic process, capitalized on the basis of employment and bringing added value (profit)" [47, c. 9].

Based on the above opinions, we conclude that human capital should be understood as an integral component of employment management, which determines all the productive abilities of an individual formed in the process of personality formation, accumulated as a result of life experience and developed by investing in education, advanced training, self-improvement, etc.

However, we are convinced that the concept of "human capital" is closely related to the concept of "employment" and fully agree with the definition of D.P. Melnychuk, who understands human capital as "an economic asset formed as a result of investment through the acquisition of knowledge and appropriate modification of the productive capabilities of an individual (labor collective, society as a whole) and is a form of representation of the latter in the course of labor activity, which provides a certain income to participants in the investment and production process" [136, p. 87].

It is worth emphasizing that in order for the acquired knowledge to be transformed into capital, the population must be employed. At the present stage, there is a rather acute problem when our capital in the form of young qualified specialists with higher education and acquired knowledge, who have made significant investments in their development, does not find support from the state and leaves for abroad. This problem is especially relevant for the agricultural sector, where specialists with agricultural education do not find their place in the modern labor market. That is why there is a need to focus on certain factors of employment formation and the functioning of the employment management mechanism in the agricultural sector of the economy.

1.2. Factors of employment formation in the agricultural sector

The success of the implementation of any mechanism depends on the nature of the organization of the process of its regulation, and the management of the mechanism is based on objective and subjective factors affecting the change in the state of this mechanism. The modern development of employment in the agricultural sector of any region is determined by many factors. Identifying these factors and determining their direct or indirect impact on the development of the labor market is a necessary condition for understanding the current state of employment

and possible changes and is a crucial prerequisite for the socio-economic stability of the agricultural sector.

The process of formation and development of the understanding of the category "employment" must be considered comprehensively, taking into account the factors of the external and internal environment, which will allow solving the problem of building its rational structure and determining the optimal proportions of employment in the process of Ukraine's integration into the global economic space.

Modern studies contain a number of theoretical and practical developments regarding the influence of factors on the employment of the population, which will lead to further improvement and implementation of the employment policy, taking into account the peculiarities and specific influence of the mentioned factors. Today, macroeconomic indicators, data of the State Employment Service, the State Statistics Service regarding the level of employment in the agricultural sector determine the feasibility of determining and assessing the degree of influence of these factors, which will become important in the future during the development and adoption of effective employment development programs at the national and regional levels.

Let's analyze the essence of the concept of "factor", which the Great Explanatory Dictionary of the Modern Ukrainian Language interprets as a condition, the driving force of any process, phenomenon [36].

Researchers U.Ya. Sadova and L.K. Semis understand the concept of "factor" as a certain force or set of forces, conditions or reasons necessary for the implementation of any process (action) [214]. That is, they become factors only under the influence of certain laws or patterns of development and require special conditions of existence.

At the same time, in many scientific works, instead of the term "factor", the synonym "factor" is used. That is why in the process of research we identify them and will determine the factors (factors) of influence on employment in the agrarian sector of the economy.

In the early 2000s, V.I. Gerasimchuk, having conducted in-depth research, found out that the system-forming factor that had the greatest impact on the reform of the economy and the employment of the population was the transformation of forms of ownership, as a result of which the foundations of a multi-system economy were formed, the institutionalization of private property, the liberalization of economic relations and foreign economic relations took place. Activity, the market

pricing mechanism was involved, legislative and legal support for market management methods was formed [44].

In her dissertation, L.M. Kravchuk establishes that the factors influencing the employment formed in a region should be divided into two groups of factors: external (macro-, meso-factors) and internal (micro-factors). Macro- and meso-factors of employment formation are understood as those that have objectively developed and form the employment of most of the region's population, and micro-factors are specific prerequisites for the employment of an individual [110].

Investigating the impact on employment and the need for labor, researchers P.Yu. Buryak, B.A. Karpinskyi and M.I. Grigoriev, the following important factors are taken into account:

– peculiarities of the territorial (regional) organization of the economy and social structures (including the training of specialists);

– a set of personnel with a certain level of qualification and training at a certain point in time;

– need, shortage or vice versa – excessive number of workers resources under a certain market situation;

– internal criteria (standard of living, work) [27].

Scientists V. Smachilo and O. Kolmakova determine that the qualitative structure of the labor market is influenced by personal data, specialization and mobility of labor resources. Personal data is understood as age, education, marital status, presence of children and is defined as a subjective factor that affects the decision to get a job. Specialization (experience, qualification and profession) and mobility (propensity to migrate, propensity to temporary immigration, propensity to retrain) are objective factors that affect job search [222].

In the process of research, K.O. Chakalova claims that the domestic labor market occupies a special place in the modern economic system. It constantly interacts with the external environment. The internal labor market is influenced by external factors, which are divided into three groups: political, economic and social. Political factors are represented by legislation, the tax system, and political stability. Among the economic factors, GDP, inflation, investments, development of innovations, availability of credit, level of employment and unemployment are distinguished. Social factors characterize the level of income and purchasing power of the population, the social and professional structure of the population, the state of development of the education system, population migration [253, c. 160].

Detailed analysis conducted by M.E. Stadnyk, made it possible to identify seven groups of factors that affect employment: demographic, natural-climatic, socio-economic, psychological, organizational-technical, political, socio-cultural [226].

Scientists V.V. Onikiyenko and N.I. Kovalenko is singled out among the basic factors of employment formation:

1) demographic: provide interdependence of employment and sex-age, professional and qualification characteristics of the population, its structure and number. According to these experts, it is they who determine the composition of the workforce by age, gender, qualifications and education, health status, and determine its number;

2) economic: provide for the formation of aggregate demand for labor and the worker's ability to provide a decent living with the help of his work, with the possibility of simultaneously increasing the efficiency of social production. The action of these factors largely determines the volume, structure and dynamics of employment of the population;

3) technical and technological: provide scientific and technical potential (technical progress, development and implementation of achievements of science and technology, innovations);

4) organizational: cover regulatory and legislative acts, forms of ownership, employment programs, types of activities, employment forecast, etc.;

5) social: determine the qualitative characteristics of the workforce and labor efficiency, aimed at the organization of professional and qualification characteristics and comprehensive development of the individual. They include the system of education, culture, health care, social protection, etc. [161].

In his research, scientist V.M. Popov identified the impact of a separate group of industry factors, the main ones being production specialization, land and natural conditions as its determining factors, seasonality, specific features of fixed assets, level of technical equipment, labor conditions and safety. [183].

At the same time, researcher N.O. Afendikova identified three groups of factors that significantly affect the employment of the rural population in local conditions: factors of the extra-production link of the employment system regulating the formation of labor resources; factors of the intra-production link of the employment system regulating the use of labor; factors of market infrastructure development and its socialization on the principles of social partnership [7].

The factors of the first group include the natural movement of the local population, the distribution of the working-age population and its migration; state guarantees of employment, investment in jobs and labor activity. The second group of factors is the improvement of organizational, economic, material and technical conditions for the realization of labor potential in the mainstream production. The third group of factors includes labor mediation, professional and labor mobility of the workforce, organizational and financial support, improvement of forms of vocational training and retraining, and increasing the role of collective bargaining in regulating professional employment.

In a study conducted by I.P. Mosiyuk, it was determined that a significant number of factors influence the employment rate. The researcher classifies them into natural, organizational, economic, social, technological, legal, demographic, psychological and other factors[141].

In the dissertation of N.P. Kazyuka, the classification of factors of employment formation is presented as follows:

1. socio-demographic, including gender, age and level of education of the existing population;

2. legislative and legal, covering all measures, means and forms of employment regulation;

3. economic, which take into account various sectors of the economy or types of economic activity; political, which take into account the current trends in the political situation in the country and its regions in particular;

4. organizational and managerial, consisting of various programs and means of influencing the structure of the economy and the structure of the population;

5. environmental, which include all programs for expanding waste-free production and are aimed at preserving the environment in general;

6. institutional, consisting of market institutions, entrepreneurship system, privatization processes, etc;

7. psychological, which include all psycho-emotional characteristics of the population;

8. educational, including the existing system, requirements, level of education and professional qualities of employees;

9. historical as factors of evolutionary formation of the employment structure of the region's population;

10. cultural, which take into account all the mental characteristics of the population, the level of culture and development of the nation [88].

After analyzing the theoretical approaches of scientists to the factors (drivers) of employment formation in the agricultural sector of the economy, it was determined that the level and transformation processes of employment are influenced by all economic processes, changes in legislation, political situation, situation in society, environmental situation, etc. At the same time, the factors existing in the literature need to be systematized according to their relationship with the relevant spheres of society [88]. We share the opinion of scholars who distinguish the following spheres of society: economic, political, social, spiritual and biological.

Studying the impact of the demographic factor on employment, we agree with the opinion of I.O. Kurylo that "the recent demographic history of our country demonstrates a significant impact of the dynamics and structure of fertility on the socio-demographic composition and reproduction of the population as a whole. At the same time, changes in the fertility model during periods of cardinal shifts are usually "harbingers" of long-term processes of its further restructuring, so they require a thorough understanding" [117, c. 13].

As O. Afonina rightly points out, "the formation and development of the regional labor market depends on the combined effect of factors, among which the demographic factor is the basic one in the formation of labor potential and characterizes possible quantitative and qualitative changes in the population of the region." [8, c. 81].

The 'emographic factor is one of the parameters that affects the development of employment in the country as a whole and in the agricultural sector in particular. It shows a direct link between employment and overall population reproduction rates. Studies have shown that the protracted demographic crisis has had a negative impact on the dynamics of the resident population, both in general and in rural areas. This requires the introduction and implementation of effective measures that will help preserve labor potential.

The agricultural sector is a branch of the national economy that generates income for the national economy of Ukraine. That is why the economic factor has an indirect impact on the formation of demand for labor, showing the ability of an employee to realize his or her potential, which will ensure a decent standard of living. In the process of employment, material incentives are important, as it is impossible to build social and labor relations on the scale of an enterprise and the whole country without a sufficient level of remuneration. We believe that the

research of scientists I.V. Ponomarenko and N.V. Ralle deserves attention, where the analysis of the level of wages in our country compared to the EU countries showed that the Ukrainian labor force is low-paid compared to all European countries. In terms of the average annual salary, calculated in accordance with purchasing power parity, workers in Ukraine receive 8.8 and 22.6 times less than in Estonia and Switzerland, respectively [182].

Researchers T. I. Pavliuk and V. S. Havryliuk note that the process of employment of the population residing in the territory of our state is ensured by the state employment policy based on the implementation of labor relations between the employee and the employer. The authors note that "citizens have the exclusive right to freely choose activities not prohibited by law, including those not related to the performance of paid work, as well as a profession and a place of work in accordance with their abilities. Coercion to labor in any form is prohibited unless provided for by law" [167, p. 507].

The implementation of employment policy is an important indicator that shows the socio-economic development of the state and the application of the international employment policy vector.

We fully agree with the opinion of V.B. Sukhomlin that employment policy contributes to deepening the understanding of the solution of urgent issues of overcoming unemployment, searching for effective tools for optimization in the field of employment of the population of Ukraine [231].

However, the current situation in the labor market dictates the need to take active measures and introduce new mechanisms of state regulation, to attract European experience, where unemployment is not reduced, but rather prevented; to approve the Program for Promoting Employment in the Agricultural Sector of the Economy for 2020-2025 both at the level of individual regions and the country as a whole. Scholar I.V. Khlivna believes that this program should be large-scale and include a number of subprograms that will address issues related to the development of the agricultural sector, namely: development of social and communal infrastructure in rural areas; economic assistance to private property development; housing construction; agricultural development and rational environmental management in rural areas. Important channels of financing these programs should be: budget financing; investments of enterprises; funds of public organizations, individuals, peasant unions (communities) [248].

During the period of structural adjustment, the role of the state in regulating employment is increasing, and the main areas of state influence should be job creation and labor market regulation, the model of which should be flexible and adapted to changes in the economy. By actively implementing these measures, the unemployment rate can be significantly reduced [204].

In our opinion, the statement of Y.O. Ulyanchenko is correct, V.A. Efanov and L.G. Baga that "the state agricultural policy should acquire not only the features of economic saving, but also human-centeredness" [241].

Therefore, at the current stage of development of the agricultural sector, the development of social infrastructure is an important factor determining the quality and level of employment. Despite a number of regulatory measures taken by the government, including the adoption of laws and regulations, the launch and implementation of government programs, etc., the potential of rural areas continues to weaken, resulting in labor migration of a significant share of the population. It is worth emphasizing the close connection between employment development and the level of social infrastructure.

The opinion of O.O. Atamaniuk and ".I. 'oyko is interesting for discussion, as they believe that "social infrastructure acts both as a socio-economic and spatial category. It combines both some basic (trade, catering, consumer services) and superstructural (education, health care, art, culture, etc.) activities; it satisfies not only physical, material, but also spiritual needs that are in the sphere of both production and consumption of life means. Consequently, they are included in all spheres of human existence and in all stages of the process of reproduction of labor force" [22, p. 37].

At the same time, according to S.T. Slyusar, "social infrastructure plays an important role in creating a favorable living environment in rural areas and ensuring the sustainability of agricultural development in general" [221, p. 77].

In support of this thesis, we believe that the development of rural infrastructure is a process that is directly related to improving financial support for the network of educational, cultural and healthcare institutions, the development of transport links and the housing and communal sector, etc.

Further development of the agricultural sector is impossible without the involvement of innovations, which requires a certain level of

education, as education is the foundation of production development. In the context of the above, the opinion of Professor O.A. Hryshnova is relevant that "investments in people not only become economically feasible, but also act as an important and necessary factor, incentive, and prerequisite for economic growth" [57, p. 101]. That is why the priority measures should be the construction of an extensive network of preschool and school institutions, accessibility and possibility of obtaining quality education.

The organizational factors of 30ounseyment formation include the activities of the State Employment Service. Today, the State Employment Service is an active intermediary in the labor market between employers and job seekers; it provides free of charge services in search of suitable work and recruitment, state social insurance services in case of unemployment, and also pays financial support in connection with temporary loss of work.

In our opinion, O. Bilyk's statement that "the efficiency of the labor market is one of the key factors in ensuring the effective development of the country, and therefore, the establishment of a balanced labor market and the implementation of an effective employment policy are possible only if the State Employment Service is functioning effectively" [16, p. 10].

The service provides free intermediary services to all labor market participants, ensures and exercises the right to social protection against unemployment, provides information and searches for vacancies, enables training in various working professions, and provides an opportunity to receive payments in connection with temporary job loss.

The content of the information factor includes media coverage of the employment structure, information on the labor market, provision of educational services, professional development programs, internships, and state regulation of employment.

As O.P. Hryshko rightly notes, "information about the state of the labor market is asymmetrical: the availability of scattered information generates a lot of search queries that negatively affect effective cooperation between job seekers and employers" [54, p. 341].

We fully agree with the author that today it is necessary to regulate the activities of private intermediaries for disseminating information on job search and personnel and to introduce close cooperation between labor market actors in order to build a quality communication environment.

The problem of ecology, which is directly related to the level of employment, is becoming quite relevant. Researchers

O.M. Klimenko and V.O. Stepanenko note that environmental degradation has a negative impact on the ability to work of the population of our country. The scientists note that "it seems even greater against the background of the aging of our country's population, the growing need to raise the retirement age, etc. It is clear that the problems of human impact on the environment and the environment on humans have a single solution and are inseparable from each other" [96, p. 111].

All environmental programs for environmental protection, programs for waste-free production and preservation of the environment in general should be taken into account.

According to N.P. Kaziuka, significant objective reasons prevent the assessment of the impact of various factors on employment, in particular, the following: reduction and dispersion of the factor influence of macroeconomic trends due to the lack of necessary market institutions at the state and regional levels; lack of a targeted policy of the regulatory authorities in the field of effective use of regulatory resources, especially labor, with an assessment of the features and nature of the state and development of employment [89].

In the process of studying the factors of employment formation, a systematic approach should be applied. Only with a comprehensive consideration and study of this problem can we correctly understand the directions of its regulation at the present stage of development of productive forces and production relations in the agricultural sector of the economy.

Researcher V.V. Yarova emphasizes that "modern mechanisms of employment regulation will work more effectively under the condition of parallel joint coordination with the policy of motivation of agricultural labor, demographic, educational, housing, and youth policy of rural areas" [276, p. 366].

That is, the interaction of all factors of employment formation will allow for effective employment management processes and level or minimize a number of factors that negatively affect the development of the agricultural sector as a whole.

Fig. 1.4 shows a generalized classification of the factors of employment formation in the agricultural sector of the economy.

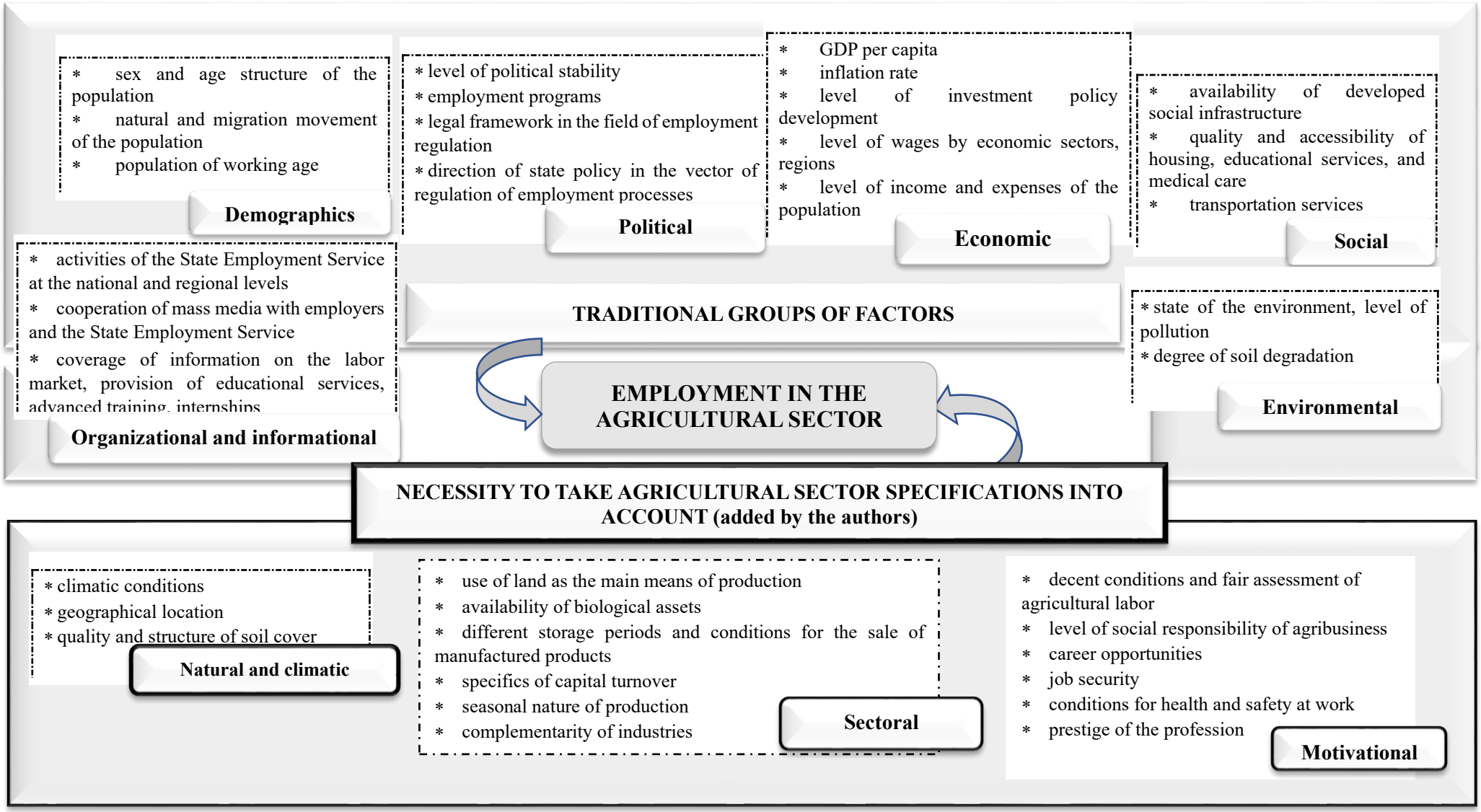

Fig. 1.4. Classification of employment factors in the agricultural sector

Source: developed by the authors.

Let us consider the proposed groups of factors in more detail.

The natural and climatic factor has a significant impact on the activities of agricultural enterprises, in particular on their financial stability and security. Its significance is associated with uncertainty caused by a number of variables, the impact of which is difficult to predict. Risks include climatic conditions, geographical location, quality and structure of soil cover. Extreme weather conditions, such as droughts, floods, hail, frost or other adverse events, may result in reduced yields and threaten crops. This may affect the financial performance of agricultural enterprises and the security of their operations. The dependence of the agricultural sector on natural and climatic conditions causes uneven supply and demand in the labor market throughout the year.

In the context of studying the impact of the natural and climatic factor, V.I. Legkyi determines employment in the following areas:

1) the factor determines the production direction of the territory and the share of employed persons by type of economic activity;

2) stimulates migration flows (intra-regional, inter-regional) depending on the geospatial location of the region. For example, the region's proximity to the EU borders stimulates emigration labor flows to these countries or the transit of migrants from other countries, as well as persons with uncertain legal status through the territory [122].

According to T. I. Pavliuk, "the mismatch of production time and working period causes different labor requirements at different stages of agricultural production" [166, p. 417].

The second group of specific factors includes sectoral factors. Sectoral factors of the agricultural sector have a significant impact on the organization and technology of the production process, which in turn has an impact on the specifics of the labor market. Such factors include the use of land in the production process along with the three main resources, the availability of biological assets, and the long period between expenditures and income.

The seasonal nature of production is also a sectoral factor, which results in such a form of labor as seasonal labor. At the same time, the nature of this factor is influenced by natural and climatic conditions: in winter, the need to use labor is minimal, and in summer and autumn, it is maximal. In the case of forming an employment management mechanism, it is necessary to identify directions to minimize the impact of seasonal production on employment processes.

The third group of factors includes motivational factors. Motivation as a category reflects the orientation of actions and processes of each employee to achieve a specific goal. The motivational factor contains motives and incentives that determine the activity of employees or the whole team in the management structure.

Motivation is a crucial factor in forming a team. Motivated team members are more likely to actively participate, achieve their goals, and succeed together. The study of the impact of motivational factors on employment in the agricultural sector allows us to determine the change in the level of competitiveness of enterprises in this sector of the economy in the modern labor market.

Motivational factors for youth employment in the agricultural sector are quite important, since young people are among the most economically active population of the most productive age. Changes in the understanding of the prestige and relevance of work in the agricultural sector are an important prerequisite for the effective implementation of the organizational and economic mechanism of employment regulation, which will increase the pace of development of the national economy as a whole.

Thus, in the field of scientific research, the factors of employment formation have been studied from the standpoint of the influence of traditional factors, such as political, economic, etc. We believe that in the context of implementing and improving the organizational and economic mechanism for regulating employment in the agricultural sector, a significant role should be given to demographic, economic and sectoral factors that are the driving forces behind employment formation and increasing the efficiency of use and return on human capital in the management of agricultural enterprises.

1.3. Content and structure of the organisational and economic mechanism for regulating employment in the agricultural sector

The organisational and economic mechanism can be seen as an effective tool for forming the basis and development of many economic objects and subjects of the economy. Meeting the socio-economic needs of the population depends on organisational and economic levers and tools aimed at the backbone sectors of the economy [250].

Creation of an effective employment management system in the agricultural sector requires a comprehensive disclosure of the essence and content of the concept and definition of the general principles of organisation and functioning.

Before we begin to disclose the essence of the organisational and economic mechanism of employment regulation, let us define the essence of the basic concept of "mechanism" and its derived categories: "economic mechanism", "organisational mechanism", "economic mechanism", "organisational and economic mechanism". The development of social production is closely related to changes in the structural content of any mechanism.

The Dictionary of Foreign Words edited by O. Melnychuk defines a mechanism as a set of intermediate states or processes of any phenomena [220, p. 498].

Scholar D.A. Mishchenko notes that "the mechanism is a holistic dialectical set of interrelated, interdependent and purposeful principles, functions, methods, forms, instruments and levers of state regulation of the economy with the aim of harmonising the interests of economic entities of the state" [139, p. 111].

From an economic point of view, N.A. Kramer reveals the content of the category "mechanism" as a set of elements, states and processes arranged in a certain sequence, in a certain connection, relationship and determining the order of a certain type of activity [112].

The basis of the economic system is the economic mechanism, which drives and provides the conceptual basis for development. A significant contribution to the disclosure of the essence of the economic mechanism was made by L.I. Abalkin, who defined it as a way of organising social production, a system of levers and incentives, and methods of economic activity [1].

According to academician A. Chukhna, "economic mechanism is an organic component of the economic system; functional side of production relations; a way of organising and managing production with its inherent forms, methods and means that implement socio-economic, organisational, economic, scientific and technological principles and relations in the interests of meeting the needs of both each economic entity and society as a whole" [259, p. 63].

Researchers M.G. Greshchak, M.O. Grebeshkova and O.S. Kotsiuba interpret the economic mechanism as "a complex social system characterised by a rather high degree of uncertainty of its inherent links

and relations". The team of authors also noted that it is an open, mostly probable, unstable system with flexible and mostly unstable internal and external relations [53, p. 25].

According to O.M. Suprun, "the economic mechanism is the fundamental basis for the rationality of economic activity of market actors, as an institutional system of economic development, consolidates institutions that form a certain economic order" [230, p. 122].

Researchers O.O. Ivanitskyi and V.V. Kosenko believe that "the economic mechanism should promote effective interaction of all elements of the economic system, i.e. full compliance with the level of development of productive forces and adequate nature of actions of both socio-economic and organisational and economic production relations in all spheres of social reproduction in all areas of socio-economic development of society" [81, p. 125].

The definition of L.L. Melnyk and Y.E. Osatska: "the economic mechanism includes a system of means, methods and levers on the basis of which the organisation, management and regulation of the national economy is carried out in order to achieve the set goals and objectives. In other words, the economic mechanism is a means of solving the tasks of economic activity or solving its problems" is also worth [135, p. 19].

Scientists O.M. Stasenko and I.V. Kokarev give similar interpretations of the concept of "economic mechanism" [227, p. 275, 99, p. 26]. They define the economic mechanism as a system of basic forms, methods and levers of using economic laws to resolve the contradictions of the social way of production, realization of property, as well as the comprehensive development of a person, the formation of his needs, the creation of a system of incentives and the coordination of the economic interests of the main classes and social groups.

According to M.V. Zos-Kior and E.V. Rudyk, the adaptation of the economic mechanism of agrarian formations to modern conditions should include: improvement of methods of planning and economic influence on increasing the efficiency of production, efficiency and rationality of the use of material, labor and financial resources, improvement of the structure of management, planning, regulation of prices and non-price sources of accumulation, methods and measures aimed at forming a stable composition of workers, encouraging various incentives to increase labor productivity [79].

The category "economic mechanism" ”s a ’omplex social system is open and consists of an organizational and economic mechanism that ensure the construction of an organizational and economic mechanism.

It is worth noting that the economic mechanism of employment regulation is a system of tools, methods, levers, and forms that ensure the effective operation of the labor market in the process of realizing human capital in order to satisfy one’s own and personal needs. In fig. 1.5 schematically shows the interdependence of the defined categories.

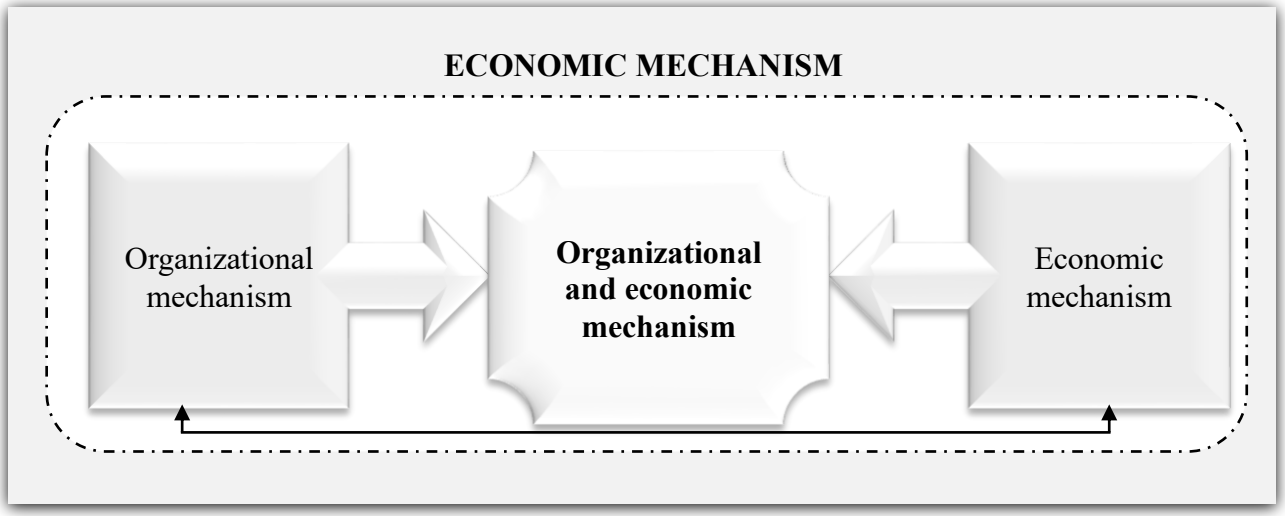

Fig. 1.5. Structuring of the categories “economic mechanism”, “organizational mechanism”, “economic mechanism”

Source: developed by the authors.

The substantiation of the content of the category “organizational mechanism” is provided by A.V. Kalyna, who considers it as “a logically justified sequence of managerial actions and methods for the implementation of functions and principles of management of a particular type of activity” [90, P. 145].

A critical analysis of the views of scholars on the category of “organizational mechanism” allows us to note that this category should be considered in a wide range, not limited to the organization of production and its management, but also to take into account the influence of environmental factors, economic laws and patterns.

The next derivative category that needs to be disclosed is the economic mechanism. For a long period of time, the concept of “economic mechanism” did not attract much attention from scholars. In 1947, Charles Rist’s scientific work “A brief outline of the main economic mechanisms” was published in France, in which he defines his attitude to

the study of economic mechanisms: it is enough to simply state the fact of their existence [279]. Subsequently, A. Kuhlman interprets an economic mechanism as a mechanism determined either by the nature of the initial phenomenon or by the final result of a series of phenomena. At the same time, the researcher believes that the constituent elements of the mechanism are always simultaneously the initial phenomenon, the final one, and the entire process that takes place in the interval between them [116].

According to O.G. Dankevych, "the central part of the economic mechanism is the economic mechanism, which acts through economic interests and consists of a set of economic means, methods, levers, standards, indicators by which objective economic laws are implemented" [64, p. 169]. The economic mechanism is an integral system that must necessarily have economic levers and be used as tools to influence the economic processes of an enterprise [200]. The dissertation of G. S. Morozova states that "the economic mechanism is the main element of the economic mechanism and is a system of economic regulators that, under certain conditions, can adjust the action of market regulators of economic development" [140, p. 16].

According to Henri Kuhlmann, the economic mechanism is determined either by the nature of the initial phenomenon or by the final result of a series of phenomena, their interdependence. At the same time, the constituent elements of the economic mechanism are always simultaneously the initial phenomenon, the final phenomena, and the entire process that takes place in the interval between them [116].

In turn, Y.S. Zavadskyi considers the economic mechanism to be a set of economic incentives (state economic incentives for production and material incentives for labor) and levers (planning, self-sufficiency, financing, conditions for the sale of products, production and technical maintenance, business conditions, various limits, production costs, profitability of production, etc.), which are constituent elements of the economic mechanism, including economic incentives" [76, p. 81].

We support the opinion of A.Y. Semenova that "the reason for the effectiveness of the economic mechanism is the greater tendency of people to respond to economic incentives, which is due to the nature of economic interest. It is in the provision or deprivation of economic benefits that the economic mechanism operates" [218, p. 187].

A comparative analysis of the features of the concept of "mechanism", conducted by by P.T. Kolisnichenko, made it possible to

identify the following distinctive features of the economic mechanism: it cannot exist without a process, since it is an integral part of it and is set up to perform only process functions; it does not have its own management and is in a state of waiting for process management; when combined with management, it represents the internal content of the process, its "know-how"; it should take into account the systematic and synergistic interaction of all elements [100, p. 164].

In our opinion, E.M. Sherman's statement that the organizational and economic mechanism underlies the functioning of the economic mechanism and determines the deep objective basis of this phenomenon, reflects the set of economic, organizational and administrative levers and methods by which organizational and technical, production and technological, financial and economic processes and relations are regulated in order to effectively influence the final results of the enterprise is correct [264].

Let us consider the constituent elements of the organizational and economic mechanism (OEM) for regulating employment in the national economy (Fig. 1.6).

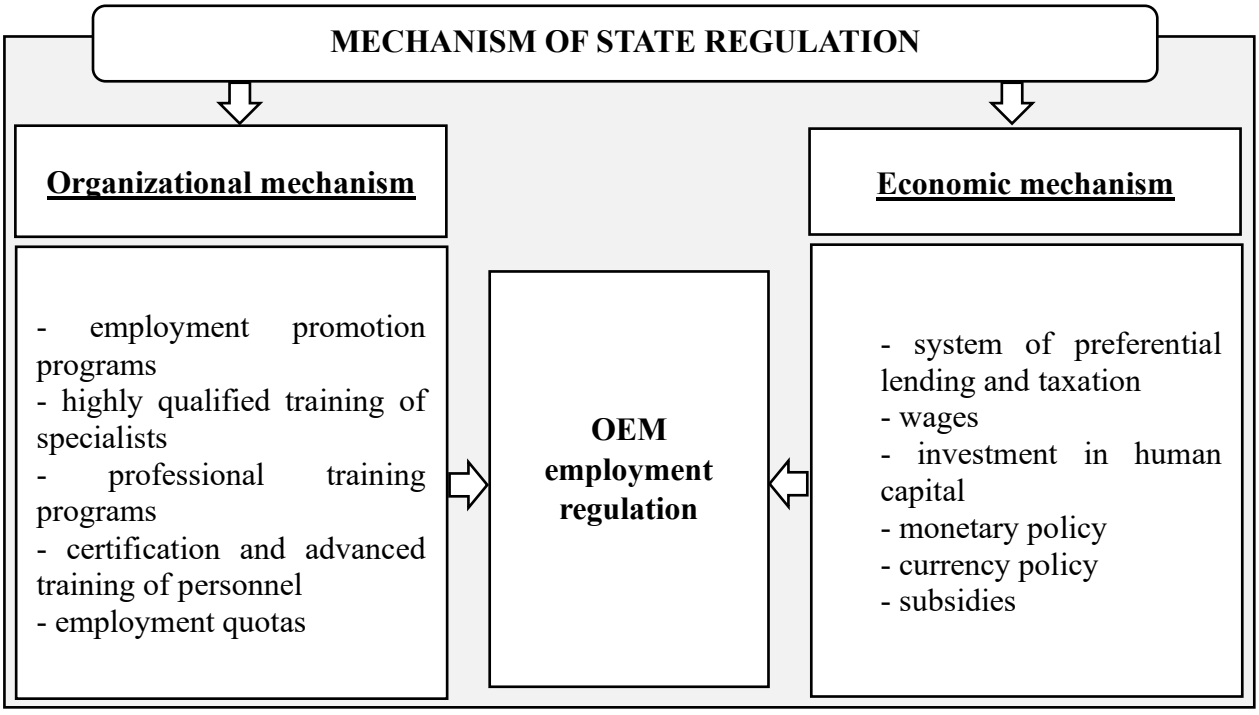

Fig. 1.6. Components of the organizational and economic mechanism of employment at the level of the national economy

Source: developed by the authors.

Thus, the analysis allows us to hypothesize that the organizational and economic mechanism is crucial as a tool for effective regulation of employment in the agricultural sector of Ukraine.

Let us summarize the views of scholars on the interpretation of the category "organizational and economic mechanism" (Table 1.2).

Table 1.2

Definition of the category of "organizational and economic mechanism" in some literary sources

№	Author, year	Definition of the category "organizational and economic mechanism"
1	2	3
1	I.P. Bulieiev, 1993, [26]	a set of management forms, methods and tools. Allows you to characterize the management process and the tools that ensure its implementation.
2	Yu. Lysenko, P. Yehorov, 1996, [123]	a system of goals and incentives that allow transforming the movement of material and spiritual needs of society members into the movement of means of production and its final results in the course of labor activity aimed at satisfying effective demand.
3	O.A. Yeromenko-Hryhorenko, 2000, [74]	a set of subsystems of socio-economic and organizational-economic relations, composed of blocks and elements corresponding to their content, the peculiarities of which correspond to the level of development of socio-economic systems.
4	P.T. Sabluk, M.Y. Malik, V.A. Valentynov, 2002, [211]	an integrated system of economic, organizational, legal forms and methods of managing the national economy.
5	O.V. Vasylyk, O.A. Hrishnova, 2008, [58]	a system of organizational and economic elements of influence on the management process, in which there is a purposeful transformation of the influence of management elements on the object of management and which has input and output. It includes subsystems of management, regulation, stimulation, coordination, motivation, etc.
6	S.O. Tulchynska, 2008, [238]	a system of basic and specific elements, a set of functions, methods, forms, levers of state influence at the national, regional and micro levels of economic, legal and organizational nature in order to ensure sustainable relations between them, to create mutually beneficial conditions for economic activity.
7	A.V. Kutsenko, 2008, [121]	optimal combination of forms, structures, methods, means and functions of management, which should form its relations with the external environment through economic levers in order to ensure targeted regulation of activities in the areas of performance management to ensure that the actual state of the enterprise meets the specified parameters.

Continuation of Table 1.2

8	V.A. Khudaverdiieva, 2009, [251]	a set of economic levers, incentives and measures aimed at ensuring the dynamic and sustainable development of agricultural enterprises based on a combination of micro and macroeconomic environment factors, taking into account elements of public administration.
9	Yu.Ya. Luzan, 2010, [127]	is a way of ensuring the implementation of the requirements of objective laws in the process of subjective human activity. It sets the rules of the economic game, orienting the activities and behavior of business entities towards the realization of certain goals.
10	O.M. Palamarchuk, 2011, [168]	a set of organizational and economic levers (each of which has its own forms of managerial influence) that affect the economic and organizational parameters of the enterprise management system, which contributes to the formation and strengthening of organizational and economic potential, competitive advantages and efficiency of the enterprise as a whole.
11	N.V. Shybaieva, 2015, [265]	an abstraction of a specific system of economic relations, but an abstraction that has a different content from the system of categories and laws of political economy, which is determined by its functional orientation.
12	O.S. Litvinov, S.M. Kaptalan, 2016, [126]	a set of managerial actions aimed at organizing interaction between system elements in order to achieve their economic interests, taking into account the peculiarities of the external and internal environment.
13	M.O. Derhaliuk, 2017, [66]	a set of organizational and economic elements (objects, subjects, goals, objectives, methods of interaction, methods, levers, tools, etc.) interconnected and interacting with each other at the macro-, meso-, and micro-levels.
14	T.V. Polozova, 2017, [181]	a set of system elements, subject to effective interaction of which the management goal is achieved.
15	M. V. Adamenko, Yu. B. Kashubina , 2020, [2]	a mechanism that is cyclical in nature and provides feedback, allowing to identify weaknesses and optimize the level of efficiency in accordance with the set goals and performance criteria.

Having analyzed a number of theoretical developments of leading scholars, we note that the main basis of the economic mechanism is the organizational and economic mechanism. The above interpretations of the concept under study allow us to highlight the main approaches of economists to the definition of this category (Fig. 1.7).

Using the structural approach in their research, I.V. Goncharuk and I.V. Tomashuk noted that "the priority task of modern rural development is an effective combination of all structural elements of the organizational and economic mechanism, the ultimate goal of which is to increase the

efficiency of the agro-industrial complex, stabilize the population and increase life expectancy, full and productive employment of the able-bodied population, and improve the standard and quality of life" [49]. At the same time, A.V. Kalyna argues that "it is the combination of economic and organizational mechanisms and the creation of an organizational and economic mechanism that allows creating a clear management system taking into account the characteristics of a particular organization" [91, p. 147].

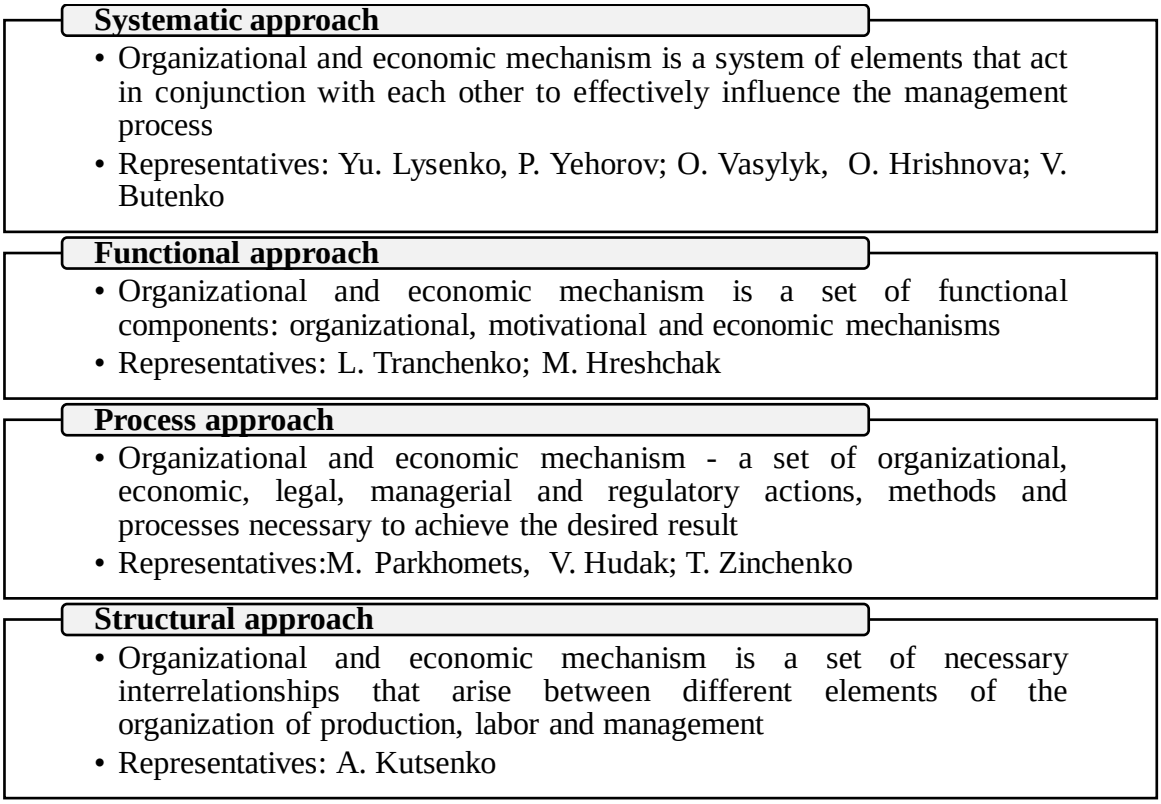

Fig. 1.7. Approaches to defining the category "organizational and economic mechanism"

Source: developed by the authors.

According to M.K. Parkhomets and V.V. Hudak, "to ensure effective management of any mechanism, including organizational and economic, a comprehensive understanding of its elements, the laws of their interaction within this mechanism, as well as knowledge of it as a single system and consideration of its interaction with other elements of the external environment is required" [169, p. 26].

It should be noted that the term "organizational and economic mechanism" is widely used in various areas of management in solving various problems. The formation of an effective organizational and

economic mechanism for employment management is the key to overcoming the crisis in the agricultural sector of the economy and will contribute to the successful operation of agricultural producers in the context of integration into the world economic space.

According to V. V. Shymanska, "the organizational and economic mechanism is a way to ensure the implementation of the requirements of objective laws in the process of subjective human activity. It sets the rules of the economic game, orienting the activities and behavior of economic entities towards the realization of goals" [266, p. 226].

Studying the essence of the "organizational and economic mechanism", in his dissertation research, A. Goncharuk identifies four approaches to the disclosure of this category: operational, methodological, functional and systematic [48].

The structural-component approach to the implementation of the organizational and economic mechanism is considered in terms of the following components: organizational, which determines the specifics of the sectoral focus of the enterprise, and economic, which considers and takes into account the financial, innovative, investment, marketing and environmental components. We believe that this approach will allow us to cover the specific features and factors inherent in a particular type of activity, as well as to adequately and rationally assess the level of development.

We fully agree with E.M. Sherman, who notes that "this approach to determining the structure allows to take into account the specifics of the activities of enterprises and contributes to a more adequate assessment of the level of their development" [264].

To define and provide our own interpretation of the concept of "organizational and economic mechanism for regulating employment in the agricultural sector of the economy", let us consider its structure from the standpoint of each individual element and its importance in the management process (Fig. 1.8).

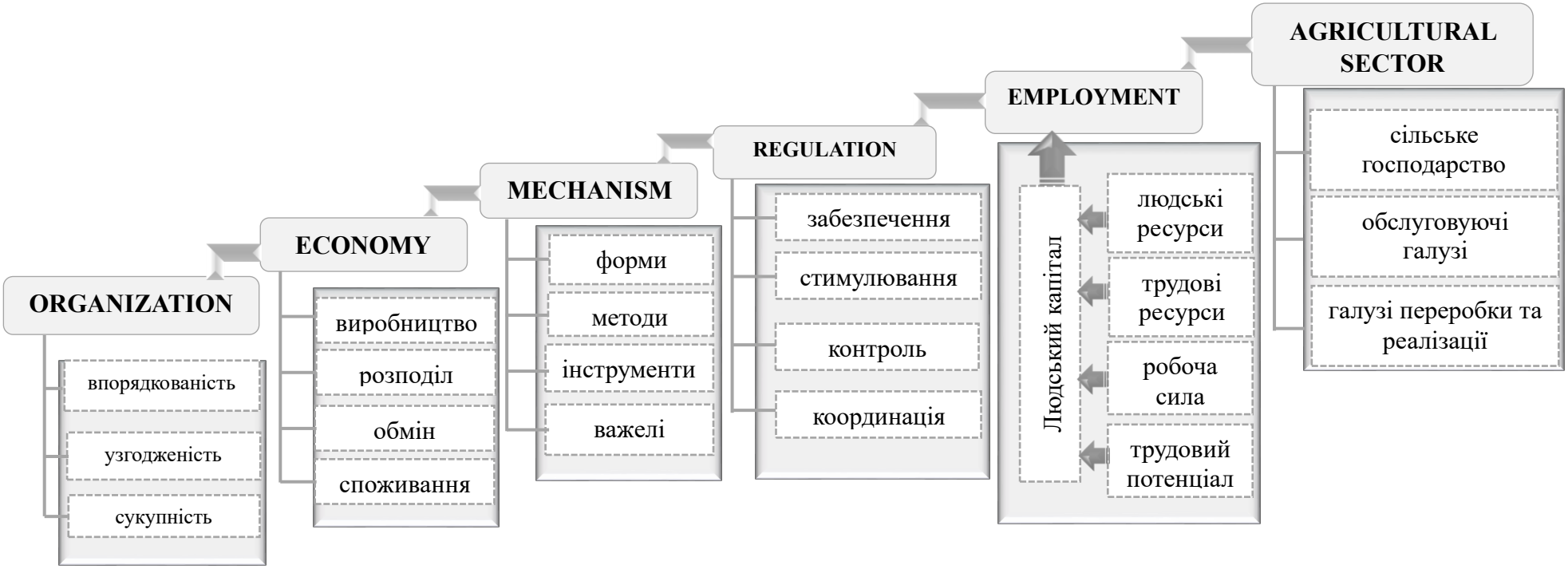

Fig. 1.8. Structure of the categorical apparatus of the organizational and economic mechanism for regulating employment in the agricultural sector

Source: developed by the authors.

In his research, scholar O. Gulevych considers the concept of "organizational and economic mechanism" at the micro and macro levels. In the author's opinion, since employment is a category of the macroeconomic level, the macro aspect of the interpretation of the concept of "organizational and economic mechanism" should be distinguished [60]. Researcher O.B. Kravchenko understands the organizational and economic mechanism of employment regulation as a set of interrelated organizational, administrative, legal, economic and social methods of influence on the labor market in order to ensure effective reproduction and, especially, the use of labor potential, balancing the supply and demand of labor, and ensuring social protection of the population [109, p. 5].

The organizational and economic me"hani'm of employment regulation should be structured in such a way that it is possible to achieve optimal interaction and understanding between the components of the organizational and economic mechanism, which will successfully adapt to changes, have a systemic nature and are determined by the action of many macro- and micro-level factors.

In our opinion, the category of "organizational and economic mechanism for regulating employment" should be understood as a complex system of orderly, coordinated forms, methods, tools, and levers of human capital management aimed at increasing the level of remuneration, increasing the motivation of agricultural workers, reducing unemployment, improving the forms of labor organization, and unshadowing employment.

We believe that the structural component of the organizational and economic mechanism and the actual implementation of the employment management mechanism in the agricultural sector of the economy is formed under the influence of:

1) organizational and economic component;

2) macro-, meso-, and micro-level factors (Fig. 1.9).

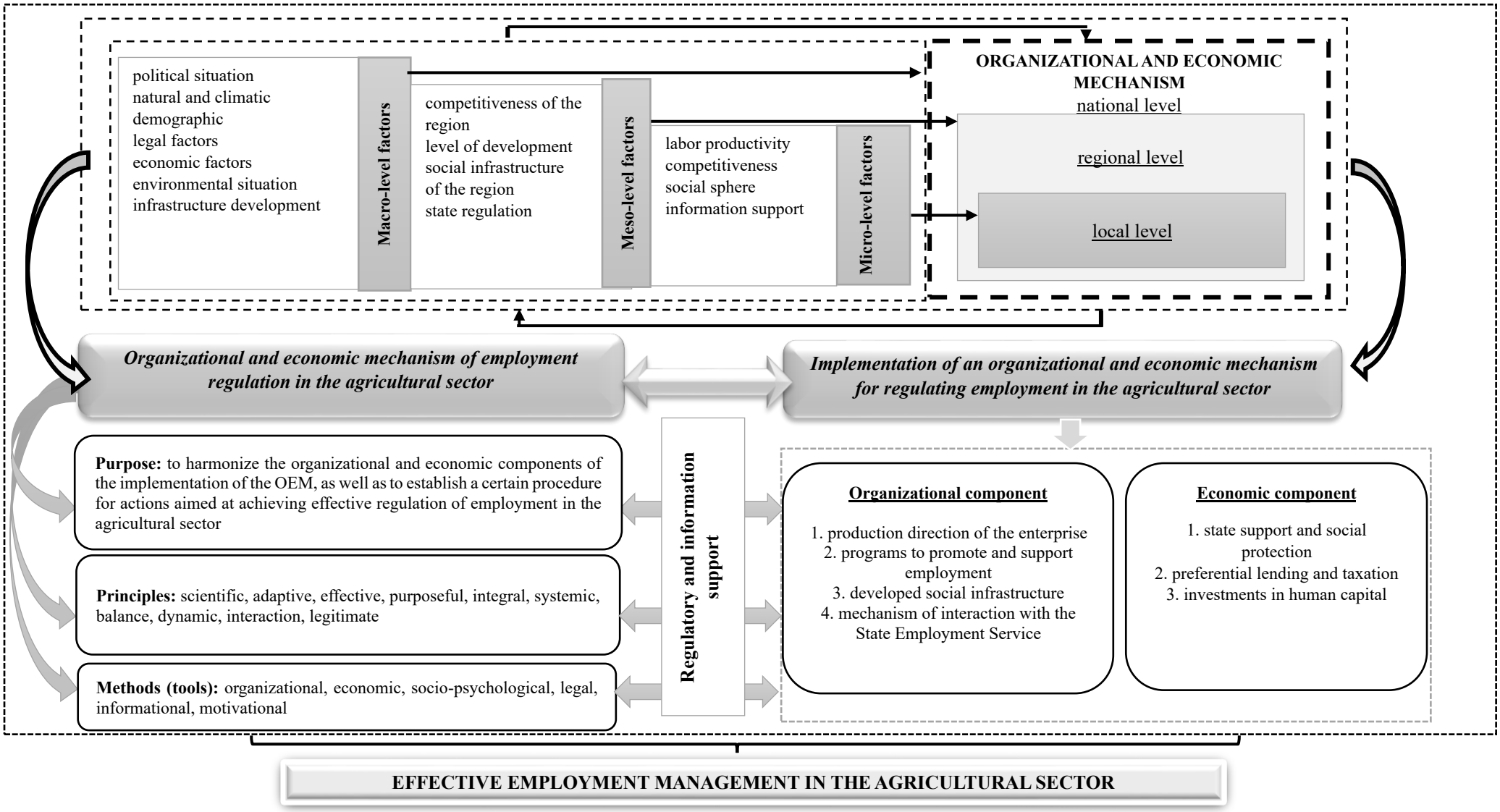

Fig. 1.9. Structural and Component Approach to the Implementation of the Organizational and Economic Mechanism for Regulating Employment in the Agricultural Sector

Source: developed by the authors.

All components of the management mechanism must be interconnected to ensure its integrity. In other words, the construction of an organizational and economic mechanism as a dynamic system should be based on common principles. This statement is fully consistent with the opinion of T.M. Halimon, who believes that "such a logic of building a mechanism makes it possible to carry out a systematic and purposeful search for ways to combine all the main components of organizational and economic support for internal management to concentrate efforts and managerial influences on the factors that determine the competitive potential of enterprises [246, p. 159]".

The functionality of the organizational and economic mechanism for regulating employment in the agrarian sector of the economy is realized through general management functions: planning, organization, coordination, motivation and control.

Management is based on the rules that must be followed by management entities when making and implementing management decisions. The general principles of building an organizational and economic mechanism for regulating employment aimed at ensuring effective employment management in the agricultural sector are as follows:

1) scientific nature (ensures elaboration of the enterprise development strategy, carries out a comprehensive analysis of the enterprise's activities, diagnostics of economic laws in the process of making and implementing management decisions);

2) adaptability (compliance of the organizational and economic mechanism of employment management with changes in the external and internal environment of the enterprise);

3) efficiency (the employment management system should correspond to the financial capabilities of the enterprise and function effectively);

4) purposefulness (focus on the purpose of building the mechanism and the content of its functioning);

5) integrity (when building an organizational and economic mechanism, consideration of the rational combination of many elements of the management system, each of which occupies the appropriate positions in the entire mechanism);

6) systemicity (compliance of the organizational and economic mechanism with the features of a system where the elements form a single integral system);

7) balance (a complex combination of opposing elements of the organizational and economic mechanism among themselves, as well as in accordance with changes in the external environment);

8) dynamism (effective implementation of the organizational and economic mechanism requires considering the object of research in the process of its development at all stages of the life cycle);

9) interaction (provides for the adaptation of the organizational and economic mechanism to the environment at the local, regional and national levels of the economy);

10) legality (ensuring the implementation of the mechanism within the framework of the current legal framework).

Thus, the functioning of the organizational and economic mechanism for regulating employment in the agricultural sector of the economy is a complex and multifaceted process that requires a clear scientific approach to its implementation and necessitates a comprehensive and multilevel assessment of its development.

Chapter 2.
ASSESSMENT OF THE CURRENT STATE OF EMPLOYMENT REGULATION IN THE AGRARIAN SECTOR OF THE UKRAINIAN ECONOMY

2.1. Analysis of the demographic factor of rural employment

The desire of the agricultural sector of the economy to position itself as a competitive component of the economy is impossible without a sufficient level of labor supply, which, in turn, is influenced by the organization of the employment regulation mechanism. The formation and development of the employment rate in the agricultural sector depends on the influence of the factors identified and grouped in subsection 1.2 of the monograph. Among the factors we have identified, one of the main ones by the nature of their influence is demographic, which allows us to provide quantitative and qualitative characteristics of population changes, which, on the one hand, will allow us to determine the level of provision of labor resources as one of the key factors of production, and on the other – the level of demographic security of Ukraine.

The population is the basis for the formation of human capital, i.e. there is a direct link between population growth and the increase in the labor force, i.e. the labor potential of society [75, p. 66]. It is worth noting that the population forms the resource potential, which is the basis for the national security of the country and the imperative to ensure socio-economic development.

Crisis phenomena of the twentieth century (world wars, the Holodomor, mass repressions and resettlement, etc.), turning points of the late twentieth century and early twenty-first century, and contemporary events have a significant impact on the process of population reproduction. According to Y.V. Afanasieva, “the current demographic situation, namely the aging of the population, reduced life expectancy and deterioration of the general level of health, threaten the labor security of the state, which can lead to severe social and economic consequences” [6].

The opinion of O.A. Grishnova and Y.M. Kharazishvili that “today it is in the interests of the state to form a certain type of population reproduction, where the negative trends of almost all components of the demographic process, which lead to the loss of the country’s ability to

reproduce the population in the achieved quality and quantity, will be minimized" [59, p. 67].

The demographic situation and the level of reproduction of the population are the initial factors that form the labor resources and human capital of rural areas, directly affecting the employment of the rural population. In this regard, A. Kustovska noted that the demographic situation in Ukraine is characterized by crisis phenomena, in particular, a decline in the birth rate, an increase in the mortality rate, a high proportion of the elderly population, and intensive migration processes [119]. Having carried out a thorough analysis, V. Zaichenko identifies the main problems of demographic development, including "a decline in the birth rate, negative processes in the formation and development of marriage and family relations, differentiation of demographic development of regions, and unsettled migration processes" [78, p. 162].

We believe it is negative that the new Law of Ukraine "On National Security of Ukraine" defines the foundations and principles of national security and defense, goals and basic principles of state policy that will guarantee protection of society and every citizen from threats, but ignores one of the important areas of state policy – overcoming the demographic crisis [193]. After all, the loss of human capital, both in qualitative and quantitative terms, becomes the root cause of destabilization and weakening of the country's national security. As V.V. Kompaniets rightly notes, the demographic factor should be considered as a factor and at the same time as a result of the state policy [103].

Thus, it can be confidently stated that the demographic factor is the basis of security and stability of the state, and demographic development is the result of effective state policy, which affects the development of human capital, which affects the amount of gross national income.

Thus, a comprehensive assessment of the current state of the demographic situation is an important component of employment management and an integral factor of the organizational and economic mechanism for regulating employment in the agricultural sector of the economy.

We consider it necessary to start assessing the demographic preconditions for the formation of employment by determining the dynamics of population growth (decline) in Ukraine in 1989-2020 (Fig. 2.1).

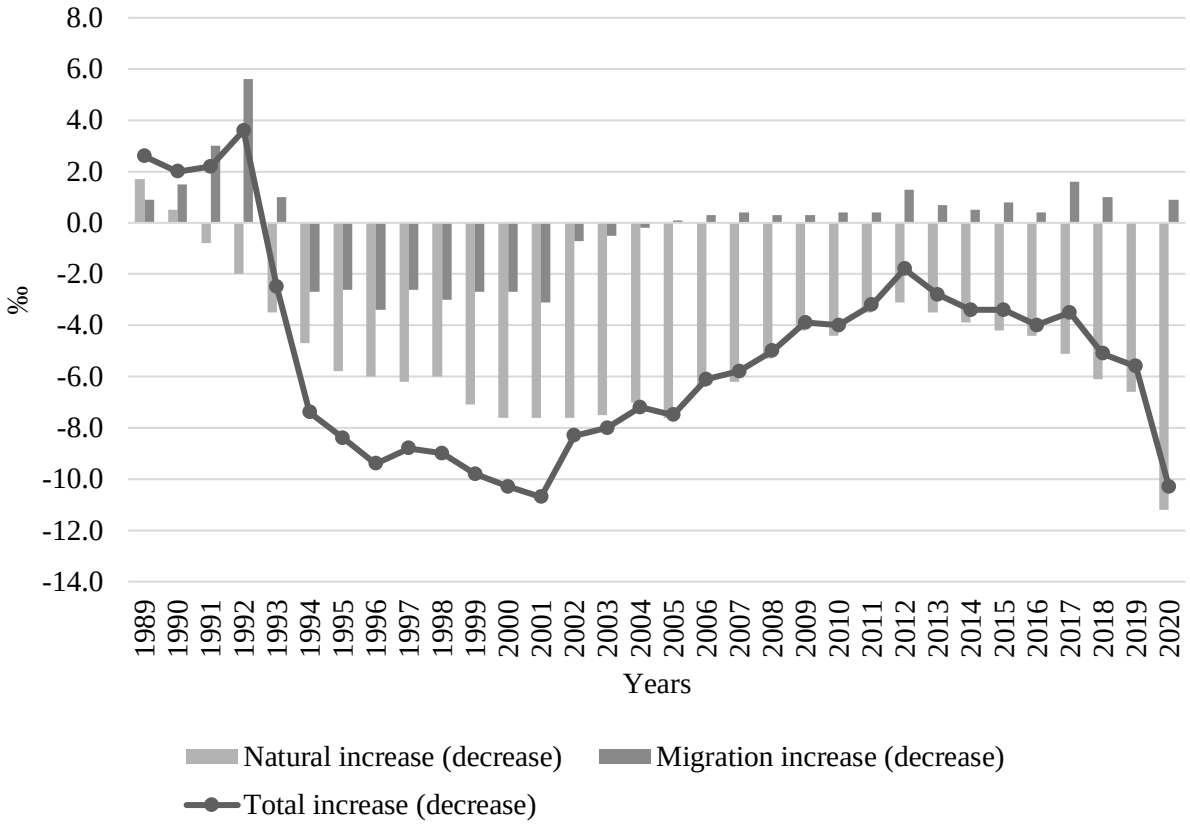

Fig. 2.1. Dynamics of Population Growth (Decline) in Ukraine in 1989-2020 (per 1000 people)

Source: compiled by the authors based on data from [164].

In fig. 2.1 the trend towards a rapid reduction of the total population in Ukraine over the past 30 years is noticeable. Such a negative dynamic is caused by a low birth rate and a high death rate. However, since 2002, we have noticed positive changes in the dynamics, although they are not high enough for the process of natural growth to take place, rather than reduction, which is influenced by a number of endogenous and exogenous factors. The highest level of natural decline was recorded in 2020 at the level of 11.2 ‰ caused by the COVID-19 pandemic. In turn, migration reproduction has a positive trend, but it does not have enough influence on the change in the number of the population, in particular in connection with the spread of internal migration.

According to the United Nations (UN), in the XXI century. In developed and developing countries, the share of the elderly population in the total population is increasing rapidly. This has a significant impact on the dynamics of economic growth and the process of social development in the future [201]. The UN also predicted that by 2050, one

in six people in the world will be over 65 (16% of the population), compared to one in 11 in 2019 (9.0% of the population). By 2050, the age of every fourth resident of Europe and North America will be 65 years or older.

To analyze the level of population aging, two coefficients are most often used: the share of people aged 60 and older (A_{60+}) and the share of persons aged 65 and older (A_{65+}). The first method that allows you to estimate the level of demographic aging of the population for the coefficient A_{60+}, is the use of the demographic aging scale developed by the French researcher J. Boze-Garnier and improved by E. Rosset (table 2.1).

Table 2.1

The Beaujeu-Garnier-Rosset demographic aging scale

Stage	Value of the coefficient A_{60+}	Stages of aging and levels of old age
1	below 8	Demographic youth
2	8–10	First fringe of old age
3	10–12	The actual forecourt of old age
4	12 and above	Demographic old age
	12–14	- initial level
	14–16	- middle level
	16–18	- high level
	18 and above	- very high level

In Ukraine, the A_{65+} coefficient is mainly analyzed according to the demographic aging scale developed by UN specialists, who proposed a three-level scale characterizing the demographic structure of the population:

- below 4% - young population;
– 4–7% – population on the verge of aging;
- 7% and above – old population.

We will analyze the dynamics of changes in the demographic situation in Ukraine, taking into account the percentage of people aged 60 and 65 and older by type of area (appendix A).

As evidenced by the data presented in Appendix A, the assessment according to the scale of demographic aging by Bohe-Garnier-Rosset showed that the Ukrainian population is characterized by a very high level of demographic aging, when the coefficient A_{60+} is 18% and above. During the analysis of the demographic situation in Ukraine by the coefficient A_{65+} the population of Ukraine is defined as “old”.

The socio-economic state of the country, its social development is influenced by the demographic situation of any region. According to L.M.

Nemets, L.M. Seghidy and K.A. German, “the reproduction of the population is the guarantee of its existence and is determined by the indicators of mechanical and natural movements, determined by the indicators of birth, mortality and natural growth [159, p. 62]”. At the same time, it should be emphasized that certain territorial differences affect the peculiarities of the economic situation, the level of development of social infrastructure, and indicators of demographic development.

After grouping the regions according to the level of natural population growth (decrease), it was established that Kyiv and the regions of western Ukraine, namely the Rivne, Volyn, Zakarpattia regions, are among the regions with an insignificant level of natural decrease. Chernivtsi, Ivano-Frankivsk, Odesa, Lviv, Ternopil, Mykolaiv, Khmelnytskyi, Vinnytsia, Kyiv, and Kherson regions are among the regions with a high level of natural decline. The most critical indicator is typical for Zhytomyr, Kharkiv, Dnipropetrovsk, Zaporizhia, Kirovohrad, Cherkasy, Poltava, Chernihiv, and Sumy regions. The main reasons for the differentiation of regions are the demographic crisis caused by the influence of a number of economic, social and environmental factors, the sex-age structure of the population, different working conditions and the demographic load indicator (appendix B).

Given the objectives, the researchers conducted an in-depth analysis of employment trends and demographic situation in Kharkiv region, one of the leading regions of Ukraine in terms of economic development. As of the beginning of 2021, the Kharkiv region accounted for 6.3% of the total population, and the gross regional product in Ukraine in 2020 was 6.2%. The territory of Kharkiv region covers 3141.8 thousand hectares, or the fourth largest in Ukraine, and the area of agricultural land is 2382.0 thousand hectares, or 75.8% of the total territory of the region. In 2020, the region produced agricultural products in all categories of farms in the amount of UAH 38462.8 million at constant prices of 2016, or 5.6% of the total production in Ukraine. According to this indicator, the region ranked sixth among the regions of Ukraine [164]. After analyzing the demographic situation in Ukraine, it was found that Kharkiv region belongs to the region with a critical level of natural population decline.

We believe that in order to determine the impact of the demographic factor on the structure of employment and to build an organizational and economic mechanism for employment management, it is necessary to study and evaluate the main indicators of the number of available population by type of settlement (Fig. 2.2).

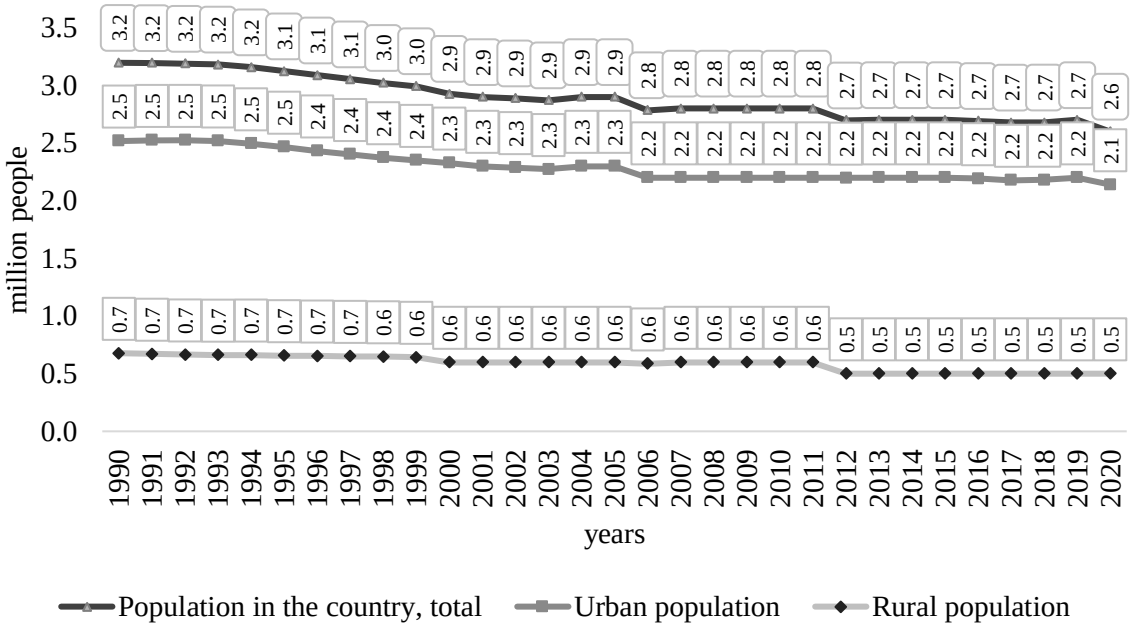

Fig. 2.2. Dynamics of the population by type of settlement in Kharkiv region in 1990-2020 million people

Source: compiled by the authors based on data from [46].

According to those shown in fig. 2.2 data, since 1993 there has been a tendency to reduce the share of the existing population. In 2000, the share of the rural population decreased by 3.0% compared to 1995 and amounted to 16.1 million people. In 2015, the rural population decreased by 19.9%, or by 3.3 million people, compared to 1995. In 2020, the dynamics of population depopulation is maintained – the number of rural population decreased by 2.5% compared to 2015.

Appendix C provides initial data on population change, based on which analytical indicators of urban and rural population dynamics were analyzed to identify absolute and relative rates of population growth (decrease). According to the data presented in it, the trend for the reduction of both the urban and rural population is clearly defined in the dynamics over the past 25 years. The first years of population reduction for rural types of settlements occurred at a slight pace, and for urban settlements there was a characteristic increase, but since 1994 the absolute reduction has increased significantly.

It is also worth noting that the proportional ratio between the urban and rural population remained at the level of 81.3% and

18.7%, respectively. The main factors that affected this indicator are the natural and migration reduction of the population, in particular internal labor migration. (appendix D).

Having analyzed the population structure of the Kharkiv region by place of residence, we also notice certain discrepancies. In particular, the largest share of the rural population lives in the territory of Blizniukivskyi district – 80.1% of the population, Dvorichanskyi – 79.0%, Zachepylivskyi – 76.3%, Velikoburlutskyi – 73.1%. Districts characterized by a larger share of the urban population include Kharkiv, where the share of the rural population is 32.7%, Balakliiskyi – 36.3%, Vovchanskyi – 39.9% (appendix E).

The type of sex-age structure of the population as a component responsible for the natural reproduction of the population is an indicator that allows us to characterize the demographic factor. Studying the demographic processes of S.I. Pirozhkov notes that the age structure takes an important place when making a forecast. This makes it more accurate and complete and is an independent factor affecting demographic processes [174].

From the point of view of demographic science, the classification proposed by the Swedish demographer H. Sundberg is quite important, who classified the population according to three age groups: children – 0-14 years; parents – 15-49 years old, great-grandparents – 50 years and older. The researcher determined that one of the general laws of the population consists in the constant specific weight of the number of parents in it, which is equal to 50%. Depending on the specific weight of children and progenitors, he distinguished three types of age structure: progressive (predominant share of children), regressive (predominant progenitors) and stationary (approximate balance between the specific weight of children and progenitors [299].

Having analyzed the sex-age structure of the population of the Kharkiv region according to the classification

H. Sundberg, we established a regressive type of age structure. Accordingly, in 2020, the share of children in the urban population was 13.7%, and in the rural population – 14.4%. It should also be noted that the share of older people (50 years and older) in cities was 37.1%, and in villages this indicator was at the level of 40.7%. The coefficient of prevalence of the specific weight of older people in urban settlements is equal to 2.708, and in rural areas – 2.826. Thus, the degree of regressiveness of the age structure is much higher in the rural population. This is a rather acute problem for the rural population, because the specific weight of women in the contingent that ensures fertility is lower, and the share of women of retirement age is 63.5%.

When studying the level of demographic development, a number of quantitative and qualitative components are investigated. In particular, the indicator of demographic load is a qualitative component that allows you to assess and analyze the ratio between the number of able-bodied and non-able-to-work population.

The analysis of the coefficients of the demographic load in the Kharkiv region (Table 2.2) indicates the presence of a significant degree of variation caused by differences in the sex-age structure of the urban and rural population. We selected the following indicators for the analysis: the general coefficient of the demographic load (k*заг*), demographic load factor "children" (k*д),* the coefficient of demographic load by "ancestors" (k*п*), the coefficient f the demographic load of the generation of "parents" by the "old" (k*с*), the coefficient of the demographic load of the generation of "children" by "ancestors" (k*п/д*), the total coefficient of the demographic load of the population of working age (k*п.заг*), the coefficient of the demographic burden of the population of pre-working age (k*п.дп*), the coefficient of the demographic load of the post-working-age population (k*п.пп*).

According to the table 2.2 it can be concluded that women living in rural areas have the maximum total coefficient of demographic load (1440 ‰), and men living in cities have the minimum (854 ‰); the coefficient of the demographic burden of "children" – 324 ‰ for women in rural areas and 273 ‰ – for women of the urban type of settlement; the marginal values of the coefficient of the demographic load by the first parents are 1117 ‰ for women in rural areas and 570 ‰ for men in urban settlements, and the demographic load by the elderly (first parents – children), respectively, is 3454 ‰ for urban women and 2235 ‰ for rural men.

Based on the analysis of the demographic load coefficients, it is worth summarizing and noting that today a general problem for the population of working age is a high level of load by progenitors, i.e. people of post-working age.

The demographic base is a component of the labor potential, but changes in the intensity of birth and death rates cause differences in the ratio of the number of persons of working age and those of non-working age [219, p. 25].

We support the point of view of I.V. Nakalyunyi, that the birth rate significantly affects the formation of human capital, and human capital, in turn, determines all aspects of life [143, p. 168]. A high birth rate

ensures a constant influx of new generations into the labor market, which contributes to the growth of economic activity and innovative potential of society. However, in order to realize this potential, investments in education, health care and professional training are necessary, which allows to increase the quality of labor resources and their competitiveness on the global market.

Table 2.2

Demographic burden in Kharkiv region by type of settlement in 2020 (‰)

Indicator	Total population			Urban population			Rural population		
	Together	including		Together	including		Together	including	
		men	women		men	women		men	women
k*заг*	1068	886	1255	1033	854	1216	1227	1031	1440
k*д*	286	291	282	279	284	273	321	319	324
k*n*	782	596	973	754	570	943	906	712	1117
k*c*	349	228	474	331	215	449	431	285	591
k*n/д*	2729	2049	3454	2706	2002	3454	2821	2235	3451
k*n.заг*	444	379	504	428	369	483	510	423	599
k*n.дn*	200	213	188	196	210	183	218	223	212
k*n.nn*	244	167	316	233	159	301	293	200	387

Source: calculated by the authors based on data from [46, 164].

On the other hand, the declining birth rate and aging population create additional challenges for the economy, in particular the reduction of the labor force and the increase of the burden on pension and social systems. This requires the development and implementation of effective demographic and social policies aimed at stimulating the birth rate, supporting families with children and adapting the labor market to new demographic realities.

Human capital is a key factor in economic growth and social development, so the state must provide conditions for its sustainable development. This includes the promotion of a healthy lifestyle, access to quality education at all levels, the development of a system of continuous learning and professional development that allows people to effectively adapt to changes in the labor market.

Thus, the formation and development of human capital through demographic processes and relevant policies are crucial for achieving sustainable economic growth and improving the quality of life of the population.

Analysis of the dynamics of the birth rate of the Kharkiv region by place of residence is shown in fig. 2.3.

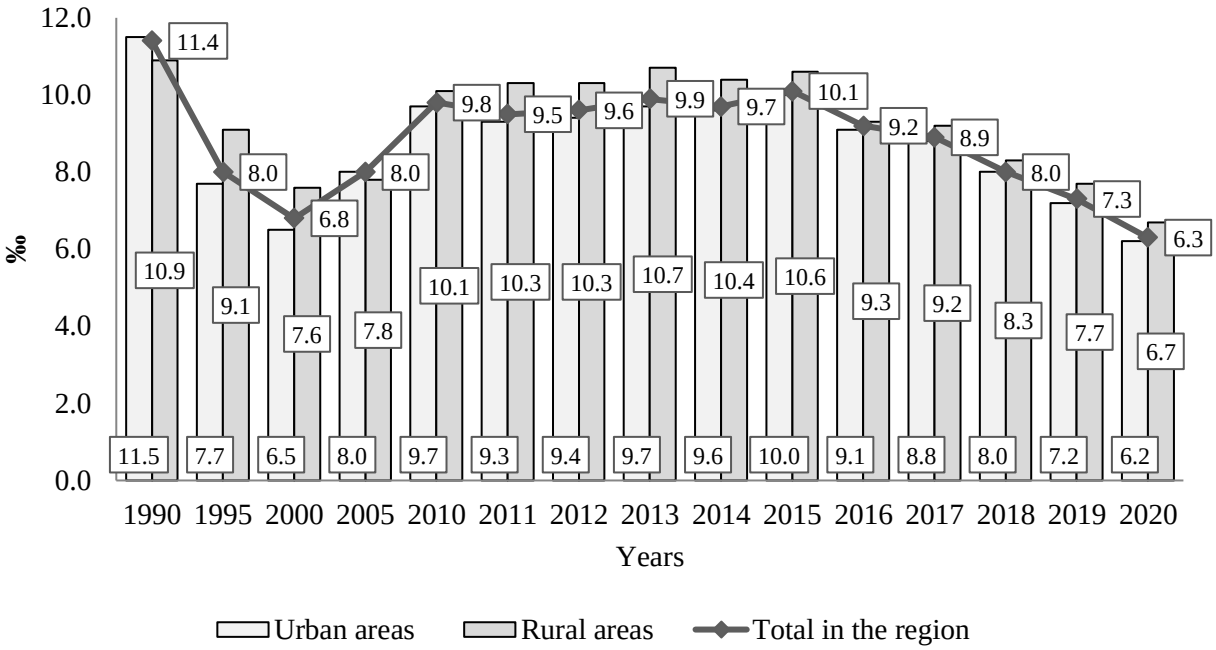

Fig. 2.3. Differentiated series of fertility dynamics in Kharkiv region by place of residence for 1990-2020 (as of January 1)

Source: compiled by the authors based on data from [46, 164].

It is important to note that since 2010, there is no specific differentiation of birth rates by place of residence. Such a trend is an indicator of activities that contribute to socio-cultural changes in society. The most crisis year of the birth rate during the studied period for the Kharkiv region was 2000: where the average for the region was at the level of 6.8 ‰. The trend towards an increase in the birth rate was gradually observed until 2015 inclusive. Since 2016, the birth rate has decreased by 1.8‰ in cities and by 2.9‰ in rural areas compared to 2015.

The mortality rate of the population remains a difficult problem for our country. In the context of studying the causes of this negative dynamic, O.M. Perebijnos notes that mortality is influenced by several factors, namely: the level of medicine, the standard of living and the difficulties of self-sufficiency of families. The author also emphasizes that there are a lot of premature deaths in Ukraine, in particular, those related to lifestyle [171].

In terms of population health indicators, Ukraine is inferior to many countries in Europe and the world. The average life expectancy of men in Ukraine is 13 years, and that of women is more than 8 years less than in the countries of the European Union [254, p. 30]. The data shown in fig.

2.4 and 2.5 indicate a consistently high mortality rate and negative dynamics in the structure of the causes of mortality, respectively.

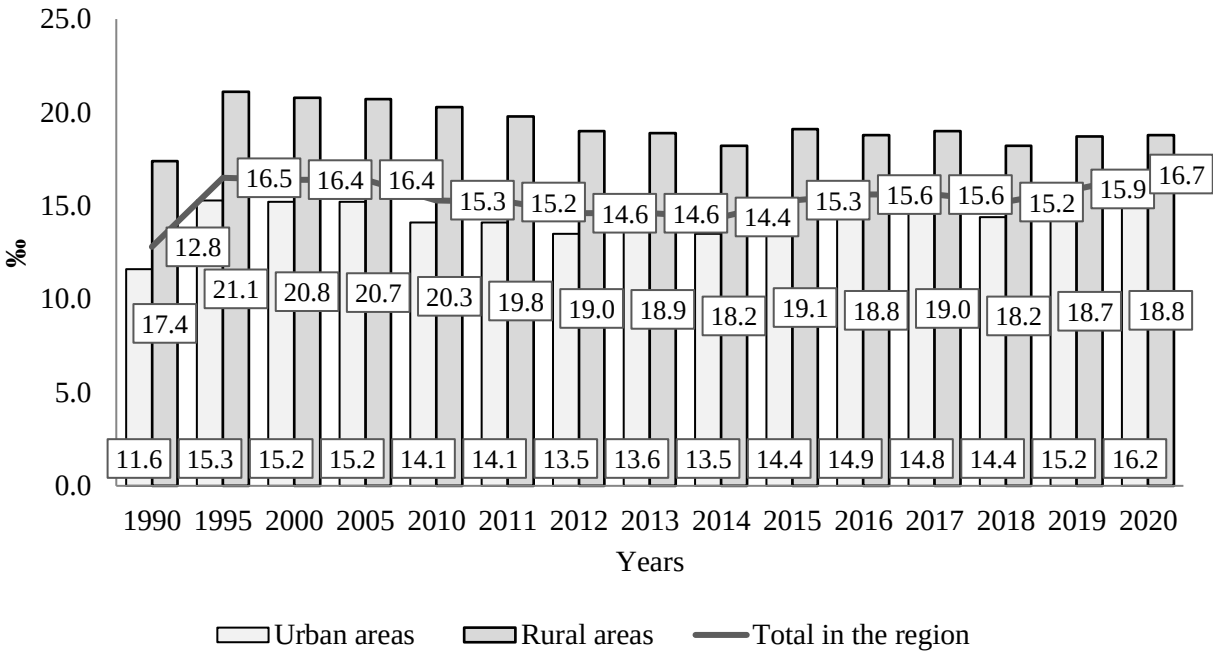

Fig. 2.4. Differentiated series of mortality dynamics in Kharkiv region by place of residence in 1990-2020

Source: compiled by the authors based on data from [46, 164].

Analyzing the data of fig. 2.4, it is worth noting that in recent years there is a noticeable trend towards an increase in the mortality rate. For residents of rural areas, the mortality rate is quite high, it reached its maximum level in 1995 and amounted to 22.3 ‰, and the minimum – in 1990 – 17.4 ‰. However, compared to the indicator and cities, it remains high. The negative dynamics are related to the organization of the health care system, antisocial lifestyle, and the level of ecology.

In fig. 2.5. the main causes of mortality of the population of Kharkiv region are singled out.

The main causes of death of the urban and rural population are diseases of the circulatory system (22,522 and 7,341 deaths, respectively),

malignant neoplasms and a number of external causes (traffic accidents, intentional self-injury, cases of injury with an unspecified intention).

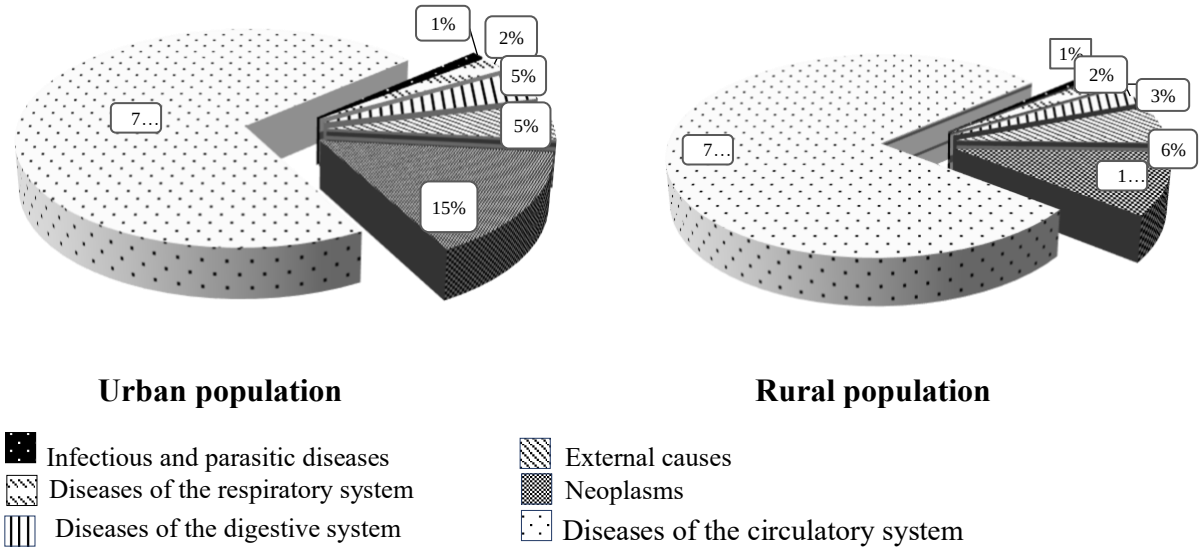

Fig. 2.5. Breakdown of deaths by cause of death in Kharkiv region in 2020

Source: compiled by the authors based on data from [46].

According to the data of appendix F, in 2020, the birth rate decreased by 2.1 ‰, the death rate decreased by 0.4 ‰, and the natural increase decreased by 1.7 ‰. This trend is also characteristic of the life expectancy rate, which decreased by 12 people.

The inter-district differentiation of the birth rate of the population of Kharkiv region was revealed. By district, the highest birth rate was in Kolomatskyi (10.9 ‰), Velikoburlutskyi (8.1 ‰), Barvinkivskyi and Blizniukivskyi (8.0 ‰) districts. Accordingly, the lowest birth rates were in Pechenizky (5.9 ‰), Zachepylivskyi (5.8 ‰) and Zmiivskyi (5.8 ‰) districts of Kharkiv region.

The dynamics of mortality is higher in Barvinkivsky district (24.1 ‰), and the lowest in Shevchenkivskyi (15.9 ‰). The root cause of this trend is the sex-age structure. Vitality coefficient (Pokrovsky's coefficient) is the highest in Kolomatsky district, i.e. 56 live births per 100 deaths, and the lowest in Zmiivskyi – 29.

This differentiation is a manifestation of socio-economic problems that exist, especially in rural areas. As a result of the excess of the death

rate over the birth rate in recent years, we are observing a natural reduction of the population.

Today's dynamic changes, globalization processes require a detailed study of the features and specifics of demographic development at the regional level based on the calculation of an integral multidimensional index. Let's make a calculation using the method of normalized multidimensional weighted average, proposed by L.F. Udotova [239].

According to this technique, it is necessary to normalize the indicators (Xij) to a single integral (R) by calculating relative indicators – coefficients (Yij), as a ratio:

$$Yij = \frac{Xij}{\overline{X}ı}, \quad (2.1)$$

where Xij – the value of the i-th indicator in the j-th district;

$\overline{X}ı$ – the average value of the i-th indicator in the population being analyzed.

We selected and normalized the following indicators for the evaluation:

$\mathbf{x_1}$ – share of the rural population;

$\mathbf{x_2}$ – the number of births per 1000 people;

$\mathbf{x_3}$– the number of deaths per 1000 people;

$\mathbf{x_4}$ – there are women per 1000 men;

$\mathbf{x_5}$ – average age of residents;

$\mathbf{x_6}$ – the number of registered marriages per 1,000 people of the existing population;

$\mathbf{x_7}$ – number of divorces per 1,000 people of the existing population.

After carrying out the procedure of normalization of relative indicators, it is necessary to calculate the ranked demographic assessment of the regions according to the formula of the multidimensional integral index (R):

$$R = \frac{\sum_{i=t}^{n} Y_{ij}}{n}, \quad (2.2)$$

where n – number of indicators (in our case n=7).

In the table 2.3 shows the results of ranking the districts of the Kharkiv region according to the assessment of the demographic situation in rural areas.

The rating assessment of the demographic situation of the districts of the Kharkiv region identified sharp differences in the demographic

development of the regions. A relatively better demographic situation in rural areas is observed in Chuguyiv, Loziv, Boriv, Zolochiv, Krasnograd, Pervomai, Novovodolaz and Zmiiv districts (multidimensional integral index 1.192–1.027).

Table 2.3

Rating assessment of the demographic situation in rural areas of Kharkiv region in 2020

Districts	Calculation coefficients							R	Rank
	$У_1$	$У_2$	$У_3$	$У_4$	$У_5$	$У_6$	$У_7$		
Chuhuivskyi	0,487	2,330	1,587	0,992	1,001	1,057	0,892	1,192	1
Lozivskyi	0,412	1,961	2,011	0,803	0,997	0,728	1,249	1,166	2
Borivskyi	1,302	0,750	0,930	0,857	0,994	1,081	2,200	1,159	3
Zolochivskyi	1,307	0,957	0,984	1,052	1,011	0,987	1,189	1,070	4
Krasnohradskyi	1,031	0,923	0,769	1,194	0,990	1,245	1,308	1,066	5
Pervomaiskyi	0,656	0,888	1,144	0,729	1,044	0,940	1,903	1,043	6
Novovodolazkyi	1,248	0,865	0,998	0,465	0,985	1,574	1,070	1,029	7
Zmiivskyi	1,043	0,934	0,959	1,079	1,020	1,198	0,952	1,027	8
Dvorichanskyi	1,538	0,877	0,911	1,005	1,008	0,846	0,892	1,011	9
Kehychivskyi	1,132	1,130	0,794	0,796	0,936	1,104	1,070	0,995	10
Bohodukhivskyi	1,000	1,061	0,974	0,803	0,987	1,151	0,833	0,973	11
Krasnokutskyi	1,333	0,773	0,915	0,951	0,994	1,057	0,773	0,971	12
Valkivskyi	1,086	0,865	0,920	0,850	1,011	1,057	0,952	0,963	13
Kolomatskyi	1,155	0,957	0,950	1,154	1,001	0,752	0,773	0,963	14
Zachepylivskyi	1,485	0,865	0,769	0,769	0,983	0,799	1,070	0,963	15
Sakhnovshchynskyi	1,265	0,992	0,876	0,776	0,973	1,128	0,714	0,961	16
Barvinkivskyi	1,140	0,865	0,984	0,809	1,015	0,893	0,952	0,951	17
Derhachivskyi	0,558	0,865	0,857	1,066	0,990	1,316	0,952	0,943	18
Blyzniukivskyi	1,555	0,888	0,998	0,729	0,994	0,822	0,595	0,940	19
Shevchenkivskyi	1,280	0,923	0,833	0,621	0,990	0,963	0,952	0,937	20
Velykoburlutskyi	1,423	0,877	0,774	0,897	0,990	0,869	0,595	0,918	21
Vovchanskyi	0,777	0,830	1,008	0,911	1,006	1,057	0,773	0,909	22
Pechenizkyi	0,915	1,199	1,008	0,971	1,034	0,822	0,357	0,901	23
Balakliiskyi	0,708	0,830	0,876	0,843	1,004	0,940	1,070	0,896	24
Iziumskyi	0,507	0,784	1,203	0,708	1,006	0,846	1,130	0,883	25
Kupianskyi	0,583	0,715	1,003	0,722	1,048	0,728	1,070	0,839	26
Kharkivskyi	0,072	1,096	0,964	0,992	0,987	1,034	0,714	0,837	27

Source: calculated by the authors.

According to the assessment of the demographic situation, Dvorichanskyi, Kegychivskyi, Bogodukhivskyi, Krasnokutskyi, Valkivskyi, Kolomatskyi, Zachepylivskyi, Sakhnovshchynskyi and Barvinkivskyi districts are at the average level (multidimensional integral index 1.011–0.951).

A threatening demographic situation has developed in Dergachyv, Blyznyukiv, Shevchenkiv, Velikoburlutsky, Vovchansky, Pechenizky, Balakliya, Izyum, Kupyan and Kharkiv districts (multidimensional integral index 0.943–0.837).

The determined dynamics show the need for intervention and the development of regional programs for the development of demographic policy, which will strengthen the demographic security of the region and improve the development of human capital. Such programs should be aimed at stimulating the birth rate, supporting families with children, improving the conditions for upbringing and education, as well as improving the quality of medical services.

All spheres of human activity need objective and most reliable information about the future demographic situation in the world, the country and individual regions, which will prevent the imbalance of all social institutions, overproduction or shortage of goods or services, and ensure the stable functionality of the financial system.

In our opinion, the judgment of E.M. is important. Libanova, that "demographic forecasting is not an end in itself and does not claim absolute accuracy of prediction – first of all, it is a method of prospective analysis that to a certain extent "creates" the future itself" [125, p. 267].

We will carry out a forecast of the number of the rural population of the Kharkiv region using the method of extrapolation based on the average annual rate of growth (decrease). The predicted population size according to this method is determined by the formula:

$$P_t = P_0 * (1 + \overline{K})^2, \quad (2.3)$$

where P_t– forecasted level of population;

P_0 – baseline population level;

$\overline{K}$ – average annual population growth rate;

t – forecasting period.

We use data on the population of the Kharkiv region for 2018 as a base level for forecasting the population. According to the calculations, the average annual rate of natural population growth (decrease) is 0.5%. Based on the forecast that this trend remains unchanged, we calculate the number (Fig. 2.6).

The results of the calculations showed that the number of the rural population of the Kharkiv region will decrease by 2027 another 29.9 thousand people.

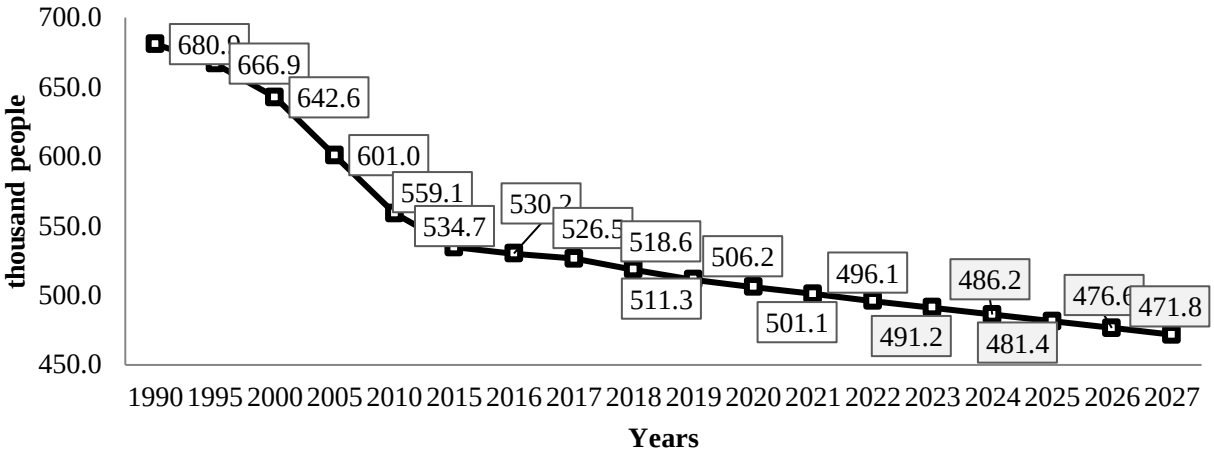

Fig. 2.6. Forecast of the rural population of Kharkiv region by extrapolation to 2027, thousand people

Source: compiled by the authors based on data from [46].

In fig. 2.7 shows the graph of the equalization of the number of the rural population of the Kharkiv region for 1990-2020 according to the equation of a straight line.

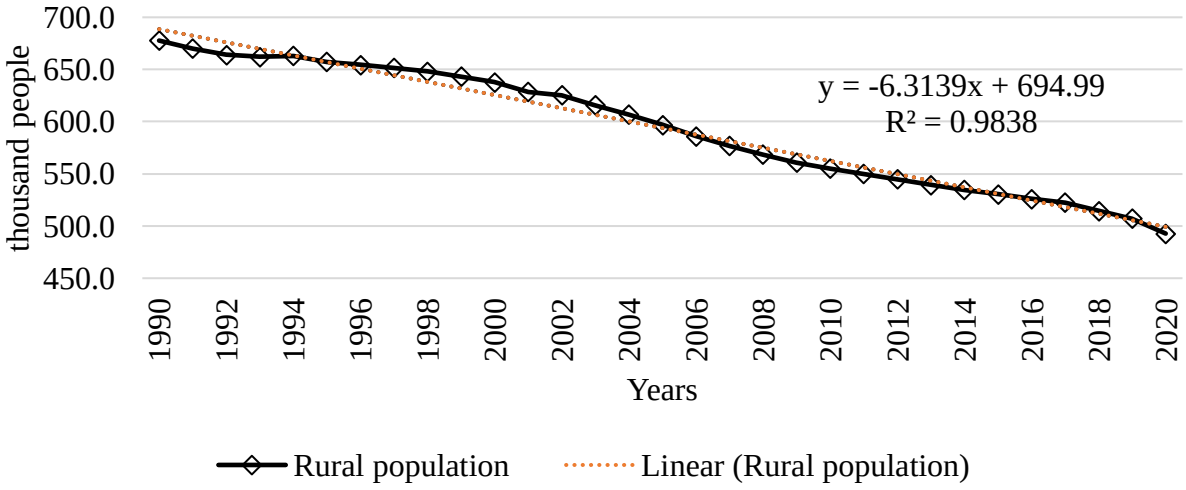

Fig. 2.7. Graph of the 64ounselli of the rural population in Kharkiv region for 1990-2020 according to the straight line equation

Source: compiled by the authors based on data from [46].

As a result of the equalization of the number of the rural population of the Kharkiv region in a straight line, an average annual decrease in the number of the existing population by 6314 people was obtained with a reliability of approximation of 98.4%. On the basis of the obtained equation of a straight line (y_x=694.99-6.3139x), it is possible to make a forecast calculation of the number of the rural population of the Kharkiv

region on January 1, 2027, where the available number will be about 455.06 thousand people.

2.2. Trends in employment and the labour market in the agricultural sector

Population employment is the main indicator of transformational changes in the economy, and employment in rural areas has its own character and certain features [97, p. 134]. Therefore, the assessment of trends and vectors of employment development occupies an important place in the system of indicators, which allow to provide an appropriate characteristic of the level of development of the national economy and characterize the stability of the economic situation both in a separate region and in the country as a whole.

It is an indisputable fact that the developed countries of the world define the creation of a high level of employment, the fight against poverty, unemployment and the decline of rural areas as one of the most important tasks of their state policy.

Today, monitoring and forecasting changes in the labor market have become extremely important after Ukraine received a visa-free regime with the European Union, which caused an increase in the labor migration of Ukrainians to EU countries. Moreover, the problem of employment and unemployment is quite acute and relevant for the agrarian sector of the economy – a powerful strategic industry that ensures the food security of our country. As the scientist M.V. aptly notes. Pivtorak, "permanent economic instability, the dominance of large high-tech agrarian formations (agroholdings), the decline of the social infrastructure of the village and the lack of alternative types of productive employment led to such negative phenomena as the high level of unemployment among rural residents and, as a result, chronic poverty of the rural population" [177, p. 108].

Therefore, the development of the labor market in the rural areas of Ukraine is important for the formation of an effective, socially oriented agrarian sector of the economy, which must satisfy people's needs for food, combine the right to land with work on it, and also be socially responsible business entities with their own economic interests [45, p. 44].

Numerous scientists have already created a sufficient basis for studying the state of peculiarities and trends in the development of the labor market. Usually, when assessing the current state of the labor

market, the main indicators that are used during the research are the economically active and inactive population, employment, unemployment, turnover of the labor force, average monthly wages, workload of the unemployed at the workplace, demand and supply of labor, etc. [207, p. 103]. Taking this statement into account, we will analyze the dynamics of changes in the main indicators of the labor market for 2010-2020 in terms of key indicators, namely: the workforce of working age, including the employed and unemployed population, the average registered number of full-time employees and the labor force ratio from admission to dismissal (Table 2.4).

According to the data given in the table. 2.4, in 2020, compared to the base year, the number of working-age workforce decreased by 1759.0 thousand people, or by 9.2%. At the same time, during the period 2010–2017, the number of the population of working age had a tendency to decrease. Since 2018, positive dynamics have been observed when analyzing the labor force indicator.

Table 2.4

Dynamics of the main indicators of the labor market of Ukraine in 2010-2020

Years	Working-age labor force, thousand people	including	
		employed population	unemployed population
2010	19 164,0	17 451,5	1 712,5
2011	19 181,7	17 520,8	1 660,9
2012	19 317,8	17 728,6	1 589,2
2013	19 399,7	17 889,4	1 510,3
2014	19 035,2	17 188,1	1 847,1
2015	17 396,0	15 742,0	1 654,0
2016	17 303,6	15 626,1	1 677,5
2017	17 193,2	15 495,9	1 697,3
2018	17 296,2	15 718,6	1 577,6
2019	17 381,8	15 894,9	1 486,9
2020	17 405,0	15 693,4	1 711,6
Deviation of 2020 from 2010, +;-	-1 759,0	-1 758,1	-0,9

Source: calculated by the authors based on [164].

According to the data given in the table. 2.4, in 2020, together with the base year, the number of working-age workforce decreased by 1759.0 thousand people, or by 9.2%. At the same time, during the period 2010–2017, the number of the population of working age had a tendency to decrease. Starting from 2018, positive dynamics can be observed during the analysis of the labor force indicator.

In the table 2.5 The dynamics of the employed population aged 15–70 in 2010–2020 were analyzed by economic sector.

Analysis of table data. 2.5 confirms the opinion that the modern labor market is going through difficult times, however, the negative trend of falling indicators of the employed population by types of economic activity is obvious. It is worth noting that this trend begins in 2014, and only in 2019 should we try to trace positive dynamics and approach the level of 2010. Protest The current realities of 2020-2021 are related to the pandemic, quarantine restrictions have a significant impact on trends decrease in the labor market. At the same time, the largest number of employed people was noted in the service sector – 58.2% in 2020. It should be noted that the share of employed people in agriculture increased by 1.7% in 2020, which is a positive trend in the modern agricultural labor market.

Table 2.5

Employed population aged 15-70 by type of economic activity in Ukraine in 2010-2020

Indicators	2010	2012	2014	2016	2018	2020	Deviation of 2020 from 2010, +;-
Total employed	20266,0	19261,0	18073,0	16277,0	16361,0	15915,3	-4350,7
The sphere of production activity							
Agriculture, forestry and fisheries	3116,0	3309,0	3091,0	2867,0	2938,0	2721,2	-394,8
in % to all	15,4	17,2	17,1	17,6	18,0	17,1	+1,7
Industry	3462,0	3237,0	2898,0	2495,0	2426,0	2358,6	-1103,4
in % to all	17,1	16,8	16,0	15,3	14,8	14,8	-2,3
Construction	943,0	836,0	746,0	645,0	665,0	664,4	-278,6
in % of all	4,7	4,3	4,1	4,0	4,1	4,2	-0,5
Service Industries							
Service sector	12746,0	11879,8	11337,3	10271,1	10332,0	9269,2	-3476,8
in % of all	62,9	61,7	62,7	63,1	63,2	58,2	-4,7

Source: calculated by the authors according to [164].

In order to study the impact of the share of the employed population in agriculture, forestry, and fishing on the main indicators of the development of the agrarian labor market, we conducted a statistical grouping of the regions of Ukraine in dynamics for 2019–2020.

According to N.N. Ryauzov, for grouping you need to determine how many groups should be formed. For this, it is worth taking into account the range of variation, which is calculated as the difference between the maximum and minimum value of the characteristic. The scientist also adds that the greater the range of variation, the more groups can be formed [210, p. 87]. To determine the limits and number of groups, we will perform a brief analysis of the main parameters of the variation of the dynamic series, which will become the initial basis for analytical grouping (Table 2.6).

Table 2.6

Main parameters of variation in the share of the employed population in agriculture, forestry, and fisheries in 2019-2020

Indicators of variation	The value of the indicator
Maximum, thousand people	34,1
Minimum, thousand people	5,8
Range of variation, thousand people	28,4
Average number of employed population in agriculture, forestry and fisheries, thousand people	21,2
Average linear deviation, thousand people	6,922
Standard deviation, thousand people	7,879
Dispersion	62,081
Coefficient of variation, %.	37,1
Oscillation coefficient	1,336

Source: calculated by the authors.

It was established that the coefficient of variation as a relative indicator of variability in 2019–2020 was equal to 37.1%, which indicates a significant degree of intensity of variation in the share of the employed population in agriculture in 2019–2020.

When performing statistical grouping, you can use equal and unequal intervals. It is important to note that the use of unequal intervals is possible if most economic phenomena quantitatively have unequal value for lower and higher groups [50, p. 39].

If the grouping feature has a smooth character of variation and at the same time equal intervals are used, then the number of groups can be approximately determined by the formula of the American scientist Sturges n = 1+ 3.322 lg N [50, p. 65]. For the 24 regions of the population we studied, the number of equal groups should be five.

According to R.A. Shmoilova, “the population is considered homogeneous if the coefficient of variation does not exceed 33% (for distributions close to normal” [269, p. 192]. According to our research,

using the selection method, the limits of the grouping intervals were established, which made it possible to form a qualitatively homogeneous group based on the grouping characteristic.

Based on the degree of intensity of variation, four groups with equal intervals were formed (Table 2.7).

Table 2.7

Variation series of the distribution of the share of the employed population in agriculture in 2019-2020

Group number	Groups of regions by the share of employed population in agriculture, %	Number of regions in the group	Relative share, %
I	до 10,0	6	12,5
II	10,1–20,0	15	31,3
III	20,1–30,0	22	45,8
IV	понад 30,1	5	10,4
	Total	**48**	**100,0**

Source: calculated by the authors.

As a result of the distribution of the regions of Ukraine in 2019–2020 by the share of the population employed in agriculture, a relative frequency histogram was obtained (Fig. 2.8).

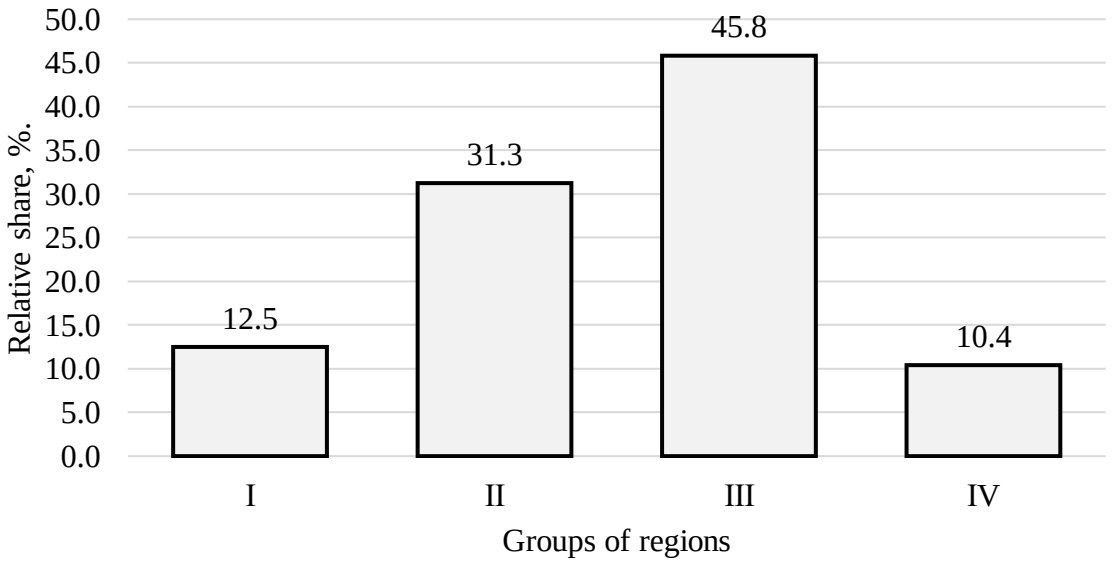

Fig. 2.8. Distribution of Ukrainian regions by the number of people employed in agriculture in 2019-2020

Source: compiled by the authors.

Thus, the largest number of regions is concentrated in the III group, which includes 22 units, or 45.8%. The smallest number of units (5 regions) is in the IV group, which is 10.4% of the total number of units of the population. According to Fig. 2.10, we can observe that the studied population corresponds to the law of normal distribution of values.

Let's begin the analysis with the characteristics of some indicators regarding the number of the workforce, the employed population, the level of wages (Table 2.8).

Table 2.8

Summary indicators of the effective grouping of Ukrainian regions by the share of the employed population in 2019-2020

Calculated values	Groups of regions by the share of the employed population in agriculture, forestry and fisheries, %.				Total or average
	I	II	III	IV	
	up to 10.0	10,1-20,0	20,1-30,0	over 30,1	
Number of regions in the group	6	15	22	5	48
Group average					
Share of the employed population in agriculture, %.	7,4	15,7	26,3	32,0	20,4
Number of enterprises engaged in agricultural activities, units.	2623	1848	1847	2048	2092
Average monthly nominal salary of full-time employees in agriculture, UAH	7675,8	7482,3	7956,3	8946,8	8015,3
Number of employed people in agriculture, forestry and fisheries, thousand people	71,4	114,7	124,9	165,0	119,0
Number of employees at enterprises, thousand people	25,6	15,0	17,9	21,7	20,1
Labor productivity in enterprises engaged in agricultural activities, per person employed in agricultural production, in constant prices of 2016, thousand UAH	807,1	917,9	854,0	1094,1	918,3
including in crop production	757,6	997,6	908,4	1005,2	917,2
in livestock production	1000,4	546,1	602,8	1671,7	955,3

Source: calculated by the authors.

As evidenced by the data in the table. 2.8, on average, one region accounts for 20.4% of the share of the employed population in agriculture, forestry and fisheries. The average number of employees in agricultural production is 20.1 thousand people per region of Ukraine, and the largest average number of employees in 2019–2020 – 25.6 thousand people – is

concentrated in the 1st analytical group. The highest average level of the average monthly salary of full-time employees was noted in the IV group (8,946.8 thousand hryvnias).

The highest value of the labor productivity indicator in 2019–2020 was recorded in the IV group and is UAH 1,094.1 thousand. This trend is also characteristic of labor productivity in the fields of plant and animal husbandry.

During the analysis of structural shifts in the employment of the agrarian sector of the economy, it is important to study the dependence of the share of the employed population on the change in the dynamics of the production of agricultural products in crop and livestock production (Table 2.9).

Table 2.9

Dependence of the share of the employed population in agriculture, forestry and fisheries on agricultural products in Ukraine in 2019-2020

Calculated values	Groups of regions by the share of the employed population in agriculture, forestry and fisheries, %.				Total or average
	I	II	III	IV	
	up to 10.0	10,1-20,0	20,1-30,0	over 30,1	
Number of regions in the group	6	15	22	5	48
Agricultural production in all categories of farms at constant prices in 2016, UAH mln	32262,9	23409,1	25703,0	36584,7	29489,9
including in crop production	23474,3	19100,1	20471,1	26874,1	22479,9
in livestock production	8788,6	4309,9	5229,8	97105,0	28858,3
Agricultural production per capita in constant prices of 2016, UAH	8375,5	13298,0	22860,7	28570,0	18276,1
incl. in crop production	6142,3	10741,8	18324,5	21462,2	14167,7
in livestock production	2233,2	2556,2	4536,1	7107,8	4108,3

Source: calculated by the authors.

It was established that in 2019–2020, with the increase in the number of people employed in agriculture, forestry, and fishing, the volume of agricultural products of all categories will increase at constant prices of 2016. In 2019–2020, the largest gross output in farms of all categories was recorded regions of the IV group (36,584.7 thousand UAH), in which the average level of the employed population in

agriculture, forestry and fishing is 165.0 thousand people. This tendency was also noted in terms of gross agricultural production per capita.

We will conduct an analysis of the dependence of the share of the employed population in agriculture, forestry and fisheries on the level of profitability of production of agricultural products of Ukraine in 2019–2020 (Table 2.10).

Table 2.10

Dependence of the share of the employed population in agriculture, forestry and fisheries on the level of profitability of agricultural production in Ukraine in 2019-2020

Calculated values	Groups of regions by the share of the employed population in agriculture, forestry and fisheries, %.				Total or average
	I	II	III	IV	
	up to 10.0	10,1-20,0	20,1-30,0	over 30,1	
Level of profitability of agricultural production in crop production, %.	-	-	-	-	-
- cereals and legumes	19,8	15,2	12,7	12,7	15,1
- sunflower	30,5	29,6	26,5	32,5	29,8
- sugar beet	-11,5	-6,5	-8,6	-14,6	-10,3
Level of profitability of agricultural production in livestock, %.	-	-	-	-	-
- milk	28,2	20,5	6,3	16,8	18,0
- meat of cattle	-22,9	-22,8	-22,3	-28	-24,0
- pig meat	-1,9	-3,0	-1,3	0,6	-1,4

Source: calculated by the authors.

Table data. 2.10 showed that as the share of the employed population increases, the level of profitability of grain and leguminous production decreases. However, there is no such tendency during the cultivation of sunflower seeds, where the highest level of profitability is characteristic of the regions of the IV group (32.5%). The negative trend in the level of profitability of the production of animal husbandry products, except for the production of dairy products, is unequivocal.

The analyzed indicators give reason to conclude that there is a clear relationship between the share of the employed population in agriculture and indicators of economic efficiency. We would also like to note that the highest level of employment in agriculture is characteristic of the Kherson, Ternopil, and Vinnytsia regions, which are included in the IV group in the dynamics for 2019–2020. In our opinion, the production

process in these regions should be concentrated not only on production raw materials, but also on increasing opportunities and capacities for independent processing of the raw material base produced by them. That is, innovations, expansion of new areas of business, namely diversification of production, will allow to increase the level of employment and the efficiency of production in the agrarian industry.

The established clear relationship between the size of the share of the employed population in the agricultural economy of Ukraine and indicators of economic efficiency confirms the need for the dominance of not extensive, but intensive approaches to employment regulation and the expediency of considering it not as a quantitative, but a qualitative characteristic. The Kharkiv region was included in the II analytical group with an average share of the employed population in 2019–2020 of 13.4%.

We believe that such a share of the employed is quite small for an agrarian country and the capacities of the Kharkiv region, which requires an increase in the level of employment in the agrarian sector of the economy due to innovations and by making management decisions that will be based on the organizational and economic mechanism of employment regulation in the agrarian sector of the economy.

In turn, the Kharkiv region has always attracted labor resources due to the high level of development, multi-vector directions of the region's economy in industry, services and the agricultural sector and belongs to the regions with a high level of employment.

However, the trends that have formed in the national labor market were also reflected in the analysis of the regional labor market, which requires the development of a methodical approach to identify and assess changes in the labor market. So let's start the analysis of the labor market of the Kharkiv region with indicators of labor availability (Table 2.11).

Analyzing the data in the table. 2.11, it can be concluded that the characteristic trend for the labor market of the Kharkiv region is a significant reduction in the number of the workforce both in the age group of 15–70 years and of working age. The highest indicator of the workforce of working age was observed in 2011 – 1375.2 thousand people, then the lowest level of the workforce was observed in 2016 – 1327.5 thousand people. In particular, in 2020, compared to 2010, the labor force aged 15–70 decreased by 77.1 thousand people, and the working-age population decreased by 21.7 thousand people. If we analyze the number of the employed population of working age, the highest employment rate was observed here in 2019 – 1,217.9 thousand people, which indicates the

improvement and stabilization of the situation on the labor market after the turning points since 2014.

Table 2.11

Key indicators of the labor market in Kharkiv region in 2010-2020

Years	Labor Force				Including Employed Population			
	Aged 15–70		Working Age		Aged 15–70		Working Age	
	Average, thousand persons	% of the population in the respective age group	Average, thousand persons	у % до населення відповідної вікової групи	Average, thousand persons	% of the population in the respective age group	Average, thousand persons	% of the population in the respective age group
2010	1365,2	63,9	1264,0	73,2	1267,3	59,3	1166,1	67,5
2011	1375,2	65,1	1272,8	74,5	1279,0	60,6	1176,6	68,9
2012	1373,6	65,7	1286,9	75,4	1280,6	61,2	1193,9	69,9
2013	1370,6	65,7	1296,1	75,4	1282,8	61,5	1208,3	70,3
2014	1328,8	63,9	1296,1	74,6	1225,3	59,0	1182,1	68,6
2015	1324,2	63,8	1285,8	74,5	1230,8	59,3	1192,4	69,1
2016	1321,2	63,8	1282,2	74,3	1236,6	59,7	1197,6	69,4
2017	1327,5	64,5	1285,1	75,7	1247,1	60,6	1204,7	71,0
2018	1329,6	64,9	1284,0	76,3	1258,9	61,4	1213,3	72,1
2019	1331,1	65,4	1285,1	77,4	1263,9	62,1	1217,9	73,3
2020	1288,1	63,9	1242,3	75,7	1208,5	59,9	1162,7	70,9
Deviation of 2020 from 2010, +;-	-77,1	0	-21,7	+2,5	-58,8	+0,6	-3,4	+3,4

Source: calculated by the authors according to [46].

According to I.O. Wenger, “during the independent existence of the country, systemic economic changes in the state, privatization of resources, creation of medium and small enterprises, processes of globalization, transformation of the international economy and world relations caused the development and creation of the current labor market [38, p. 35]. Taking into account the specifics of the agricultural sector, employment as the main indicator of shifts and transformational processes in the economy has a number of characteristic features and peculiarities.

In 2020, the workforce of working age in the Kharkiv region was 1242.3 thousand people. Amount them, 80.5% or 1,019,200 people were the working age workforce in urban areas, 17.6% or 223,100 people were

in rural areas. The total population employed in the region's economy at the beginning of 2020 was 956.1 thousand people in urban areas, and 206.6 thousand people in rural areas. More than 79,600 people of working age in the region officially had the status of unemployed. The share of the unemployed in urban areas was 79.3%, and in rural areas – 20.7%.

The level of employment is negatively affected by the number of unemployed people with reduced motivation to work. The population that has lost its job subsequently loses its potential, qualifications and ability to be competitive in the labor market. According to L.G. Yarovoi, unemployment is a macroeconomic problem that is formed under the influence of such factors as: structural changes in the economy, scientific and technological progress, inflation, demographic processes, the level of qualification, the seasonal nature of production, the level of labor motivation, the imperfection of labor legislation, the insufficient level of aggregate of demand [277, p. 752].

In the context of the study of the influence of the level of unemployment, the opinion of D.P. deserves attention. Bogyni and O.A. Grishnova, who noted that the state, man and society have their own interest in the effective use of labor force. It is known that if the unemployment rate increases by at least 1%, the gross national product will decrease by 2% [21, p. 270]. This highlights the importance of developing and implementing policies aimed at reducing unemployment, including job creation, support for entrepreneurship, vocational training and retraining of workers, and stimulation of economic activity. Effective management of the labor market is a key factor for ensuring economic growth, raising the standard of living of the population and the stability of society as a whole.

The dynamics of the number of registered unemployed and the number of vacancies on the labor market of the Kharkiv region are shown in fig. 2.9. In 2020, the number of registered unemployed was 21.6 thousand people, which is 1.7 thousand people less than the figure at the beginning of the analyzed period. In December 2020, the number of registered unemployed persons per vacant job was 4, and in January 2020 it was 6, which is the maximum number for the analyzed period.

According to E.V. Pakhuchoi, the labor market is a litmus test that reacts sharply to changes in the structure of the economy and reflects almost all socio-economic phenomena that occur in society, therefore the lack of stable development of the labor market does not contribute to the effective functioning of the labor market, in particular in the agricultural

sector [170, p. 88]. Incomplete and ineffective use of human capital does not allow full use of the production potential of the state and individual regions.

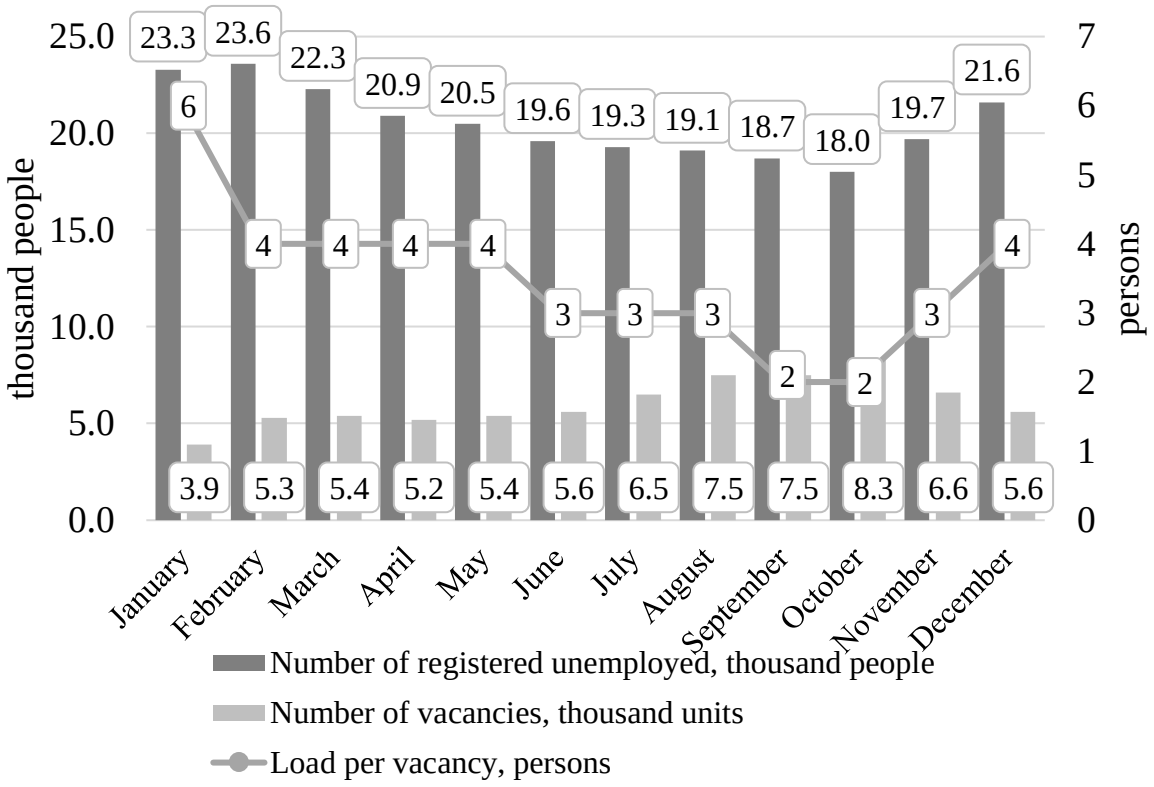

Fig. 2.9. Dynamics of registered unemployment and the number of vacancies in Kharkiv region in 2020

Source: compiled by the authors based on [46].

The statement of M.B. is quite debatable. Mahsma and S.D. Voloshchuk, that the tendency to reduce the employed population in the agrarian sector of the economy is positive and corresponds to modern conditions and world trends [134, p. 136–137]. Although the authors specify their opinion somewhat and note that, unfortunately, this trend is not related to the high level of intensification of the agricultural industry as in developed countries. We believe that the agrarian sector of the economy is a powerful strategic industry that has had a positive foreign trade balance for many years in a row, supports the integrity of rural areas, provides jobs to a significant part of the rural population, and is the basis of food security of our country. That is why the reduction in the number of employed people in the agricultural sector is a big risk for this industry. In this context our statement from previous research, that the growth of incomes of workers in the agricultural sector

and the improvement of labor force indicators contribute to the strengthening of the socio-economic security of the agricultural sector, is very relevant [33, p. 28].

The average annual decrease in the number of the employed population aged 15–70 in rural areas was 9.0 thousand people, and the number of the employed population of working age increased by 8.3 thousand people on average during the analyzed period, as evidenced by the data in Fig. 2.10.

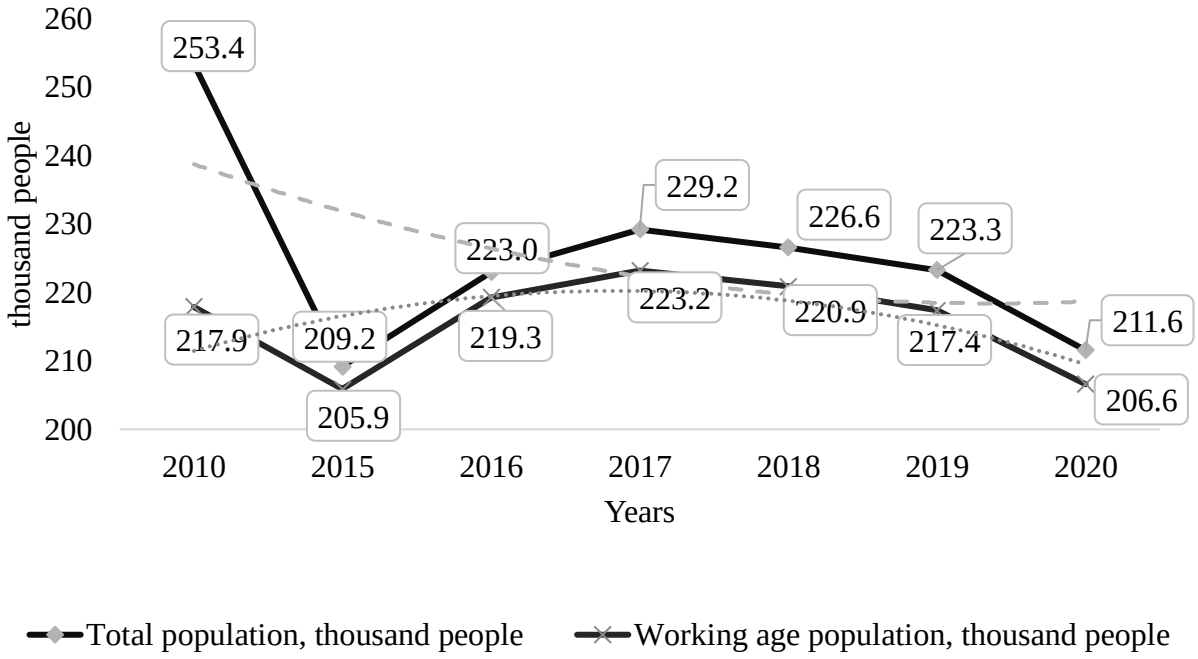

Fig. 2.10. Dynamics of the employed population in rural areas of Kharkiv region in 2010-2020, thousand people

Source: compiled by the authors based on [46].

In the modern agricultural labor market, it has been recorded that the number of jobs has decreased in recent years, and production volumes have decreased accordingly. It is possible to achieve and ensure balance only under the condition of effective implementation of the organizational and economic mechanism of employment regulation, where state policy will be one of the driving factors. A more accurate and thorough analysis of the dynamics can be compared on the basis of the alignment of the dynamics series according to the equation of a straight line and a parabola of the third order (Fig. 2.11).

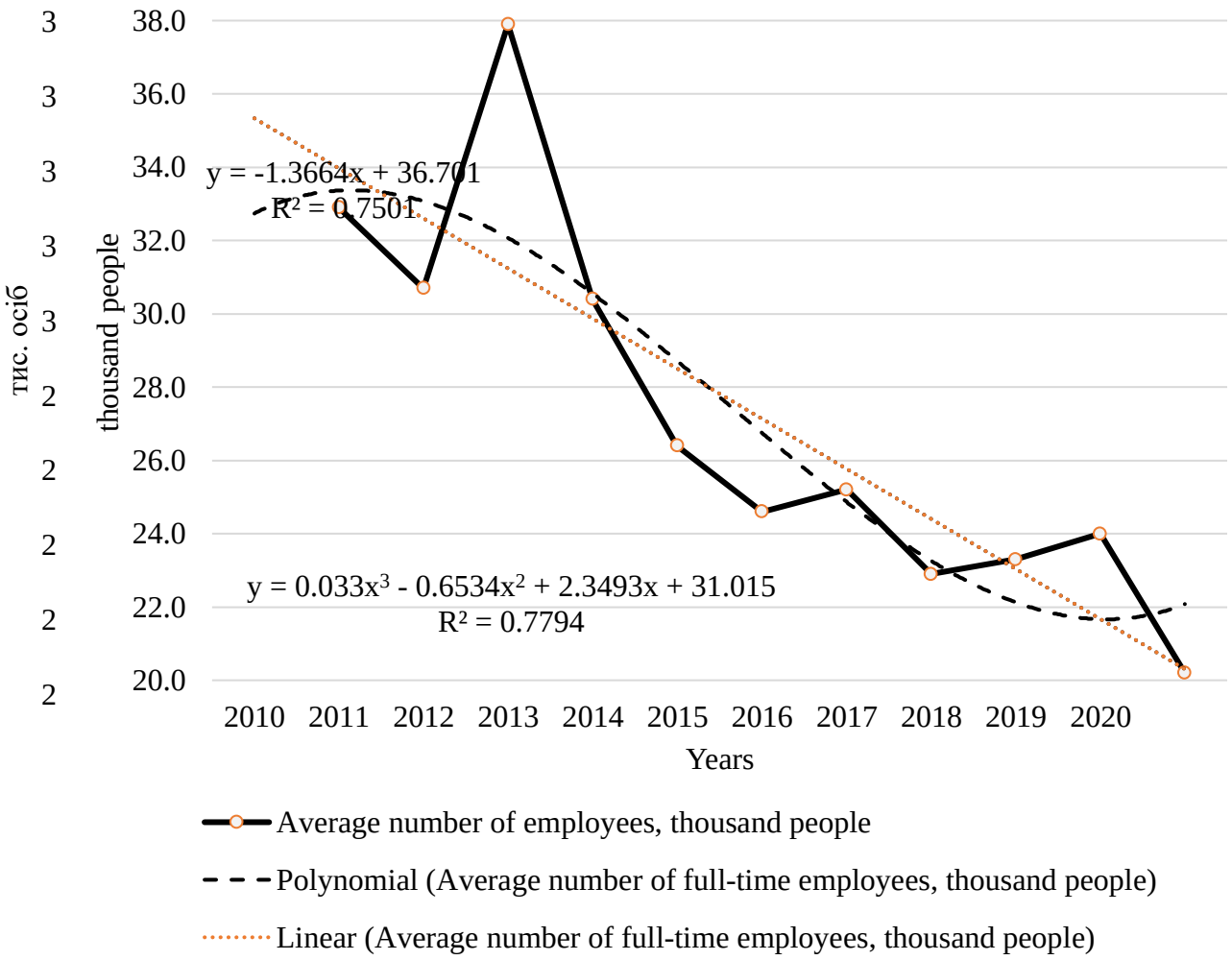

Fig. 2.11. Dynamics of the average number of full-time employees in agriculture in Kharkiv region in 2010-2020

Source: compiled by the authors based on [46].

In fig. 2.11 we clearly observe that the dynamics of the average registered number of full-time employees in the agriculture of the Kharkiv region for 2010–2020 has a tendency to decrease. Alignment of a series of dynamics according to the equation of a straight line shows that in 2009, i.e., the year preceding the base one, the average registered number of full-time employees in agriculture was 36.7 thousand people, and their annual reduction was 1.4 thousand people. Alignment of the dynamic series according to the third-level parabola equation shows that in 2009 the average registered number of full-time employees in agriculture was 31,000 people, the annual increase was 2,300 people, and the average annual decrease was 0,700 people . So the analysis shows that even with annual growth, but an average annual reduction, the total number of employees tends to decrease.

In our opinion, a universal methodical approach that allows taking into account the comprehensive nature of the processes that affect employment is the analysis of its level in the section of economic sectors using the method of structural shifts and determination of the localization coefficient. This makes it possible to identify the concentration of employed persons and the localization of industries at the level of the state or region.

Scientist S. Kuznets noted that the structural changes of the economy belong to the six characteristics that shape modern economic growth, and these structural changes "presuppose a transition first from agricultural to non-agrarian production, and then from industry to the production of services [289, c. 248]".

According to the hypothesis of three sectors of the economy, or the hypothesis of Clark-Furastier, the following sectors are distinguished in the economic activity: primary (agriculture), secondary (industry, construction), tertiary (the sphere of services) and other types of economic activity. K. Clark also determined that a higher level of average income falls on the tertiary sector of the economy, which employs a larger share of the population [280, p. 7].

The above is reflected in the comparison of the employed population aged 15–70 by sectors of the economy of Ukraine in the cross-section of regions (Table 2.12).

Analysis of table data. 2.12. allows us to draw the following conclusions. First, we confirm the dynamics of redistribution of employment between industries in favor of the tertiary sector (the service sector). On average, the tertiary sector has 392.3 thousand employed people, the secondary sector has 120.9 thousand people in second place, and the primary sector has an average of 108.8 thousand people. Secondly, in terms of oblasts, the largest share of employed in the primary sector was noted in Vinnytsia oblast, namely 200.5 thousand people (31.6% of the total number of employed in the oblast). This indicator is the smallest in the Kyiv region – 43.7 thousand people, or 5.8% of all employed in the region.

For the Kharkiv region, the number of people employed in agriculture, forestry and fisheries (primary sector) is higher than the average for Ukraine and amounts to 155,500 people. For the tertiary sector, the number of employed persons is 756.7 thousand and belongs to the highest indicators. The conducted analysis proves that the agricultural

sector is not a priority for the Kharkiv region and the largest share of the employed is concentrated in the service sector.

Table 2.12

Comparison of the employed population aged 15-70 by sectors of the Ukrainian economy by regions in 2020

Regions	Employed population aged 15-70, total thousand people	Primary sector of the economy, thousand people	%	Secondary sector of economy, thousand people	%	Tertiary sector of economy, thousand people	%	Other types of economic activity, thousand people	%
Ukraina	15915,3	2721,2	17,1	3023,0	19,0	9807,7	61,6	363,4	2,3
Vinnytska	634,9	200,5	31,6	86,1	13,6	341,2	53,7	7,1	1,1
Volynska	364,1	70,3	19,3	59,6	16,4	229,3	63,0	4,9	1,3
Dnipropetrovska	1367,8	102,5	7,5	388,2	28,4	848,5	62,0	28,6	2,1
Donetska	713,7	60,6	8,5	209,0	29,3	428,6	60,1	15,5	2,2
Zhytomyrska	489,3	67,6	13,8	94,3	19,3	314,0	64,2	13,4	2,7
Zakarpatska	492,7	127,1	25,8	85,3	17,3	241,4	49,0	38,9	7,9
Zaporizka	707,3	118,2	16,7	185,5	26,2	393,6	55,6	10,0	1,4
Ivano-Frankivska	548,8	154,3	28,1	91,6	16,7	286,1	52,1	16,8	3,1
Kyivska	755,7	43,7	5,8	159,1	21,1	540,8	71,6	12,1	1,6
Kirovohradska	362,0	98,7	27,3	59,8	16,5	197,8	54,6	5,7	1,6
Luhanska	287,1	36,5	12,7	67,0	23,3	179,2	62,4	4,4	1,5
Lvivska	1038,9	176,0	16,9	220,0	21,2	618,0	59,5	24,9	2,4
Mykolaivska	479,7	133,9	27,9	81,3	16,9	255,8	53,3	8,7	1,8
Odeska	991,2	148,9	15,0	129,2	13,0	685,0	69,1	28,1	2,8
Poltavska	566,2	117,2	20,7	113,3	20,0	325,8	57,5	9,9	1,7
Rivnenska	465,8	78,4	16,8	84,3	18,1	291,3	62,5	11,8	2,5
Sumska	459,9	105,5	22,9	84,9	18,5	255,1	55,5	14,4	3,1
Ternopilska	398,4	124,1	31,1	49,5	12,4	213,1	53,5	11,7	2,9
Kharkivska	1208,5	155,5	12,9	275,9	22,8	756,7	62,6	20,4	1,7
Khersonska	434,5	126,2	29,0	51,2	11,8	247,2	56,9	9,9	2,3
Khmelnytska	505,0	134,7	26,7	78,2	15,5	285,6	56,6	6,5	1,3
Cherkaska	504,5	132,9	26,3	95,2	18,9	266,6	52,8	9,8	1,9
Chernivetska	376,5	103,6	27,5	57,4	15,2	194,6	51,7	20,9	5,6
Chernihivska	411,3	99,6	24,2	58,8	14,3	247,9	60,3	5,0	1,2
Kyiv	1351,5	4,7	0,3	158,3	11,7	1164,5	86,2	24,0	1,8

Source: compiled by the authors based on [164].

For the Kharkiv region, the number of people employed in agriculture, forestry and fisheries (primary sector) is higher than the average for Ukraine and amounts to 155,500 people. For the tertiary

sector, the number of employed persons is 756.7 thousand and belongs to the highest indicators. The conducted analysis proves that the agricultural sector is not a priority for the Kharkiv region and the largest share of the employed is concentrated in the service sector.

Thus, the trend of transition to post-industrialism is clearly visible, where the share of the service sector occupies prominent positions in the structure of the economy. We believe that in order to build an effective employment regulation mechanism, it is necessary to develop and further implement an effective population employment policy. To implement this policy, the sectors of the region's economy should be defined and structured.

The investment opportunities of the region are always within certain limits, and in order to identify industries with a high potential for increasing the level of employment, it is necessary to conduct a structural analysis, which will allow us to find out in which industries it is necessary to concentrate resources. For the analysis, we will use the method of structural shifts and determine the influence of factors at the national, regional, and industry levels, which will allow us to analyze the level of competitiveness and prospects of economic sectors (Table 2.13).

Analysis of structural changes in employment in the Kharkiv region using the method of structural shifts made it possible to assess the influence of national, regional and industry factors on changes in the regional indicator.

In general, for the period 2010–2020, the regulation of employment in agriculture, industry and trade should be attributed to the positive and effective results of the regional management system. In turn, the calculation helped determine that the dynamics of the number of people employed in agriculture had a negative impact on national trends in this area of the economy.

Therefore, the analysis using the method of shifting components is effective when analyzing changes in the labor market, which allows you to draw more reasonable conclusions and make constructive decisions.

Table 2.13

Analysis of structural changes in employment in Kharkiv region in 2010-2020

Type of economic activity	Ukraine			Kharkiv region			Structural changes in employment in Kharkiv region due to the following factors		
	employed population aged 15-70, total		Deviation of 2020 to 2010, +;-	employed population aged 15-70, total		Deviation of 2020 to 2010, +;-	national level	regional level	industry level
	ths. People	ths. People		ths. People	ths. People				
	2010	2020		2010	2020				
Agriculture, forestry and fisheries	3115,6	2721,2	-394,4	126,0	155,5	29,5	-27,0	45,5	11,1
Industry	3461,5	2358,6	-1102,9	238,0	222,0	-16,0	-51,1	59,8	-24,7
Construction	943,0	664,4	-278,6	57,2	53,9	-3,3	-12,3	13,6	-4,6
Wholesale and retail trade, repair of motor vehicles and motorcycles	4832,0	3648,7	-1183,3	356,2	294,2	-62,0	-76,5	25,2	-10,8
Transportation, warehousing, postal and courier activities	1389,7	975,2	-414,5	83,1	71,4	-11,7	-17,8	13,1	-6,9
Temporary accommodation and catering	0,0	285,4	+285,4	0,0	19,1	0,0	0,0	0,0	0,0
Information and telecommunications	0,0	283,7	+283,7	0,0	26,0	0,0	0,0	0,0	0,0
Financial and insurance activities	332,8	212,5	-120,3	17,7	10,3	-7,4	-3,8	-1,0	-2,6
Real estate operations	1153,2	251,2	-902,0	97,4	34,7	-62,7	-20,9	13,5	-55,3
Professional, scientific and technical activities	0,0	418,2	+418,2	0,0	37,8	0,0	0,0	0,0	0,0
Activities in the field of administrative and support services	0,0	304,6	+304,6	0,0	20,6	0,0	0,0	0,0	0,0
Public administration and defense; compulsory social insurance	1223,8	901,9	-321,9	61,4	55,8	-5,6	-13,2	10,6	-3,0
Education	1688,3	1394,9	-293,4	108,3	104,9	-3,4	-23,2	15,4	4,4
Health care and social assistance	1341,4	935,4	-406,0	76,2	66,6	-9,6	-16,4	13,5	-6,7
Arts, sports, entertainment and recreation	784,7	196,0	-588,7	45,8	15,3	-30,5	-9,8	3,9	-24,5
Other types of economic activities	0,0	363,4	+363,4	0,0	20,4	0,0	0,0	0,0	0,0
Total	20266,0	15915,3	-4350,7	1267,3	1208,5	**-182,7**	**-272,1**	**213,0**	**-123,6**

Source: calculated by the authors based on [46, 164].

Together with the method of “displacement of components” for greater informativeness, the localization coefficient is calculated, which helps distinguish the branches of the national economy by the level of competitiveness and single out the most promising branches. To calculate the localization coefficient (L_i) each branch of the economy (i) use the following formula:

$$L_i = \frac{c_i}{c} / \frac{E_i}{E}, \quad (2.4)$$

де c_i – the number of people employed in the i-th industry of the region’s economy;

c – the number of employees in the region as a whole;

E_i – the number of people employed in the i-th branch of the national economy;

E – the number of people employed in the national economy as a whole.

The value of the localization coefficient allows you to determine the impact of the industry on the economy of a particular region. The value of the coefficient characterizes the classification feature of belonging to a separate industry to the following categories:

– industries are “non-specialized” for the economy of the region (coefficient of localization <0,75);

– industries of regional importance (coefficient of localization 0,75–1,25);

– basic sectors of the economy (coefficient of localization >1,25).

Let’s analyze the coefficient of localization of economic sectors of the Kharkiv region (Fig. 2.12). During the studied period, the basic industry of the Kharkiv region in terms of employment is the sphere of services, namely real estate operations and industry (the coefficient of localization of the employed exceeds 1.25). Agriculture belongs to the branches of regional importance (the localization coefficient is in the range of 0.75–1.25). This shows that this industry meets the needs of the domestic market and allows to multiply the income received from the basic sectors of the economy.

Thus, based on the analysis, we found out that the modern labor market, the dynamics of employment indicators are taking on negative trends. It has been established that the total number of the working population both in Ukraine and in the Kharkiv region is constantly decreasing, along with a general decrease in the average number of full-time employees, a decrease in the labor force turnover rate from the hiring

of employees and an inversely proportional increase in the indicator from the dismissal of employees. The defined methodical approach revealed that the concentration of people employed in agriculture in the Kharkiv region, compared to the potential and capabilities of the region, is insufficient. This confirms the need for further development and implementation of a conceptual model of the organizational and economic mechanism of employment regulation.

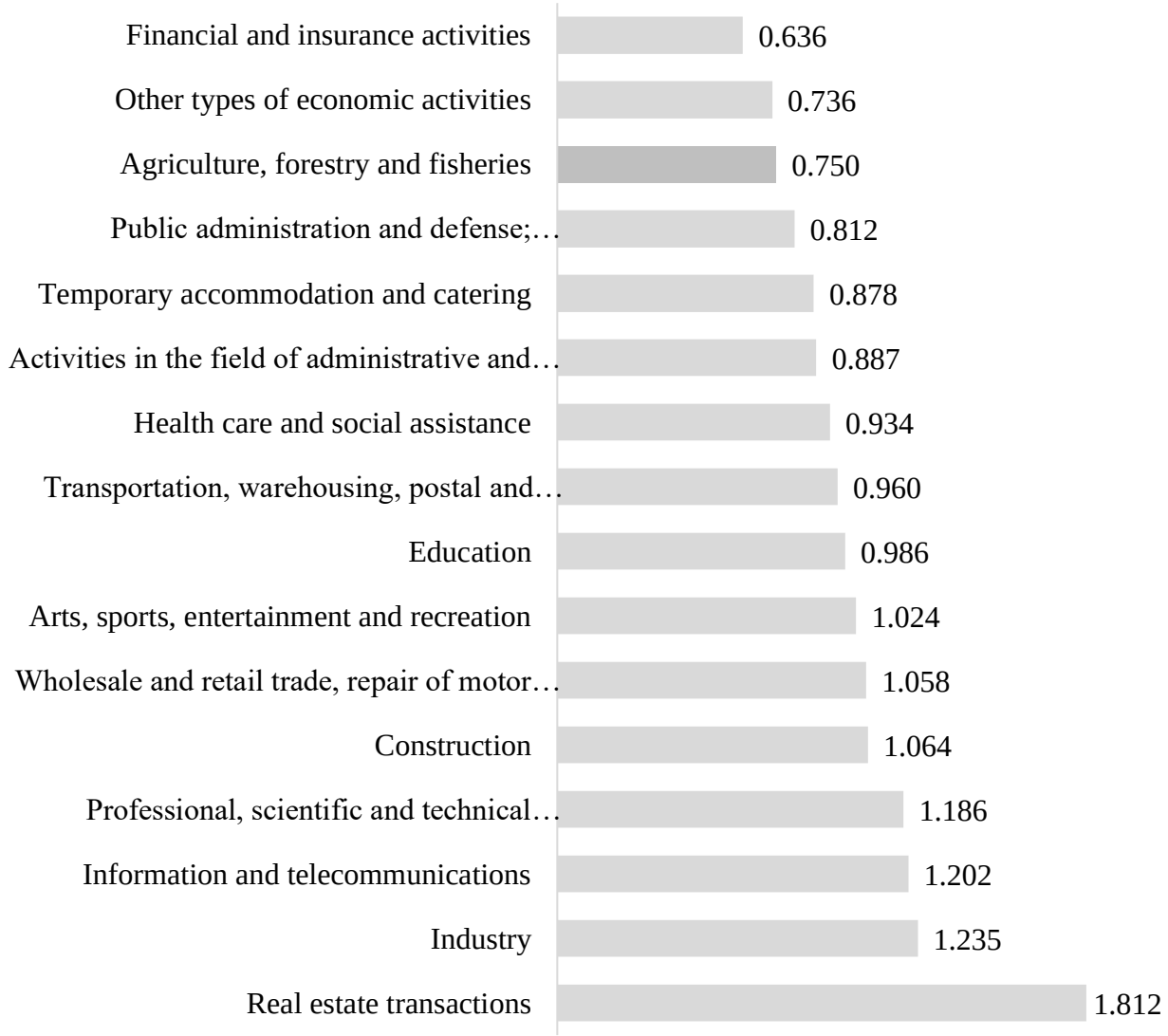

Fig. 2.12. Localization coefficient of economic sectors in Kharkiv region in 2020

Source: calculated by the authors based on [46].

2.3. Remuneration of labour as the dominant economic factor of employment in the agricultural sector

To implement the strategy for the development of the employment regulation mechanism in the agrarian sector of the economy, it is necessary to carry out an economic assessment of the factors of employment formation, which will allow to form an idea of external and internal factors, modern trends in the development of the economic phenomenon, and to find out the risks, threats and reserves that the state must take into account during determination of the goals and methods of the structural-component approach to the implementation of the organizational-economic mechanism of employment regulation.

We share the opinion of M. Sokolyk that the basis of the recovery of the economy of our country should be a strategy that will ensure the increase of its efficiency and competitiveness and should be based on labor productivity, and not only on the favorable conditions of the raw materials market, changes in currency policy, etc. The author also notes that indicators of labor productivity, together with a decent level of remuneration, close to the level of highly developed countries, should become a reference point during the development of the program of socio-economic development of Ukraine [225, p. 68]. This opinion was relevant at various stages of the formation of our state, which is confirmed by the research of T. Kostyshina. At the beginning of the 2000s, the researcher noted that the main component of the motivation of the employee's labor activity, the increase of productive work at enterprises of various organizational and legal forms of management and forms of ownership is a high salary [107, p. 19].

According to the resolution adopted by the UN General Assembly on September 25, 2015, it is determined that one of the points of sustainable development is "the promotion of continuous, comprehensive and sustainable economic growth, full and productive employment and decent work for all [172, p.15]". Thus, a decent wage is a key factor that ensures the formation of the development trend of population employment, its well-being and determines the vector of socio-economic development of the country.

We consider it necessary to conduct an analysis of the level of average nominal wages in Ukraine and individual EU countries in order to confirm the rather negative fact that wages in our country are at one of the lowest levels among European countries (Fig. 2.13).

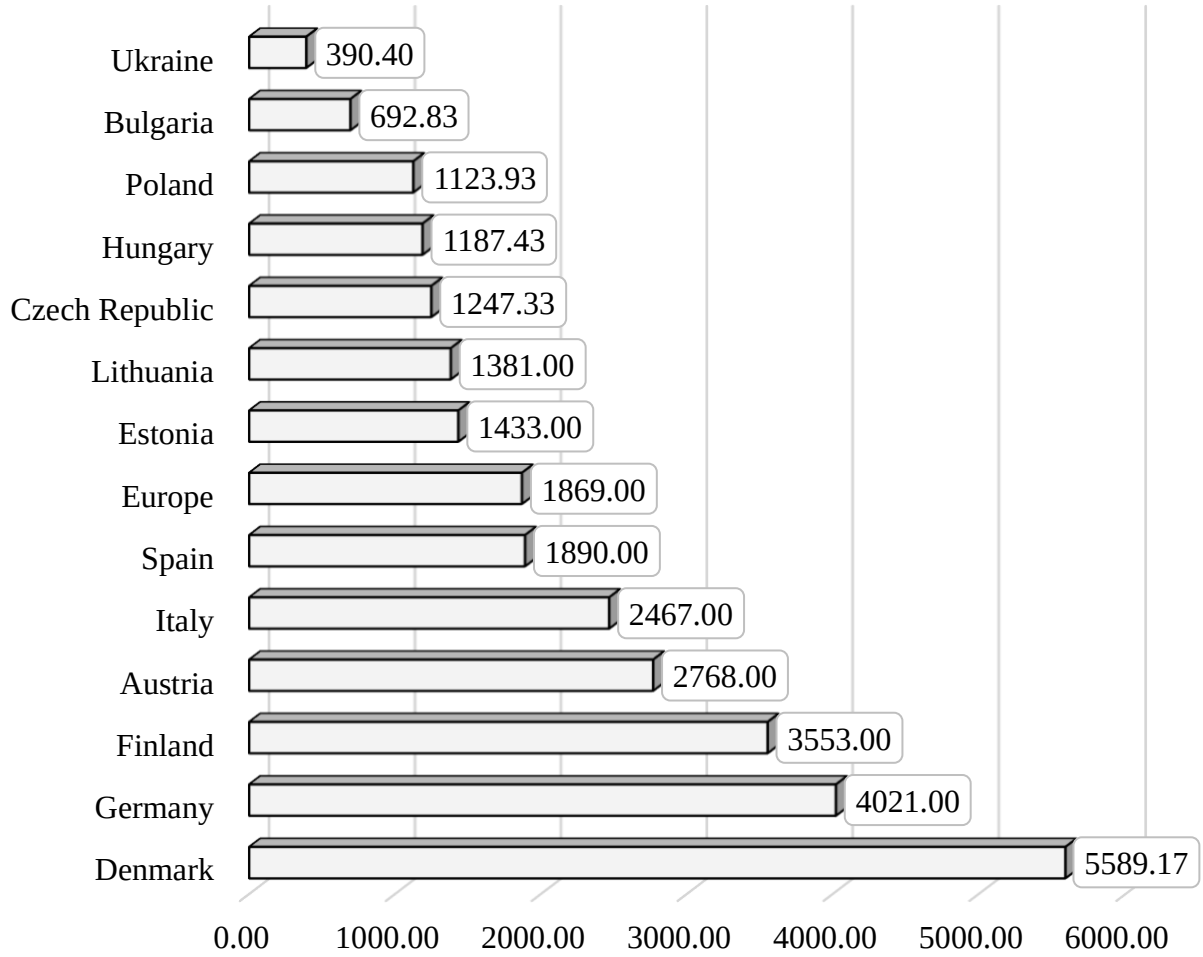

Fig. 2.13. Average nominal wage in Ukraine and selected EU countries and selected EU countries in 2020, euros

Source: calculated by the authors based on [164, 285].

Based on the data shown in fig. 2.13, it is worth noting that, having converted the average monthly salary in Ukraine into a single currency – the euro at the NBU exchange rate on the relevant date, the following conclusions can be drawn. Firstly, citizens of such countries as Denmark (€5589.17), Germany (€4021.00), Finland (€3553.00), Austria (€2768.00), Italy (€2467.00) receive the highest average monthly wages. Euro). It should also be noted that these countries do not have minimum wage laws, preferring to conclude collective agreements between interested stakeholders.

Secondly, after comparing wages in our country with other countries, we note that compared to Denmark, the level of our average monthly wages is 14 times lower, compared to Germany – 10 times, compared to Finland – 9 times. The average monthly salary in Europe as a whole exceeds our level by almost five times, and the salary level in

Poland, with which Ukraine borders, is three times higher. The above conclusions indicate the need to increase the level of wages in Ukraine, which will ensure the formation of human capital and improve the image of our country on the world market.

In view of our research on the level of wages in Ukraine as a whole, attention should be paid to the peculiarities of the reproduction of the labor force in the sector of agro-industrial production, which is the subject of our research. The topic of our work is extremely relevant, because improving the welfare and living conditions of agricultural workers is one of the most complex socio-economic problems, which covers a wide range of issues and requires an urgent solution.

We will evaluate the level of wage differentiation of full-time agricultural workers for 2010–2020 (Table 2.14).

Table 2.14

Estimation of regional wages in agriculture in Ukraine for 2010-2020

Indicators	2010	2015	2020	Deviation of 2020 to 2010, +;-
Average monthly salary of full-time employees in agriculture, UAH				
on average in Ukraine	1376,1	2938,7	9030,2	+7654,1
maximum	2357,0	5532,0	14156,0	+11799,0
minimum	608,0	2023,0	6588,0	+5980,0
median	1375,0	3125,0	9588,0	+8213,0
first quartile	1185,0	2794,5	8319,0	+7134,0
third quarter	1562,0	3286,0	10531,0	+8969,0
Variation range, UAH	1749,0	3509,0	7568,0	+5819,0
Oscillation coefficient, %.	127,1	119,4	83,8	-43,3
Quadratic coefficient of variation, %.	25,3	36,7	34,7	+9,5
Quartile coefficient of variation, %.	0,137	0,079	0,115	-0,022
Quarterly coefficient of differentiation, %.	0,137	0,081	0,117	-0,020

Source: compiled by the authors based on [46].

The calculations show that during the period under study, regional differentiation of the levels of average monthly wages is clearly visible. For example, in 2020, the maximum amount of differentiation in the level of the average monthly salary was UAH 7,568.00, which is 16.2% less than the average value of the indicator for Ukraine. The indicators of the first and third quartiles showed that in 25% of the regions of Ukraine the wage level did not exceed UAH 8,319.00, in 75% – UAH 10,531.00. It has been established that in the modern labor market it has not yet been

possible to overcome differentiation in the level of remuneration, however, the calculated coefficients allow us to note that the intensity of differentiation is decreasing.

The next stage of the economic assessment of factors of employment formation is the analysis of growth/decrease rates of nominal and real wages. We will determine the dynamics of the financial support of employees, which they receive as a result of the realization of their labor force, and the purchasing power of the same employee at the existing price level after deducting expenses using the example of the Kharkiv region (Table 2.15).

Table 2.15

Growth/decrease rate of nominal and real wages in Kharkiv region in 2010-2020

Years	Nominal wages, %.		Real wages, %.	
	Of the previous year	December to December of the previous year	of the previous year	December to December of the previous year
2010	117,6	115,9	107,6	106,6
2011	116,8	116,7	108,7	111,8
2012	114,4	109,7	114,2	110,7
2013	108,1	105,9	109,3	106,3
2014	105,7	110,7	93,9	86,6
2015	117,6	129,3	77,3	89,0
2016	120,3	118,2	106,2	104,6
2017	140,4	135,4	119,6	118,6
2018	122,6	121,8	110,1	109,6
2019	118,6	114,8	108,4	109,5
2020	109,8	115,0	106,4	109,3

Source: compiled by the authors based on [46].

After analyzing official statistical data, it was determined that in 2020 in the Kharkiv region, the growth rate of nominal wages had the highest value in 2017 (140.4%), the lowest – in 2014 (105.7%). This is connected with crisis phenomena and the unstable situation in our country. The situation regarding changes in real wages is similar to the dynamics of changes in nominal wages. In 2012–2013, the ratio between real and nominal wages was almost at the same level and was 114.4% and 114.2% in 2012, respectively, and 108.1% and 109.3% in 2013 . Improvement and stabilization of the situation was observed in 2016, accordingly, the level of nominal and real wages in the Kharkiv region began to rise.

For a more detailed assessment of the situation, which will allow us to determine clear vectors of wage changes, we will analyze the

growth/decrease rates with the consumer price index (Fig. 2.14). According to the Methodology for calculating real wage indices, the term "nominal wage" is interpreted as basic and additional wages, other incentive and compensatory payments, which are paid to an employee in connection with employment relations in accordance with the law. Real wages are goods and services that can be bought with wages or that are provided as wages.

This indicator characterizes the dynamics of the general level of prices for goods and services purchased by the population for non-productive consumption.

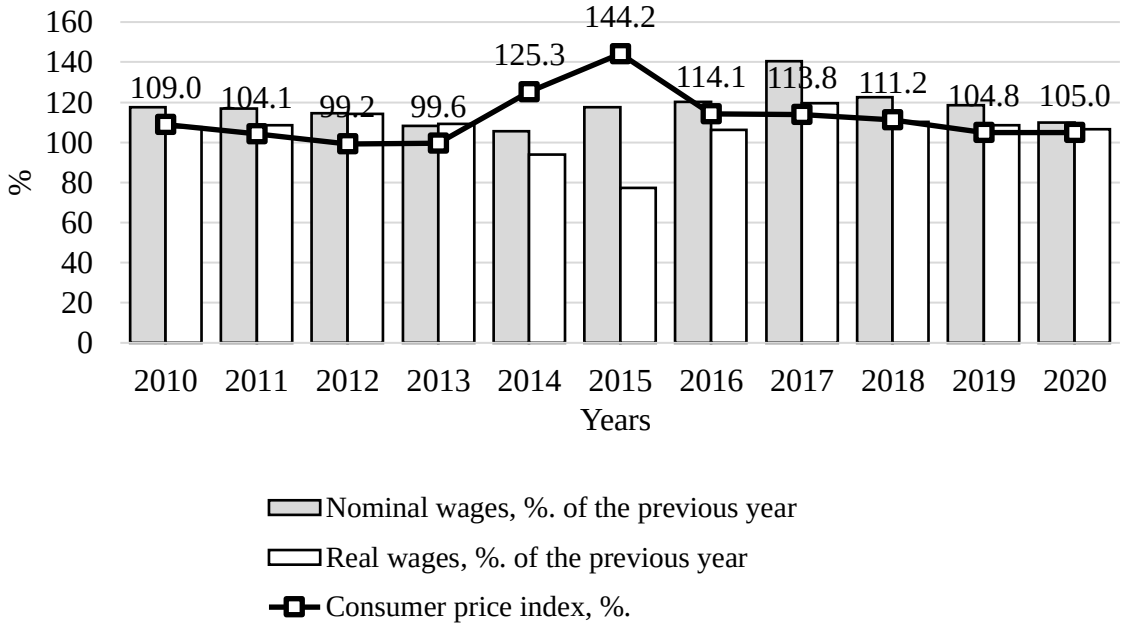

Fig. 2.14. The ratio of growth rates of the consumer price index, nominal and real wages in Kharkiv region in 2010-2020

Source: compiled by the authors based on [46].

Income is an indicator that forms an idea of the well-being of employees, the availability and provision of various benefits for a sufficient standard of living depends on their level. The issue of ensuring the growth of the income share and equal distribution of the population's income does not lose its relevance throughout the entire period of Ukraine's independence.

Let's compare the structure of the wage fund for full-time employees in agriculture in Ukraine and the Kharkiv region (Fig. 2.15). Shown in fig. 2.15, the comparative structure of the wage fund of full-time agricultural workers in Ukraine and the Kharkiv region shows the imbalance of the components of the wage fund, which is the root cause of the reduction of

the motivational component in the process of achieving effective activity results.

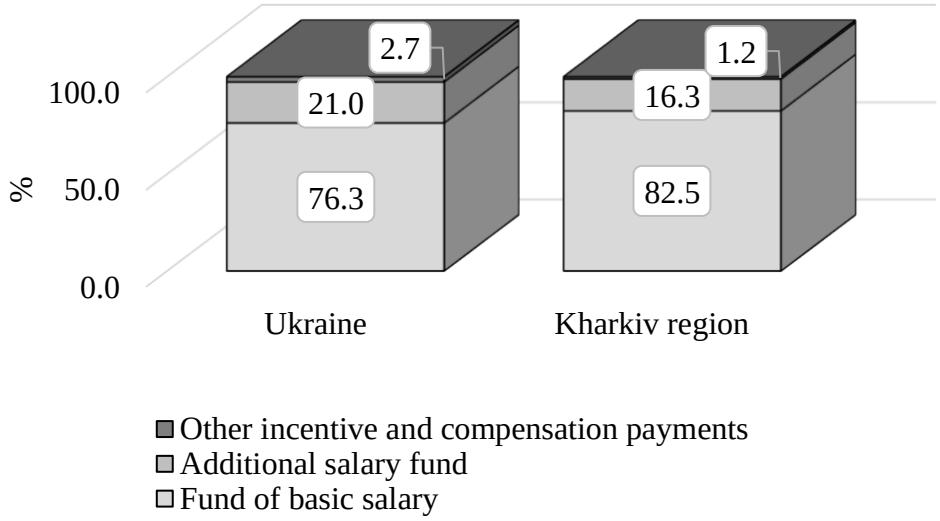

Fig. 2.15. Structure of the wage fund of full-time agricultural workers in Ukraine and Kharkiv region in 2020, %, in UAH

Source: compiled by the authors based on [46, 164].

The share of the basic salary in Ukraine is equal to 76.3%, and in the Kharkiv region – 82.5%; the share of additional wages is 4.7% lower in the region than in Ukraine as a whole. Similar dynamics can be observed in relation to the structure of other incentive and compensation payments – 1.5% lower than the level in Ukraine. Negative factors influencing this trend are ineffective personnel policy, lack of a motivational component, enterprise policy regarding extensive ways of achieving high activity results, rather than intensive ones.

We believe that the basis of the mechanism should be one of the components that determines the balance of the wage structure, which will be based on the experience of countries with developed economies, where additional wages are an effective means of stimulating productive work. Labor productivity is an important indicator that allows you to assess the effectiveness of labor and the efficiency of the use of labor resources. We will analyze the dynamics of annual labor productivity in agricultural enterprises of the Kharkiv region. (Fig. 2.16).

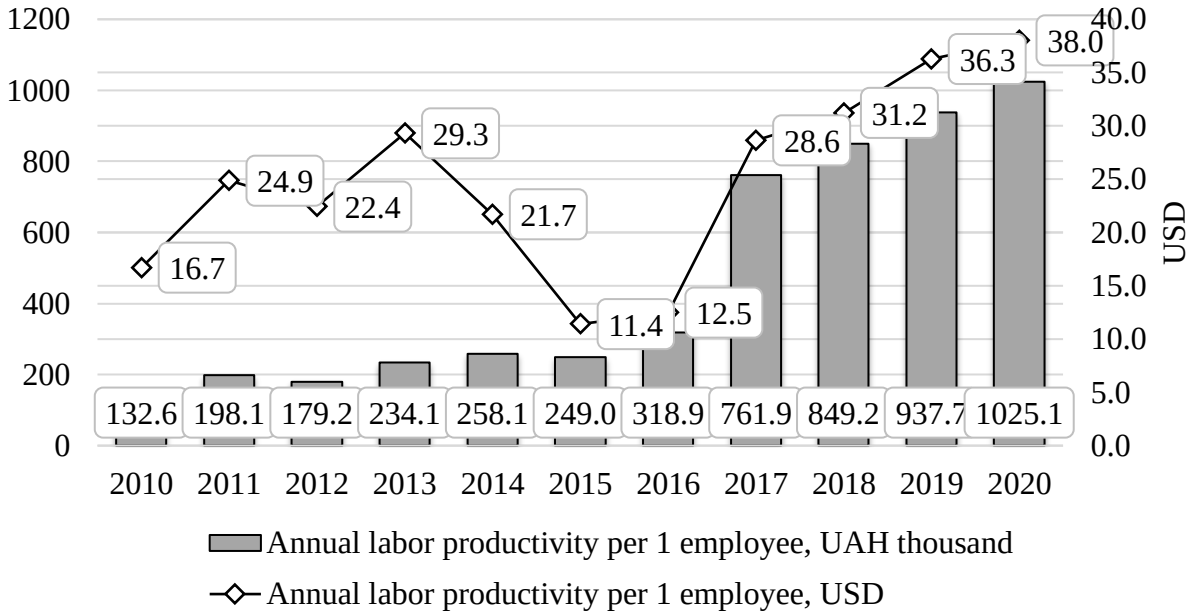

Fig. 2.16. Dynamics of annual labor productivity per 1 employee in agricultural enterprises of Kharkiv region for 2010-2020

Source: built by the author according to [164].

The data of fig. 2.16 show that the dynamics of annual labor productivity per employee in agricultural enterprises of the Kharkiv region. Has an upward trend. However, after calculating the annual labor productivity per employee in agricultural enterprises of the Kharkiv region in US dollars in order to take into account the devaluation of the national currency for the period under study and to minimize the distortion and misinterpretation of the obtained results, it was established that the dynamics of annual labor productivity growth has an oscillatory nature. In particular, the most crisis period was in 2015 with an indicator of 11.4 dollars. USA and only since 2017 managed to reach the level of 2013.

Note that the level of labor productivity affects the efficiency of the production process, which affects the dynamics of the level of labor remuneration. We will analyze the change in labor productivity and its payment at agricultural enterprises in the Kharkiv region. (Table 2.16).

According to the given data in the table. 2.16 labor productivity in agricultural enterprises in 2020 increased by 7.7 times compared to the base year. This is due to a reduction in the number of employees and an increase in gross output. At the same time, the average monthly salary increased by 5.8 times.

The ratio of growth rates of labor productivity and its payment in agricultural enterprises of the Kharkiv region shows the annual excess of

the growth of labor payment over its productivity. Therefore, at agricultural enterprises, it is necessary to implement a policy on the development of measures aimed at increasing the level of labor productivity.

Table 2.16

Correlation of labor productivity growth rates and labor remuneration in agricultural enterprises of Kharkiv region

Indicator	Years					
	2010	2012	2014	2016	2018	2020
Labor productivity per 1 employee, UAH thousand	132,6	179,2	258,1	318,9	849,2	1025,1
Average monthly salary per 1 full-time employee, UAH	1503,00	2204,00	2601,00	3654,00	6658,00	8839,00
Chain index of labor productivity	-	0,905	1,103	1,281	1,115	1,093
Chain index of average monthly salary	-	1,144	1,086	1,183	1,256	1,108
Ratio of labor productivity growth rates and wages	-	0,790	1,016	1,083	0,887	0,990

Source: calculated by the authors according to [164].

Let's consider the dynamics of the average monthly salary of full-time employees in various sectors of the economy of the Kharkiv region for 2010–2020 (Table 2.17). In order to eliminate the influence of inflationary processes on the value indicators of income, the salary was recalculated in dollars. USA at the appropriate exchange rate (according to NBU data as of the end of the year).

Based on the table. 2.17, the following conclusions can be reached. First of all, the ten-year dynamics shows a trend of fluctuating wage levels, both on average across the economy and across individual industries. For example, the average monthly salary of agricultural workers in 2020 was UAH 9,757.36, or $392.18. USA, which is 48.0% more than the 2010 level.

It was also noted that only in 2017 the level of wages began to be equal to a similar indicator in 2010. On average, this indicator was UAH 11,591.15, or USD 465.88, respectively. USA (which is 55.5% more than the level of 2010).

Table 2.17

Dynamics of the average monthly salary of full-time employees in Kharkiv region by type of economic activity in 2010-2020

Industries	2010		2014		2017		2018		2020	
	UAH	USD	UAH	USD	UAH	USD	UAH	USD	UAH	USD
Average for the economy	2060,00	258,79	3143,00	199,30	6244,00	222,44	7657,00	276,53	11591,15	465,88
Agriculture, forestry and fisheries	1503,00	188,82	2601,00	164,93	5300,00	188,81	6658,00	240,45	9757,36	392,18
Industry	2183,00	274,25	3386,00	214,71	6566,00	233,92	8097,00	292,42	12759,47	512,84
Construction	2109,00	264,95	3610,00	228,92	7790,00	277,52	10238,00	369,74	9831,79	395,17
Wholesale and retail trade; repair of motor vehicles	1367,00	171,73	2324,00	147,37	4749,00	169,18	6030,00	217,77	11286,10	453,62
Transportation, warehousing, postal and courier activities	2434,00	305,78	3650,00	231,45	7112,00	253,37	9060,00	327,19	11950,53	480,33
Temporary accommodation and catering	1326,00	166,58	2037,00	129,17	4704,00	167,58	5403,00	195,12	6026,07	242,21
Information and telecommunications	2586,00	324,87	4509,00	285,92	15850,00	564,66	14824,00	535,36	19888,19	799,36
Financial and insurance activities	4444,00	558,29	6714,00	425,75	8807,00	313,75	10848,00	391,77	20378,72	819,08
Operations with real estate	1475,00	185,30	2613,00	165,69	4583,00	163,27	5685,00	205,31	8980,86	360,97
Professional, scientific and technical activities	2780,00	349,25	3931,00	249,27	7068,00	251,80	8940,00	322,86	16613,20	667,73
Education	1976,00	248,24	2852,00	180,85	5930,00	211,26	7002,00	252,87	9878,46	397,04
Health care and social assistance	1570,00	197,24	2384,00	151,17	4712,00	167,87	5510,00	198,99	16442,82	660,89
Arts, sports, entertainment and recreation	1558,00	195,73	3223,00	204,38	5051,00	179,94	6405,00	231,31	9270,96	372,63

Source: calculated by the authors according to [164].

Secondly, the disparity in the amount of wages in certain industries is obvious. In particular, in 2020, the level of wages in agriculture was significantly inferior to indicators in other industries. It was lower compared to the information and telecommunications, and financial and insurance industries by two times, compared to the average level in the economy – by 15.8%.

To form a labor regulation mechanism in the labor market of Ukraine, the state uses various social indicators of incomes of workers in the agricultural sector.

We will analyze the rate of growth of the average monthly wage of workers employed in agriculture, in relation to the indicator of the minimum wage, the average monthly wage in the country as a whole, and the subsistence minimum (Table 2.18).

Table 2.18

The ratio of wages in agriculture to minimum social guarantees in Kharkiv region in 2010-2020

Years	Minimum wage, UAH	Subsistence minimum for persons of working age, UAH	Average monthly salary per full-time employee, UAH	Average monthly salary per full-time employee in agriculture, UAH	Ratio of average monthly salary of employees employed in agriculture, in % to		
					minimum wage	average monthly salary per full-time employee	subsistence level
2010	922,00	922,00	2250,00	1467,00	159,1	65,2	159,1
2011	1004,00	1004,00	2648,00	1852,00	184,5	69,9	184,5
2012	1134,00	1134,00	3041,00	2094,00	184,7	68,9	184,7
2013	1218,00	1218,00	3282,00	2344,00	192,4	71,4	192,4
2014	1218,00	1218,00	3480,00	2556,00	209,9	73,4	209,9
2015	1378,00	1378,00	4195,00	3309,00	240,1	78,9	240,1
2016	1600,00	1600,00	5183,00	4195,00	262,2	80,9	262,2
2017	3200,00	1762,00	7104,00	6057,00	189,3	85,3	343,8
2018	3723,00	1921,00	8865,00	7557,00	203,0	85,2	393,4
2019	4173,00	2102,00	10497,00	8856,00	212,2	84,4	421,3
2020	5000,00	2270,00	11591,00	9757,00	195,1	84,2	429,8

Source: calculated by the authors according to [164].

The analysis of the ratio of the average monthly salary of workers employed in agriculture to the minimum social guarantees showed that in

2020 the ratio between the salary and its minimum amount established by the legislation was at the level of 2013. Regarding the average monthly salary in the country this indicator was the highest in 2017 and was 85.3%. In our opinion, an important issue is the analysis of the level of average monthly wages in agriculture in the section of individual regions (Fig. 2.17).

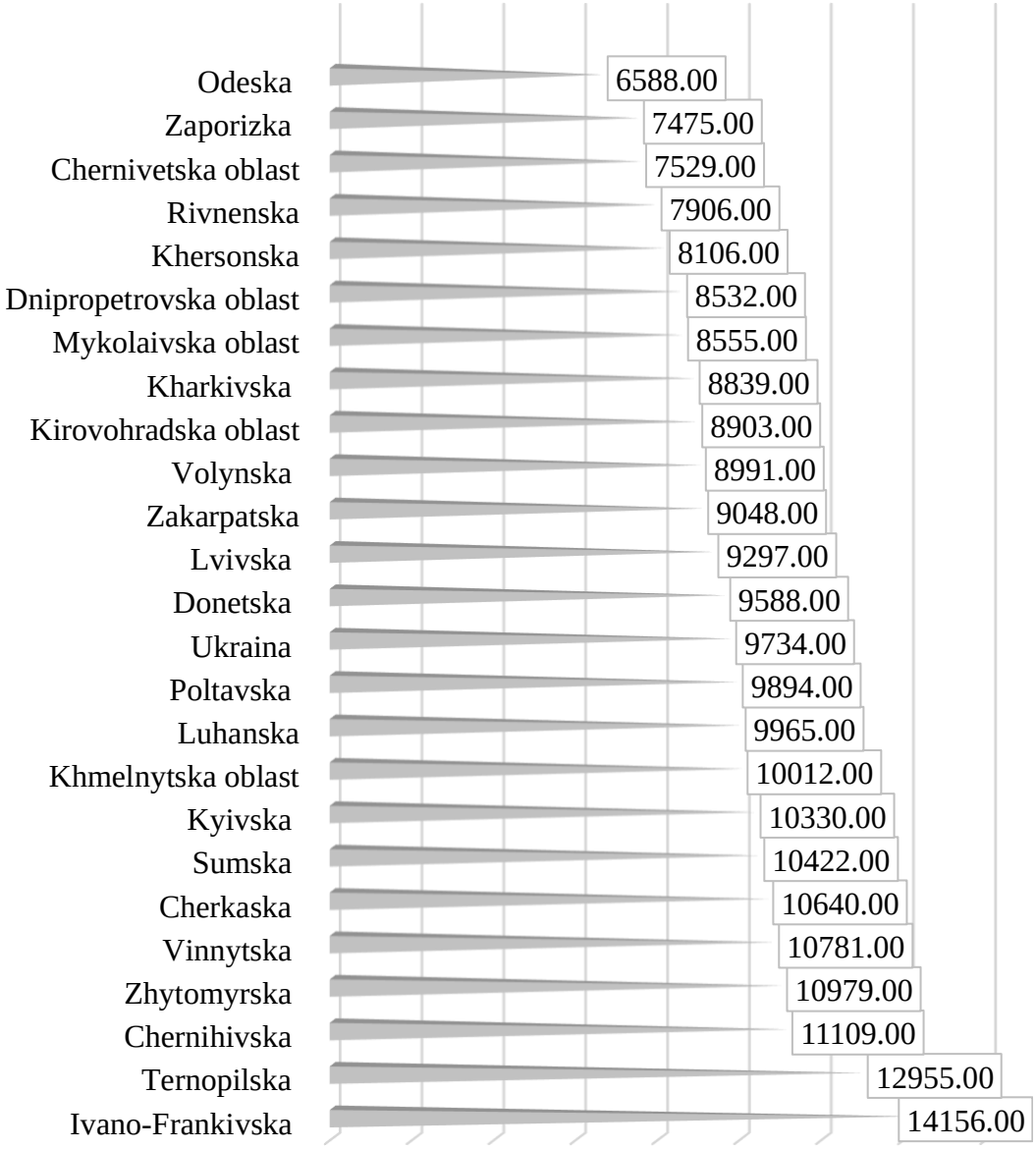

Fig. 2.17. Regional differentiation of the average monthly wage of agricultural workers in Ukraine in 2020, UAH

Source: compiled by the authors based on [164].

The data of fig. 2.17 show that the regional differentiation of the levels of average monthly wages of agricultural workers was pronounced.

The highest level of wages was in the following regions: Ivano-Frankivsk (14,156.00 UAH), Ternopil (12,955.00 UAH), and Chernihiv (11,109.00 UAH). The lowest level of wages is characteristic of such regions as Zaporizhia region (7475.00 UAH), Odesa region (6588.00 UAH), Chernivtsi region (7529.00). For the Kharkiv region, this indicator was at the level of UAH 8,839.00, which is 37.6% lower than the level of the Ivano-Frankivsk region and 25.5% higher than the level of the Odesa region.

Modern conditions for building an organizational and economic mechanism of employment regulation require constant monitoring and analysis of the structure of aggregate resources of households. The household is one of the subjects of the economy, which is of great importance when determining the level of well-being of the population and is an indicator of the result of transformational changes in the national economy. In fig. 2.18 shows a diagram that reflects the structure of the formation and use of household resources.

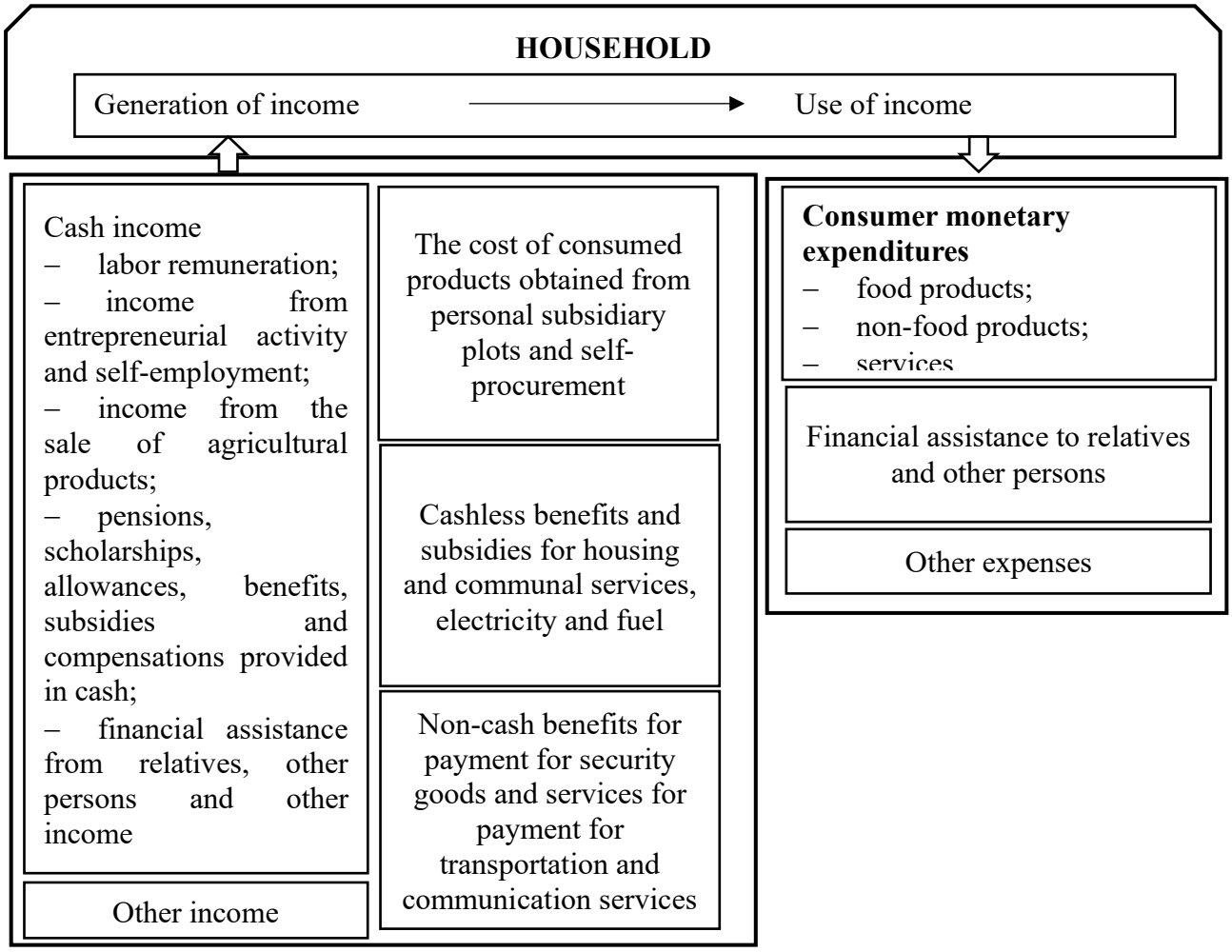

Fig. 2.18. Structure of formation and use of household resources

Source: compiled by the authors based on [164].

The analysis of the structure of the total resources of households is given in the table. 2.19 allows us to draw the following conclusions. First, urban residents receive 96.3% of their income in cash, while rural residents receive 90.9%. Also, the analysis of the structure indicates that the main source of the formation of monetary income is the payment of labor. The second place in the structure of household incomes is occupied by pensions, scholarships, benefits, benefits, subsidies and compensations provided in cash (30.5% in rural areas and 19.4% in cities). Secondly, the reduction in the structure of monetary income from labor remuneration is quite negative for households – for 2010-2020, this share decreased by 4.7% for rural areas. Thirdly, the share of non-monetary income prevails in rural areas and amounts to 8.2%, while for cities it is insignificant and amounts to 2.9%.

According to the conducted comprehensive analysis of the wage level, as one of the dominant factors in the formation of employment in the agrarian sector of the economy, it was established that one of the priority directions for solving employment problems in the countryside is the settlement of the issue of households in rural areas and the establishment of a decent wage level as a fundamental factor spheres of labor activity.

The establishment of a wage institute and the formation of the concept of a decent wage level are today a mandatory attribute of a country with a high level of development, which determines the level and quality of life of workers and their family members.

In fig. 2.19 determines the place of decent wages in the structural and logical chain of functioning of households and formation of employment. Today in Ukraine, in the conditions of European integration, the issue of employment regulation remains quite relevant. The following are the general recommendations regarding areas of employment improvement:

– ensuring the concept of a decent level of remuneration for the purpose of achieving European norms and standards;

– formation of an effective legislative framework for the regulation of issues of remuneration, social protection of employees and regulation of the rights of the parties to the social dialogue;

– implementation of a package of reforms that will stimulate support for employed youth, especially those with higher education, and prevent the rapid outflow of the best specialists abroad.

Table 2.19

Structure of total household resources in Kharkiv region in 2010-2020

Indicator	2010		2015		2018		2020		Growth in 2010-2020, +;-	
	in urban areas	in rural areas	in urban areas	in rural areas	in urban areas	in rural areas	in urban areas	in rural areas	in urban areas	in rural areas
Total total resources on average per month per household, UAH	3234,5	3399,8	5127,8	4656,3	8823,2	8993,3	9163,4	9333,4	+5928,9	+5933,7
Structure of aggregate household resources, %.										
Cash income	94,1	85,4	95,4	85,5	95,0	86,4	96,3	90,9	+2,2	+5,5
Remuneration of labor	61,8	43,7	62,8	42,3	65,7	54,9	69,2	39,0	+7,4	-4,7
Income from entrepreneurial activity and self-employment	1,7	3,0	4,3	0,4	2,2	–	3,4	4,9	+1,7	+1,9
Income from the sale of agricultural products	0,5	8,1	0,1	7,5	1,4	5,8	0,0	7,9	-0,5	-0,2
Pensions, scholarships, allowances, benefits, subsidies, and compensation provided in cash	25,0	25,6	23,1	26,9	20,6	18,9	19,4	30,5	-5,6	+4,9
Cash assistance from relatives, other persons and other cash income	5,1	5,0	5,1	8,4	5,1	6,8	4,3	4,1	-0,8	-0,9
Non-monetary income	5,9	14,6	4,6	14,5	5,0	13,6	2,9	8,2	-3,0	-6,4
Cost of consumed products obtained from personal subsidiary plots and self-procurement	1,5	10,9	1,2	8,8	0,1	7,5	0,9	6,9	-0,6	-4,0
Non-cash benefits and subsidies for housing and communal services, electricity, and fuel	0,8	0,6	0,7	1,5	1,3	2,7	0,2	0,0	-0,6	-0,6
Non-cash benefits for payment of goods and services for security, transportation and communication services	0,5	0,5	0,6	0,2	0,5	0,4	0,3	0,1	-0,2	-0,4
Other receipts	3,1	2,6	2,1	4,0	3,1	3,0	1,5	1,2	-1,6	-1,4

Source: compiled by the authors based on [46].

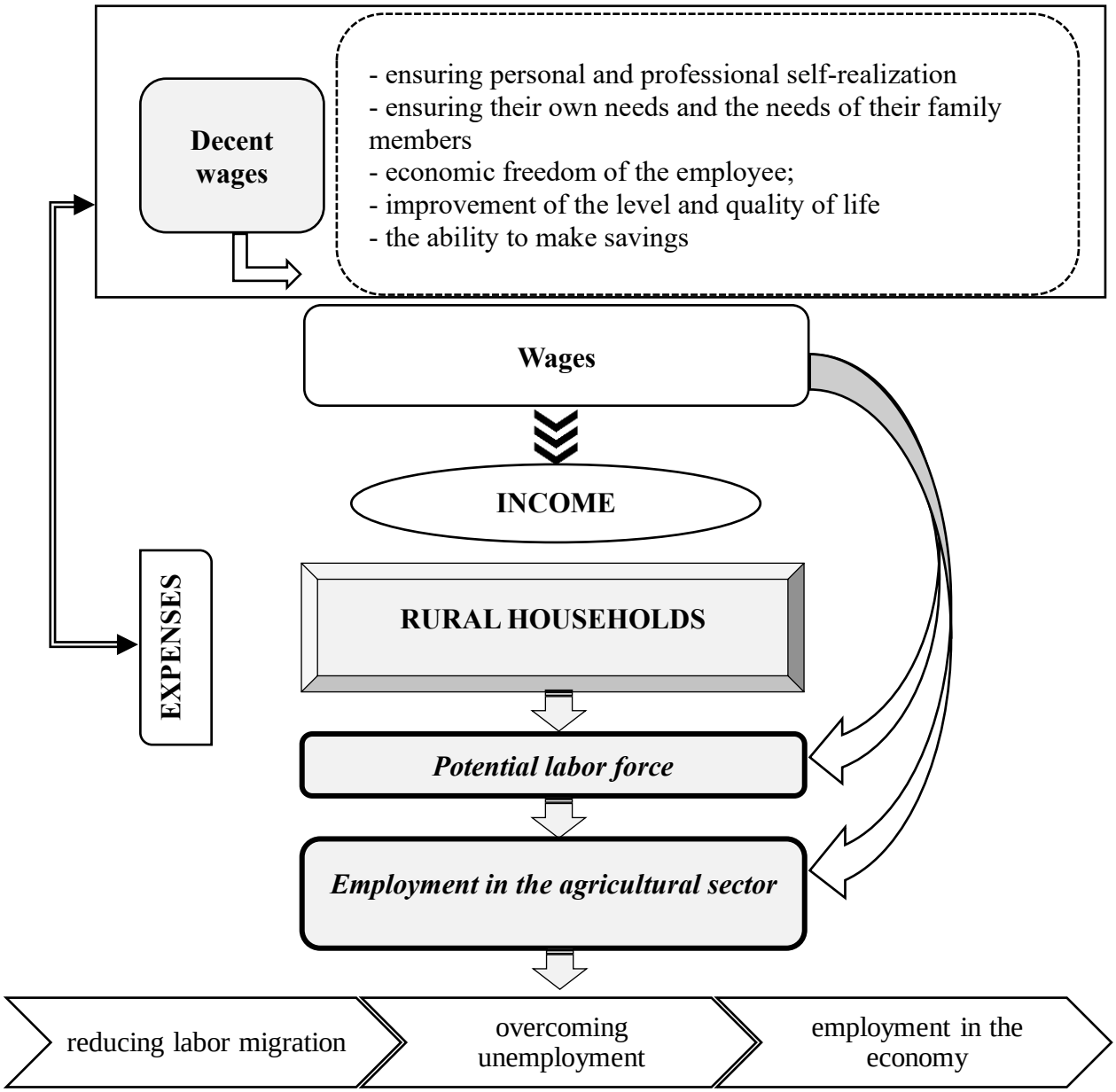

Fig. 2.19. The place of decent pay in the structural and logical chain of household functioning and employment generation

Source: compiled by the authors.

We believe that the introduction of the concept of decent payment for agricultural labor will become an important and beneficial component of labor relations for all subjects of economic activity. The employee will be able to satisfy his needs and be motivated for high performance results, the employer will be able to form a highly professional personnel core, develop social partnership, and the state will increase the level of social stability in society, ensure a sufficient standard of living and well-being of the population. Consequently, the agricultural labor market will become competitive and attractive for investments, and workers will be competitive on the European labor market.

Chapter 3
IMPROVING THE ORGANISATIONAL AND ECONOMIC MECHANISM OF EMPLOYMENT REGULATION AND ITS ACCOUNTING AND INFORMATION BASE

3.1. Accounting and information basis for remuneration of labour

The accounting and information basis for labor and its payment is extremely important in the current economic environment, as it ensures transparency and accuracy of calculations, which is the basis of trust between employees and employers. Accurate payroll accounting helps avoid conflicts related to incorrectly accrued payments and guarantees fairness in relations between the parties to the labor process. A reliable information base also helps companies plan their expenses more efficiently and optimize production processes, which ultimately contributes to their competitiveness in the market.

In addition, the accounting and information base of labor and its remuneration is an important tool for government regulation and control over compliance with labor laws. Reliable information on the level of wages and the terms of their payment allows government agencies to monitor economic trends, identify and resolve problems related to non-payment or delays in payments, and make informed decisions to improve the living standards of the population. Thus, proper accounting of labor and its payment not only ensures social stability but also contributes to the sustainable development of the country's economy as a whole.

Every enterprise, industry, organization or institution in Ukraine must have real and reliable information about wages, their amount, accrual, withholding and payment. This information is provided by accounting. Salary is one of the most complex and important socio-economic categories. On the one hand, it is the main, and often the only, source of income for employees and the basis for the material well-being of their families. On the other hand, for employers, wages are a significant part of production costs and an effective means of motivating employees to achieve the company’s goals. Therefore, the issues of effective organization of wages and their level, along with the issue of employment, form the basis of social and labor relations in society, as they cover the vital interests of all participants in the labor process.

Ukraine's integration into the global European space requires a review of the organizational and economic mechanism for regulating labor and its remuneration, as well as finding ways to solve problems with employee benefits arising from the crisis. This process is accompanied by the emergence of new and dynamic updating of existing legal and regulatory documents used by accountants. Accordingly, there is a constant need to analyze, systematize and summarize these innovations. Employee benefits affect the interests of not only individuals and legal entities, but also the state as a whole.

Employee benefits are one of the significant components of the total expenses of any company and one of the most complex accounting items, which include a rather large list of payments, each of which has its own specifics of reflection in the external reporting of the company. The level of employee benefits and their structure are also of great social importance and affect not only the current but also the future performance of the company.

Remuneration is an essential component of organizing any business. As a way of meeting people's needs through labor, it is eternal, beyond history. Since the beginning of human history, remuneration has been paid in kind through the appropriation of labor products. With the emergence of commodity production and money, labor remuneration became predominantly monetary.

The main legislative act on which labor legislation in Ukraine is based is the Constitution of Ukraine, which states that everyone has the right to work, including the opportunity to earn a living by work that he or she freely chooses or agrees to [104].

According to the Law of Ukraine "On Remuneration of Labor", wages are remuneration, usually calculated in monetary terms, which the owner or his authorized body pays to the employee for the work performed by him under the employment contract [194].

According to the Tax Code of Ukraine, wages are basic and additional wages, other incentive and compensation payments paid (provided) to the taxpayer in connection with the employment relationship in accordance with the law [178].

According to the provisions of the National Accounting Regulation (Standard) 26 "Employee Benefits", current employee benefits include: wages and salaries, other payroll accruals; payments for unworked time (annual leave and other paid unworked time); bonuses and other incentive

payments payable within twelve months after the end of the period in which the employees perform the relevant work, etc.

Salary is an economic category that reflects the relationship between the owner of the enterprise and the employee regarding the distribution of newly created value [102].

The tasks of accounting and information support of labor remuneration management are:

- accurate and timely documentation of data on the volume of work performed, products received and accrued remuneration in accordance with the quantity and quality of labor expended;
- correct calculation of remuneration for each employee in accordance with the applicable regulations;
- Compliance with the procedure for distributing remuneration by accounting objects;
- full and timely settlement of payroll with employees;
- timely preparation and submission of accounting and statistical payroll reports.

By ensuring the 102ounsellin of these tasks, payroll accounting has a major impact on labor discipline. Proper accounting mobilizes employees to perform work and search for reserves to improve production efficiency [160].

Thus, the rational organization of accounting and analysis of labor and its remuneration is crucial for the stable functioning and development of an enterprise (Table 3.1). It ensures the accuracy and timeliness of settlements with employees, which contributes to their motivation and job satisfaction. Transparency and reliability of accounting data helps to avoid conflicts between employees and employers, reduces the risk of errors in accruals and prevents financial losses. In addition, proper payroll accounting is the basis for planning labor costs, which helps a company manage its resources more efficiently and ensure competitiveness in the market.

Analysis of labor and remuneration data allows a company to assess the efficiency of labor resources, identify weaknesses in labor organization, and find reserves for increasing productivity. Based on such analysis, you can develop and implement measures to optimize labor costs, improve bonus systems and motivate employees. In addition, data analysis allows the company to comply with labor laws and ensure social responsibility, which is an important factor in maintaining a positive image and trust from employees and the public.

Accounting for labor and its remuneration should be organized in such a way as to contribute to increased labor productivity, strengthening labor discipline, and improving the quality of production, work, and services.

Table 3.1

Stages of organization of accounting and information support of labor and its remuneration in agricultural enterprises

Stage	Name of the stage	Essence of the stage
I	Identification of enterprise needs	Identification of requirements for accounting and information support, analysis of the specifics of the enterprise and its labor processes
II	Development of regulations and policies	Development of internal regulations governing labor accounting and remuneration, development of regulations on remuneration and bonuses
III	Selection and implementation of software	Selection of appropriate software tools for automation of accounting processes, implementation and configuration of software
IV	Staff training	Conducting training for accountants and responsible employees on the use of software and new regulations
V	Maintaining primary accounting of working time	Organization of a time tracking system, time sheets management
VI	Payroll deductions	Calculation and withholding of taxes, insurance premiums, fines and other mandatory payments
VII	Organization of synthetic and analytical accounting of labor and its payment	Reflection of business transactions on labor accounting and its payment in the system of accounts, registers of analytical and synthetic accounting in accordance with the current form of accounting at the enterprise
VIII	Reflection of expenses in accounting	Reflecting labor costs in the company's financial statements
IX	Reporting and submission to government agencies	Preparation and submission of necessary reports to tax authorities, social insurance bodies and other regulatory agencies
X	Analysis and control	Continuous monitoring and analysis of the accounting and information system, control over compliance with labor legislation, making adjustments if necessary

Source: compiled by the authors.

Analysis of labor and payroll data allows a company to assess the efficiency of labor resources, identify weaknesses in labor organization, and find reserves for increasing productivity. Based on such analysis, you can develop and implement measures to optimize labor costs, improve bonus systems and motivate employees. In addition, data analysis allows the company to comply with labor laws and ensure social responsibility, which is an important factor in maintaining a positive image and trust from employees and the public.

Accounting for labor and its remuneration should be organized in such a way as to contribute to increased labor productivity, strengthening labor discipline, and improving the quality of production, work, and services.

The basis for organizing remuneration is the tariff system of remuneration, which includes tariff scales, tariff rates, salary schemes and tariff and qualification characteristics. The tariff system of remuneration is used to distribute work depending on its complexity, and employees depending on their qualifications and the levels of the tariff scale. It is the basis for the formation and differentiation of wages.

The wage scale is a component of the tariff system that determines the ratio of remuneration levels for different groups of employees in the material production sector depending on their qualifications. It consists of a certain number of grades (no more than six) and the corresponding inter-grade coefficients. The tariff category assigned to an employee is an indicator of the qualification level required to perform a particular job. Each category has its own coefficient, which shows how much the level of remuneration for work in this category is higher than the first category.

A tariff category is an element of the tariff system that characterizes the level of qualification of the performers of a given job. Labor classification distinguishes between job classification and employee classification. Job classification is a set of methods for accounting for and comparing labor costs of different types of work depending on the nature, quality and conditions of performance.

Employee classification is the assignment of a certain tariff (qualification) category to an employee in accordance with his or her qualifications. The qualification is determined based on the employee's special knowledge and practical skills, as well as the requirements for performing work of the appropriate complexity.

In agricultural production, tariff categories are mainly assigned to employees engaged in repair and construction work.

Depending on the method of measuring labor remuneration (amount of labor or time), there are two forms of labor remuneration: piecework and hourly (Figure 3.1). Hourly wages depend on the amount of time worked, while piecework wages depend on the quantity and quality of products produced by employees.

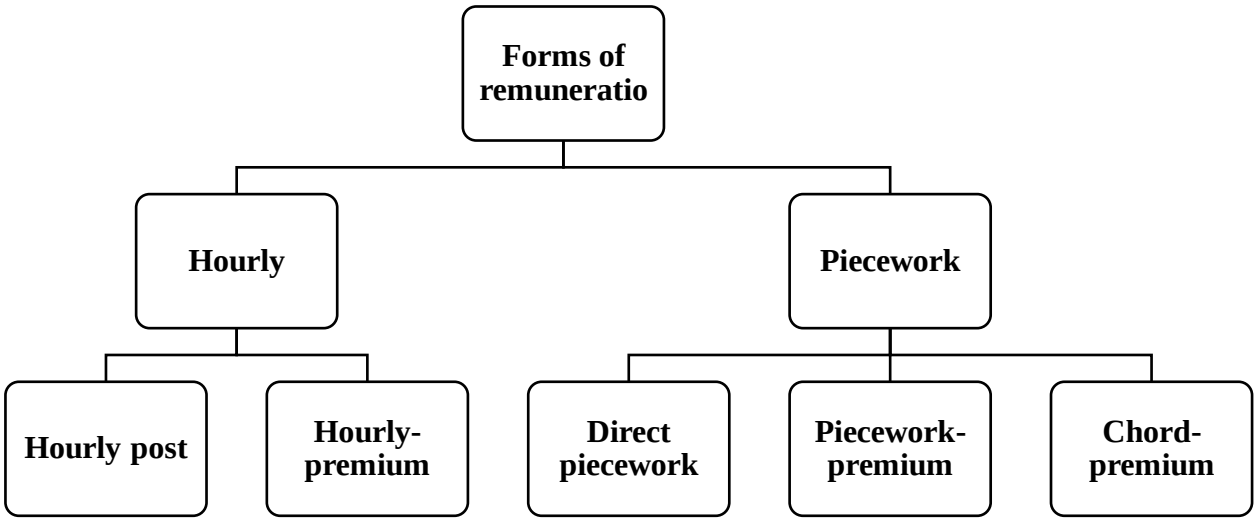

Fig. 3.1. Classification of forms of remuneration

Source: systematized by the authors based on [160].

Hourly remuneration is used mainly for work that is difficult or impossible to account for in terms other than time. Hourly remuneration is divided into simple and hourly-premium remuneration. Simple hourly remuneration is calculated at hourly wage rates and monthly salaries for the actual time worked.

Under the hourly-premium system, employees receive bonuses in addition to their basic salary for the time worked, which increases their material interest in the results of their work.

The piecework form of payment has the following systems: direct piecework, piecework-premium and chord-premium.

With direct piecework remuneration, the prices per unit of output (work) are unchanged, and the amount of wages depends on output (the higher the output, the higher the wages) This system of remuneration is used mainly in industrial workshops of enterprises, as well as in construction.

Under the piece-rate system, along with payment at piece rates for the amount of work performed, employees are awarded bonuses for exceeding production standards and for exceeding monthly, quarterly, and annual production targets. This system of remuneration is used in repair workshops, vehicle fleets, crop production, and livestock production, where products are delivered throughout the year.

The most progressive system of remuneration is the chordal bonus system. The essence of the chordal-premium remuneration system is that

payment is accrued for the final product, taking into account its quantity and quality.

Prior to payments for products during the year, employees are given an advance, which is determined by piecework rates for the amount of work performed in crop production or the number of animals cared for. In the case of a collective contract with a piece-rate system, each employee is paid an advance depending on the amount of time worked and his or her qualifications. At the end of the harvest, employees are paid the difference between the wages accrued for the produce and the amount of the advance paid during the year. The additional payment for the products is distributed among the employees of the production units in proportion to the remuneration accrued during the year for the amount of work performed.

Depending on the organization of labor at the enterprise, the piecework form of payment may be individual or team. In the case of direct individual piecework remuneration, earnings are calculated by multiplying the rate by the quantity of output.

The brigade piecework form of remuneration is used when the nature of the work makes it impossible to organize individual work accounting. With brigade piecework remuneration, the total amount accrued for the actual work performed is distributed among the members of the brigade in proportion to the grades and the amount of time worked in accordance with the time sheet.

By type, wages at agricultural enterprises, as well as at other enterprises, are divided into basic wages; additional wages; and other incentive and compensation payments (Figure 3.2).

The main document for recording attendance and hours worked is the Time Sheet (form No. PSG-1). It is prepared in one copy during the month separately by production units and categories of employees. Time records in departments, on farms, in teams, repair shops and other production units are kept by specially appointed employees or heads of departments. For each employee, a separate line is provided in the timesheet to record the number of hours worked and to indicate the reasons for absenteeism. The timesheets also indicate the employee's position, salary, type of payment, amount of salary, personnel number, and synthetic and analytical accounting code. At the end of the month, the timesheet is submitted to the accounting department for payroll.

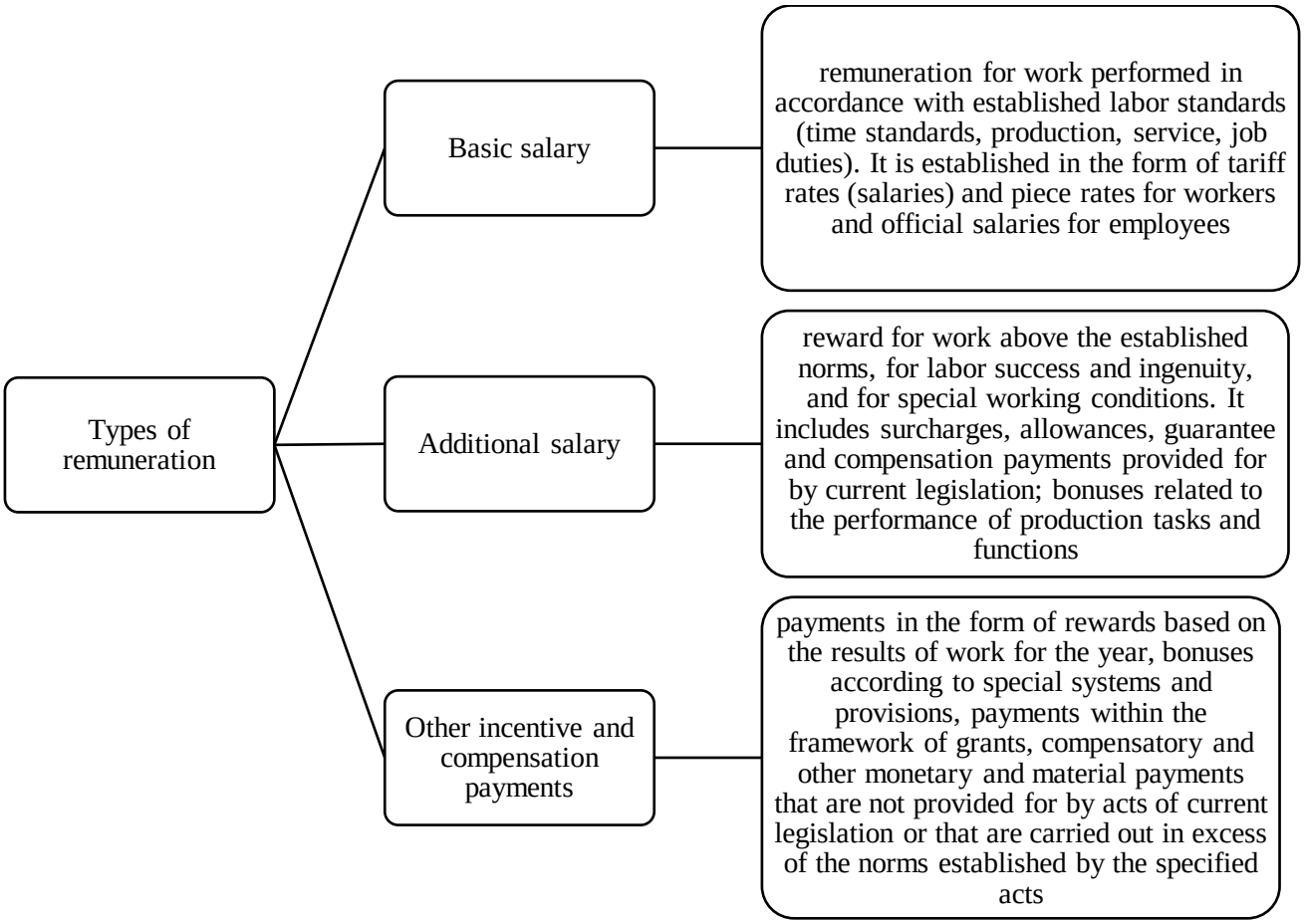

Fig. 3.2. Classification of forms of remuneration

Source: systematized by the authors based on [160].

To account for manual and horse-drawn work, use the Record Sheet of Labor and Work Performed (form No. PSG-2). The worksheets reflect the name of the work for the corresponding day, the time worked, the amount of work performed, and the amount of wages accrued. For each type of work, the unit of measurement, production rate, and price are recorded. The number of horse-days worked is given in the last line for each type of work performed with the help of horses.

The tractor driver's record sheet (form No. PSG-3) is used to record the work of tractor drivers for 5, 10, 15 days, depending on how it is provided for in the document flow plan. It reflects the work performed for a particular crop, the composition of the unit and the agrotechnical conditions for their implementation. Transportation work performed by tractors is documented with a tractor waybill (f. No. PSG-4). The waybill is signed by the mechanic or foreman every day before leaving the garage and given to the tractor driver. On its front side, the tractor driver is assigned a task, which indicates who has the tractor at his disposal, where the cargo is to be delivered from and to, the class and quantity of cargo to

be transported, and the distance of transportation. When filling the tractor with fuel, the fueler shall note in the waybill the remaining fuel at departure, the amount of fuel dispensed, and approve it with his or her signature. The mechanic (foreman) checks the serviceability of the tractor, gives permission to leave and notes the time of the start of work, approves it with his signature, and the tractor driver signs to accept the tractor (in good condition).

The ”everse side of the letter reflects the completion of the task, which is certified by the signature of the sender and recipient of the cargo.

To record the amount of work performed, working hours and wages in construction, industrial, auxiliary and other industries and businesses, a piecework order, form No. PSG-5, is used. The front side of the work order indicates the task, work category, time rate, and unit price. On the reverse side of the form No. PSG-5, a time sheet is filled out to record the time worked by each employee. The earnings of each team member are determined in the timesheet in proportion to the work performed, time worked, work category, and established rates.

Livestock employees are paid primarily for the products they produce, such as milk, offspring, live weight gain, wool, eggs, as well as for care or hours worked. The calculation of payroll is documented in the Calculation of Payroll for Livestock Employees. The calculation for each employee reflects the amount of products received, the number of livestock served, prices, and the amount of remuneration. This document is prepared by the farm accountant. The quantity of products received is taken from the documents for the receipt of products: a milk yield journal, acts for the receipt of livestock, a calculation for determining the increase in live weight, diaries of agricultural products, acts of wool shearing, and others. Working hours are recorded in the time sheet. To calculate labor remuneration, farms develop production (service) rates and product prices. Prices for products are determined based on production rates and the chordal payroll. Substitute workers in livestock farming are paid 100%, and permanent substitute cattle breeders (milkers, pig breeders) who serve breeding stock are paid 110% of the established rates or the average earnings of the workers they replace.

Prices for products may be stable for several years, uniform for the year, or differentiated by periods of the year (winter, summer).

Data on accrued wages for each employee is grouped in the following registers and documents: Time sheet (form No. PSG-1), Cumulative statement of accounting for the use of the machine and tractor

fleet (form No. ZhN-5), Cumulative statement of accounting for the work of trucks (form No. ZhN-6), Piecework order (form No. PSG-5).

The generalized register that reflects wage (salary) settlements with each employee is the Employee's Payroll (form No. P-6) or the Book of Payroll Settlements (form No. 44).

Payroll statements signed by the manager and chief accountant of the company are also the personal account of employees and the working papers to account 66 "Settlements for payments to employees".

Accounting for payroll deductions is critical to ensuring financial discipline and compliance with legal requirements. Accurate and timely accounting of taxes, insurance premiums, fines and other deductions helps to avoid legal problems and penalties from regulatory authorities. In addition, proper accounting of withholdings ensures transparency in the relationship between employers and employees, prevents conflicts due to miscalculations, and helps maintain employee trust and loyalty. Thus, accounting for payroll deductions is an important component of the overall accounting and financial management system of an enterprise.

In Ukraine, as of January 1, 2024, the employer's obligations are as follows to deduct deductions from the employee's salary, which consist of:

1) personal income tax – 18%;

2) military duty – 1.5%.

The amount of personal income tax may be reduced by the amount of a tax social benefit. This term means the amount guaranteed by the state by which an employee's accrued salary may be reduced for tax purposes. This benefit is provided for by law if the salary does not exceed the income limit, which is determined by multiplying the minimum wage set as of January 1 of the current year by a coefficient of 1.4 and rounded to the nearest UAH 10.

The amounts of tax social privilege provided for by the Tax Code of Ukraine [178] are equal for individual taxpayers: 100 percent of the subsistence minimum for an able-bodied person (per month) established by law as of January 1 of the reporting tax year for any taxpayer; 150 percent of the amount of the total benefit; 200 percent of the amount of the total benefit.

Starting from January 1, 2024, the subsistence minimum for able-bodied persons in Ukraine is UAH 3028. Therefore, in 2024, the amount of the tax social benefit will be UAH 1514 (UAH 3028.00 × 0.5), and the

income limit for the application of the NSL will be UAH 4240 (UAH 3028.00 × 1.4).

Thus, the amount of the tax social benefit in 2024:

- UAH 1514 – "basic" tax social benefit, which applies to any employee who is not entitled to a higher benefit;

- UAH 2271 – "150% tax social benefit", provided if the employee is eligible for such a benefit, and its amount is 150% of the basic tax social benefit;

- UAH 3028 – "tax social benefit 200%" is granted upon eligibility for such benefit and its amount is double the amount of the basic tax social benefit.

The "child" tax social benefit is a benefit that applies to employees who have 2 or more children under the age of 18. In this case, the tax social benefit per child is UAH 1,514.

Employers must pay a unified social tax on the employee's earnings, which is a mandatory payment to the compulsory state social insurance system. The unified social tax is not a deduction, it is calculated separately and paid by the employer at its own expense (enterprise, individual entrepreneur) as an additional charge to the employee's payroll. It does not affect the net amount. The amount of the unified social tax increases the employer's expenses and it is closely related to the withheld personal income tax and military fee, as:

- is paid together with personal income tax and military duty when paying salaries;

- is included in a single report with personal income tax and military duty. This is the Tax calculation of income amounts;

- together with the personal income tax and the military fee, can be paid from a single account at the Treasury.

The basis for the calculation of the USC is:

- Actually accrued wages – for employees with disabilities, external part-time employees, employees working under an employment contract with non-fixed working hours;

- actually accrued wages that exceed the minimum wage, or the minimum wage if the accrued wages do not exceed the minimum wage, for other employees.

Thus, the amount of the unified social tax at the rate of 22% in 2024 is as follows:

- in January-March: minimum: 1562 UAH (7100 × 0.22); maximum: 23430 UAH (106500 × 0.22);

- in April-December: minimum: 1760 UAH (8000 × 0.22); maximum: 26400 UAH (120000 × 0.22).

Table 3.2

Unified social tax rates in 2024

22%	**related to persons with disabilities**		
	8,41%	**5,5%**	**5,3%**
basic unified social contribution rate, salary, remuneration under civil law contracts, payment "for oneself" from the income of individual entrepreneurs, etc.	apply to enterprises, institutions and organizations, individual entrepreneurs and individual entrepreneurs in relation to the salaries of employees with disabilities	is applicable only to enterprises and public organizations of people with disabilities. Conditions: - number of persons with disabilities ≥ 50% of the total number of employees; - payroll of persons with disabilities ≥ 25% of total labor costs	are applied only by enterprises and all-Ukrainian public organizations of persons with disabilities, including the Ukrainian Society of the Blind and the Ukrainian Society of the Deaf and Dumb. Conditions: • number of persons with disabilities ≥ 50% of the total number of employees; • - payroll of persons with disabilities ≥ 25% of total labor costs

Source: compiled by the authors based on [192].

Example. An employee was paid a salary for January 2024 in the amount of UAH 10,000, of which UAH 3,500 was an advance payment. Calculate the amount of withholdings:

Personal income tax = 10000 UAH × 0.18 = 1800 UAH;

Military fee = 10000 UAH × 0.15 = 150 UAH;

Net salary to the employee = 10000 – 1800 -150 = 8050 UAH.

Single social contribution = 10000 UAH × 0.22 = 2200 UAH (paid by the employer).

Other deductions may be made from the salary of the company's employees:

- trade union dues;
- unreturned accountable amounts;

- reimbursement of damages caused by shortages, losses from damage to valuables, theft, and losses caused by defective products;

- the cost of products and services provided in payment for labor,

- other deductions in accordance with employee applications.

Payroll accounting in the system of accounts is a synthetic accounting of accrual and distribution of wages, determination of the amount due to employees and allocation of accrued wages to the appropriate cost accounts by items and objects of calculation.

Account 66 “Settlements on payments to employees” summarizes information on settlements on payments to employees belonging to both the accounting and non-accounting staff of the enterprise – on wages (for all types of wages, bonuses, benefits, etc.), for amounts on payments to employees not received from the enterprise’s cash desk within the established time frame, and on other current payments [191].

Account 66 “Calculations for payments to employees” has the following sub-accounts:

661 “Salary calculations”;

662 “Settlements with depositors”;

663 “Calculations for other payments”.

According to the credit of account 66 “Calculations for payments to employees”, the basic and additional wages, bonuses, benefits for temporary incapacity for work, other payments due to the employees of the enterprise, accrued to the employees of the enterprise are displayed, for the debit – payment of the basic and additional wages, bonuses, benefits for temporary incapacity for work etc; the cost of received materials, products and goods at the expense of wages (repayment of debt owed to employees for other payments); personal income tax deductions, mandatory state social insurance deductions, payments under executive documents and other deductions from employee payments.

The company's debt for payments to”empl’yees in the event that the company receives cash for payment through the company’s cash register and the employees do not receive it within the specified period is reflected by the debit of sub-accounts 661 “Payments for wages” and 663 “Payments for other payments” and the credit of sub-account 662 “Payments with depositors” .

Subaccount 663 “Calculations for other payments” records payments for payments that do not belong to the wage fund, in particular partial unemployment benefit, temporary disability benefit.

Analytical accounting of calculations is carried out for each employee, types of payments and deductions.

According to account 66, the balance can be displayed: the credit one, which reflects the debt of the enterprise to the employees of the enterprise for wages, and the debit one, which shows the debt of employees to the enterprise for wages (Fig. 3.3).

Dr	**66 "Settlements for employee benefits"**	Cr
B/D (accounts receivable – overpaid amounts of employee benefits, etc.)		B/D (accounts payable)
- (decrease in turnover) payment of basic and additional wages, bonuses, temporary disability benefits, etc.; cost of materials, products and goods received as wages		+ (increase in turnover) basic and additional wages, bonuses, temporary disability benefits, and other payments due to employees accrued to the company's employees
C/D (B/D Dr + Turnover Dr + C/D Cr – Turnover Cr – B/D Cr)		C/D (B/D Cr + Turnover Cr + C/D Dr – Turnover Dr – B/D Dr)

Fig. 3.3. Accounting layout of synthetic account 66 "Settlements on payments to employees"

Source: systematized by the authors according to [191].

Wages are one of the elements of production costs and one of the important items of production cost. In order to include it in the composition of costs, all the wages calculated in the calculation and calculation – payment information are grouped by the direction of costs (shops, divisions, other structural subdivisions) in a special information or distribution tabulagram.

Business transactions for accounting of payments to employees are shown in the table. 3.3.

In order to control the use of the wage fund and the status of payments for wages with workers and employees, a summary statement of payments with workers and employees is drawn up. This information is compiled on the basis of indicators of settlement and payment information for the reporting month. The information summarizes the

company's general data: the amount of accrued wages, the amount of wages issued in cash in the current month, the amount of deposited wages, as well as the amount of deductions by their types. Based on this information, a check is issued to receive money from a current bank account, as well as to receive data for transferring personal income tax, withheld from wages and other deductions to the budget. According to the same statement, certificates on the use of the labor remuneration fund are drawn up.

Table 3.3

Business transactions for accounting for payments to employees

Nature of the transaction	Debit	Credit
Accrued wages and salaries or other benefits:		
- - to employees engaged in capital construction	151	661
- - employees of the main production	23	661
- - general production personnel	91	661
- - administrative personnel	92	661
- - sales personnel	93	661
- - Employees of housing and communal services, maintenance and other facilities and divisions	949	661
Accrual of annual leave amounts due to vacation payroll	471	661
Accrued amount of temporary disability benefits (first 5 days at the expense of the company)	949	661
Accrued amount of temporary disability benefits (after 5 days of sickness), maternity benefits and other benefits paid by the Social Insurance Fund	652	661
Wages and other payments to employees are paid:		
- - from the company's cash desk in cash	661	301
- - to employees' bank card accounts	661	311
Withheld from wages:		
- - amounts of personal income tax	661	641
- - amounts of military duty	661	642
- - unreturned accountable amounts	661	372
- - compensation for damages	661	375
- - under writs of execution and other deductions with the consent of employees	661	685
The cost of products and services provided in lieu of wages withheld from wages	661	70
Deposited amounts of unpaid wages	661	662
Deposited wages paid	662	30, 31

Source: systematized by the authors based on [191].

According to the journal-order form of accounting, which is often used by agricultural enterprises, the synthetic accounting of labor payment calculations is kept in the Journal-order No. 5-B.

The order journal is opened for a month. In the Journal-order No. 5-B reflect accrued wages and related amounts of deductions for social activities and provisions for future expenses. In addition, in the Journal-order f. No. 5-B a separate section is allocated for the display of debit turnovers on accounts 47, 65, 66. The basis for displaying debit turnovers is the Settlement and Payment Information or Book of Accounting for Labor Payment Settlements.

The distribution of wages and deductions for social activities by accounting objects is reflected in the "Summary of the accrual and distribution of wages and deductions from it by accounting objects" f. no. 5.1. This statement is compiled on the basis of primary documents from labor accounting, accumulated information, cost accounting journals.

It reflects the number of man-hours worked, the amount of accrued wages and deductions from it for social activities. The information is the basis for entries in the Expense Report, Analytical Accounting Information (f. No. 5.4) on account 65 "Insurance Settlements" and drawing up the journal-order f. No. 5-B.

Under the condition of using an automated form of accounting, the main output typescripts of labor accounting and its payment are Turnover and balance sheet for account 66, Turnover for account, Account card, Employee card, Analysis of account 66, Analysis of sub-accounts, General ledger, Chess list, etc.

Thus, the payment of labor is a significant object of accounting, the economic essence of which is to provide workers with material resources in exchange for their services as a workforce and is an important component of the organizational and economic mechanism of employment regulation in the agrarian sector of the economy, satisfying the information requests of key stakeholders .

3.2. Improving the organisational and economic mechanism in the context of de-shadowing of employment in the agricultural sector

Today, the instability of the political situation in the country, the difficult conditions caused by the COVID-19 pandemic, and high unemployment have a negative impact on the socio-economic

development of the state, which leads to the growth of shadow employment as one of the negative phenomena in the labour market, including the agricultural one. Over the past ten years, the shadowing of economic relations has been on a steady upward trend and is the factor that most hinders the development of the business environment in Ukraine, leading to a reduction in the state budget revenues, which further threatens the provision of all social guarantees and benefits to citizens and creates an obstacle to the country's socio-economic development. In this regard, shadow employment as a key element that causes dysfunctional economic development and areas for its de-shadowing requires a more thorough study.

The high degree of shadow economy combined with political and economic instability, high level of government corruption and bribery leads to the reluctance of many Ukrainian entrepreneurs to invest in the economy of their country and the withdrawal of financial capital abroad, which does not contribute to the creation of jobs in the labour market [69, p. 16].

It should be noted that the spread of activities outside the regulatory and legislative field has been a permanent problem for our country since the declaration of independence. The spread of shadow employment has a twofold nature. On the one hand, this type of employment allows an employee to earn income while selling labour and bypass a number of formalities, and on the other hand, the employee works in conditions of uncertainty, as the working conditions are agreed upon verbally.

The Parliamentary Assembly of the Council of Europe (PACE) has identified shadow employment and shadowing of financial flows as the main factors of economic shadowing. According to the International Labour Organisation (ILO), the illegal labour market is widespread in developing countries, where it reaches more than 30 % of GDP [29, p. 25].

We believe that the high level of people employed in the shadow sector is a rather negative factor for the development of the country's economy, which further affects the high rates of labour in the "shadow", causes partial or complete tax evasion, etc. According to the definition contained in S.V. Mochernyi's dictionary, shadow employment is an illegal format of labour relations initiated by an employer or an employee with the aim of not paying taxes, evading the provisions of the law, in particular by paying salaries to employees in cash (in "envelopes") [73, с. 447].

International organisations, such as the International Labour Organisation, the Organisation for Economic Cooperation and Development and the European Commission, focus on employment that does not meet legal requirements, as it poses a threat to full, productive and quality employment, sustainable economic development and the observance of labour rights [85, p. 11].

Fig. 3.4 shows the conventional definitions of employment that contradicts the law at the international level.

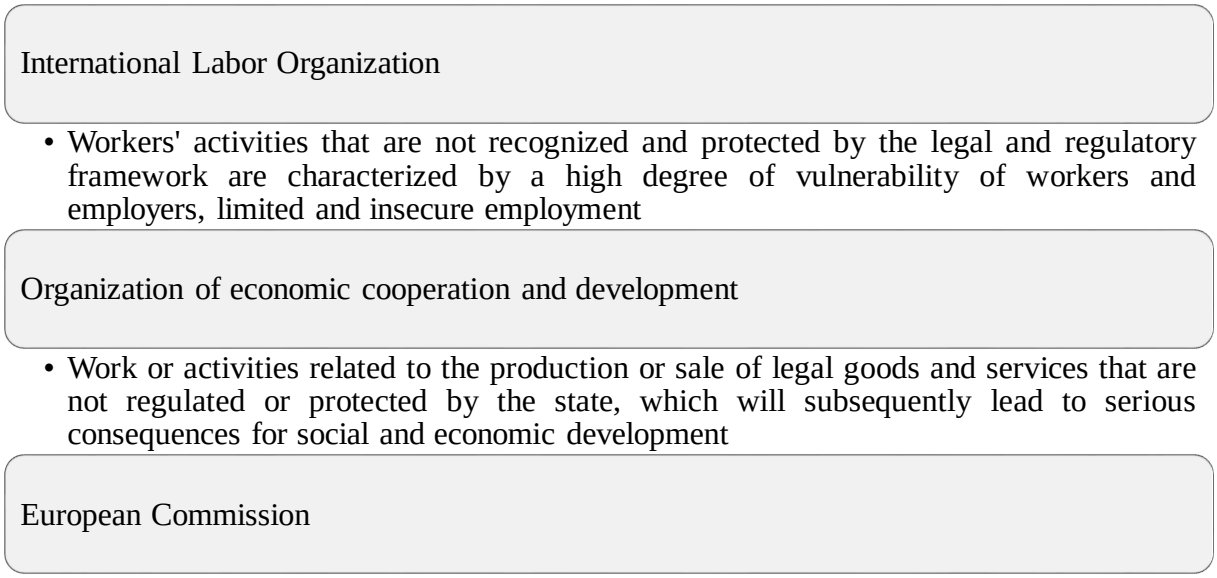

Fig. 3.4. Convention definitions of employment that does not meet the requirements of the law

Source: compiled by the authors based on [282, 283, 291].

The terminology used to describe shadow employment varies, and different authors and researchers may use different approaches to their definitions. However, in the process of more thorough research, approaches to the definition of the informal economy are converging. According to the 17th ICLS, informal employment is defined as the total number of informal jobs in formal or informal sector enterprises or households during the reference period.

Fig. 3.5 shows a generalised view of the nature and structure of informal employment.

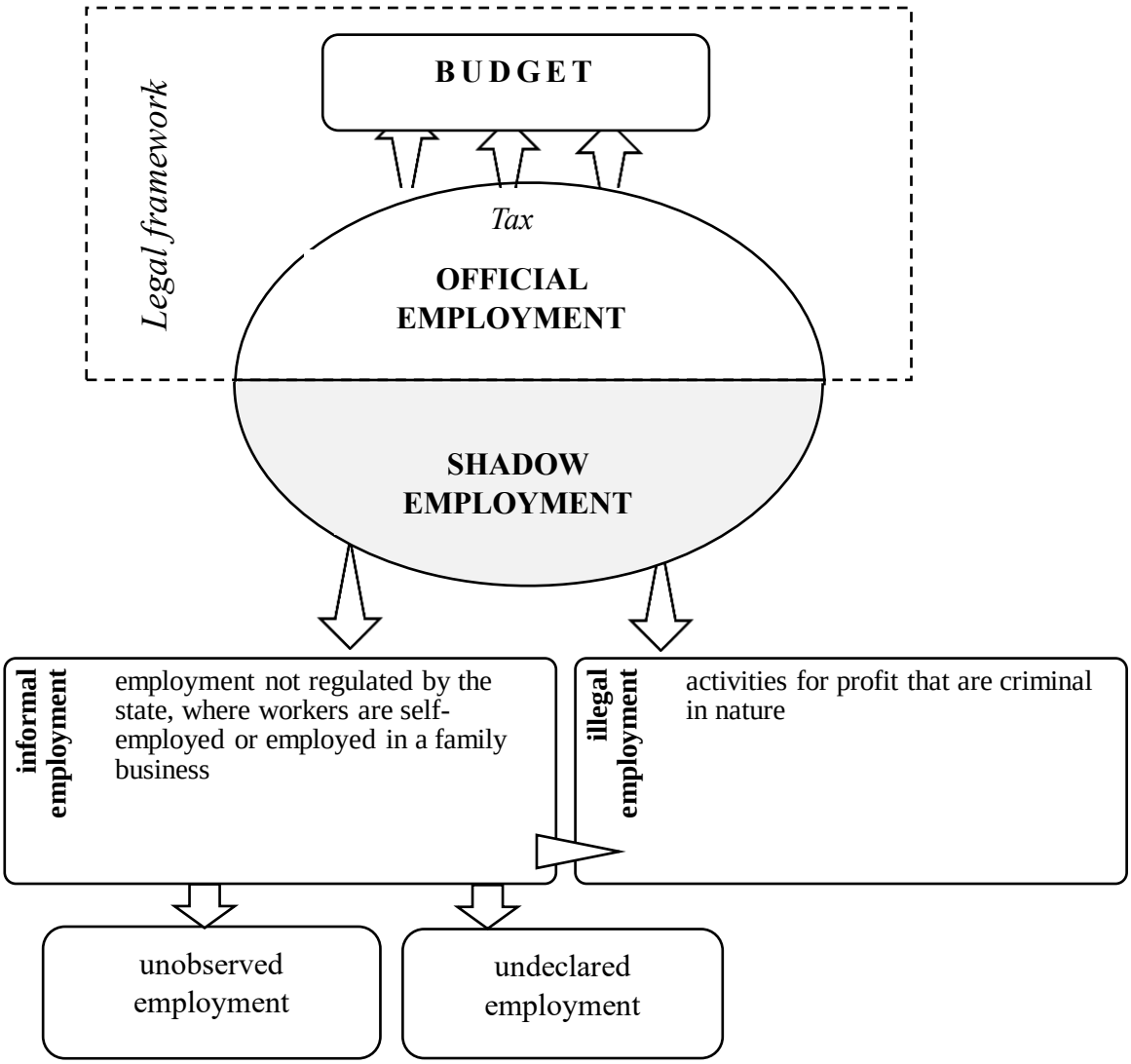

Fig. 3.5. Content of the category "shadow employment"
Source: compiled by the authors based on [101, 186].

The author's vision of the phenomenon of "shadow employment" is reduced to the understanding that it is an activity that goes beyond the legal framework, contradicts and does not comply with the norms of the current legislation, manifested in the payment of wages in "envelopes", the employment of unofficially registered workers, tax evasion, social contributions and other manifestations of violations of labour legislation. The most widespread type of shadow employment is informal employment, which can be divided into certain forms (Figure 3.6).

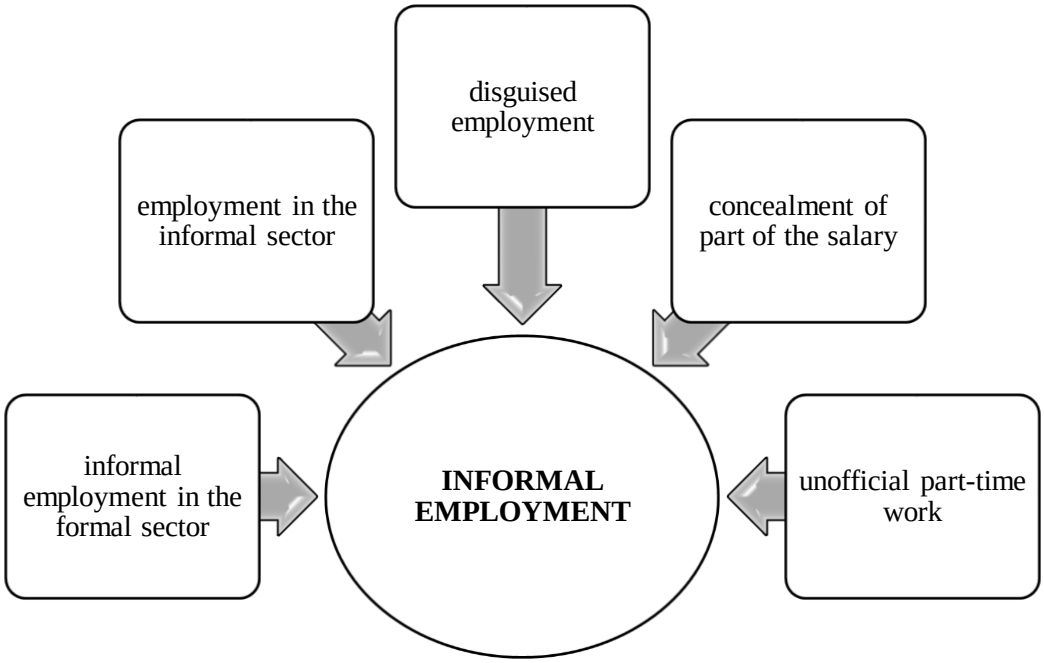

Fig. 3.6. Forms of informal employment in Ukraine

Source: generalized by the authors.

Disguised employment refers to circumstances when an employee enters into a civil law agreement as an individual or an agreement as an individual entrepreneur instead of an employment contract. An informal part-time job is an employee's work at the main job and additional earnings, but without formalisation. When an employee has a signed employment contract but receives his or her salary in an "envelope", this is a form of informal employment, as the employee conceals part of his or her salary. Informal employment in the formal sector is work at an officially registered enterprise or for an individual without an employment contract. Employment in the informal sector is work for an unregistered employer.

According to the employment status, it covers the following categories of workers: persons working on their own account (self-employed) and employers working in their own enterprises in the informal sector; family members working for free, regardless of whether they work in enterprises in the formal or informal sectors; employees performing informal work, i.e. not covered by legal or social protection as employees, not entitled to other employment-related benefits (e.g. advance notice of dismissal, severance pay, annual paid leave or sick leave), and hired domestic workers in households; members of informal production cooperatives; self-employed workers who produce goods exclusively for

their own final consumption (if they are included in the employed population) [291].

We agree with the opinion of T.E. Kaganovska that the high share of informal employment in the context of transformation is an obvious fact, caused by the weakness of socio-economic institutions and high unemployment, which has a destructive impact on the development of the country's economy [87, p. 9].

The mod'rn globalised economy also causes further "informalisation" of employment even in developed countries through the spread of temporary work, part-time employment, remote work, subcontracts and other forms of flexible employment. With regard to transition economies, experts identify the following as the main factors behind the spread of informal employment: attempts to avoid the high fiscal burden of taxes and social contributions (including by concealing part of salaries) and distrust of public administration.

There is not a single country in the world where the issue of developing the informal labour market is not relevant, with the exception of Kuwait, where the informal economy is virtually non-existent. This is due, in particular, to the absence of a huge number of taxes (by the way, in Ukraine, an entrepreneur needs to make 147 tax payments during the year) [2, p. 137].

Let's analyse the evolution of stages in the European Union's policy on combating informal employment (Fig. 3.7).

Today, the EU is helping Ukraine to overcome informal employment. A dialogue with EU countries and its organisations has been launched to help drive informal employment out of the Ukrainian labour market. All of this is manifested in the harmonisation of Ukrainian legislation with the European one. We believe that interdependent labour will improve the level of labour relations and social guarantees for employees and, at the same time, will be aimed at overcoming unfair competition in the market and eliminating the impact of destabilising factors on the state budget. We have conducted a brief analysis of the dynamics of the employed population in the informal sector according to official statistics.

Fig. 3.7. Evolution of stages in the EU policy on combating informal employment

Source: compiled by the authors based on [31, 108, 235].

The analysis began with a study of the dynamics of the integral indicator of the level of the shadow economy in Ukraine and the share of the employed population in the informal sector of the economy in 2010-2020 (Figure 3.8).

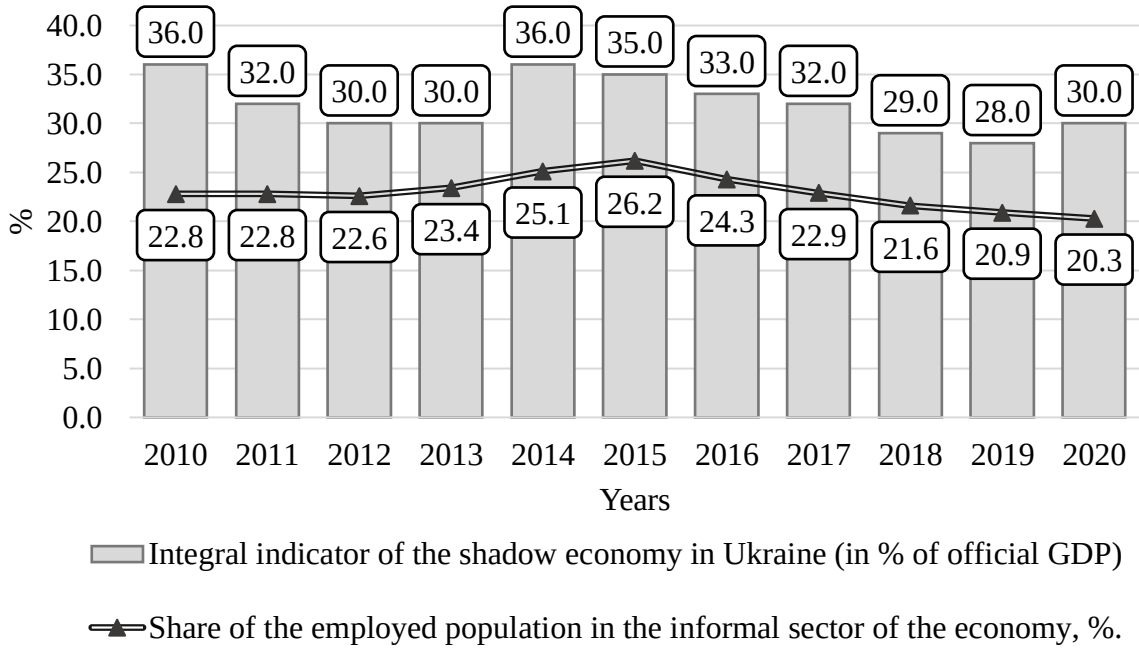

Fig. 3.8. Dynamics of the integral indicator of the shadow economy and the share of the employed population in the informal sector of the Ukrainian economy in 2010-2020, %

Source: compiled by the authors based on [164, 232].

The distribution of informal employment by regions of Ukraine, shown in Fig. 3.9, shows that the largest share of informal employment is in the western regions of the country, with Chernivtsi, Rivne and Ivano-Frankivsk regions occupying the first positions, with employment rates of 47.7%, 44.8% and 37.2% respectively.

Kharkiv region, whose employment dynamics were thoroughly studied in the second section of this paper, demonstrates one of the lowest rates in Ukraine, namely 9.6%, which is two times lower than the average rate in Ukraine and almost five times lower than the Chernivtsi region.

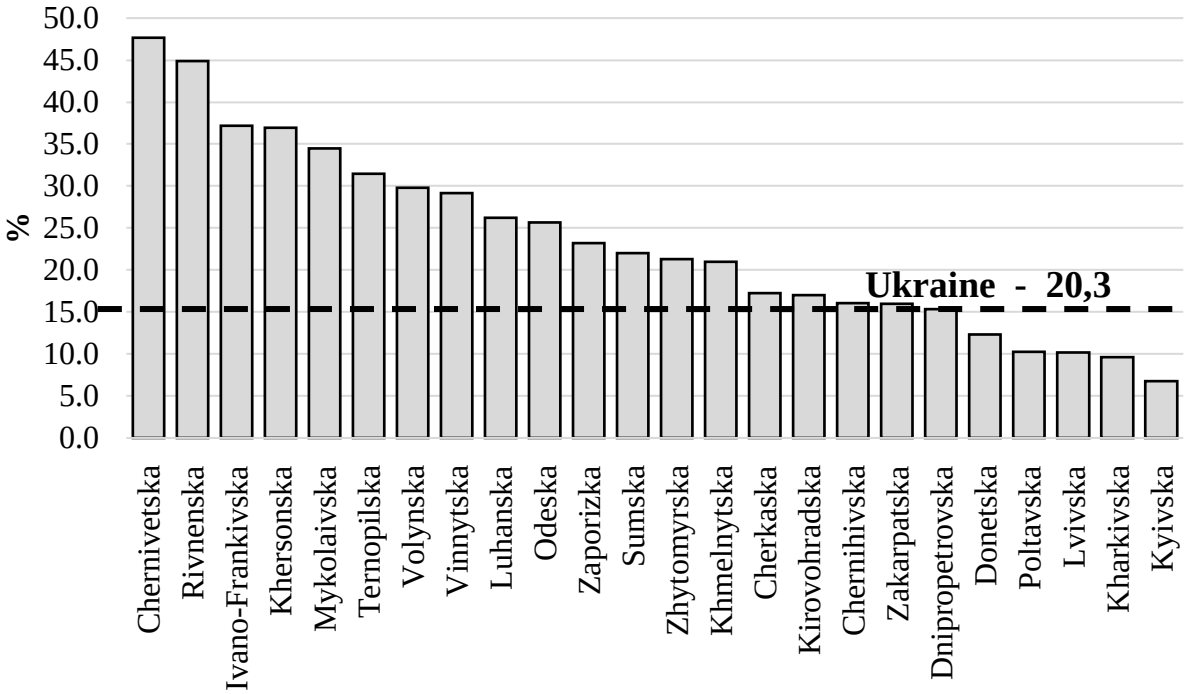

Fig. 3.9. Share of the informally employed population by regions of Ukraine in 2020, in % of the employed population in the respective region

Source: compiled by the authors based on [164].

Further analysis is to study the dynamics of the share of the informally employed population in 2014-2020 in relation to the total number of employees in the respective group (Figure 3.10). As the State Employment Service changed the methodology for calculating the informal employment rate in accordance with the requirements of the 17th International Labour Statistics Conference, a direct comparison of the 2000-2013 figures with the 2014-2020 figures is not possible. Starting from 2014, the calculation of informal employment includes data on employment in the informal sector of the economy and informal employment in the formal sector of the economy.

A common analysis of Fig. 3.10 shows the dynamics of the decline in the share of people employed in the informal sector of the economy and suggests a trend towards deformalisation of labour relations. In particular, in 2020, the total level of informally employed was 20.3% of the total employed population, which is lower than in 2014 and 2017. In 2020, one in four men (23.5%) and one in six women (16.9%) were employed in the informal sector.

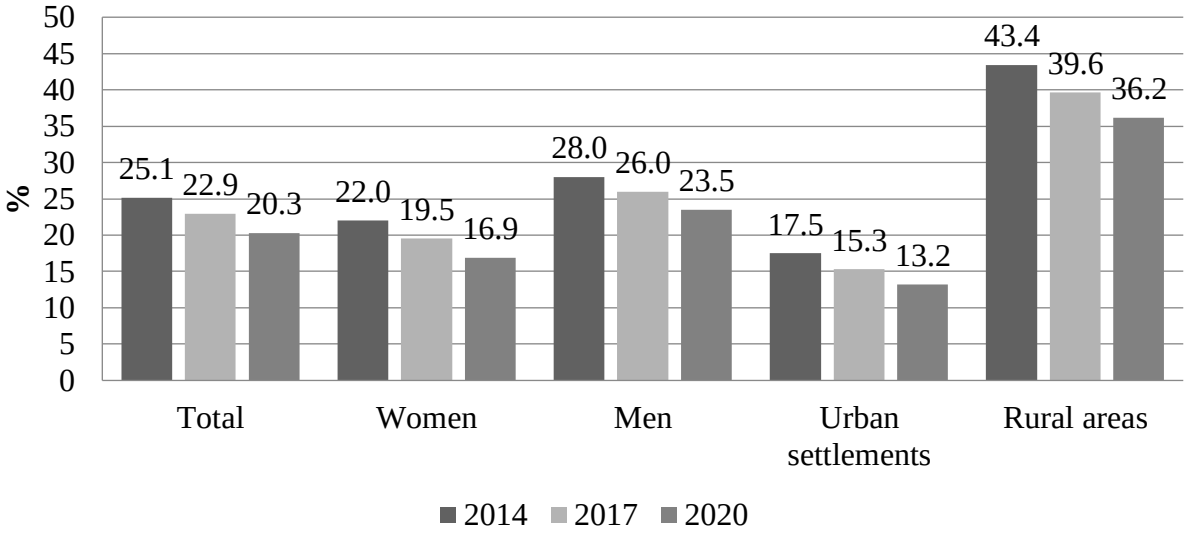

Fig. 3.10. Dynamics of the share of informally employed population in 2014-2020, in % of the total number of employed in the respective group

Source: calculated by the authors according to [164].

In 2020, the age structure of the informally employed underwent some changes (Table 3.4).

Table 3.4

Employment of the population aged 15 years and older in the informal sector in Ukraine in 2020

Population	Employed population in the informal sector of the economy sector of the economy		including by age group, in % of the total number of employees in the respective age group								Deviation of the number of employed people in the non-farm sector of the economy in 2020 from 2014 (+-), thousand people
	total, thousand people	in % of the total number of	15-24	25-29	30-34	35-39	40-49	50-59	60-70	71 years and older	
Total population	3275,9	20,3	27,5	21,3	20,8	18,4	18,6	19,5	28,3	47,4	-1265,0
women	1306,6	16,9	22,3	16,8	15,9	14,4	15,3	17,2	29,0	52,9	-614,0
men	1969,3	23,5	23,6	31,5	24,6	21,8	21,9	22,1	27,6	40,7	-651,0
urban population	1460,6	13,2	18,4	15,0	14,2	13,0	12,3	11,8	13,2	13,3	-782,4
rural population	1815,3	36,2	41,2	34,2	35,9	34,3	33,2	35,5	57,5	88,0	-482,6

Source: compiled by the authors based on [164].

Having analysed the educational level of the informally employed population, we note that the degree of involvement of the employed population with higher education in the informal sector of the economy is higher in rural areas than in urban areas (Table 3.5).

Table 3.5

Population employed in the informal sector of the economy, by gender, place of residence and level of education in 2020 (in %)

Indicators	Education level as a percentage of the employed population of the respective level of education					
	full higher	basic higher	incomplete higher	vocational	complete general secondary	basic, primary general secondary or no education
Total population	8,3	15,8	14,5	26,4	38,9	51,1
women	6,1	12,4	12	24	37	50,5
men	10,8	19,3	18	27,6	39	51,6
urban population	7,4	12,6	10,8	18,8	24,8	32,5
rural population	13,3	26,4	23,5	38,8	49,9	63,5

Source: calculated by the authors according to [164].

The bulk of people involved in the informal economy are those with basic, primary or no education. It should be noted that the level of education is fully correlated with participation in informal economic activities – the more educated a person is, the less often he or she is engaged in such activities (Fig. 3.11).

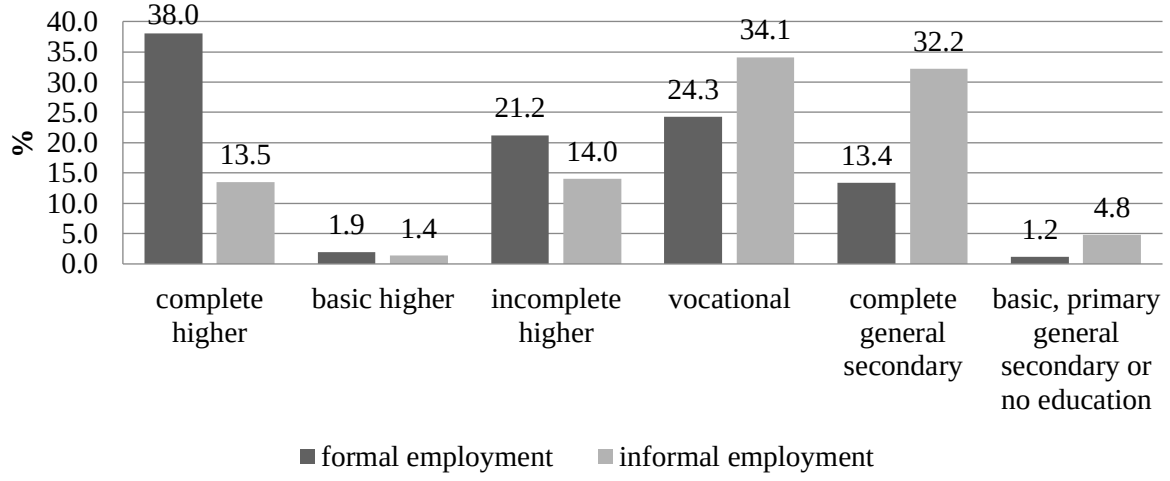

Fig. 3.11. Employment by type of job and level of education in 2020, in % of the number of employed people by the corresponding level of education and type of job

Source: compiled by the authors based on [164].

According to Table 3.6, the share of people who are self-employed is 56.0%, or 1813.9 thousand people. The largest share is made up of rural residents – 74.7%.

Table 3.6

Population employed in the informal sector of the economy, by employment status and place of residence in 2020

Indicators	Persons working for hire		Individuals who do not work for hire	
	thousand people	in % of employees of this status	thousand people	in % of employees of this status
Total population	1423,9	10,7	1813,9	69,3
urban population	996,3	10,1	458,5	67,3
rural population	427,6	12,5	1355,4	90,0

Source: calculated by the authors according to [164].

Researchers T.M. Kiryan and M.S. Shapoval believe that the main reasons that influence the growth of the shadow economy include the inefficiency of the institutional mechanism for regulating the economy and the unsatisfactory environment for business development. In particular, the authors identify the following reasons:

- high tax pressure and uneven tax burden on business entities;
- corruption in state and local authorities;
- excessive regulation of business entities;
- legal insecurity of business entities against abuse by officials of state and local authorities;
- ineffective mechanisms of anti-corruption legislation;
- inefficient functioning of the judicial and law enforcement systems;
- inefficient tax administration;
- contradictory and overlapping legislative and regulatory frameworks in certain sectors;
- high crime rate;
- lack of historical practice of observance of norms and moral standards of law-abiding behaviour in conducting business and paying taxes by business entities and citizens [94, pp. 32-33].

It has been proven that an increase in the share of informal employment causes deformation of the country's budget, which subsequently leads to dysfunctional socio-economic development (Figure 3.12).

In addition, an employee engaged in off-the-books work is deprived of the opportunity to have his or her employment and insurance record credited, which will affect his or her pension provision in the future; an employee may be dismissed at any time without notice and compensation; there is no right to sick pay, vacation pay, unemployment benefits, satisfactory working conditions and safety, etc.

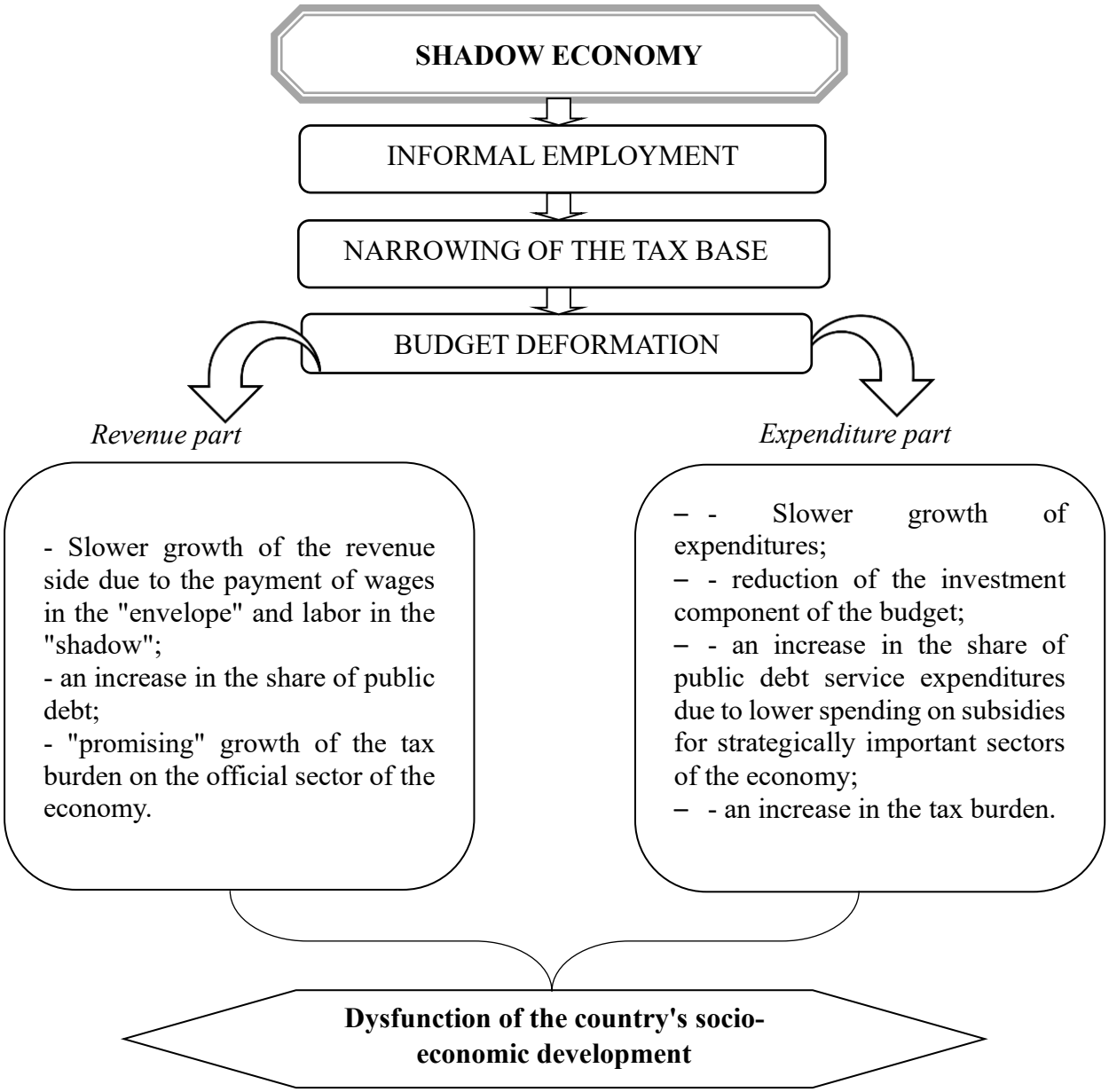

Fig. 3.12. Structural and logical diagram of the impact of informal employment on the socio-economic development of the economy

Source: compiled by the authors.

In subsection 1.3, we identify and classify the factors that influence the formation of employment in the agricultural sector of the economy. Informal employment, as one of the negative phenomena that is gradually

spreading in the modern employment sphere, is also formed under the influence of certain preconditions or causes.

Fig. 3.13 shows a decomposition of the factors that lead to the growth of informal employment in the agricultural sector.

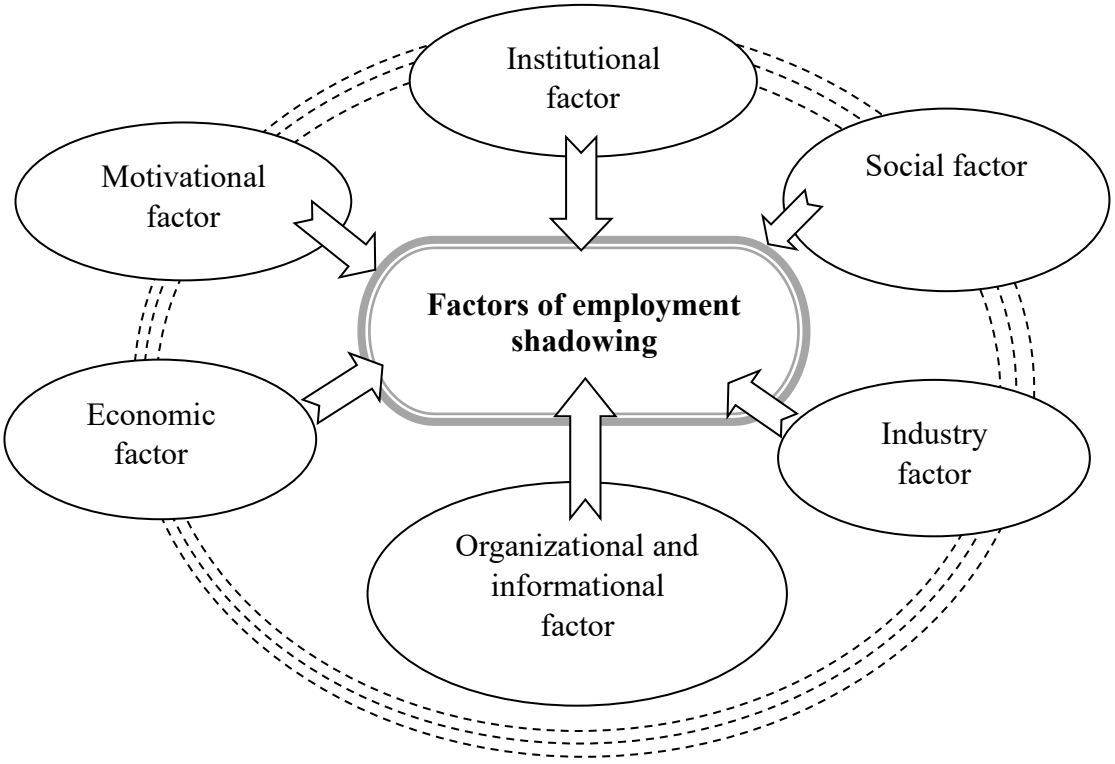

Fig. 3.13. Decomposition of the main factors influencing the growth of informal employment in the agricultural sector

Source: compiled by the authors.

Institutional factor. The influence of the institutional factor is manifested in high rates of bureaucracy, bribery, ineffective policy of institutions, and low quality of services provided by the state. This is confirmed by the Corruption Perceptions Index (CPI), a calculated indicator provided by Transparency International (Fig. 3.14).

According to Fig. 3.14, it can be concluded that in 2000-2020, Ukraine's place in the Corruption Perceptions Index ranking was extremely critical and close to the total number of countries in the ranking. Over the last year, Ukraine's score in the Corruption Perceptions Index was 33 out of 100.

Fig. 3.14. Diagram of the dynamics of corruption perception indices in Ukraine in 2000-2020

Source: compiled by the authors based on [84, 281].

Other components of the institutional factor include imperfect and outdated labour legislation and ineffective anti-corruption legislation. We believe that solving a number of problems under the influence of the institutional factor will help to form the basis for the development of a mechanism for regulating employment in the agricultural sector.

Motivational factor. The modern sphere of industrial relations, including in the agricultural sector of Ukraine, is characterised by minimal or no motivational measures to ensure effective employment. Neglecting the importance of the motivational factor has led to the fact that employees are not interested in official employment and work “in the shadows”.

A study conducted in the form of a survey among workers in th“ shadow economy shows that the individual motivation to engage in undeclared labour activity is the common interest of employers and employees in it [284].

Social factor. Social injustice, the loss of opportunities to find a job with decent pay, and the ineffectiveness of the current social support system are phenomena typical of rural areas, which in the long run lead

to income differentiation and are destabilising factors for employment development. Also, socially vulnerable groups have limited access to the labour market, which further leads to the search for work in the "shadow" and acceptance of all working conditions. It should be noted that this factor has a negative and destructive impact not only on the labour market, but also on the economy, social sphere and socio-economic development of the industry and the country as a whole.

Economic factor. Social relations formed between employers and employees are related to the purchase and sale of labour as a specific commodity. The desire to receive high wages on the part of the employee and the employer's desire to pay the minimum amount of taxes or not pay them at all lead to the spread of shadow employment. In such efforts, employers are willing to provide "double-entry bookkeeping", participate in schemes to reduce the tax base, etc. The Centre for Social and Economic Studies has found that the main tax evasion schemes cause losses of about 6-10% of Ukraine's official GDP. [203].

Sectoral factor. This factor is specific and completely distinguishes the agricultural sector from other sectors of the economy. The spread of informal employment in the agricultural sector can be defined as a completely voluntary and conscious phenomenon, which is the best option for adapting to the current realities of the labour market. The sectoral factor has an impact on the formation of shadow employment due to such factors as low domestic demand for agricultural products, increased costs of raw materials, plant protection products, fertilizers, etc. due to the devaluation of the national currency, unresolved land issues, reduced financial support for the development of the agricultural sector, in particular the livestock sector, etc. Fig. 3.15 shows the distribution of the informally employed population aged 15-70 by type of economic activity in Ukraine in 2020.

According to the data in Fig. 3.15, the largest share of the informally employed population is in agriculture, fisheries and forestry (44.1%) and construction (17.2%).

Organisational and information factor. The absence of functional and informational structures or inefficiency of their functioning, the perception of unfiltered flows of information that cover the ideology of shadow employment through the media pose a threat to formal employment. For example, insufficient information campaigns by the government on the consequences and risks of informal employment may

lead to citizens not being aware of the full picture of the risks associated with engaging in informal work.

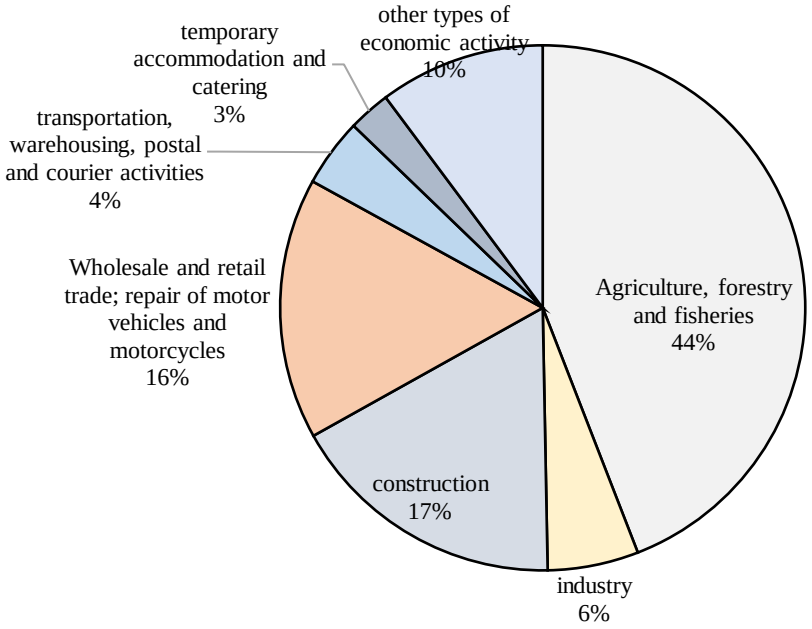

Fig. 3.15. Informally employed population aged 15-70 by type of economic activity in 2020

Source: compiled by the authors based on [164].

To curb the impact of the identified factors of employment shadowing, it is important to have a synergy of institutional foundations and economic growth that will facilitate the de-shadowing of employment. Having described the main factors of informal employment in the agricultural sector of our country, we can form a conceptual scheme of imperatives and measures to de-shadow agricultural employment (Fig. 3.16).

It should be noted that the proposed measures will have a positive effect only if there is a certain control over their implementation. The mission of unshadowing employment in the agricultural sector of the economy is to significantly reduce the level of labour relations that are formed outside the legal framework, which will subsequently become one of the key factors that will ensure the implementation of the organisational and economic mechanism for regulating employment in the agricultural sector of the economy, taking into account the national and sectoral characteristics of this phenomenon and the driving factors that contribute to the spread of informal employment in the country.

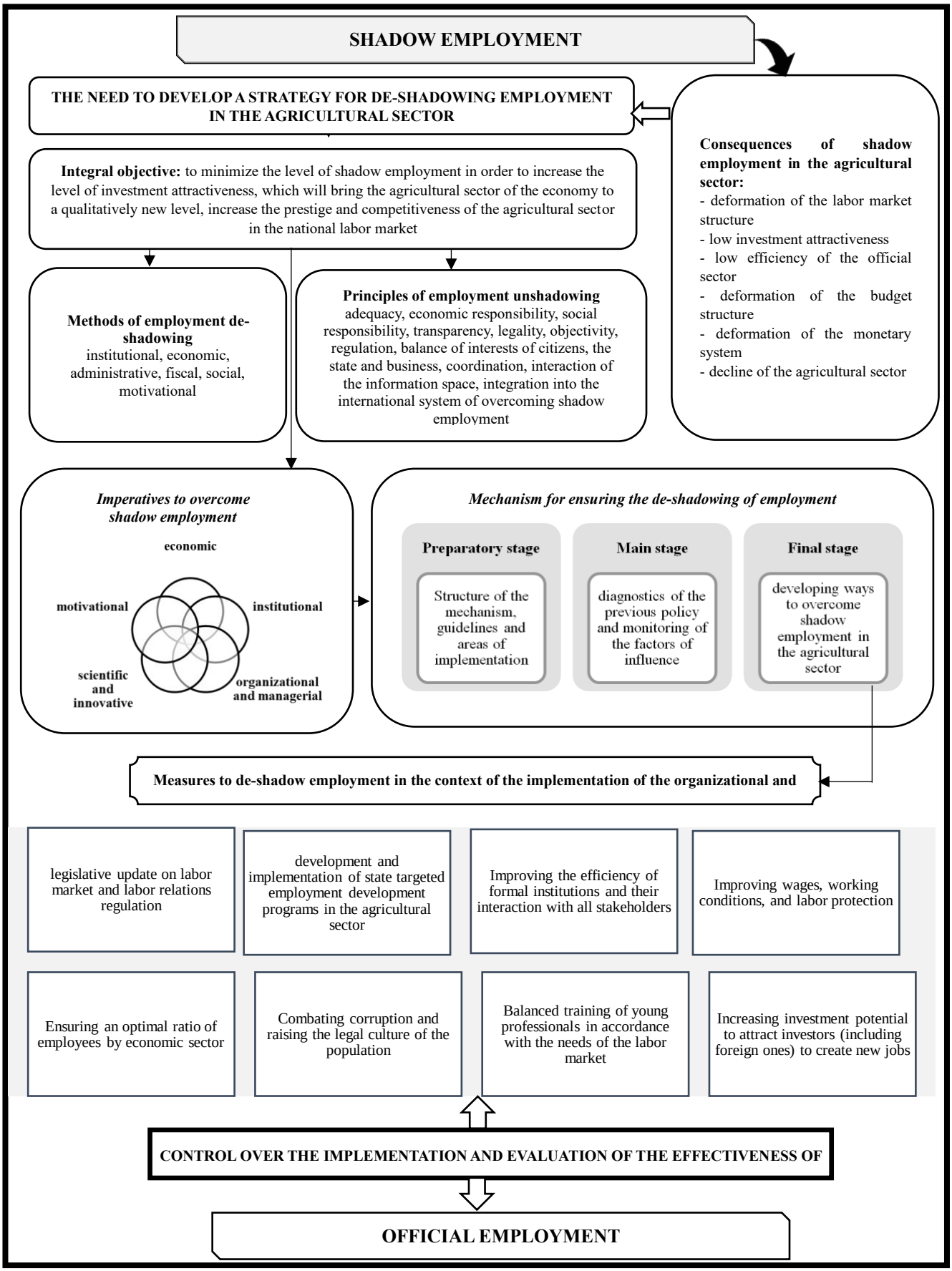

Fig. 3.16. Conceptual scheme of imperatives and ways to de-shadow employment in the agricultural sector

Source: compiled by the authors.

The integral goal of de-shadowing employment in the agricultural sector of the economy in the context of the implementation of the organisational and economic mechanism of employment regulation is being actualised against the background of European integration processes that require deep structural transformations and adaptation to the standards and requirements of the European Union. The development and implementation of effective mechanisms to stimulate the development of the agricultural sector, including investment and innovation policy, are necessary to ensure the competitiveness and sustainable development of the Ukrainian economy.

The proposed conceptual framework forms the basis for the further development of a comprehensive employment de-shadowing programme for the whole country. This programme should cover a wide range of measures, including legislative initiatives, infrastructure development, business support and social protection. It is important to take into account the various factors affecting employment, such as demographic trends, economic conditions, technological changes and globalisation. The further development and implementation of such a programme could be a strategic step that would allow for a deeper formation of future vectors of agricultural employment development, as it would allow for a positive effect on the country's budget, stable development of the national economy, and strengthening of the country's economic security and food independence.

3.3. Modelling the factors and level of employment in the agricultural sector at the regional level

Trends in the current agricultural labor market have a significant impact on the level of socio-economic development of the sector in both the individual region and the country as a whole, namely: production volumes, services, labor productivity, quality and well-being of the population are declining, rural areas are declining, their identity and color are being lost, etc.

The agricultural sector is experiencing a decline in the number of people employed in agriculture. The specificity of the agricultural sector is that agriculture determines the way of life of people living in rural areas. Although the rural society is gradually adapting to the changes that accompany market transformations, this adaptation is aimed mainly at

survival, not at the formation of a new way of life that would correspond to changes in the production sector [115, p. 48].

In view of this, the assessment of the main trends in the development of the agricultural labor market will in the future become a powerful basis during the development and implementation of measures that will contribute to the growth of the employment level, increase the share of the employed and increase the level of efficiency of the agrarian sector of the economy.

Sources of information on the size of the existing and permanent rural population (estimated) in the section of cities, districts, urban-type settlements of the Kharkiv region, the size of the permanent population by age, sex and place of residence, the average registered number of full-time employees in the field of agriculture, calculation of labor turnover indicators , demographic load and, ultimately, data from statistical yearbooks “Kharkiv Region”, “Cities and Districts of Kharkiv Region”, demographic yearbook “Population of Kharkiv Region” were used to analyze the labor force, estimate and model the level of employment and unemployment of the rural population in agriculture , statistical collection “Labor of the Kharkiv region”.

According to the statistical methodology, the employment rate shows the share of the employed population in the total population of the corresponding age group, and which is analyzed by gender and place of residence and by age groups. Employment abroad is not included in the employment estimates, as it does not contribute to the growth of the country’s GDP, and migrant workers are not part of the labor force.

We will conduct a comparative analysis of the employment level of the population of the Kharkiv region by gender and place of residence, by age group in 2020 (Table 3.7).

Analysis of the level of participation in the workforce allows us to draw the following conclusions. With an average employment rate of the population aged 15–70 in rural areas of 57.2%, it varies significantly by age group. This level is the lowest in the age group of 15–24 years, where the share of the employed population in the total number of persons of this age is 37.6%. It can be assumed that the main reasons for such a level can be education of young people in higher educational institutions, service in the Armed Forces of Ukraine, unemployment, the presence of persons with disabilities, as well as internal and external labor migration. However, only the 15-24 age group is the only one among the eight age groups in which the employment level of the population in rural areas

exceeds the average indicator for the region by 12%, in urban areas – by 14.5%.

Table 3.7

Comparative analysis of the employment rate of the population of Kharkiv region by gender and place of residence, by age group in 2020, %

Indicators	In total, at the age of		By age group							
	15 years and older	15-70 years old	15–24	25–29	30–34	35–39	40–49	50–59	60–70	71 and older
Total population	53,1	59,9	25,6	80,9	77,8	77,3	80,5	79,3	12,2	0,6
By gender										
- women	47,0	55,1	21,3	75,3	69,0	72,8	79,6	78,2	9,1	0,4
- men	60,3	65,2	29,5	86,0	86,3	81,6	81,4	80,6	17,0	1,0
By place of residence										
- urban area	54,1	60,5	23,1	86,0	78,0	78,2	80,7	79,9	13,5	0,7
- rural areas	48,9	57,2	37,6	60,0	76,8	73,0	79,8	76,6	6,7	0,3
Deviation of the rural employment rate from the (+,- %):										
- average in the region	-4,2	-2,7	+12,0	-20,9	-1,0	-4,3	-0,7	-2,7	-5,5	-0,3
- urban area	-5,2	-3,3	+14,5	-26,0	-1,2	-5,2	-0,9	-3,3	-6,8	-0,4

Source: calculated by the authors according to [46].

Rural youth have fewer opportunities both for further education after school and for external labor migration. For example, not having proper conditions for learning in schools (lack of computer classes, access to the Internet, insufficient knowledge of foreign languages, lack of opportunity to work with tutors due to the low level of income of parents) and receiving low scores from an external independent assessment, during admission to Rural children cannot adequately compete with graduates of urban schools in vocational schools.

In the age group of 25–29 years in rural areas, the level of participation in the workforce is only 60% and is characterized by a significant deviation from the average level for the region (-20.9%) and from the indicator for urban areas (-26%).

Multivariate econometric 135ounselli was used for an in-depth analysis of rural population employment factors. The task is to identify interdependencies between features using correlation-regression analysis (hereafter CRA). It is known that with the correlation type of connection, each value of the independent variable corresponds to several values of the dependent variable, and it is not known in advance which one it is. The convenience of correlation-regression analysis (CRA) is that this

statistical method will allow us to identify interdependencies between several characteristics. This method makes it possible to establish the very fact of the existence of a relationship (correlation analysis) and to find a mathematical function that determines it (regression analysis) [51, p. 207].

The main characteristic of the cor"elat'on relationship is the regression line, i.e. "the function that connects the average values of the resulting characteristic with the values of the independent variables. In KRA, the regression line is evaluated not at individual points, as in analytical grouping, but at each point of the interval of changes in the actual characteristic x" [228, p. 150].

There are regression models with one equation, systems of simultaneous equations, and time series models. Regression involves estimation of model parameters, statistical verification of the significance of equation parameters and indicators of closeness of connection, analysis of model adequacy. We used a one-equation regression model in which the dependent variable is represented as a function of the independent variables and parameters:

$$y = f(x_{1,}x_{2,\dots,}x_n) \tag{3.1}$$

Model specification consists in formulating a type of model based on the appropriate theory of the relationship between variables. Due to the difficulty of justifying the form of the relationship of the rural population employment indicator, we will use a multivariate linear regression equation, each parameter of which will have a certain economic meaning:

$$y_x = a_0 + a_1x_1 + a_2x_2 + \cdots + a_nx_n + e, \tag{3.2}$$

where y_x - theoretical values of the resulting characteristic; $a_0,\ a_1,\ a_2,\dots a_n$ - parameters of the equation; $x_1,\ x_2,\ \dots x_n$ - the value of factor characteristics, e – random variable, observation errors (includes the influence of factors not taken into account in the model, random errors and measurement features). The presence of a random variable in the model has three explanations: the specification of the model, the selective nature of the initial data, the peculiarities of the measurement of variables.

Individual regression coefficients of this equation $a_1\ a_2, \dots . a_n$ are partial regression coefficients [229, c.156]. They characterize the

influence of the relevant factor on the performance indicator at a fixed (eliminated) value of other factors. They show how, on average, the resulting characteristic y changes with a change in the corresponding factor characteristic by unit a, provided that other factor characteristics remain unchanged. The free term of equation (a_0)may not have an economic meaning and is not interpreted, since it is the beginning of the countdown and characterizes the theoretically expected value of the resulting characteristic under the condition that all factor characteristics are equal to zero.

The parameters of the multiple reg”essi’n equation are found by the method of least squares (LSM), the essence of which is to minimize the square of the difference (e) between the actual (y) and theoretically expected (yx) values of the outcome characteristic determined with the obtained partial regression coefficients:

$$\sum e_i^2 = \sum \left(y - \overline{y_x}\right)^2 \rightarrow \min . \quad (3.3)$$

The start of the countdown (a_0) and partial regression coefficients (a_i) are determined by solving the system of equations:

$$\begin{aligned}
&\sum y = na_0 + a_1\sum x_1 + a_2\sum x_2 + \ldots + a_n\sum x_n \\
&\sum yx_1 = a_0\sum x_1 + a_1\sum x_1^2 + a_2\sum x_1x_2 + \ldots + a_n\sum x_1x_n \\
&\sum yx_2 = a_0\sum x_2 + a_1\sum x_1x_2 + a_2\sum x_2^2 + \ldots + a_n\sum x_2x_n^2 \\
&\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \\
&\sum yx_n = a_0\sum x_n + a_1\sum x_1x_n + a_2\sum x_2x_n + \ldots + a_n\sum x_n^2
\end{aligned} \quad (3.4)$$

We determined the employment level of the employed rural population aged 15 years and older in the rural areas of 27 administrative districts of the Kharkiv region in 2020. To do this, we found the percentage ratio of the average registered number of full-time employees in the rural areas of a separate district aged 15 years and older to the number of the existing rural population of the same district of the specified age group. This indicator will further characterize the level of employment of the rural population and will be the dependent variable (y).

According to the theory of correlation analysis, it is necessary to comply with the requirements regarding the correspondence of the number of observations and the number of investigated features. The consequence of reducing the dimension by excluding non-essential

factors can be, on the one hand, the speed, efficiency and quality of the model, on the other hand, an insufficiently complete description of the studied process in the unified national accounting system. The optimal ratio between the number of factor characteristics included in the model and the volume of the studied population is considered to be the criterion when "the number of independent variables (x) is 3-4 times less than the volume of the studied population" [274, p. 264].

During the CRA, it is desirable to find as large a set of relationships between variables as possible. The Multiple Regression module of the STATISTICA software product allowed us to determine the intercorrelation coefficients for different combinations of factor characteristics for the study of their impact on the employment level of the rural population by the method of sorting through various equations. The general list of independent factors (k=9) included (a sample of indicators was carried out in the field of agriculture in the section of districts of the Kharkiv region in 2020):

1) average monthly salary of full-time employees (UAH),

2) level of hiring employees (%),

3) dropout rate (%),

4) labor force replacement rate (percentage ratio of the number of hired employees to the number of employees who left during the year),

5) the number of cattle per 100 hectares of agricultural land (head),

6) the ratio of potential demographic replacement per 100 people, or the ratio of children's workload (children aged 0–14 years per 100 people aged 15–64 years, people),

7) the pension burden ratio (per 100 persons aged 15-64)

8) the demographic support ratio (the number of the population aged 15–64 years per 100 people of the population aged 65 and over),

9) the ratio of the total demographic load per 100 people (the ratio of the total population aged 0–14 and 65+ to the number of working-age population aged 15–64, per 100 people).

We conducted a confluent analysis, that is, we studied a whole hierarchy of regressions between different combinations of variables. Analyzing regressions with a different number of factor characteristics, they established the "degradation effect" of regression coefficients, which manifests itself in the fact that when many variables that have linear relationships with each other (multicollinear variables) are included in the regression, the partial regression coefficients tend to return to those values they had in the equation with a smaller number of variables [275].

Confluent analysis indicates that in some cases meaningless results were obtained. This is evidenced by the inconsistency of the signs of the regression coefficients with theoretically put forward assumptions, unexplained changes in their values. The reason is that the regression equation taken in isolation is, so to speak, a "black box" model, since it does not reveal the mechanism of dependence of the output variable y (employment level of the rural population) from the input variables x_i, and only the fact of the existence of such dependence is ascertained.

Based on the change in the regression coefficients and the multiple coefficient of determination R^2 we have highlighted useful and redundant variables. A variable is considered useful when its inclusion significantly increases the overall coefficient of determination. Thus, as a result, the inclusion of six input variables in the multifactorial model of the level of employment of the rural population of the Kharkiv region in 2020 was justified. We believe that the model will be optimal with such a dimension, which will be checked in the future by various criteria and tests for the adequacy of the model. We adopted the following notations:

y – the level of employment of the rural population, %;
x_1 – average monthly salary of full-time employees, UAH;
x_2 – labor force attrition rate, %;
x_3 – labor force replacement rate, %;
x_4 – cattle population density, heads per 100 ha land;
x_5 – coefficient of potential demographic replacement per 100 people;
x_6 – coefficient of pension burden per 100 persons.

Calculations were carried out with the help of the software product, the integrated system of analysis and data management STATISTICA using the modules Basic Statistics (descriptive statistics), Multiple Regression (multiple regression), Anova/Manova (univariate and multivariate analysis) (Appendix H). The correctness of the model specification is confirmed by the analysis of intercorrelation coefficients (pairwise linear correlation coefficients between independent variables) (Appendix H.1). The analysis of intercorrelation coefficients shows that none of the six studied factors duplicates another. Their values do not exceed 0.7 and range from $r_{x_5x_6} = 0.034008$ to $r_{x_1x_3} = 0.59456$. Thus, all six factors were included in the multiple linear regression equation.

As we can see, the motivational part for employment in agriculture is represented by the wage rate. Necessary and excessive labor turnover

are represented by relative indicators of the level of attrition of the labor force and the ratio between the number of employees hired and those who leave (the labor force replacement rate). The productive part of agricultural production, the level of its intensity, is expressed by the density of cattle per 100 hectares of agricultural land. In addition, it is indirectly a characteristic of the level of development of the livestock industry and the social responsibility of agrarian business. The demographic block of employment factors of the rural population is represented by the ratio of different age groups, namely the number of children aged 0–14 years and persons of working age. As a result of the slowdown in the renewal of rural personnel, in practice there is an insufficient turnover of the workforce. Therefore, an independent variable was included in the rural population employment model, the coefficient of the pension burden, which is the ratio between the number of people older than working age and people aged 15–64 years. So, in the probable model, the theoretical dependence is based on the hypothesis that the level of employment of the rural population in the agriculture of the Kharkiv region in 2020 (y) is a function of the average monthly salary of full-time employees (x_1), level of employee attrition (x_2), labor force replacement rate (x_3), cattle density per 100 hectares of agricultural land (x_4), coefficient of potential demographic replacement per 100 people (x_5) and coefficient of pension burden per 100 persons (x_6).

On the basis of a spreadsheet with the results of a multivariate regression analysis, a multivariate model of the dependence of the level of employment of the rural population of the Kharkiv region in 27 districts of the Kharkiv region in 2020 on the average monthly salary, the level of attrition of the workforce, the labor force replacement rate, the density of cattle on 100 hectares of agricultural land, the coefficient of potential demographic replacement, the coefficient of pension burden per 100 people has the following form (Appendix H.2):

$$y_x = 64{,}95516 + 0{,}00234x_1 - 0{,}29394x_2 + 0{,}07492x_3 + 0{,}80999x_4 + 0{,}1473x_5 - 2{,}42905x_6. \quad (3.4)$$

The given econometric model describes the relationship between indicators. The economic content of the regression coefficient $a_1 = 0{,}00234$ is that if the average monthly salary of a full-time employee increases by UAH 1,000, the level of employment of the population in

agriculture increases by 2.34%, provided that the level of attrition of the workforce, the rate of its replacement, the density of cattle stock per 100 hectares of agricultural land, the coefficient of potential demographic replacement and the coefficient of pension burden remain at the average level.

Indicators of labor force replacement, cattle density and the coefficient of potential demographic load exert a similar influence on the level of employment. In particular, in only six districts of the Kharkiv region, the number of employed workers exceeds the number of dismissed workers, and the labor force replacement rate exceeds 100%. Therefore, an increase in this value by 1% contributes to an increase in the level of employment of the rural population by 0.07492% (assuming the average fixed value of the other five factors included in the multiple correlation-regression model).

Without the development of the livestock sector, an increase in the level of intensity of agricultural production, namely the number of cattle per 100 hectares of agricultural land, it is impossible to improve the issue of employment. The consequence of the increase in the density of animal stock is an increase in the level of employment by 0.80999%, provided that the average monthly salary of employees, the rate of attrition of the workforce, the rate of its replacement, the coefficients of potential demographic replacement and the pension burden remain at the average level.

In rural areas of the Kharkiv region in 2020, for every 100 people aged 15–64, there are an average of 22.7 people aged 0–14, and this indicator ranges from 19.64 to 27.12. On average, the corresponding figure for Ukraine is 19.4%. An increase in the coefficient of potential demographic replacement, or the coefficient of child burden, by 1% contributes to an increase in the level of employment of the rural population by 0.14730% (provided that other factors included in the correlation model remain at the average level).

The regression coefficient for factor x2 has a negative value and is $a_2=-0,29394$. This means that if the dropout rate increases by 1%, the employment level of the rural population decreases by 0.29394%. At the same time, the average monthly salary of full-time employees, the labor force replacement rate, the density of cattle stock per 100 hectares of agricultural land, the coefficient of potential demographic replacement and the coefficient of pension burden remain at an average level.

The largest absolute decrease in the level of 142ounseyment of the rural population of the Kharkiv region is due to the increase in the pension burden ratio. On average, in rural areas of the Kharkiv region, there are 29 people older than working age per 100 people of working age, in Ukraine – 22 people. In such districts of the Kharkiv region as Barvinkivskyi, Valkivskyi, Dvorichanskyi, Zmiivskyi, Zolochivskyi, Kolomatskyi, Pervomaiskyi, Pechenizi, this ratio varies from 30% to 34%. Regression coefficient a_5 shows that, given the average level of other factors included in the multiple correlation model, in the case of a 1% increase in the pension burden ratio, the employment rate decreases by 2.42905%.

For further comparison by the degree of influence on the dependent variable among the regression coefficients of the multivariate equation, which are different in economic content and have different units of measurement, we standardize them using beta coefficients. In a standardized form, the multiple regression model of the level of employment of the rural population is written as follows (Appendix H.2):

$$y_x = 0{,}262701x_1 - 0{,}164797x_2 + 0{,}102734x_3 + 0{,}30232x_4 + 0{,}018886x_5 - 0{,}517968x_6. \quad (3.5)$$

The standardized coefficient shows how many mean square deviations the resulting characteristic changes with an increase in the i-th factor characteristic by one mean square deviation. PPP STATISTICA itself applies the specified standardized coefficients. If the rest of the factors remain unchanged, then the level of employment of the rural population:

- increases by 0.262701 standard deviation if the average monthly salary increases by one standard deviation;
- the mean square deviation decreases by 0.164797 in case of an increase in the level of labor force dropout by one mean square deviation;
- the mean square deviation increases by 0.102734 if the labor force replacement rate increases by one mean square deviation;
- the mean square deviation increases by 0.30232 in case of an increase in the density of the cattle population by one mean square deviation;

- increases by 0.0.01886 mean square deviation in the case of an increase in the coefficient of potential demographic replacement by one mean square deviation;
- the mean square deviation is reduced by 0.517968 if the pension load factor increases by one mean square deviation.

Thus, the analysis of standardized beta coefficients showed that the greatest influence on the formation of employment in the village has the pension burden per 100 persons of the working population (β_{x1} =*-0,517968*), cattle population density per 100 hectares of agricultural land (β_{x4} =*0,30232*) and the income level of the rural population (β_{x1} =*0,262701*). In multiple correlation, for a more accurate assessment of the impact of each feature on the modeled indicator, without taking into account the interaction of factors with other features included in the correlation model, partial elasticity coefficients are used and Q-coefficients (Appendix H.3). The assessment of the impact of individual factors using elasticity coefficients and Q-coefficients is given in the table. 3.8.

Table 3.8

Assessing the impact of individual factors using elasticity and Q-coefficients

Factor	Average value	Variation index, %	Regression coefficient	Coefficient of elasticity	Q-coefficient
x_1	9281,96	15,91	0,00234	0,938	0,149235
x_2	32,18	22,95	-0,29394	-0,409	-0,093866
x_3	87,95	20,54	0,07492	0,285	0,058539
x_4	6,43	57,30	0,80999	0,225	0,128925
x_5	22,70	7,44	0,1473	0,144	0,010714
x_6	28,51	9,86	-2,42905	-2,991	-0,294913

Source: calculated by the authors.

Elasticity coefficients are relative indicators of the relationship between indicators and show how much the resulting characteristic will change in the event of a 1% change in the factor characteristic at a fixed value of other factors at any level. The elasticity coefficients given in the table show that:

- in the case of an increase in the average monthly salary by 1%, the employment level increases by 0.938% (subject to the stability of other factors);

- in the case of an increase in the level of labor force dropout by 1%, we have a reduction in the level of employment by 0.409% (subject to the constancy of other factors);
- in the case of a 1% increase in the labor force replacement rate, we have a relative increase in the employment level of 0.285% (assuming other factors remain constant).
- in the case of an increase in the level of intensity of development of the livestock industry (livestock density per 100 ha of agricultural land) by 1%, the level of employment of the rural population increases by 0.0.225% (subject to the stability of other factors);
- in case of an increase in the coefficient of potential demographic replacement by 1%, the relative increase in the level of employment is 0.144%;
- in the case of an increase in the pension burden ratio by 1%, the employment level decreases by 2.991%.

So, we receive confirmation of the previously made conclusion that the main factors affecting the employment level of the rural population of the Kharkiv region in 2020 are the aging of the rural population (the consequence of which is an increase in the pension burden on persons of working age), the level of average monthly income of employees, the indicator replacement of the labor force and revival of the livestock industry, intensification of the development of this branch of agriculture, which we characterize by the density of cattle.

An important condition for the application of correlation-regression analysis is the qualitative homogeneity of the investigated indicators, the approximation of their characteristics to the law of normal distribution. It makes it possible to take into account the degree of variation of the features included in the multivariate correlation model Q-coefficient, for the determination of which the product between the elasticity coefficient and the variation index is found (separately for each factor index). Calculation Q-coefficient did not fundamentally change the location of factors in the ranked series by the degree of influence on the level of employment of the rural population of the Kharkiv region. Of greatest importance Q-the coefficient is acquired by the variable – the coefficient of the pension burden (x_6) 0,295. This indicator, having the smallest degree of fluctuation, at the same time exerts the most significant influence on the level of employment according to the criterion of the coefficient of elasticity. Variable average monthly salary (x_1) Q=0,149,

which puts this factor in second place. The largest degree of fluctuation has the density of livestock per 100 hectares of agricultural land (x_4). More than a third of the districts of the Kharkiv region are not engaged in livestock development (10 districts out of 27). Therefore, due to the high value of the variation indicator, this factor comes in third place after Q-coefficient – 17,2%.

The significance of the regression coefficients for t-test (t-criterion of Student) evaluated in the column$t(20)$ in Appendix H.2. We see that for three of the six factors, the actual value of the Student's criterion is higher than the theoretical one, established according to the mathematical table "Table of critical values *t*- criterion of Student». At a significance level of 0.05 $t_{табл}$ it is 2,09. That is, there are factors that have passed the materiality test:

1) average monthly salary of full-time employees $t_{0.05} = 2.09 < 3.15598$;

2) average monthly salary of full-time employees$t_{0.05} = 2.09 < 3{,}59664$;

3) pension load factor $t_{0.05} = 2.09 < 4{,}91622$

Therefore, partial regression coefficients $a_1 = 0{,}00234$, $a_4 = 0{,}80999$ та $a_6 = -2{,}42905$ can be considered significant at the level 0,05 accotding to t-criterion of Student.

The next step of the research is to assess the quality of the regression model of employment of the rural population, to check its adequacy using a system of criteria, which will allow us to draw a conclusion about the practical significance of the model of the level of employment of the rural population of the Kharkiv region.

Let's evaluate the reliability of the model and estimates of its parameters. The multiple (cumulative) correlation coefficient is $R = 0.69019559 \approx 0{,}69$ (Appendix H.2). On the basis of the Chaddock scale, we will give a qualitative characteristic of the degree of connection between variables by the quantitative value of R. The multiple correlation coefficient indicates the existence of an average and close linear relationship between the level of employment of the rural population of the Kharkiv region, the average monthly wage, the level of attrition and replacement of the workforce, the density of the cattle population, the coefficients of potential demographic replacement and the coefficient of the pension burden.

Let's estimate the significance of the level of the multiple correlation coefficient using F - Fisher's test. According to add. H.2 actual value F - Fisher's criterion is 3,543325. According to the special mathematical table "Value F with a probability of 0.95» determine the tabular value F - Fisher's test:

$$F_{табл} = F_{\alpha;p;n-k-1} = 2{,}60 \quad (3.6)$$

$$F_{(6,20)} = F_{факт} = 3{,}543325 > F_{\alpha;p;n-k-1} = 2{,}60 \quad (3.7)$$

Since the actual value of Fisher's criterion is greater than the tabular equation of the linear multiple regression of the employment level of the rural population of the Kharkiv region in 2020, it can be considered statistically significant at the level of significance $\alpha = 0.05$. The equation of the multiple regression of the indicator of employment of the rural population of the Kharkiv region is significant for F - test at the significance level of 0.05 and degrees of freedom of variation (6, 20) and can be used for forecasting.

The degree of relationship between variables reflects the multiple (cumulative) coefficient of determination $R^2 = 0.47636996 \approx 0{,}476$, which shows the proportion of changes in the values of one variable associated with changes in the values of other variables. The variation in the level of employment of the rural population of the Kharkiv region by 47.6% is caused by the influence of factors included in the econometric model (average monthly wages, dropout rate, labor force replacement rate, density of cattle, heads per 100 ha of agricultural land, coefficient of potential demographic replacement per 100 persons, pension burden ratio per 100 persons). Factors not taken into account in the study account for 52.4%.

A disadvantage of the multiple coefficient of determination is that it tends to increase when new factors are added, although this does not necessarily mean an improvement in the quality of the regression model. Unlike R^2, adjusted ratio R^2 can decrease when introducing new factors into the model that do not have a significant impact on the dependent variable. Therefore, it makes sense to use the adjusted (adapted R_a^2, corrected, adjusted) coefficient of determination (appendix H.2):

$$R_a^2 = 1 - \frac{n-1}{n-p-1}(1 - R^2) = 1 - \frac{27-1}{27-6-1}(1 - 0.4764) \approx 0{,}319 \text{ або } 31{,}9\%. \quad (3.8)$$

Thus, the value of the adapted coefficient of determination shows that the employment level of the rural population of the Kharkiv region depends on the factors included in the multifactorial correlation-regression model by 31.9%.

To assess the quality of the multivariate regression model of the employment level of the rural population, we tested it for multicollinearity. Multicollinearity always exists in multiple regression models. The question is only the degree or level of multicollinearity. It complicates the study of the influence of individual factors on the resulting characteristic, significantly reduces the accuracy of regression coefficient estimates (their standard errors become too large), because the interaction of collinear factors in the model will double and distort the results. In our study, the higher the collinearity, the less reliable will be the indicators of the influence of individual factors on the level of employment of the rural population of the Kharkiv region.

The theoretical consequences of multicollinearity are high correlation between independent variables, instability of model coefficients, a significant change in model parameter estimates with a small change in the original data (for example, adding new observations), large standard errors, low significance of parameter estimates, while the model as a whole is significant (high the value of the coefficient of determination and the corresponding F-statistic); incorrect, from the point of view of the theory, signs or unreasonably large values of parameter estimates. If a significant level of collinearity of factors is detected, one of a pair of interrelated factors is excluded, or some of their functions are taken as an explanatory factor.

Testing for the presence of multicollinearity was performed using Glauber and Farrar's F-test. The presence of multicollinearity indicates that one or more factors are related to each other by a linear or approximately linear relationship. F-ratio (F-test) was calculated for each coefficient of determination:

$$F_i = \frac{\frac{R^2_{x_i x_1 \dots x_p}}{p-1}}{\frac{1-R^2_{x_i x_1 \dots x_p}}{n-p}} = \frac{R^2_{x_i x_1 \dots x_p}}{p-1} \cdot \frac{n-p}{1-R^2_{x_i x_1 \dots x_p}}, \quad (3.9)$$

where n – number of observations, p – the number of factors.

The F-test tests the null hypothesis that the coefficient of determination is 0. Calculated F-test values were compared to critical

values found in tables of Fisher's F-distribution with degrees of freedom $v_1 = p - 1$ і $v_2 = n - p$ and a given level of significance. If the actual value of the criterion is less than the table value, then the null hypothesis is not accepted and the specific factor is not accepted x_i is not multicollinear.

In its initial form, the correlation model of the level of employment of the rural population of the Kharkiv region provided for a larger number of independent variables. As a result of testing the level of multicollinearity, it was established that two pairs of factors turned out to be collinear: the labor force exit rate by admission and the labor force replacement rate; the second pair is the coefficient of potential demographic replacement (the number of persons aged

0–14 years per 100 persons of the population aged 15–64 years) and the coefficient of the total demographic load (the number of persons of the age groups 0–15 years and 65 and older per 100 persons of the population aged 15–64 years). Due to the presence of an interfactor correlation, the following independent variables were extracted from the pairs of interrelated independent variables: the dropout rate of the labor force by admission and the coefficient of the general demographic burden (the number of persons in the age groups 0–15 years and 65 and older per 100 persons population aged 15–64). Therefore, six factors remained for testing the presence of multicollinearity in the model of the level of employment of the rural population. Determination of the tightness (density) of the regression relationship was carried out by constructing an auxiliary regression (that is, a model of the dependence of each factor *x* from all other factors) and calculation of the corresponding coefficient of determination R^2 for this auxiliary equation. The coefficient of determination connects each individual factor with others included in the correlation model (there will be as many of them as there are factors). Next, an F-test was determined for each coefficient of determination.

Determining the level of multicollinearity in its content is close to testing its presence. Since a six-factor regression model was built in our study, the analysis of paired correlation coefficients between independent variables based on the data of the matrix of paired correlation coefficients of the main model of the level of employment of the rural population is not enough to determine multicollinearity. To determine the degree of multicollinearity, we calculated the value of the variation-inflation factor (dispersion-inflation factor) VIF for each variable:

$$VIF_i = \frac{1}{1 - R_i^2}. \quad (3.10)$$

Researchers use values VIF_i=10 as critical. If $VIF_i \le 10$, then it can be argued about the insufficiency of the connection between *i* factor and all others. If $VIF_i \ge 10$, then this indicates the presence of multicollinearity. On the basis of Appendix J. Let us summarize the results of constructing auxiliary regressions for testing the level of multicollinearity of the correlation-regression model of the level of employment of the rural population of the Kharkiv region (Table 3.9).

Table 3.9

Results of building auxiliary regressions and testing the level of multicollinearity by the Glauber-Farrar F-test and VIF-test

Results	Independent variables					
	x_1	x_2	x_3	x_4	x_5	x_6
Coefficients of auxiliary regressions:						
a_1	-	-0,0009	-0,0077	0,0012	-0,0003	-0,0005
a_2	-21,33	-	-0,0699	0,0971	-0,0143	-0,1178
a_3	-45,91	-0,0179	-	-0,0196	-0,0311	-0,0486
a_4	76,08	0,2590	-0,2049	-	-0,0879	-0,0194
a_5	147,90	-0,2829	-2,4025	-0,6502	-	-0,2352
a_6	-88,05	-0,8468	-1,3675	-0,0522	-0,0857	-
Cumulative correlation coefficient for the i-th factor, $R_{xi....xn}$	0,590	0,370	0,453	0,519	0,404	0,412
Coefficient of total determination for the i-th factor, $R^2_{xi...xn}$	0,348	0,137	0,205	0,270	0,163	0,170
Glauber-Farrar F-test* $F_i = \frac{R^2_{x_i x_1 ... x_p}}{p-1} \cdot \frac{n-p}{1-R^2_{x_i x_1 ... x_p}}$	2,2454	0,6655	1,0838	1,5514	0,8197	0,8608
Dispersion and inflationary factor $VIF_i = \frac{1}{1-R_i^2}$	1,5337	1,1587	1,2579	1,3699	1,1947	1,2048

*Table value of $F_{0.05} = 2,60$.
Source: calculated by the authors.

Thus, due to the removal of collinear factors, there are no close relationships between the remaining factors, and the relationship of the dependent variable by factor characteristics is high.

The actual values of the employment level of the rural population in the districts of the Kharkiv region differ from the theoretical values calculated by the multiple regression equation $y_{x_{1...n}}$ (appendix H.4). The smaller this difference, the closer the theoretical values are to the empirical data, the better the quality of the built model. The magnitude of the deviations of the actual and calculated values of the result characteristic $(y - y_{x_{1...n}})$ for each observation represents the error of approximation. These deviations $(y - y_{x_{1...n}})$ are not compared with each other, except for the value equal to "0". Their number corresponds to the total volume. For comparison, the values of deviations expressed as a percentage of the actual values of the resulting characteristic are used. Because $(y - y_{x_{1...n}})$ can be both a positive and a negative value, then the approximation errors for each observation are usually expressed as a percentage modulo. Deviation $(y - y_{x_{1...n}})$ can be considered as the absolute error of approximation, and $\frac{|y - y_{x_{1...n}}|}{y} \cdot 100$ - as the relative approximation error. To check the quality of the multiple regression model, the average error of approximation is determined from the relative deviations for each observation. The value of the average relative approximation error should not exceed 12–15% [263]. For the multiple model of employment of the rural population constructed by us, the average relative error of approximation is (Appendix H.4):

$$\bar{\varepsilon} = \frac{1}{n}\sum \frac{|y - y_{x_{1...n}}|}{y} \times 100 = \frac{380{,}3}{27} = 14{,}1\ \%. \qquad (3.11)$$

The value of the average approximation error is 14.1<15. This indicates that the straight-line multiple regression model of employment of the rural population of the Kharkiv region passed the adequacy test. The calculated theoretical values of the resulting characteristic correspond to the empirical data.

The next stage of the research is the analysis of the structure of the correlation dependence of the employment level of the rural population of the Kharkiv region (Table 3.10).

Using the matrix of paired correlation coefficients and β-coefficients, we will decompose the aggregate coefficient of determination ($R^2 = 0.4764$) on individual factors. To do this, we define

the coefficient of separate determination (or coefficient of influence) as the product between the corresponding paired correlation coefficient and β - coefficient.

Table 3.10

Analysis of the structure of correlation dependence of the level of employment of the rural population of Kharkiv region in terms of causality, 2020

Independent variables	Standardized regression coefficient β_{yx_j}	Pairwise correlation coefficient, r_{yx}	Coefficient of separate determination (coefficient of influence) $d_j^2 = \beta \cdot r_{yx_j}$	The relative share of the factor, %
x_1	0,262701	0,372741	0,092207	9,22
x_2	-0,164797	0,037412	0,005806	0,58
x_3	0,102734	-0,065658	0,006352	0,64
x_4	0,30232	0,404457	0,115142	11,51
x_5	0,018886	-0,097709	0,001738	0,17
x_6	-0,517968	-0,523065	0,255125	25,51
Total	x	x	**0,476370**	**47,64**

Source: calculated by the authors.

The analysis of the correlation dependence structure confirms the conclusions made earlier regarding the three strongest factors. The most significant factor affecting the level of employment of the rural population of the Kharkiv region is the pension burden ratio, i.e. the number of people over the working age (65 years and older) per 100 people of the working age (15–64 years). This factor accounts for 25.51% of the total variation of the result characteristic. The second in the rating of factors is the density of cattle stock per 100 hectares of agricultural land, the specific weight of which is 11.51%. The third, with a share of 9.22%, is the average monthly salary of full-time employees. The total share of the other three factors is 1.4%.

Let's summarize the obtained estimates of the parameters of the multiple linear regression model of the level of employment of the rural population of the Kharkiv region (Table 3.11).

Thus, the mathematical model of the level of employment of the rural population in the districts of the Kharkiv region in 2020, synthesized according to the equation of a straight line, on the basis of its verification according to Fisher's -criterion and the average error of approximation, is generally adequate and recognized as statistically significant at the level

of significance. The obtained actual values of Student's criteria indicate the statistical significance of three of the six independent variables included in the model: the average monthly salary of full-time employees, the coefficient of the pension burden, the density 152ounsellik per 100 hectares of land. They are the ones that passed the materiality test.

It has been proven that the most significant factors affecting the employment level of the rural population are the pension burden ratio (persons older than working age, i.e., 65 years and older, per 100 persons aged 15–64), the number of cattle per 100 hectares of agricultural land, the average monthly salary of full-time employees in the field of agriculture. The share of these factors is, respectively, 22.51%, 11.51% and 9.22% of the total variation of the dependent variable.

Table 3.11

Estimation of the parameters of a linear multiple regression model of the level of employment of the rural population of Kharkiv region in 2020

Factor	Regression coefficient a_i	Student's t-test $t_{0.05} = 2.09$	Elasticity coefficient, E_{x_i}	Q - coefficient	Standardized regression coefficient β_{yx_j}	The structure of correlation dependence, %
x_1	0,00234	3,15598	0,938	0,149235	0,262701	9,22
x_2	-0,29394	-0,94627	-0,409	-0,093866	-0,164797	0,58
x_3	0,07492	0,47707	0,285	0,058539	0,102734	0,64
x_4	0,80999	3,59664	0,225	0,128925	0,302320	11,51
x_5	0,1473	0,10676	0,144	0,010714	0,018886	0,17
x_6	-2,42905	-4,91622	-2,991	-0,294913	-0,517968	25,51
Multiple (cumulative) correlation coefficient, R					0,690	
Multiple (cumulative) coefficient of determination, R^2					0,476	
Adjusted (adapted) multiple coefficient of determination					0,319	
F -Fisher-Snedekor criterion					3,543325	
Average approximation error, $\bar{\varepsilon}$					14,1	

Source: calculated by the authors.

Thus, the mathematical model of the level of employment of the rural population in the districts of the Kharkiv region in 2020, synthesized according to the equation of a straight line, based on its verification by F - Fisher's test and the average error of approximation are generally adequate and recognized as statistically significant at the level of significance $\alpha = 0.05$. Actual values of Student's t-criterion indicate the statistical significance of three of the six independent variables included

in the model: the average monthly salary of full-time employees, the coefficient of the pension burden, the density of livestock per 100 hectares of land. They are the ones that passed the materiality test.

It has been proven that the most significant factors affecting the employment level of the rural population are the pension burden ratio (persons older than working age, i.e., 65 years and older, per 100 persons aged 15–64), the number of cattle per 100 hectares of agricultural land, the average monthly salary of full-time employees in the field of agriculture. The share of these factors is, respectively, 22.51%, 11.51% and 9.22% of the total variation of the dependent variable.

The multiple regression model of the level of employment of the rural population can be used for practical purposes and making forecasts. To predict the level of employment of the rural population, we applied the theoretical provisions of a small sample and calculated predictive values based on reliable intervals for each of the independent variables of the correlation-regression model of the level of employment of the rural population of the districts of Kharkiv region. The center of the interval estimation of the input data of the correlation-regression model is the sample point estimate, and the determination of the interval boundaries is related to the average estimation error and the reliable probability. Interval estimation is a supplement and extension of the point estimation of the corresponding parameter.

The algorithm for finding an inter”al e’timate, which contains the desired parameter with a given probability, is as follows:

1) for each factor characteristic, we determine the variance adjusted for the Bessel correction factor ($\frac{n}{n-1}$) to eliminate the offset error.

$$S^2 = \sigma_0^2 \frac{n}{n-1} = \frac{\sum(x-\tilde{x})^2}{n} \cdot \frac{n}{n-1} = \frac{\sum(x-\tilde{x})^2}{n-1}, \qquad (3.12)$$

where S^2– adjusted sample variance of the corresponding factor characteristic; σ_0^2 – the actual sample variance; $\tilde{x}$ – sample arithmetic mean; *n* – number of population units. The mathematical reliability of the corrected variance for any sample size is equal to the general variance.

2) we determine the average sampling error:

$$m = \sqrt{\frac{S^2}{n}}, \qquad (3.13)$$

3) we set a probability level of 0.95, which is considered sufficient in static practice. This means that only in five cases out of 100 the error can exceed the specified dimensions. According to the table "The value of the integral of probabilities at different values *t* based on the probability level of 0.95, we find out the value of the normalized deviation: *t=1,96*.

4) we determine the marginal parcel of the sample for the average value of the corresponding factor characteristic of the correlation model:

$$\Delta_{xi} = tm. \quad (3.14)$$

5) establish a reliable interval for the average value of the factor characteristics of the correlation-regression model:

$$I_p = (\tilde{x} - \Delta; \tilde{x} + \Delta), \quad (3.15)$$

The results of the calculations are shown in the table. 3.12.

Table 3.12

Interval Estimation of Factor Attributes of the Correlation Model of Rural Population Employment in the Districts of Kharkiv Region

Factor attributes	Point estimate	Adjusted sample variance	Average error	Marginal sampling error	Reliable interval of the factor attribute
	$\tilde{x}$	S^2	m	Δ_{xi}	$(\tilde{x} - \Delta; \tilde{x} + \Delta)$,
Average monthly salary of full-time employees, x1	9281,96	2263657,67	289,55	567,52	[8714; 9849]
Labor force attrition rate, x2	32,18	56,66	1,45	2,84	[29; 35]
Labor force replacement rate, x3	87,95	338,95	3,54	6,94	[81; 95]
Density of cattle population, x4	6,43	24,18	0,95	1,85	[5; 8]
Potential demographic replacement rate, x5	22,70	2,96	0,33	0,65	[22; 23]
Pension burden coefficient, x6	28,51	8,20	0,55	1,08	[27; 30]

Source: calculated by the authors.

It was established that with a probability of 0.95 it is possible to guarantee that the difference between the sample average and the general average of the average monthly salary will not exceed UAH 567.52, the level of attrition of the labor force is 2.84%, the rate of replacement of the

labor force is 6.94%, the density cattle population – 1.85, coefficient of potential demographic load – 0.65%, coefficient of pension load – 1.08%.

Using interval estimates of the factor characteristics included in the multiple correlation model and substituting their values into the regression equation, which is significant for F - test at a significance level of 0.05 and can be used for forecasting, we calculated a reliable interval of theoretically expected values, in which the value of the employment level of the rural population may lie (Table 3.13).

Table 3.13

Reliable interval of forecast values of the level of employment of the rural population in Kharkiv region

Factor attributes	Reliable interval of values of factor attributes		Forecast values of the employment rate according to the model, %. $Y_x=64,95516+0,00234x_1-0,29394x_2+0,07492x_3++0,1473x_5-2,42905x_6$	
	lower limit	upper limit	at the min values of the reliable interval	at the max values of the reliable interval
x_1	8714	9849	15,5	30,9
x_2	29*	35*		
x_3	81	95		
x_4	5	8		
x_5	22	23		
x_6	27*	30*		

* - inverse relationship between factors and employment rate

Source: calculated by the authors.

Thus, with a probability of 0.95, it can be stated that the forecast level of employment of the rural population of the Kharkiv region will range from 15.5% to 30.9%.

2020.21. Improving the institutional environment for the implementation of the organisational and economic mechanism of employment regulation

The development of measures to support the development of human capital in agriculture and its rational use is crucial both for the development of the sector and for the development of the national economy. The study has shown that the agricultural employment market is in an uncertain environment and faces problems of human capital formation and reproduction in rural areas. To achieve and maintain an

optimal ratio and balance in the agricultural labour market, ensure the development of human capital, and adhere to the principles of decent work, government measures are important.

We fully agree with the view of H.P. Pasemko and O. Amosov that state regulation in general should be viewed as the art of organising behaviour that will meet a specific goal and consist of certain actions aimed at neutralising existing differences [4]. We believe that the state, subject to consensus and mutually coordinated cooperation with stakeholders (employees – business – the state), is able to develop a framework based on established rules, methods, and principles to ensure sustainable development of the labour market, including the agricultural one. It is a reasonable opinion that the level of social solidarity, citizens' self-awareness, the level of development of civil society, its trust in the government, together with the competence of state structures, competent, thoughtful and consistent policy of the government of the country are the key to minimising negative global trends affecting the labour market [39, p. 177].

It is undeniable that employment regulation plays an important role in the implementation of public policy. This is primarily due to the fact that the current state of the labour market is a litmus test that reflects the level of socio-economic development of the country and the effectiveness of measures taken by the state to address social problems. We agree with the statement that "the employment policy should be subordinated to the main strategic task – to provide every able-bodied member of society not with a job at all, but with the opportunity to develop and realise their potential to the greatest extent possible, while receiving a decent remuneration for their work" [82, p. 77].

At the same time, the development of an institutional mechanism for regulating employment in the agrarian sector of the economy should begin with defining the main goal of the state policy of employment regulation, outlining its tasks, identifying and developing current and long-term employment development programmes, regulating the interests of labour market actors, stimulating and motivating the development of agrarian employment, monitoring and analysing the results of the effectiveness of the measures taken by the state.

The state is the main intermediary and coordinating entity in the labour market and carries out its activities using various methods of influence: legal, economic, social, organisational, aimed at the full use of the country's labour potential, appropriate development of human capital,

ensuring equal rights and freedoms of citizens and their social protection. In our opinion, the state policy in the field of agricultural employment is an important instrument of influence, which includes systematic and targeted measures to regulate human capital in order to ensure optimisation of the labour market, which includes a number of levers used by the state to influence the object of regulation and achieve the main goal – socio-economic growth and development of the state.

At the legislative level, the state employment policy is based on certain principles, namely: priority of ensuring full, productive and freely chosen employment in the process of implementing the active socio-economic policy of the state; responsibility of the state for the formation and implementation of the employment policy; ensuring equal opportunities for the population in the exercise of the constitutional right to work; promoting the efficient use of labour potential and ensuring social protection of the population from unemployment [189].

In our opinion, the principles of proactivity and subsidiarity should be added to this list of principles. The principle of proactivity means that the state conducts a "game of advance", i.e., makes scientifically based forecasts of the development of the situation on the labour market, changes in its conditions and determines, on this basis, specific directions and measures that will ensure maximum efficiency in the implementation of the outlined measures, programmes, etc. At the same time, the principle of subsidiarity is very important, as the essence of this principle is that the defined goals, objectives and benchmarks should be integrated at all levels of public administration in order to form a holistic organisational and economic mechanism for employment regulation. The analysis of the main theories of employment has revealed that there are different views on the role and place of the state in regulating the labour market, which were influenced by different stages of development and formation of the socio-economic system (Figure 3.17).

We believe that the role of the state in regulating employment is undeniably important. However, it is necessary to strike a balance between state influence and labour market self-regulation so that state regulators do not hinder labour market self-regulation, but rather help to improve the competitiveness of the labour force, increase its mobility and contribute to the welfare and living standards of the population.

Therefore, this issue requires a clear, scientifically based study in order to provide basic proposals for improving the effectiveness of state policy and determining its place in the organisational and economic

mechanism for regulating employment in the agricultural sector of the economy.

The functional content of the State policy in the area of employment regulation represents the sustainable areas of the State's activity aimed at regulating and coordinating processes in the modern labour market and reflecting the main means of regulating this area of production relations. The functions are performed by public authorities, their list and content are determined by objective reasons for state intervention in the regulation of labour market processes.

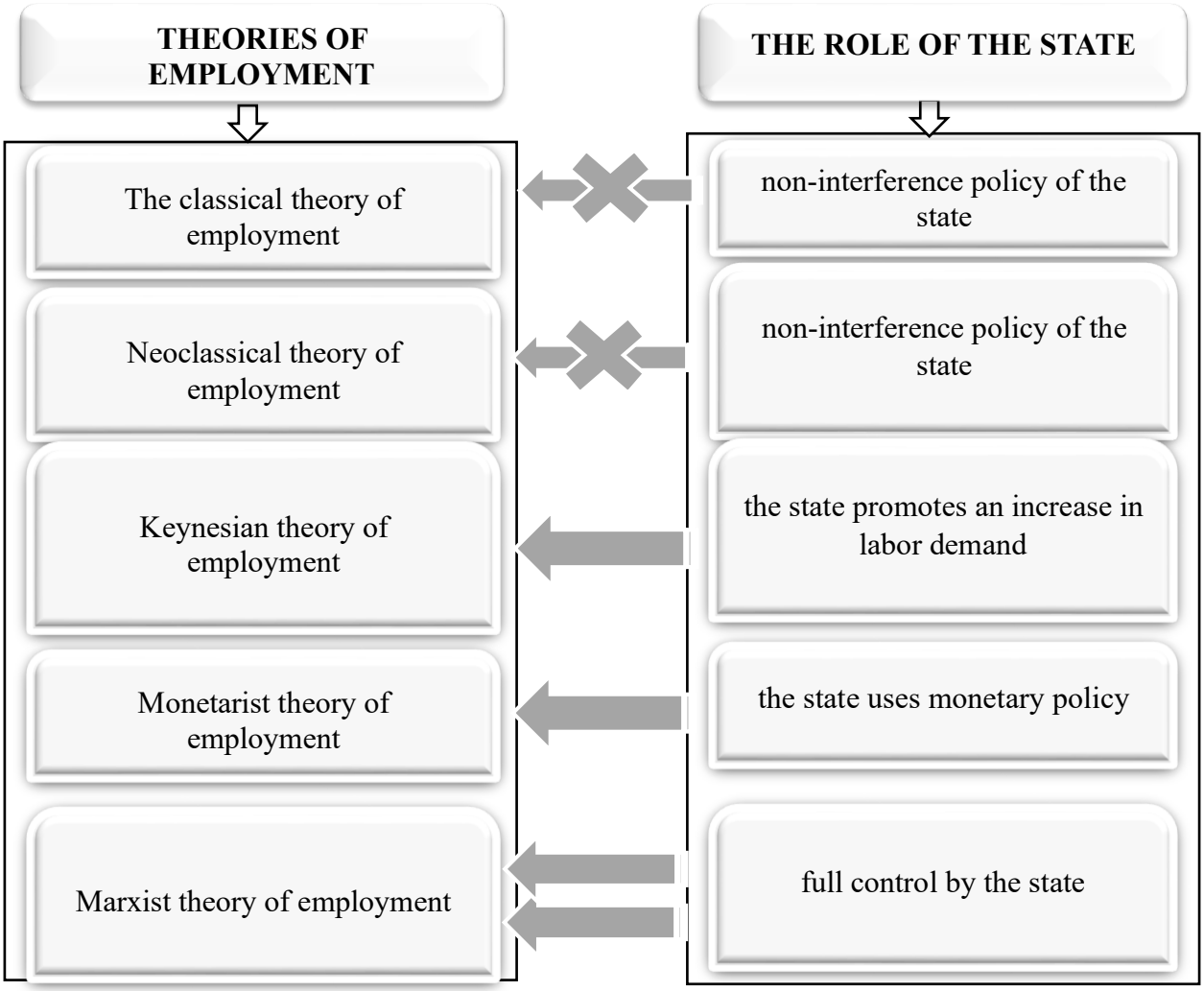

Fig. 3.17. Comparative characteristics of the role of the state according to the main theories of employment

Source: compiled by the authors.

Considering public policy as a complex system, functions are a necessary characteristic of this system [20, p. 226]. Based on the analysis

of scientific works, we have summarised and supplemented the main functions of the state employment policy (Fig. 3.18).

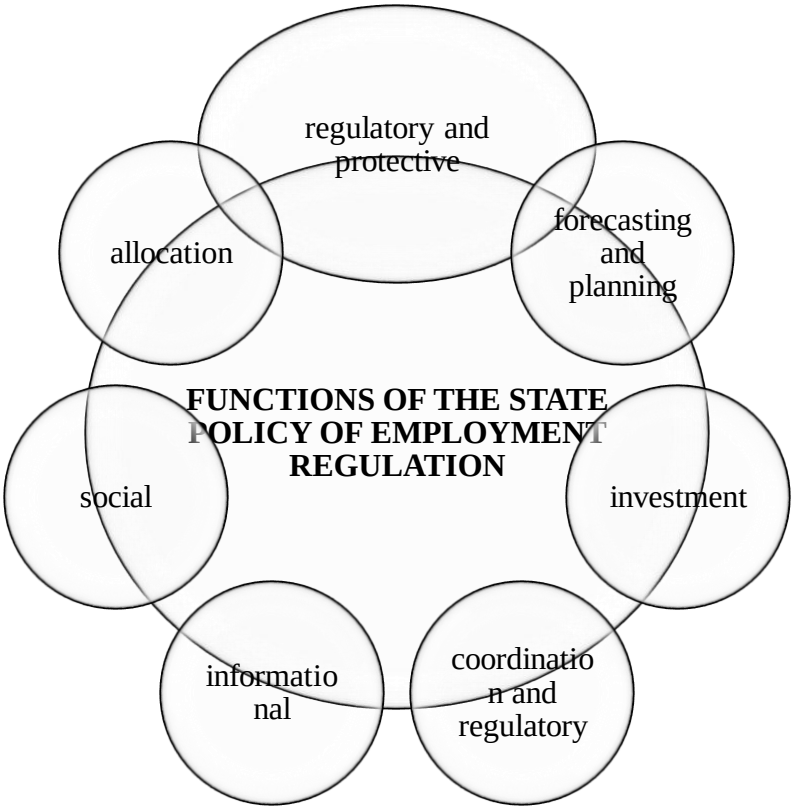

Fig. 3.18. Functions of the state policy of employment regulation

Source: compiled by the authors.

At the current stage of development of the labour market, the following functions of state policy can be distinguished:

- regulatory and protective – the state ensures the establishment and availability of a legal framework in the field of labour relations regulation by adopting regulations aimed at creating a system of rights protection for all labour market participants;
- Forecasting and planning – the state is the developer of targeted programmes that include forecasts and plans for the development of the labour market of the state;
- investment – the state ensures the implementation of investment policy, which will create preconditions for the development of human capital;
- coordination and regulation – the state promotes balance in the labour market and its proportional development;

- informational – the state provides all labour market participants with up-to-date information, provides information and advisory support, and carries out career guidance activities;
- social – the state creates conditions for social development and restoration of human capital, implements a set of social protection measures in the field of employment;
- allocative – the state policy is aimed at fair distribution of the results of socio-economic development, which contribute to a balanced level of supply and demand in the market.

However, it should be noted that the above list of functions of the State policy of employment regulation is not exhaustive and can be supplemented in accordance with the whole variety of functions. The position of S.I. Bandur and O.A. Kovenska seems to be promising, as they note that the performance of their functions by the subjects of state regulation in an accumulative form should be reflected in the most important aspects of their regulatory impact on the labour market: technological, geopolitical, economic, institutional, social, and regional [13, p. 12].

Scientists also propose parameters for assessing each of the proposed aspects of state regulation of the labour market, namely: technological aspect, economic aspect, institutional aspect, social aspect, regional aspect [13, p. 12].

The state should focus not only on labour relations, but also analyse other types of state policy: investment, financial, demographic, social, etc., which may directly and indirectly affect employment.

According to the purpose of our study, agrarian policy is of great importance, as it should be aimed at the development of the agricultural sector, which will become an imperative for the development of the agricultural labour market (creation of new jobs, development of social infrastructure) and an important element in building an institutional mechanism for regulating employment in the agricultural sector of the economy.

State regulation of employment is influenced by regulatory elements that form a system of regulatory, economic, social and organisational measures, forms and methods. These elements cover the factors (drivers) of employment and can positively influence the regulation of the employment process.

The institutional mechanism of employment regulation is implemented by formal and informal institutions. Formal top-level institutions include the Verkhovna Rada of Ukraine, the Cabinet of Ministers of Ukraine, the Ministry of Economy, and the Ministry of Agrarian Policy and Food of Ukraine. Each of them performs and implements certain functions and tasks within the limits of its powers.

The main actors of the formal institution of state regulation of senior employment in Ukraine are shown in Figure 3.19.

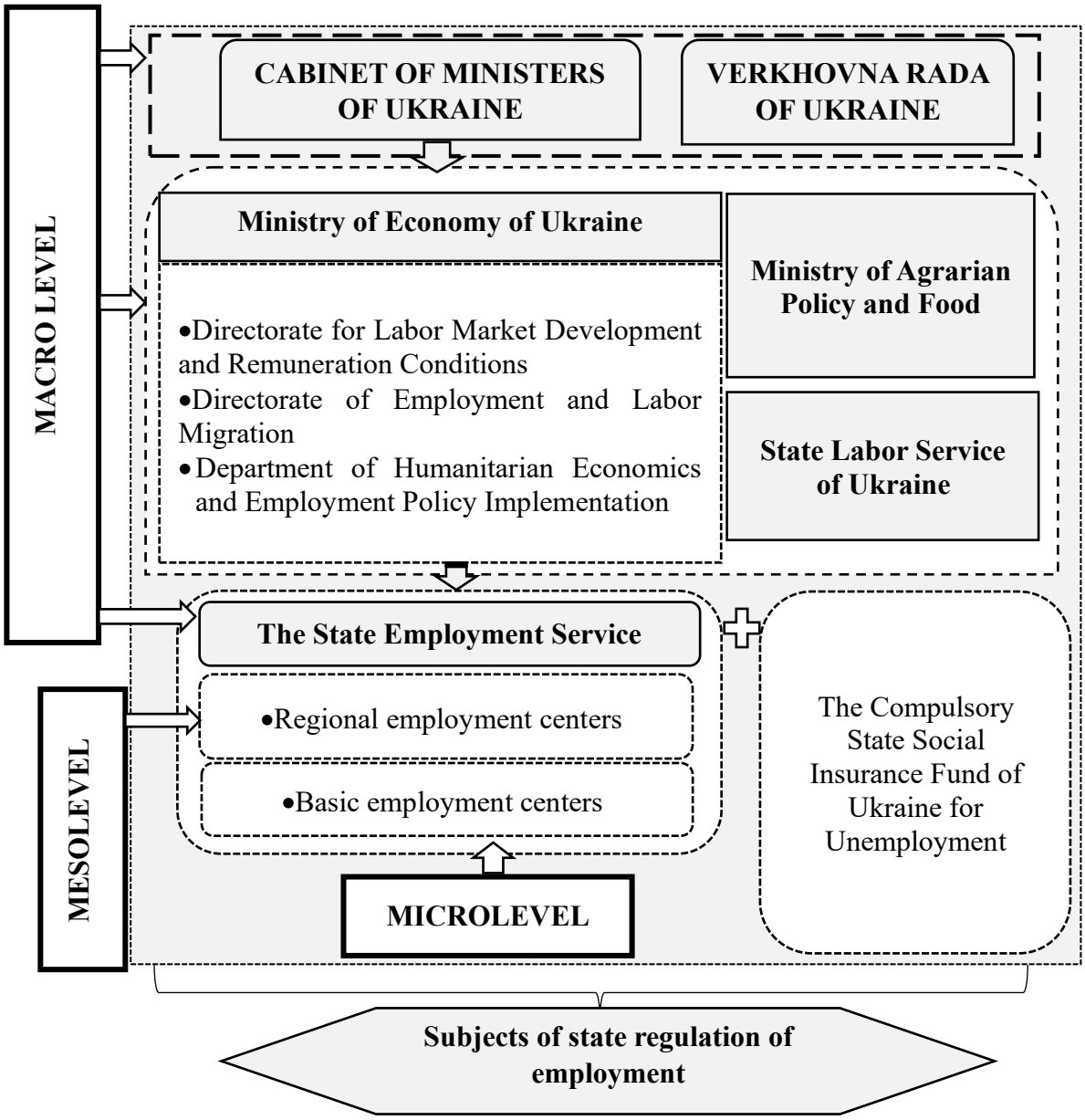

Fig. 3.19. Subjects of the regulatory policy of employment regulation in Ukraine

Source: compiled by the authors.

The Verkhovna Rada of Ukraine, as the supreme state authority in the field of employment regulation, is responsible for defining the main directions of employment regulation by adopting a number of regulatory legal acts and systematically reviewing and amending them.

The Cabinet of Ministers of Ukraine ensures the development and approval of the main directions of implementation of the state policy in the sphere of employment for the medium term, which define the ways and means of solving employment problems and provide for measures to consolidate the efforts of all parties to the social dialogue aimed at regulating the processes taking place in the labour market in order to increase the level of employment [189].

The Ministry of Economy of Ukraine"is a'central executive body that ensures the formation and implementation of state policy in the field of labour, employment, labour migration, labour relations, and social dialogue [185]. The Ministry's organigram identifies the following units responsible for employment regulation: the Directorate for Labour Market Development and Remuneration Conditions, the Directorate for Employment and Labour Migration, the Department for Humanitarian Economics and Employment Policy Implementation.

It is also one of the central executive authorities that implements the state policy on supervision and control over compliance with legislation on labour, employment, compulsory state social insurance against industrial accidents and occupational diseases that caused disability, temporary disability, unemployment in terms of appointment, calculation and payment of benefits, compensation, provision of social services and other types of material support in order to comply with the law. The activities of this Service are directed and coordinated by the Cabinet of Ministers of Ukraine through the First Vice Prime Minister of Ukraine – Minister of Economy.

The Ministry of Agrarian Policy and Food of Ukraine develops and implements state agricultural policy, state policy in the fields of agriculture, etc. According to the Regulations governing this Ministry (approved by the CMU on 17.02.2021), it is not explicitly stated that its powers include the implementation of the formation of a mechanism for regulating employment in the agricultural sector of the economy [67]. However, the approved Concept of the State Targeted Programme for the Development of the Agrarian Sector of the Economy for the Period up to 2022 defines the development and implementation of directions for the development of the agricultural sector of the economy within the

framework of the Programme on the basis of optimising its production and social infrastructure, increasing the competitiveness of agricultural production, increasing its volumes, improving the quality and safety of agricultural products, protecting the environment, and ensuring the protection of the human rights of the population. We believe that today it is already advisable for the state to develop the Concept of Agricultural Sector Development until 2027 and present a draft State Target Programme for Agricultural Sector Development, as well as to regulate the mechanism of interaction between the Ministry of Economy and the Ministry of Agrarian Policy and Food in this document.

The Ministry of Economy of Ukraine is subordinated to the State Employment Service as a centralised system of state institutions. The Service consists of the State Employment Centre, regional employment centres (employment centre of the Autonomous Republic of Crimea, regional, Kyiv and Sevastopol city employment centres), basic employment centres (city, district and city-regional employment centres), the Institute of Personnel Training of the State Employment Service of Ukraine, vocational (vocational-technical) education institutions of the State Employment Service, other educational institutions of the State Employment Service, as well as enterprises, institutions and organisations established by the Service [164; 179].

The main tasks of the State Employment Service are as follows:

- Implementation of the state policy in the field of employment, migration, social protection and unemployment; systematic analysis of the labour market situation;
- providing services to employers and potential employees;
- support of citizens in the organisation of entrepreneurial activity (individual and group consultations);
- promoting labour mobility; participation in the implementation of measures aimed at preventing mass layoffs;
- organisation of training, retraining and advanced training of the unemployed, taking into account current and future labour market needs, and confirmation of the results of non-formal vocational training;
- support in employment of certain categories of the population that are uncompetitive in the labour market;
- submitting proposals to the Ministry of Economy on the formation of state policy in the field of employment;
- control over the use of the Fund’s resources by employers and the unemployed [179].

According to the State Employment Service, 640.2 thousand vacancies were registered in January-October 2021, which is 38.3% lower than in the same period in 2019. The largest share in the structure of registered vacancies in January-October 2021 by type of economic activity is occupied by the agriculture, fishing and forestry sector – 17.1%. It was also found that as of 01.10.2021, the agricultural labour market was characterised by a shortage of vacancies. For example, 57 vacancies were registered for the position of agronomist, while the number of registered unemployed was 222. The shortage of vacancies for the position of a worker in the complex maintenance of agricultural production was 1353 vacancies; the shortage of vacancies for the position of a farm worker was 623 vacancies.

The analysis of the data shows the need to introduce measures to regulate employment in the modern agrarian labour market, which will be the key to achieving a balance in the labour market and will ensure the socio-economic development of the industry and the state.

According to I.V. Bilyk, the formation of the institutional environment of the agrarian labour market is characterised as institutionally unbalanced, which is manifested in the absence of effective institutions that could provide conditions for achieving balance [15, p. 143].

We believe that the activities of formal subjects of state regulation of employment are still aimed at overcoming employment problems and resolving negative situations in the labour market, but the state of the current labour market requires more clear and coordinated work of public authorities, which will allow to obtain a positive effect from the work done.

In this case, the effect can be achieved through employment incentive programmes. Employment incentive programmes are divided into short-term programmes aimed at creating jobs at a rapid pace, medium-term and long-term programmes aimed at ensuring a balance in the labour market. There are also active programmes (vocational guidance, retraining, training, increasing labour mobility, providing preferential support to businesses, encouraging start-ups, creating new jobs, including by the state) and passive programmes (unemployment severance pay, etc.).

In accordance with the defined programmes (tools), the scientific community distinguishes five foreign models of employment regulation: American (USA); Japanese; Anglo-Saxon or liberal (UK, Canada,

Australia); Scandinavian or social democratic (Sweden, Norway, Denmark); continental or German (Germany, Austria, Belgium, the Netherlands, Switzerland), which take into account all factors that affect employment.

It should be understood that the formation of a model of state regulation of employment depends on the specifics of the national economy, its state and development vectors. We agree with the opinion of L.V. Tesheva that "each state has its own socio-economic strategy, has characteristics inherent only to it, focusing on mentality, level of education, cultural environment and traditions" [233, p. 111].

It should be noted that today developing countries are characterised by a significant level of employment in the service sector and agriculture and a low level of employment in the secondary sector of the economy. In the former socialist countries, most of the active population is employed in the production sector, while a small part is employed in non-production sectors [88, p. 89].

For example, the US labour market is characterised by an employee's orientation and focus on self-realisation and personal success; the functioning and support of regional development agencies that address employment issues; decentralisation of the labour market – each state has its own regulatory mechanisms and legislative framework; and a high geographical mobility of employees. An important element of this model is that considerable attention is paid to vocational guidance through the functioning of government agencies subordinated to the US Department of Labour and vocational guidance sectors in educational institutions, which aim to ensure that young people make a conscious choice of their future profession, are able to find a job after graduation in accordance with their qualifications and do not oversaturate the market with the same type of profession.

The Japanese labour market model aims to guarantee full employment for employees throughout their working lives. In the event of redundancy or dismissal, the employer must provide the employee with another job at the same or a subsidiary enterprise with the possibility of retraining at the employer's expense. It is possible to migrate employees to other jobs between companies to avoid a complete redundancy. Young professionals are given preference when hiring, while employees who have reached retirement age are forced to retire.

The labour market in the UK, Canada, and Australia is characterised by a relatively passive influence of the state on it, with most of the powers

vested in trade unions; employers have broad powers to regulate the hiring/dismissal of employees, establish working hours, and pay. The state analyses the demand in the labour market and informs about its state, provides vocational training with the possibility of further employment, supports the development of unemployment insurance funds, and implements programmes for the employment of young people and women.

The labour market model of the Sca”dina’ian countries has the following features: a vector for preventing unemployment rather than fighting it; subsidies and loans to families for the proportional distribution of labour between districts; provision of timely information on vacancies; active state policy in the labour market (3% of GDP for employment regulation measures); high remuneration. The role of the state is to coordinate the migration of people and labour from regions with a labour surplus to regions with a labour deficit to ensure a balance in the labour market.

This direction is implemented through the provision of loans and subsidies to the population, which helps to support relocation. The Scandinavian model of employment regulation is characterised by adherence to the principle of solidarity, which means that every employee receives the same salary for doing the same work.

The continental or German model (G”rman’, Austria, Belgium, the Netherlands, Switzerland) is characterised by high wages, which contributes to labour productivity growth; preferential support for companies that take measures to modernise their enterprises and create new jobs; and strict labour legislation.

It should also be noted that at the stage of changes in the global labour market, in the period of development of digital technologies, all models of employment regulation are characterised by the introduction of flexible employment elements. The essence of this form of employment is that it facilitates the use of a wider range of employee capabilities and human capital. In addition, employees can optimise their working time, which is important in the current context (COVID-19 pandemic) to maintain the functioning of the enterprise.

Appendix R analyses the experience of state regulation of the labour market and employment promotion tools in the leading countries of the world in order to ensure and implement this experience in the institutional mechanism of employment regulation in Ukraine. A fairly common practice in the implementation of the state employment policy of

developed countries is the development of adaptive and flexible programmes to promote employment, taking into account the specifics of a particular socio-economic situation [118, p. 277-278].

The global experience in promoting employment development has several vectors, but generally corresponds to the overall programme of economic development, attracting investments, promoting the development of certain types of economic activity, and is complemented by proactive state policy instruments to stimulate employment through vocational training, professional development of employees, support and assistance in employment of socially vulnerable groups.

Given the current state regulation of employment in Ukraine, the experience of foreign countries and the effectiveness of their measures, there is a need to adapt the positive elements of experience in accordance with the current model of employment regulation in the Ukrainian labour market, including in the agricultural sector.

We agree with the opinion that at the current stage of development of mechanisms for the formation and implementation of modern employment policy in Ukraine, the problem of forming an effective employment policy does not sufficiently use the potential opportunities for consolidating the efforts of society and government, building mechanisms of state regulation based on a service-oriented system of institutions, and does not fully form the institutional mechanism of state regulation of the labour market and employment of the population of Ukraine. [23, c. 59].

Today, an institutional mechanism for employment regulation has been introduced in Ukraine, and the main methods and tools have been identified that are in line with international practice. However, based on the situation with employment in the agricultural sector of the economy, it can be stated that this experience is still being accumulated, and the quality of the institutional mechanism implementation can be assessed as rather low. The reason for this is that the institutional environment that is being formed in the agricultural labour market is assessed as unstable, as it is being formed in an accelerated mode, in conditions of constant reforms and changes, which does not always contribute to the effectiveness of institutions aimed at ensuring a balance in the labour market.

According to O.M. Pyshchulina, modern types of employment (remote employment, outsourcing, staff leasing, etc.) are borrowed from the experience of foreign companies in doing agricultural business, but

often penetrate the agricultural labour market through the informal sector. Therefore, the reactions of the main labour market participants lead to results that are hardly predictable and unexpected, and so often the so-called institutional traps arise [176, p.140-141].

For a general understanding of the concept of "institutional trap", foreign scientific literature uses the concept of "path dependence" (direct dependence on development at the previous stage) and applies the concept of "lock-in" effect (blocking the system through suboptimal institutions) [130, p. 61]. Thus, the need to identify institutional traps allows us to identify cases where institutions not only impede the development of a system or mechanism, but also cause destruction.

Researcher O. Brazhko in his works identifies a number of institutional traps that have formed in the Ukrainian labour market under the influence of such factors as employment inertia, imperfection of the institutional mechanism of wage formation and weakness of the institutions of state regulation of the social and labour sphere [19, p. 80].

It is worth noting that the formation of "institutional traps" usually occurs due to the presence of certain institutional shortcomings in the socio-economic space of the country, which lead to an increase in transaction costs in the process of economic functioning. In the scientific literature, these gaps are identified as "institutional vacuum", "institutional gaps" or "institutional pits" [18, p. 151].

The main institutional traps of the agrarian labour market in Ukraine are identified, including: the inertia of rural employment, which is the mismatch between employment and production dynamics; poverty of the population, low income levels do not provide a basis for the development of human capital, which does not allow the employee to improve and change the level and quality of life; the trap of shadow employment due to the fact that labour relations can be formalised outside the legal framework and exist as long as they are beneficial to both parties.

In order to overcome and avoid the above institutional traps, it is important to take measures in the short term in the form of a clear strategy for the development of effective employment in the agricultural sector of the economy through a comprehensive combination of effective economic policy systems, regulatory frameworks and state programmes to promote agricultural employment.

Fig. 3.20 shows the components of effective state regulation of employment in the agricultural sector.

A clear strategy for the development of effective employment in the agricultural sector of the economy will allow to implement the consolidated interests of labour market institutions, ensure the development of the industry, and overcome unemployment in the agricultural sector, strengthen the implementation of the de-shadowing of agricultural employment, stop migration and create favourable conditions for the socio-economic development of the region and the country as a whole.

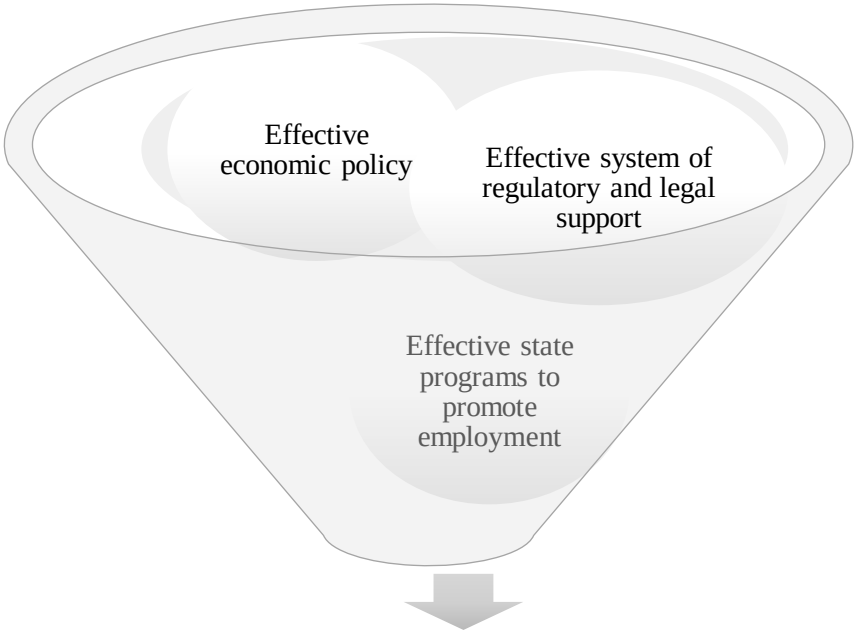

Fig. 3.20. Components of effective state regulation of employment in the agricultural sector

Source: compiled by the authors.

The primary role in the formation of an institutional mechanism for regulating employment should belong to the state, whose activities should be coordinated and aimed at solving employment problems and combined with the overall programme of institutional development of the economy.

We propose a conceptual approach to the implementation of the organisational and economic mechanism for regulating employment in the agricultural sector of the economy at the institutional level, based on the conceptual-target, structural-content and performance blocks. The main objective of this conceptual approach is to strengthen the influence of institutions on the regulation of employment processes by creating favourable conditions for their development (Figure 3.21).

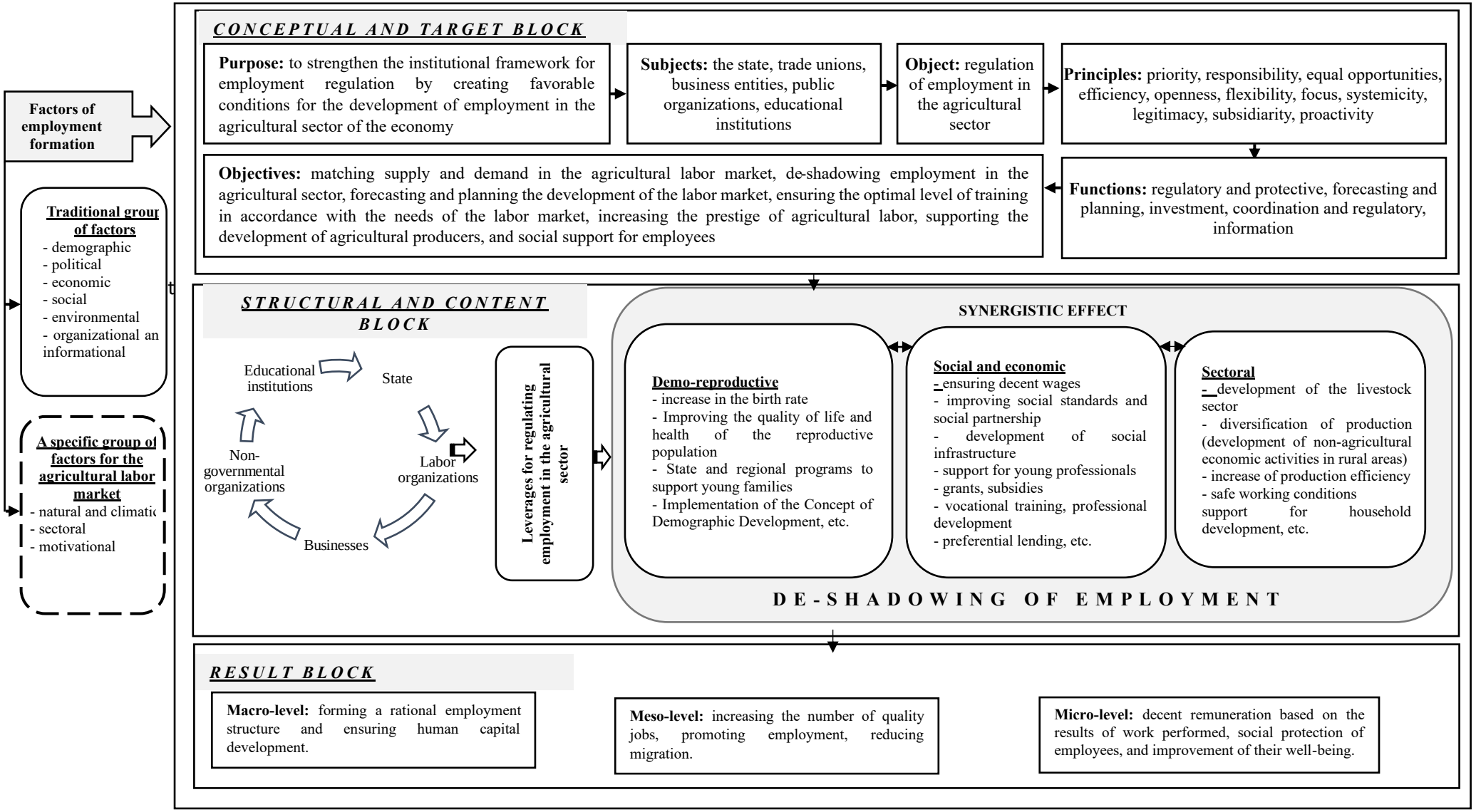

Figure 3.21. Conceptual approach to the implementation of the organizational and economic mechanism of employment regulation in the agricultural sector of the economy at the institutional level

Source: developed by the authors.

We believe that the proposed conceptual approach to the implementation of the organisational and economic mechanism for regulating employment in the agricultural sector of the economy at the institutional level will have a positive impact on the efficiency of regulation of agricultural employment, and due to the synergistic effect of the proposed levers of influence, positive changes in the labour market can be achieved and a modern model of employment development in the agricultural sector of the economy can be formed. The functioning of the institutional framework leads to the emergence of relations between public authorities and business entities at all levels of government. Accordingly, in the course of relations, the institutional framework can, on the one hand, create favourable conditions for development, and on the other hand, if necessary, introduce measures to restrain or limit the development of an individual entity, industry, region or even the state. It should be noted that these principles should be focused on the formation and development of human capital as a strategically important resource that is the basis for sustainable socio-economic development of the country and the region.

In the future, the effectiveness of the mechanism will be assessed by the results of improving the regulatory and legal legislation in the field of employment regulation, by the results of the work of public authorities, the measures they take and the overall situation on the labour market. We believe that in the future, the state policy of employment regulation should move from the practice of resolving and regulating the situation at the current stage to the practice of working on a proactive basis, i.e. taking preventive measures based on positive changes in the agricultural sector and the economy as a whole.

Conclusions

The results of the monographic study allow drawing conclusions of theoretical and applied nature, the main ones being the following.

It is established that the category of "employment" has come a long way in forming its content, has undergone periodic transformation and has secured its position as an integral part of the management process at the macro and micro levels. The concepts of employment are analysed, the constituent elements of the qualitative characteristics of the category of "employment" are substantiated, which allow taking into account the nature of the modern labour market in the implementation of the organisational and economic mechanism for regulating employment.

It is proved that the effective development of employment in the agricultural sector is possible provided that a number of factors are taken into account, which further necessitates a study of the sector in terms of developing a mechanism for its management. Using a systematic approach, the author presents a generalised classification of factors of employment formation with due regard for the specifics of the agricultural sector, namely: demographic, political, social, economic, organisational, informational, environmental, natural and climatic, motivational, and sectoral. It is determined that in improving the organisational and economic mechanism for regulating employment in the agricultural sector, a significant role should be given to natural and climatic, motivational and sectoral factors, which are the driving forces behind the formation of employment and increasing the efficiency of use and return on human capital in the management of agricultural enterprises.

It is determined that the organisational and economic mechanism is an economic category that is the main basis of the category "economic mechanism" and combines a system of interrelations and interdependencies between the components that provide employment. The division of the implementation of the organisational and economic mechanism for regulating employment in the agricultural sector into organisational and economic components is substantiated.

The results establishe the undoubtedly significant influence of demographic processes as one of the determining factors of the employment process. It is revealed that the current demographic situation in Ukraine is characterised by a tendency to reduce the total population. An in-depth analysis of the main indicators to provide a qualitative description of the demographic situation in Ukraine in general and

Kharkiv region in particular has made it possible to determine that the population of Ukraine is characterised by a very high level of demographic ageing, low fertility, high mortality and is showing signs of a second demographic transition. It was recorded that in 2020, the level of total population decline in Ukraine decreased by 7.7 per cent compared to 1989, and the level of natural decline – by 8.3 per cent. In turn, the migration growth rate remained at 1 per cent. These destructive trends are also characteristic of Kharkiv region: it was found that it belongs to the regions with a high level of natural population decline, as the dynamics of the last 20 years clearly defines the trend towards a decrease in the number of both urban and rural population. In particular, the total population decreased by 18.8% in 2020 compared to 1990, the urban population by 16.0%, and the rural population by 28.6%. The analysis has shown that the demographic situation in rural areas is a threat that may have a negative impact on employment and the economic situation in rural areas and cause the phenomenon of "rural extinction".

It is proved that the modern labour market is experiencing crisis phenomena that negatively affect the dynamics of employment, they are not sustainable and are in constant flux. In 2020, the total labour force of the working-age population decreased by 1759.0 thousand people. In 2010-2017, the number of people of working age tended to decline. Since 2018, this trend has become positive. The established clear relationship between the share of the employed population in Ukrainian agriculture and the indicators of economic efficiency confirms the need for intensive rather than extensive approaches to employment regulation and the expediency of considering it not as a quantitative but as a qualitative characteristic. The substantiated methodological approach made it possible to determine the unsatisfactory situation with employment in the agricultural sector on the basis of an in-depth analysis of employment by economic sectors, by calculating the concentration of industries using the method of structural changes and calculating the localisation coefficient, which is important when choosing vectors of employment regulation policy. The analysed current trends in employment by economic sectors confirmed the dynamics of redistribution of employment between industries in favour of the tertiary sector of the economy. It was found that, according to the localisation coefficient for Kharkiv region, agriculture belongs to the sectors of regional importance, i.e. it meets the needs of the domestic market.

The monograph analyses the average nominal wage in Ukraine and the EU countries and finds that its average level in the EU countries is almost five times higher than in Ukraine. This calls for an increase in the level of wages in Ukraine. The structure of the wage fund of full-time agricultural workers in Ukraine and Kharkiv region shows an imbalance in the components of the wage fund, which is the main reason for the decrease in the motivational component in the process of achieving effective performance. The analysed trends have led to the need to reconsider the mission of wages as the dominant economic factor of employment growth in the agricultural sector. To this end, the article substantiates the concept of decent wages in agriculture, which involves revising its place in the structural and logical chain of household functioning. This approach will help to stop the outflow of young specialists from rural areas, minimise migration processes, overcome rural unemployment, revive rural areas, ensure their attractiveness with favourable working and living conditions, and achieve the prestige of agricultural labour and its decent remuneration.

It is found that accounting and information support is critical in the process of regulating employment and remuneration in agricultural enterprises, as it ensures accurate and timely management of labour resources. With proper accounting of working time, labour costs and employee productivity, businesses can plan their workforce more effectively, distribute workloads and optimise production processes. This allows not only to increase labour productivity but also to ensure the stability and motivation of employees, which is a key factor for the successful functioning of the agricultural sector.

In addition, studies have shown that accounting and information support allows agricultural enterprises to comply with the requirements of the legislation on labour and its remuneration, in particular, the calculation of taxes, social contributions and other mandatory payments. This helps to avoid fines and penalties imposed by regulatory authorities and supports the company’s social responsibility. Reliable information on employment and remuneration helps in preparing reports for government agencies, which is important for obtaining government support and participating in agricultural development programmes. Thus, accounting and information support is the foundation for effective employment and remuneration management, ensuring the stability and development of agricultural enterprises.

Given the unstable situation in the country, the importance of improving the organisational and economic mechanism in the context of de-shadowing employment in the agricultural sector of the economy is determined. The author's vision of the phenomenon of "shadow employment" is substantiated. It is based on the understanding that this is an activity that goes beyond the legal framework and does not comply with the norms of current legislation. The built structural and logical scheme of the impact of informal employment on socio-economic development proves that the spread of this type of employment has a negative impact on the country's economic development. Based on the identified decomposition of the main factors influencing the growth of informal employment in the agricultural sector of the economy, a conceptual scheme of imperatives and measures to de-shadow agricultural employment is proposed, which will allow achieving positive results on the basis of monitoring the implementation and evaluation of the effectiveness of the measures taken.

The carried out econometric modelling of the factors and the level of employment on the example of rural districts of Kharkiv region confirmed the hypothesis of low employment in the agricultural sector under the conditions of direct and indirect influence of exogenous and endogenous factors. By identifying, selecting a system of factors and testing the proposed correlation-regression model for adequacy, the article establishes the crucial importance of demographic (level of pension burden), socio-economic (level of remuneration in agriculture) factors, as well as the factor of sectoral structure and production intensity, in particular in livestock production (cattle density). Having constructed confidence intervals, we found that in the short term, overcoming the low level of employment in the agricultural sector is possible if effective management solutions are found to regulate it at the regional level. These include the revival of the livestock sector, which is of strategic importance for the formation of rural employment, becoming a social sector; development of institutional mechanisms for the formation of decent wages in agriculture; gradual implementation of the directions of regulation of demo-reproduction processes in the state as a whole, etc.

The importance of the State's influence and its functional content on the regulation of employment processes is determined. The main functions of the state policy of employment regulation are generalised and allocated, namely: regulatory and protective, forecasting and planning, investment, coordination and regulatory, information, social, allocation.

The formal institutions of the State regulation of employment are characterised and it is established that their role in regulating and solving employment problems is insufficient and requires revision and improvement of their activities. Five foreign models of employment regulation are studied: American (USA); Japanese; Anglo-Saxon, or liberal (UK, Canada, Australia); Scandinavian, or social democratic (Sweden, Norway, Denmark); continental, or German (Germany, Austria, Belgium, the Netherlands, Switzerland). The experience of some foreign countries in regulating employment is analysed. The importance of introducing positive elements of foreign experience into the modern model of employment regulation is proved. The author identifies "institutional traps" and offers his own vision of a clear strategy for the development of effective employment in the agricultural sector of the economy, which will allow to implement the consolidated interests of labour market institutions. A conceptual approach to the implementation of the organisational and economic mechanism for regulating employment in the agricultural sector of the economy at the institutional level is proposed.

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APPENDIXES

Appendix A

Dynamics of changes in the demographic situation in Ukraine in 2010-2020
Taking into account the percentage of people aged 60 and 65 years and older

Year	Total population, thousand people	incl. share at age			
		60 years and older		65 years and older	
		thousand people	%	thousand people	%
2010	45782,6	9471,4	20,7	7168,9	15,7
2011	45598,2	9532,4	20,9	6965,2	15,3
2012	45453,3	9617,9	21,2	6928,4	15,2
2013	45372,7	9702,1	21,4	6905,3	15,2
2014	45245,9	9753,3	21,6	6928,8	15,3
2015	42759,7	9330,4	21,8	6675,8	15,6
2016	42590,9	9417,2	22,1	6768,9	15,9
2017	42414,9	9545,9	22,5	6867,5	16,2
2018	42216,8	9679,7	22,9	6967,3	16,5
2019	41983,6	9827,1	23,4	7034,6	16,8
2020	41418,7	10121,6	24,4	7211,1	17,4
Year	Urban population, thousand people	incl. share at age			
		60 years and older		65 years and older	
		thousand people	%	thousand people	%
2010	31269,2	6057,4	19,4	4413	14,1
2011	31186	6164,4	19,8	4325,2	13,9
2012	31125,2	6284,4	20,2	4357,1	14
2013	31123	6402,2	20,6	4395,6	14,1
2014	31081	6495,6	20,9	4463,7	14,4
2015	29434,3	6253,5	21,2	4338,2	14,7
2016	29346,2	6361,4	21,7	4456,9	15,2
2017	29243,5	6500	22,2	4576,3	15,6
2018	29132,2	6632,1	22,8	4693,7	16,1
2019	29017,9	6774,3	23,3	4786,9	16,5
2020	28720,7	7056,5	24,6	4994,0	17,4
Year	Rural population, thousand people	incl. share at age			
		60 years and older		65 years and older	
		thousand people	%	thousand people	%
2010	14513,4	3414	23,5	2755,9	19
2011	14412,2	3368	23,4	2640	18,3
2012	14328,0	3333,6	23,3	2571,3	17,9
2013	14249,7	3299,8	23,2	2509,7	17,6
2014	14164,9	3257,7	23	2465,2	17,4
2015	13325,3	3076,9	23,1	2337,6	17,5
2016	13244,7	3055,8	23,1	2312	17,5
2017	13171,4	3045,9	23,1	2291,2	17,4
2018	13084,6	3047,6	23,3	2273,6	17,4
2019	12965,7	3052,8	23,5	2247,6	17,3
2020	12698,0	3065,1	24,1	2217,1	17,5

Source: calculated by the author according to [164].

Appendix B

Natural movement of Ukraine's population by region in 2020

Source: compiled by the author based on data from [164].

Appendix C

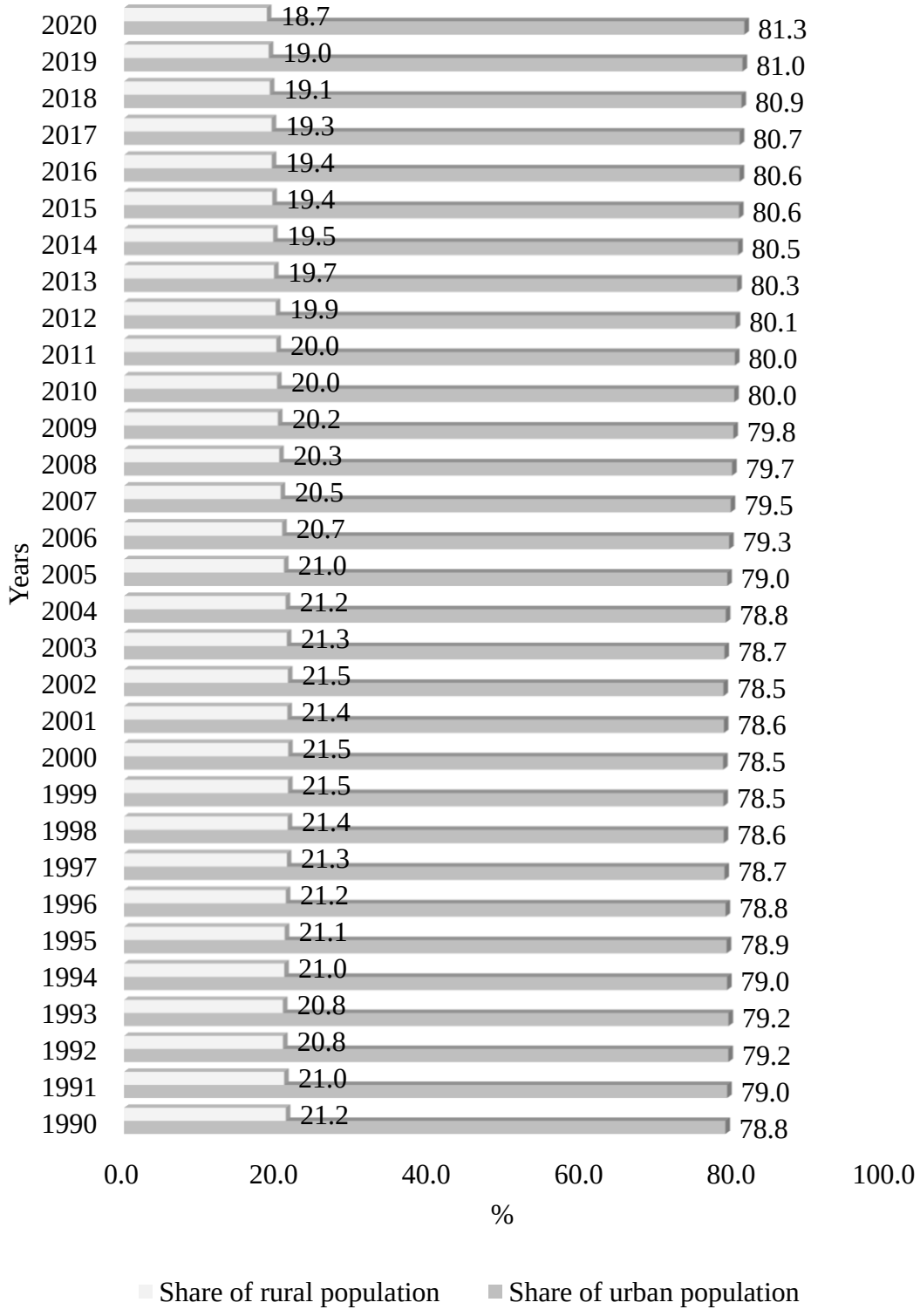
Dynamics of the population of Kharkiv region in 1989-2020

Year	Population, thousand people		Absolute increase (decrease), thousand people				Population growth (decline) rate, %.				Population growth (decline) rate, %.			
			urban		rural		urban		rural		urban		rural	
	Urban	rural	basic	chain	basic	chain	basic	chain	basic	chain	basic	chain	basic	chain
1989	2518,9	677,7	-	-	-	-	100,0	-	100,0	-	-	-	-	-
1990	2524,6	670,2	5,7	5,7	-7,5	-7,5	100,2	100,2	98,9	98,9	0,2	0,2	-1,1	-1,1
1991	2524,7	663,9	5,8	0,1	-13,8	-6,3	100,2	100,0	98,0	99,1	0,2	0,0	-2,0	-0,9
1992	2520,0	662,1	1,1	-4,7	-15,6	-1,8	100,0	99,8	97,7	99,7	0,0	-0,2	-2,3	-0,3
1993	2495,2	663,0	-23,7	-24,8	-14,7	0,9	99,1	99,0	97,8	100,1	-0,9	-1,0	-2,2	0,1
1994	2465,8	657,5	-53,1	-29,4	-20,2	-5,5	97,9	98,8	97,0	99,2	-2,1	-1,2	-3,0	-0,8
1995	2433,4	654,4	-85,5	-32,4	-23,3	-3,1	96,6	98,7	96,6	99,5	-3,4	-1,3	-3,4	-0,5
1996	2402,4	651,5	-116,5	-31,0	-26,2	-2,9	95,4	98,7	96,1	99,6	-4,6	-1,3	-3,9	-0,4
1997	2374,7	648,0	-144,2	-27,7	-29,7	-3,5	94,3	98,8	95,6	99,5	-5,7	-1,2	-4,4	-0,5
1998	2351,3	643,2	-167,6	-23,4	-34,5	-4,8	93,3	99,0	94,9	99,3	-6,7	-1,0	-5,1	-0,7
1999	2328,1	637,8	-190,8	-23,2	-39,9	-5,4	92,4	99,0	94,1	99,2	-7,6	-1,0	-5,9	-0,8
2000	2308,7	628,6	-210,2	-19,4	-49,1	-9,2	91,7	99,2	92,8	98,6	-8,3	-0,8	-7,2	-1,4
2001	2288,7	625,5	-230,2	-20,0	-52,2	-3,1	90,9	99,1	92,3	99,5	-9,1	-0,9	-7,7	-0,5
2002	2272,0	615,9	-246,9	-16,7	-61,8	-9,6	90,2	99,3	90,9	98,5	-9,8	-0,7	-9,1	-1,5
2003	2259,9	606,8	-259,0	-12,1	-70,9	-9,1	89,7	99,5	89,5	98,5	-10,3	-0,5	-10,5	-1,5

2004	2251,5	596,9	-267,4	-8,4	-80,8	-9,9	89,4	99,6	88,1	98,4	-10,6	-0,4	-11,9	-1,6
2005	2243,0	586,0	-275,9	-8,5	-91,7	-10,9	89,0	99,6	86,5	98,2	-11,0	-0,4	-13,5	-1,8
2006	2235,2	576,9	-283,7	-7,8	-100,8	-9,1	88,7	99,7	85,1	98,4	-11,3	-0,3	-14,9	-1,6
2007	2227,4	568,5	-291,5	-7,8	-109,2	-8,4	88,4	99,7	83,9	98,5	-11,6	-0,3	-16,1	-1,5
2008	2221,5	560,9	-297,4	-5,9	-116,8	-7,6	88,2	99,7	82,8	98,7	-11,8	-0,3	-17,2	-1,3
2009	2214,1	555,0	-304,8	-7,4	-122,7	-5,9	87,9	99,7	81,9	98,9	-12,1	-0,3	-18,1	-1,1
2010	2205,2	549,9	-313,7	-8,9	-127,8	-5,1	87,5	99,6	81,1	99,1	-12,5	-0,4	-18,9	-0,9
2011	2197,3	544,9	-321,6	-7,9	-132,8	-5,0	87,2	99,6	80,4	99,1	-12,8	-0,4	-19,6	-0,9
2012	2204,9	539,5	-314,0	7,6	-138,2	-5,4	87,5	100,3	79,6	99,0	-12,5	0,3	-20,4	-1,0
2013	2202,5	534,7	-316,4	-2,4	-143,0	-4,8	87,4	99,9	78,9	99,1	-12,6	-0,1	-21,1	-0,9
2014	2200,7	530,6	-318,2	-1,8	-147,1	-4,1	87,4	99,9	78,3	99,2	-12,6	-0,1	-21,7	-0,8
2015	2192,5	526,1	-326,4	-8,2	-151,6	-4,5	87,0	99,6	77,6	99,2	-13,0	-0,4	-22,4	-0,8
2016	2178,8	522,4	-340,1	-13,7	-155,3	-3,7	86,5	99,4	77,1	99,3	-13,5	-0,6	-22,9	-0,7
2017	2179,5	514,5	-339,4	0,7	-163,2	-7,9	86,5	100,0	75,9	98,5	-13,5	0,0	-24,1	-1,5
2018	2168,4	507,2	-350,5	-11,1	-170,5	-7,3	86,1	99,5	74,8	98,6	-13,9	-0,5	-25,2	-1,4
2019	2 158,1	500,4	-360,8	-10,3	-177,3	-6,8	85,7	99,5	73,8	98,7	-14,3	-0,5	-26,2	-1,3
2020	2 140,9	492,9	-378,0	-17,2	-184,8	-7,5	85,0	99,2	72,7	98,5	-15,0	-0,8	-27,3	-1,5
Average annual growth rate (decrease), %			*X*	*X*	*X*	*X*	*X*	*99,5*	*X*	*99,0*	*X*	*X*	*X*	*X*
Average annual growth increase (decrease) temp, %			*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*X*	*-0,5*	*X*	*-1,0*

Source: calculated by the author according to [46, 164].

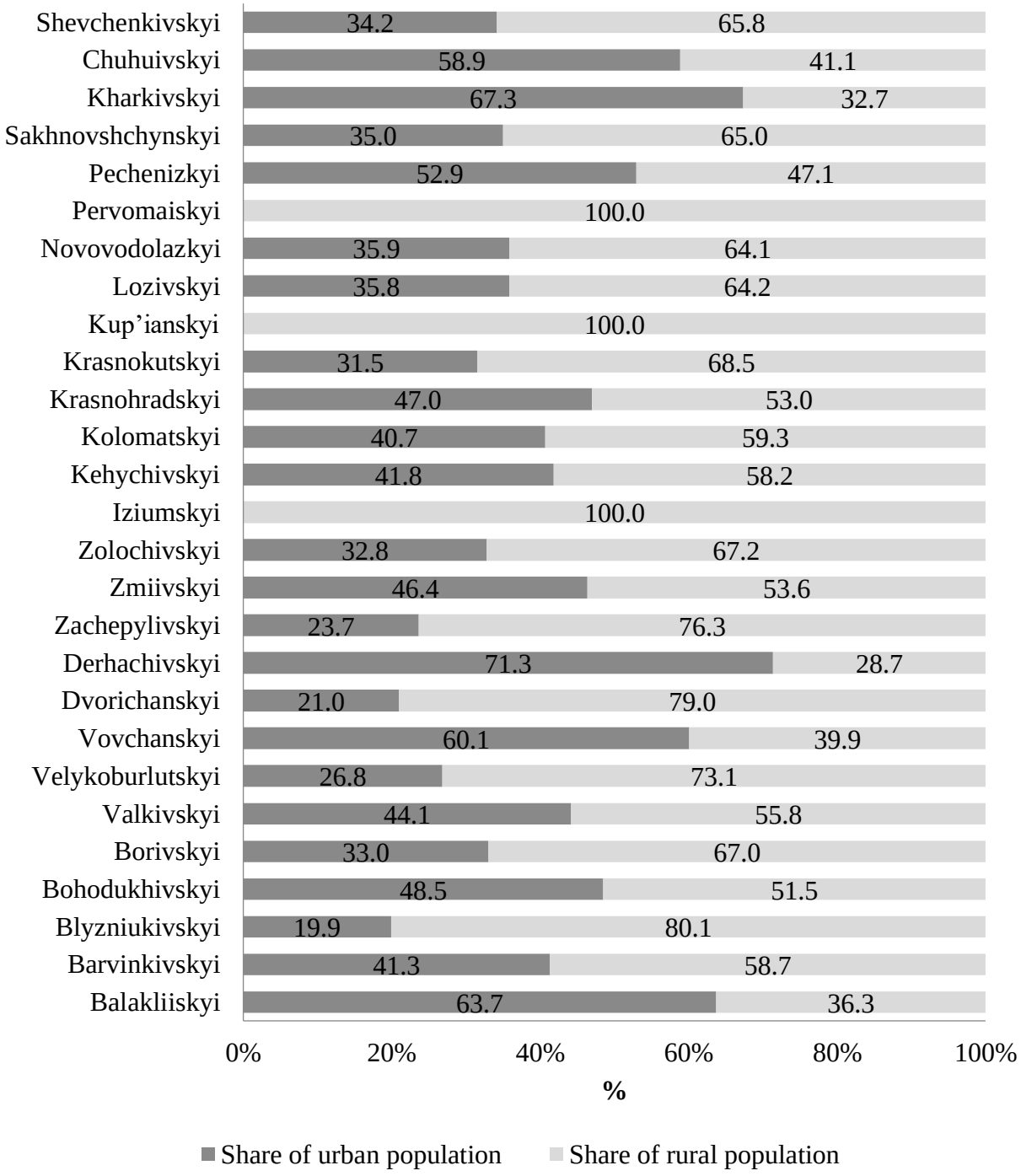
Appendix D



Structure of the existing population of Kharkiv region by type of settlement in 1990-2020

Source: compiled by the author based on data from [46, 164].

Appendix E



Structure of the population by type of settlement in Kharkiv region in 2020

Source: compiled by the author based on data from [46, 164].

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Appendix F

Indicators of natural population movement in Kharkiv region in 2016-2020

Districts	2016 р.				2018 р.				2020 р.			
	К нар, ‰	К см, ‰	К п.п, ‰	Кж, ‰	К нар, ‰	К см, ‰	К п.п, ‰	Кж, ‰	К нар, ‰	К см, ‰	К п.п, ‰	Кж, ‰
Balakliiskyi	8,9	16,5	-7,6	53,8	7,4	18,2	-10,8	40,5	6,5	16,6	-10,1	39,3
Barvinkivskyi	10,3	22,1	-11,8	46,4	8,4	23,3	-14,9	36,1	8,0	24,4	-16,4	32,7
Blyzniukivskyi	11,3	21,9	-10,6	51,8	8,1	21,2	-13,1	38,4	8,0	19,7	-11,7	40,8
Bohodukhivskyi	9,8	17,8	-8,0	54,9	8,7	19,1	-10,4	45,7	7,1	18,9	-11,8	37,4
Borivskyi	9,2	19,0	-9,8	48,6	7,1	21,1	-14,0	33,5	6,8	19,0	-12,2	35,9
Valkivskyi	9,0	18,1	-9,1	49,8	7,3	17,3	-10,0	42,2	7,2	18,1	-10,9	39,7
Velykoburlutskyi	9,0	19,3	-10,3	46,8	7,5	17,3	-9,8	43,4	8,1	16,7	-8,6	48,5
Vovchanskyi	9,0	19,5	-10,5	46,2	7,9	19,6	-11,7	40,0	6,7	18,6	-11,9	36,2
Dvorichanskyi	8,2	18,2	-10,0	45,3	7,8	18,6	-10,8	41,8	6,2	19,5	-13,3	31,9
Derhachivskyi	9,5	17,5	-8,0	54,2	8,0	17,4	-9,4	45,9	7,3	17,2	-9,9	42,5
Zachepylivskyi	8,7	18,3	-9,6	47,9	7,2	15,9	-8,7	45,1	5,8	19,9	-14,1	29,2
Zmiivskyi	8,8	19,0	-10,2	46,6	7,9	19,4	-11,5	40,9	5,9	18,1	-12,2	32,8
Zolochivskyi	10,3	20,6	-10,3	50,2	9,0	21,5	-12,5	42,0	7,0	19,5	-12,5	36,1
Iziumskyi	9,8	24,5	-14,7	40,1	6,8	24,7	-17,9	27,5	7,3	20,9	-13,6	34,9
Kehychivskyi	10,8	17,3	-6,5	62,4	9,7	17,0	-7,3	57,1	7,6	15,3	-7,7	49,7
Kolomatskyi	10,1	26,5	-16,4	38,0	9,2	20,9	-11,7	44,1	10,9	19,5	-8,6	55,7
Krasnohradskyi	8,6	17,2	-8,6	50,2	7,4	16,1	-8,7	46,0	7,3	15,5	-8,2	46,9
Krasnokutskyi	8,7	18,9	-10,2	46,2	7,6	18,8	-11,2	40,5	7,4	16,9	-9,5	43,5
Kup'ianskyi	8,8	21,4	-12,6	41,2	6,2	20,6	-14,4	30,1	5,7	18,2	-12,5	31,4
Lozivskyi	10,0	18,5	-8,5	53,9	7,6	20,1	-12,5	37,6	7,4	18,7	-11,3	39,4
Novovodolazkyi	11,1	20,3	-9,2	54,5	8,6	19,7	-11,1	43,7	8,8	20,1	-11,3	43,7
Pervomaiskyi	9,3	20,4	-11,1	45,4	7,7	23,5	-15,8	32,7	6,5	19,7	-13,2	33,0
Pechenizkyi	8,4	20,5	-12,1	41,3	8,1	18,1	-10,0	44,6	5,9	19,7	-13,8	29,8
Sakhnovshchynskyi	10,7	19,4	-8,7	55,2	8,9	18,3	-9,4	48,5	7,0	17,7	-10,7	39,6
Kharkivskyi	9,4	16,4	-7,0	57,2	8,0	16,7	-8,7	47,6	7,0	16,4	-9,4	42,8
Chuhuivskyi	8,6	18,3	-9,7	46,9	8,0	19,8	-11,8	40,5	6,9	16,3	-9,4	42,1
Shevchenkivskyi	9,3	17,5	-8,2	53,2	8,0	16,9	-8,9	47,4	6,8	15,9	-9,1	42,9

Source: calculated by the author according to [46].

Appendix G

Structure of the population by type of settlement in Kharkiv region in 2020

Districts	Total population, thousand people	including			
		urban population	in % of the total number	rural population	in % of the total number
Balakliiskyi	79,3	50,5	63,7	28,9	36,3
Barvinkivskyi	20,6	8,5	41,3	12,1	58,7
Blyzniukivskyi	18,1	3,6	19,9	14,5	80,1
Bohodukhivskyi	38,0	18,5	48,5	19,6	51,5
Borivskyi	16,2	5,4	33,0	10,9	67,0
Valkivskyi	31,1	13,8	44,1	17,4	55,8
Velykoburlutskyi	21,6	5,8	26,8	15,8	73,1
Vovchanskyi	45,1	27,1	60,1	18,0	39,9
Dvorichanskyi	16,9	3,5	21,0	13,3	79,0
Derhachivskyi	93,5	66,7	71,3	26,8	28,7
Zachepylivskyi	14,8	3,5	23,7	11,3	76,3
Zmiivskyi	69,9	32,4	46,4	37,5	53,6
Zolochivskyi	25,2	8,3	32,8	17,0	67,2
Iziumskyi	16,7	0,0	0,0	16,7	100,0
Kehychivskyi	20,6	8,6	41,8	12,0	58,2
Kolomatskyi	6,8	2,7	40,7	4,0	59,3
Krasnohradskyi	43,5	20,4	47,0	23,1	53,0
Krasnokutskyi	27,2	8,6	31,5	18,7	68,5
Kup'ianskyi	23,6	0,0	0,0	23,6	100,0
Lozivskyi	27,8	10,0	35,8	17,8	64,2
Novovodolazkyi	31,8	11,4	35,9	20,4	64,1
Pervomaiskyi	15,1	0,0	0,0	15,1	100,0
Pechenizkyi	9,7	5,2	52,9	4,6	47,1
Sakhnovshchynskyi	20,5	7,2	35,0	13,3	65,0
Kharkivskyi	177,1	119,3	67,3	57,8	32,7
Chuhuivskyi	45,8	27,0	58,9	18,9	41,1
Shevchenkivskyi	19,9	6,8	34,2	13,1	65,8

Source: calculated by the author according to [46].

Appendix H

y	employment rate of the rural population, %.
X_1	average monthly salary, UAH
x_2	attrition rate, %.
X_3	labor force replacement rate, %.
X_4	cattle density, heads per 100 ha of agricultural land,
x_5	potential demographic replacement rate per 100 people
x_6	Pension burden ratio per 100 people

Appendix H.1

Matrix of pairwise correlation coefficients (intercorrelation)

Correlations (Spreadsheet1)							
	x_1	x_2	x_3	x_4	x_5	x_6	y
x_1	**1,000000**	-0,047067	-0,594560	0,443797	-0,182976	-0,063041	0,372741
x_2	-0,047067	**1,000000**	0,074853	0,147754	-0,067286	-0,315628	0,037412
x_3	-0,594560	0,074853	**1,000000**	-0,254807	-0,084665	-0,152069	-0,065658
x_4	0,443797	0,147754	-0,254807	**1,000000**	-0,292842	-0,080332	0,404457
x_5	-0,182976	-0,067286	-0,084665	-0,292842	**1,000000**	-0,034008	-0,097709
x_6	-0,063041	-0,315628	-0,152069	-0,080332	-0,034008	**1,000000**	-0,523065
y	0,372741	0,037412	-0,065658	0,404457	-0,097709	-0,523065	**1,000000**

Appendix H.2

Results of building a multiple regression of the level of rural employment in the STATISTICA system

Regression Summary for Dependent Variable: y (Spreadsheet1) R = 0,69019559 R^2 = 0,47636996 Adjusted R^2_a =0,31928094 F(6, 20) = 3,543325 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(20)**	**p-value**
Intercept			64,95516	61,97969	1,04801	0,307136
x_1	0,262701	0,227253	0,00234	0,00203	3,15598	0,261310
x_2	-0,164797	0,174154	-0,29394	0,31063	-0,94627	0,355303
x_3	0,102734	0,215345	0,07492	0,15705	0,47707	0,638486
x_4	0,302320	0,189347	0,80999	0,50731	3,59664	0,126025
x_5	0,018886	0,176894	0,14730	1,37972	0,10676	0,916041
x_6	-0,517968	0,177616	-2,42905	0,83294	-4,91622	0,008539

Appendix H.3

Basic statistics: averages and standard deviations

Independent variables	Means	regression coefficient	elasticity coefficient	β-coefficient	Std.Dev.	Coefficient of variation, %
x_1	9281,963	0,00234	0,938	0,262701	1476,421	15,91
x_2	32,181	-0,29394	-0,409	-0,164797	7,387	22,95
x_3	87,951	0,07492	0,285	0,102734	18,066	20,54
x_4	6,431	0,80999	0,225	0,30232	4,918	76,47
x_5	22,697	0,1473	0,144	0,018886	1,689	7,44
x_6	28,508	-2,42905	-2,991	-0,517968	2,810	9,86
y	23,15				13,175	56,91

Appendix H.4

Actual and forecasted values of the level of employment of the rural population of Kharkiv region and estimated data for determining the average approximation error

№	Employment rate of the rural population, %.		Calculated data for determining the average approximation error, %.	
	Real, y	point forecast, y_x	$\lvert y-y_{x_{1\ldots n}}\rvert$	$\frac{\lvert y - y_{x_{1\ldots n}}\rvert}{y} \cdot 100$
1.	47,3	38,7	8,6	18,2
2.	22,9	19,8	3,1	13,4
3.	13,7	14,2	0,5	3,7
4.	45,9	42,9	3,0	6,4
5.	15,9	17,2	1,3	8,2
6.	15,4	15,8	0,4	2,5
7.	16,1	30,4	4,3	26,7
8.	33,0	27,4	5,6	16,9
9.	15,3	23,2	3,9	25,5
10.	50,4	56,7	6,3	12,5
11.	11,3	24,0	2,7	23,9
12.	25,1	25,8	0,6	2,5
13.	15,8	15,1	0,7	4,4
14.	9,6	8,7	0,9	9,8
15.	29,1	34,4	5,4	18,4
16.	16,3	9,8	6,5	39,9
17.	40,0	45,8	5,8	14,6
18.	17,7	19,8	2,0	11,5
19.	6,6	5,8	0,8	12,3
20.	8,1	8,5	0,4	4,9
21.	19,4	24,6	5,2	27,0

22.	7,4	7,4	0,1	0,8
23.	21,4	6,1	5,4	25,2
24.	17,0	21,7	4,7	27,9
25.	46,1	45,3	0,8	1,7
26.	35,7	35,1	0,6	1,7
27.	22,5	27,0	4,5	19,8
Total	**625,0**	**651,2**	**-**	**380,3**

Appendix H.5

Decomposition of the total variation in the level of rural employment into separate independent variables

Independent variables	β- coefficient	Paired correlation coefficient, r_{yx}	Paired coefficient of determination	Share of the factor, %.
X_1	0,262701	0,372741	0,092207	9,22
x_2	-0,164797	0,037412	0,005806	0,58
x_3	0,102734	-0,065658	0,006352	0,64
x_4	0,30232	0,404457	0,115142	11,51
x_5	0,018886	-0,097709	0,001738	0,17
x_6	-0,517968	-0,523065	0,255125	25,51
Total	x	x	**0,476370**	**47,64**

Appendix J

Auxiliary regressions for testing the level of multicollinearity of factors by the Glauber-Farr F-test

Appendix J.1

Regression Summary for Dependent Variable: x1 (Spreadsheet1) R= 0,590235 R?= 0,348377 Adjusted R?= ,17233118 F(5,21)=2,2454 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(21)**	**p-value**
Intercept			19384,30	5156,139	3,75946	0,001153
x_2	-0,106726	0,165601	-21,33	33,099	-0,64448	0,526242
x_3	-0,561811	0,166522	-45,91	13,608	-3,37379	0,002869
x_4	0,253398	0,173207	76,08	52,002	1,46298	0,158279
x_5	-0,169216	0,165799	-147,90	144,912	-1,02061	0,319054
x_6	-0,167560	0,166589	-88,05	87,544	-1,00582	0,325950

Appendix J.2

Regression Summary for Dependent Variable: x2 (Spreadsheet1) R= ,36982632 R?= ,13677151 Adjusted R?= ----- F(5,21)=,66546 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(21)**	**p-value**
Intercept			71,08884	40,68418	1,74733	0,095189
x1	-0,181728	0,281976	-0,00091	0,00141	-0,64448	0,526242
x3	-0,043709	0,269662	-0,01787	0,11026	-0,16209	0,872787
x4	0,172450	0,234251	0,25904	0,35188	0,73617	0,469769
x5	-0,064691	0,221200	-0,28289	0,96730	-0,29245	0,772809
x6	-0,322078	0,211167	-0,84682	0,55521	-1,52523	0,142122

Appendix J.3

Regression Summary for Dependent Variable: x3 (Spreadsheet1) R= 0,453016 R?= 0,205221 Adjusted R?= ,10099982 F(5,21)=1,0838 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(21)**	**p-value**
Intercept			256,0952	65,52755	3,90821	0,000809
x1	-0,625658	0,185446	-0,0077	0,00227	-3,37379	0,002869
x2	-0,028587	0,176367	-0,0699	0,43135	-0,16209	0,872787
x4	-0,055785	0,191486	-0,2049	0,70349	-0,29133	0,773659
x5	-0,224637	0,172420	-2,4025	1,84406	-1,30285	0,206733
x6	-0,212655	0,173901	-1,3675	1,11826	-1,22285	0,234932

Appendix J.4

Regression Summary for Dependent Variable: x4 (Spreadsheet1) R= ,51936406 R?= ,26973902 Adjusted R?= ,09586736 F(5,21)=1,5514 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(21)**	**p-value**
Intercept			9,996011	26,57107	0,37620	0,710543
x1	0,365011	0,249497	0,001216	0,00083	1,46298	0,158279
x2	0,145886	0,198168	0,097119	0,13192	0,73617	0,469769
x3	-0,072156	0,247681	-0,019640	0,06742	-0,29133	0,773659
x5	-0,223362	0,197953	-0,650241	0,57627	-1,12836	0,271896
x6	-0,029845	0,204595	-0,052238	0,35811	-0,14587	0,885414

Appendix J.5

Regression Summary for Dependent Variable: x5 (Spreadsheet1) R= 0,40410251 R?= 0,16329884 Adjusted R?= ----- F(5,21)=0,81971 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(21)**	**p-value**
Intercept			31,87138	6,908213	4,61355	0,000150
x1	-0,279277	0,273637	-0,00032	0,000313	-1,02061	0,319054
x2	-0,062703	0,214403	-0,01434	0,049029	-0,29245	0,772809
x3	-0,332911	0,255526	-0,03113	0,023892	-1,30285	0,206733
x4	-0,255918	0,226806	-0,08791	0,077909	-1,12836	0,271896
x6	-0,142589	0,216889	-0,08573	0,130404	-0,65743	0,518048

Appendix J.6

Regression Summary for Dependent Variable: x6 (Spreadsheet1) R= ,41242556 R?= ,17009484 Adjusted R?= ----- F(5,21)=,86082 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(21)**	**p-value**
Intercept			46,88203	12,60949	3,71800	0,001273
x1	-0,274297	0,272709	-0,00052	0,00052	-1,00582	0,325950
x2	-0,309645	0,203015	-0,11777	0,07721	-1,52523	0,142122
x3	-0,312594	0,255627	-0,04861	0,03975	-1,22285	0,234932
x4	-0,033917	0,232512	-0,01938	0,13284	-0,14587	0,885414
x5	-0,141430	0,215127	-0,23523	0,35780	-0,65743	0,518048

Appendix K

6-factor model

y employment rate of the rural population, %.
X_1 average monthly salary, UAH
x_2 admission rate, %.
X_3 attrition rate, %.
X_4 cattle density, heads
x_5 Potential replacement rate per 100 people
x_6 pension burden ratio

Appendix K.1

Regression Summary for Dependent Variable: y (Spreadsheet1) R= 0,69946105 R^2 = 0,48924576 Adjusted R^2_a = 0,33601948 F(6,20)=3,1930 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(20)**	**p-value**
Intercept			62,21017	53,11736	1,17118	0,255290
x_1	0,321903	0,230956	0,00287	0,00206	1,39378	0,178678
x_2	0,303160	0,353009	0,42836	0,49880	0,85879	0,400633
x_3	-0,386623	0,307427	-0,68959	0,54833	-1,25761	0,223019
x_4	0,321640	0,188894	0,86176	0,50609	1,70276	0,104106
x_5	0,035431	0,174264	0,27635	1,35921	0,20332	0,840943
x_6	-0,504983	0,174274	-2,36815	0,81727	-2,89764	0,008901

Appendix K.2

Correlations (Spreadsheet1)							
	x1	**x2**	**x3**	**x4**	**x5**	**x6**	**y**
x_1	1,000000	-0,446803	-0,047067	0,443797	-0,182976	-0,063041	0,372741
x_2	-0,446803	1,000000	0,774044	-0,109209	-0,076648	-0,306028	-0,023233
x_3	-0,047067	0,774044	1,000000	0,147754	-0,067286	-0,315628	0,037412
x_4	0,443797	-0,109209	0,147754	1,000000	-0,292842	-0,080332	0,404457
x_5	-0,182976	-0,076648	-0,067286	-0,292842	1,000000	-0,034008	-0,097709
x_6	-0,063041	-0,306028	-0,315628	-0,080332	-0,034008	1,000000	-0,523065
y	0,372741	-0,023233	0,037412	0,404457	-0,097709	-0,523065	1,000000

Appendix K.3

	β	r	Estimated data				Share, %
x_1	0,321903	0,372741	0,119986	0,119986	0,222533	0,108873	10,89
x_2	0,30316	-0,023233	-0,007043	0,007043	0,013063	0,006391	0,64
x_3	-0,386623	0,037412	-0,014464	0,014464	0,026826	0,013125	1,31
x_4	0,32164	0,404457	0,130090	0,130090	0,241271	0,118041	11,80
x_5	0,035431	-0,097709	-0,003462	0,003462	0,006421	0,003141	0,31
x_6	-0,504983	-0,523065	0,264139	0,264139	0,489886	0,239674	23,97
			0,489245	**0,539185**		**0,489245**	**48,92**

Appendix L

7-factor model

y employment rate of the rural population, %.
X_1 average monthly salary, UAH
x_2 level of admission, %.
X_3 attrition rate
x_4 labor force replacement rate, %.
X_5 density of cattle, heads
x_6 potential replacement rate per 100 people
x_7 pension burden ratio

Regression Summary for Dependent Variable: y (Spreadsheet1) R= 0,76233570 R^2 = 0,58115572 Adjusted R?= 0,42684468 F(7,19)=3,7661 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(19)**	**p-value**
Intercept			208,5885	87,03245	2,39668	0,026991
x_1	0,40287	0,218212	0,0036	0,00195	1,84623	0,080498
x_2	3,76683	1,727725	5,3225	2,44126	2,18023	0,042021
x_3	-2,94824	1,286638	-5,2585	2,29488	-2,29143	0,033536
x_4	-2,12545	1,040923	-1,5500	0,75912	-2,04189	0,055295
x_5	0,48929	0,193757	1,3109	0,51912	2,52530	0,020610
x_6	-0,55901	0,164064	-2,6215	0,76939	-3,40725	0,002956
x_7	0,01068	0,162361	0,0833	1,26637	0,06575	0,948261

Correlations (Spreadsheet1)								
	x1	**x2**	**x3**	**x4**	**x5**	**x9**	**x7**	**y**
x_1	1,000000	-0,446803	-0,047067	-0,594560	0,443797	-0,063041	-0,182976	0,372741
x_2	-0,446803	1,000000	0,774044	0,679769	-0,109209	-0,306028	-0,076648	-0,023233
x_3	-0,047067	0,774044	1,000000	0,074853	0,147754	-0,315628	-0,067286	0,037412
x_4	-0,594560	0,679769	0,074853	1,000000	-0,254807	-0,152069	-0,084665	-0,065658
x_5	0,443797	-0,109209	0,147754	-0,254807	1,000000	-0,080332	-0,292842	0,404457
x_6	-0,063041	-0,306028	-0,315628	-0,152069	-0,080332	1,000000	-0,034008	-0,523065
x_7	-0,182976	-0,076648	-0,067286	-0,084665	-0,292842	-0,034008	1,000000	-0,097709
y	0,372741	-0,023233	0,037412	-0,065658	0,404457	-0,523065	-0,097709	1,000000

	β	r	Estimated data				Share, %.
X_1	0,40287	0,372741	0,150166	0,150166	0,153407	0,089154	8,92
x_2	3,76683	-0,02323	-0,087515	0,087515	0,089404	0,051958	5,20
x_3	-2,94824	0,037412	-0,110300	0,110300	0,112680	0,065485	6,55
x_4	-2,12545	-0,06566	0,139553	0,139553	0,142565	0,082853	8,29
x_5	0,48929	0,404457	0,197897	0,197897	0,202168	0,117491	11,75
x_6	-0,55901	-0,52307	0,292399	0,292399	0,298710	0,173597	17,36
x_7	0,01068	-0,09771	-0,001044	0,001044	0,001066	0,000620	0,06
	-	-	**0,581156**	**0,978872**	-	**0,581156**	**58,12**

Appendix M

7-factor model

y employment rate of the rural population, %.
X_1 average monthly salary, UAH
x_2 level of admission, %.
X_3 attrition rate
x_4 labor force replacement rate, %.
X_5 density of cattle, heads
x_6 demographic support coefficient per 100 people
x_7 potential replacement rate per 100 people

Regression Summary for Dependent Variable: Var1 (Spreadsheet1) R= ,74922183 R?= ,56133336 Adjusted R?= ,39971933 F(7,19)=3,4733 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(19)**	**p-value**
Intercept			45,38181	77,51320	0,58547	0,565120
x_1	0,44324	0,221707	0,00396	0,00198	1,99920	0,060095
x_2	3,45968	1,760232	4,88850	2,48719	1,96547	0,064149
x_3	-2,72679	1,308803	-4,86356	2,33441	-2,08342	0,050958
x_4	-1,90480	1,057051	-1,38912	0,77088	-1,80199	0,087436
x_5	0,45390	0,198343	1,21611	0,53141	2,28846	0,033741
x_6	0,53363	0,166872	0,19941	0,06236	3,19784	0,004737
x_7	0,01402	0,166149	0,10935	1,29592	0,08438	0,933636

Correlations (Spreadsheet1)								
	Var2	**Var3**	**Var4**	**Var5**	**Var6**	**Var7**	**Var8**	**Var1**
x_1	1,000000	-0,446803	-0,047067	-0,594560	0,443797	0,029174	-0,182976	0,372741
x_2	-0,446803	1,000000	0,774044	0,679769	-0,109209	0,320910	-0,076648	-0,023233
x_3	-0,047067	0,774044	1,000000	0,074853	0,147754	0,344010	-0,067286	0,037412
x_4	-0,594560	0,679769	0,074853	1,000000	-0,254807	0,134625	-0,084665	-0,065658
x_5	0,443797	-0,109209	0,147754	-0,254807	1,000000	0,099925	-0,292842	0,404457
x_6	0,029174	0,320910	0,344010	0,134625	0,099925	1,000000	0,042590	0,508284
x_7	-0,182976	-0,076648	-0,067286	-0,084665	-0,292842	0,042590	1,000000	-0,097709
y	0,372741	-0,023233	0,037412	-0,065658	0,404457	0,508284	-0,097709	1,000000

	β	r	Estimated data				%
x_1	0,44324	0,372741	0,165214	0,165214	0,177867	0,099843	9,98
x_2	3,45968	-0,02323	-0,080379	0,080379	0,086535	0,048575	4,86
x_3	-2,72679	0,037412	-0,102015	0,102015	0,109828	0,061650	6,17
x_4	-1,9048	-0,06566	0,125065	0,125065	0,134644	0,075580	7,56
x_5	0,4539	0,404457	0,183583	0,183583	0,197643	0,110944	11,09
x_6	0,53363	0,508284	0,271236	0,271236	0,292009	0,163915	16,39
x_7	0,01402	-0,09771	-0,001370	0,001370	0,001475	0,000828	0,08
			0,561334	**0,928861**		**0,561334**	**56,13**

8-factor model

y employment rate of the rural population, %.
X_1 average monthly salary, UAH
x_2 level of admission, %.
X_3 attrition rate
x_4 labor force replacement rate, %.
X_5 density of cattle, heads
x_6 demographic support coefficient per 100 people
x_7 Potential replacement rate per 100 people
x_8 coefficient of total demographic burden per 100 people

Regression Summary for Dependent Variable: Var1 (Spreadsheet1) R= 0,77415201 R?= 0,59931133 Adjusted R?= ,42122748 F(8,18)=3,3653 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(18)**	**p-value**
Intercept			567,4569	406,8824	1,39465	0,180097
x_1	0,32370	0,236152	0,0029	0,0021	1,37073	0,187310
x_2	4,39963	1,872232	6,2166	2,6454	2,34994	0,030384
x_3	-3,38493	1,380390	-6,0374	2,4621	-2,45216	0,024634
x_4	-2,57076	1,156408	-1,8748	0,8433	-2,22306	0,039259
x_5	0,56894	0,213747	1,5243	0,5727	2,66175	0,015889
x_6	-1,22474	1,356139	-0,4577	0,5068	-0,90310	0,378398
x_7	1,08307	0,834569	8,4477	6,5094	1,29777	0,210753
x_8	-2,04813	1,568050	-8,3580	6,3989	-1,30617	0,207942

Means and Standard Deviations (Spreadsheet1)			
	Means	**Std.Dev.**	**N**
x_1	9281,963	1476,421	27
x_2	28,400	9,324	27
x_3	32,181	7,387	27
x_4	87,951	18,066	27
x_5	6,431	4,918	27
x_6	354,091	35,258	27
x_7	22,697	1,689	27
x_8	51,205	3,229	27
Y	23,150	13,175	27

Correlations (Spreadsheet1)									
	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_7	***y***
x_1	1,000000	-0,446803	-0,047067	-0,594560	0,443797	0,029174	-0,182976	-0,150591	0,372741
x_2	-0,446803	1,000000	0,774044	0,679769	-0,109209	0,320910	-0,076648	-0,306404	-0,023233
x_3	-0,047067	0,774044	1,000000	0,074853	0,147754	0,344010	-0,067286	-0,309860	0,037412
x_4	-0,594560	0,679769	0,074853	1,000000	-0,254807	0,134625	-0,084665	-0,176625	-0,065658
x_5	0,443797	-0,109209	0,147754	-0,254807	1,000000	0,099925	-0,292842	-0,223119	0,404457
x_6	0,029174	0,320910	0,344010	0,134625	0,099925	1,000000	0,042590	-0,839423	0,508284
x_7	-0,182976	-0,076648	-0,067286	-0,084665	-0,292842	0,042590	1,000000	0,493606	-0,097709
x_8	-0,150591	-0,306404	-0,309860	-0,176625	-0,223119	-0,839423	0,493606	1,000000	-0,506287
Y	0,372741	-0,023233	0,037412	-0,065658	0,404457	0,508284	-0,097709	-0,506287	1,000000

	β	r	Estimated data				%
x_1	0,3237	0,372741	0,120656	0,120656	0,048000	0,028766	2,88
x_2	4,39963	-0,02323	-0,102217	0,102217	0,040664	0,024370	2,44
x_3	-3,38493	0,037412	-0,126637	0,126637	0,050379	0,030192	3,02
x_4	-2,57076	-0,06566	0,168791	0,168791	0,067149	0,040242	4,02
x_5	0,56894	0,404457	0,230112	0,230112	0,091543	0,054862	5,49
x_6	-1,22474	0,508284	-0,622516	0,622516	0,247650	0,148418	14,84
x_7	1,08307	-0,09771	-0,105826	0,105826	0,042100	0,025231	2,52
x_8	-2,04813	-0,50629	1,036942	1,036942	0,412517	0,247224	24,72
	-	-	0,599306	2,513696		0,599306	59,93

4-factor model

y employment rate of the rural population, %.
X_1 average monthly salary, UAH
x_2 labor force replacement rate, %.
X_3 density of cattle, heads
x_4 demographic support coefficient per 100 people

Regression Summary for Dependent Variable: Var1 (Spreadsheet1) R= ,66733601 R?= ,44533735 Adjusted R?= ,34448960 F(4,22)=4,4159 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(22)**	**p-value**
Intercept			-77,0008	31,40826	-2,45161	0,022629
Var2	0,327490	0,214019	0,0029	0,00191	1,53019	0,140223
Var5	0,130470	0,201110	0,0951	0,14666	0,64875	0,523214
Var6	0,246747	0,178032	0,6611	0,47699	1,38597	0,179646
Var7	0,456509	0,162527	0,1706	0,06073	2,80883	0,010228

Correlations (Spreadsheet1)					
	Var2	**Var5**	**Var6**	**Var7**	**Var1**
Var2	1,000000	-0,594560	0,443797	0,029174	0,372741
Var5	-0,594560	1,000000	-0,254807	0,134625	-0,065658
Var6	0,443797	-0,254807	1,000000	0,099925	0,404457
Var7	0,029174	0,134625	0,099925	1,000000	0,508284
Var1	0,372741	-0,065658	0,404457	0,508284	1,000000

	β	r	Estimated data				%
x_1	0,32749	0,372741	0,122069	0,122069	0,263950	0,117547	11,75
x_2	0,13047	-0,06566	-0,008566	0,008566	0,018523	0,008249	0,82
x_3	0,246747	0,404457	0,099799	0,099799	0,215795	0,096101	9,61
x_4	0,456509	0,508284	0,232036	0,232036	0,501732	0,223440	22,34
			0,445337	**0,462470**		**0,445337**	**44,53**

6-factor model

y	employment rate of the rural population, %.
X_1	average monthly salary, UAH
x_2	level of admission, %.
X_3	attrition rate
x_4	cattle density, heads
x_5	demographic support coefficient per 100 people
x_6	potential replacement rate per 100 people

Regression Summary for Dependent Variable: Var1 (Spreadsheet1) R= ,69739755 R?= ,48636334 Adjusted R?= ,33227235 F(6,20)=3,1563 p						
	b*	**Std.Err. – of b***	**b**	**Std.Err. – of b**	**t(20)**	**p-value**
Intercept			-73,9681	42,47117	-1,74161	0,096938
x_1	0,363469	0,229122	0,0032	0,00204	1,58635	0,128344
x_2	0,344967	0,351008	0,4874	0,49597	0,98279	0,337452
x_3	-0,427925	0,308336	-0,7633	0,54996	-1,38785	0,180452
x_4	0,303814	0,189852	0,8140	0,50866	1,60027	0,125217
x_5	0,502380	0,175045	0,1877	0,06541	2,87001	0,009466
x_6	0,034018	0,174844	0,2653	1,36373	0,19456	0,847696

Correlations (Spreadsheet1)							
	Var2	**Var3**	**Var4**	**Var6**	**Var7**	**Var8**	**Var1**
x_1	1,000000	-0,446803	-0,047067	0,443797	0,029174	-0,182976	0,372741
x_2	-0,446803	1,000000	0,774044	-0,109209	0,320910	-0,076648	-0,023233
x_3	-0,047067	0,774044	1,000000	0,147754	0,344010	-0,067286	0,037412
x_4	0,443797	-0,109209	0,147754	1,000000	0,099925	-0,292842	0,404457
x_5	0,029174	0,320910	0,344010	0,099925	1,000000	0,042590	0,508284
x_6	-0,182976	-0,076648	-0,067286	-0,292842	0,042590	1,000000	-0,097709
y	0,372741	-0,023233	0,037412	0,404457	0,508284	-0,097709	1,000000

	β	r	Estimated data				%
x_1	0,363469	0,372741	0,135480	0,135480	0,250397	0,121784	12,18
x_2	0,344967	-0,02323	-0,008015	0,008015	0,014813	0,007204	0,72
x_3	-0,427925	0,037412	-0,016010	0,016010	0,029589	0,014391	1,44
x_4	0,303814	0,404457	0,122880	0,122880	0,227110	0,110458	11,05
x_5	0,50238	0,508284	0,255352	0,255352	0,471948	0,229538	22,95
x_6	0,034018	-0,09771	-0,003324	0,003324	0,006143	0,002988	0,30
			0,486363	**0,541059**		**0,486363**	**48,64**

Appendix R

Foreign experience in regulating employment

Country	Employment regulation policy	Approaches/tools to promote employment (priority)	Main indicators	Employment regulatory authorities
Sweden	- Solidarity policy – equal pay for similar work, regardless of the employer's financial capacity; - support for low-performing sectors of the economy that are of strategic importance; - stimulating the creation of new jobs; - creation of a computer database with information on available vacancies and an extensive network of information centers providing 231ounselling services; - equal opportunities for achieving well-being; - regulation of migration processes and optimization of the level of labor force by regions by providing subsidies and loans for relocation to areas with labor shortages.	- high social protection; - creation of new jobs; - training and retraining of unemployed persons	Employment rate (2020 p.) – 60,7% unemployment rate (2020 p.) – 8,3%	Employment Service functioning on a 3-way basis (state-employers-trade unions) National Labor Market Council
France	- support for enterprises that employ young professionals by providing benefits; - the state finances social insurance costs for young professionals for one year; - state support for starting a business	- state support when starting your own business; - part-time work; - youth employment policy	Unemployment rate (2020 p.) – 9,1 %	National interprofessional trade and industrial employment center
USA	- encouraging the active role of entrepreneurs; - high territorial mobility of employees between enterprises; - decentralization of the labor market; - high level of labor mobility; - - wages are set based on labor supply and demand.	- active work of the employment information service; - professional training of specialists	unemployment rate (2020 p.) – 6,9 %	A federal-state employment system consisting of 2,200 labor exchanges located in all states

Japan	- the principle of lifelong employment (the management of Japanese companies carefully selects specialists, as the Japanese employment culture does not provide for the dismissal of an employee and his/her transfer to another job); - a special strategy to prevent unemployment based on maintaining the number of employees by transferring them to other companies and to shorter working hours; - high level of intra-company patriotism - slow evaluation process and professional growth of employees.	- the principle of lifetime employment; - high social guarantees; - system of training and retraining of employees	Employment rate (2020 p.) – 60,3 % unemployment rate (2020 p.) – 3,0 %	
Germany	- State support for enterprises that provide jobs for young professionals, women, and people with special needs; - even distribution of the labor force, which ensures equal development of all territories and does not lead to migration of the working population to large cities.	- youth employment promotion policy; - preferential state support for enterprises.	Unemployment rate (2020 p.) – 5,8 %	Federal Employment Agency

Source: compiled by the author.

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