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## Article

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Journal of Risk and Financial Management

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*Suggested Citation:* Shulha, Olha; Kostyshyna, Tatiana; Semykina, Maryna; Katan, Liudmyla; Smirnova, Hanna (2021) : Modeling of social risks in the labor sphere, Journal of Risk and Financial Management, ISSN 1911-8074, MDPI, Basel, Vol. 14, Iss. 10, pp. 1-12, <https://doi.org/10.3390/jrfm14100488>

This Version is available at:

<https://hdl.handle.net/10419/258592>

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Article

# Modeling of Social Risks in the Labor Sphere

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**Abstract:** Modern society has developed in such a way that social reality is characterized by the significant dynamics of all processes and their uncertainty. Under such conditions, risk accompanies any purposeful activity of the social subject, and, in turn, the latter is aimed at reducing the uncertainty of its results. The purpose of this paper is to form the basis of a comprehensive study of social risks in the labor sphere and to develop practical recommendations for minimizing their negative consequences. In order to determine the main factors influencing the probability for the unemployed not to work in the specialty in which they have trained, we used the data of a micro-level survey on economic activity of the population to build linear regression models based on structural variables. As a result of applying the method of economic-mathematical modeling, in particular the basics of probability theory, the models of social risks of unemployment in terms of occupational groups and employment of unemployed persons outside of the specialty they have trained in were developed. The models developed made it possible to formalize and identify patterns of supply and demand dynamics of labor in terms of professions, as well as to identify the main factors influencing the change in the probabilistic characteristics of employment of unemployed persons outside of the specialty they have trained in.



**Citation:** Shulha, Olha, Tatiana Kostyshyna, Maryna Semykina, Liudmyla Katan, and Hanna Smirnova. 2021. Modeling of Social Risks in the Labor Sphere. *Journal of Risk and Financial Management* 14: 488. <https://doi.org/10.3390/jrfm14100488>

Academic Editor: Thanasis Stengos

Received: 14 August 2021

Accepted: 9 October 2021

Published: 14 October 2021

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**Keywords:** social risks; labor sphere; unemployment; modeling; management

## 1. Introduction

Modern society has developed in such a way that social reality is characterized by significant dynamics of all processes and their uncertainty. Under such conditions, risk accompanies any purposeful activity of the social subject, and, in turn, the latter is aimed at reducing the uncertainty of its results.

The dynamism of modern labor relations, changes in the motivational and value principles of employers and employees, the uncertainty of the conditions for the inclusion of individuals in labor activity cause a significant increase in social risks in this sphere. Among the features of the mechanisms of optimization of social risks in the labor sphere, one should note the crucial role of mutual determination of behavioral labor strategies of an individual and the functions of institutions that regulate and standardize these relations. Certainly, any social action is always institutionally conditioned, and on the other hand, all social institutions can be implemented only through the actions of people. In this context, one of the main contradictions in the development of modern Ukrainian society, which requires scientific justification and practical solutions, is the contradiction between the need to implement optimal strategies for management of social risks in the labor sphere

and the available scientific support for these processes. To resolve the above contradiction, as a theoretical tool, it is advisable to use the methodology of risk study followed by the development of the conceptual foundations of social risk management on this basis.

An important circumstance that actualizes the scientific search is the actual underdevelopment of the methodological foundations of understanding of social risks, in particular, the conceptual framework, classification features and essential characteristics. Problems of a practical nature also remain unresolved, and the issue of developing mechanisms to prevent the negative consequences of the implementation of the risks under study is especially pressing.

A significant contribution to the study of various aspects of the development of the social and labor sphere were made by leading national scientists, notably by Begg 2017, Chang et al. 2018, and Lupu 2019. Begg (2017) analyzes the uncertainty of the economic situation that the choice is made in, which is the main reason for the impossibility of maximizing profits. Chang et al. (2018) consider the uncertainty of choice due to limited opportunities to obtain information on the external and internal socio-economic environment. Lupu (2019) states the uncertainty of the situation and lack of knowledge are one of the defining characteristics of the behavior of individuals under conditions when it is guided by special guidelines-institutions. In summary, this is about the formal consolidation of the system of legal norms and institutions, such as markets, firms, banks, etc. The rest of the institutions, which are represented by treaties and voluntarily adopted codes of conduct such as traditions and stereotypes represent informal restrictions on the behavior of individuals (Palier 2018).

In the scientific literature, studies of social risks, including those specific to the labor sphere, are conducted in the context of the theoretical foundations of riskology.

Rapp et al. (2018) determine that the level of total risk is constantly changing due to the dynamic nature of the external environment of the firm. This forces entrepreneurs to regularly clarify their position in the market, assess the degree of risk of certain events and, accordingly, adjust their behavior in the field of risk management (Caraher and Reuter 2017). The way out of this situation, which threatens the economic activity of the economic entity of any level, as Gransow and Price (2019) quite rightly believe, is to create institutional risk absorbers.

As a result of various manifestations of risk in almost all spheres of human life there is a fairly wide variety of approaches to its definition. Much of the interpretation is based on two axiomatic definitions. A risk is related to random events or processes (Devos and Rahman 2018). The weakness of social policy reinforces the role of certain negative traits of the labor mentality (disrespect for the law, labor discipline, saving of work time, paternalistic orientations, hopes for state support, etc.), without stimulating the development of traits that should be truly inherent in the worker of a market type and are necessary for the formation of motivation for competitive work.

The consequences of these events or processes are undesirable (Qi et al. 2019). Miscalculations of social and economic policy, to some extent, are related to the inconsistency of management decisions that do not rely on the assessment of transformations of the population's labor consciousness at the stage of market transformation.

The category of risk is inextricably linked with the category of uncertainty, as the latter is the basis of the vast majority of socio-economic processes (Bhatti and Rehman 2019). Therefore, activities related to reducing uncertainty in the situation of choice can be considered as one of the manifestations of risk.

Most of the processes under study are characterized by uncertainty, with a variety of options for the internal state and the external environment (Bonetto et al. 2018). Depending on the form of information that the object has in the decision-making process, uncertainty can be classified as follows: complete lack of knowledge, physical uncertainty, unreliability, ambiguity, and linguistic uncertainty. In their pure form, uncertainties are almost non-existent; there is a combination of their different types.

The difference between uncertainty and risk can be in the way information is presented and expressed as follows: for a risk situation—the presence of probabilistic characteristics of uncontrolled parameters; for a situation of uncertainty—their absence (Fujita and Moscarini 2017).

Where there is a possibility of qualitative or quantitative assessment of the probability of an event's occurrence, one can talk about a risk (Hällsten et al. 2017). As for the term "probability", it is fundamental to the relevant scientific theory and allows quantitative comparison of events according to the degree of probability of their occurrence (Busemeyer and Neimanns 2017).

The probability of the event can be displayed numerically, and as a unit of measurement one accepts the probability of a reliable event, i.e., the one that is bound to occur (Johnston and Mas 2018).

In the historical logical aspect, the currently dominant scientific theories of risk can be divided into two main groups.

The key provision of the classical understanding of risk (as a threat of adverse consequences of the event) (Bonoli et al. 2017) is the assumption that economic and social policy shapes public expectations on each issue, but there is a type of expectations, which are not formed by one or another action. For example, all other things being equal, an individual understands that in the future he or she will face old age and, as a consequence, the social risk of losing status benefits and income. Expectations, as a reaction to economic action, contain three possible variants of stereotypical perception of the future: adaptive, extrapolation and rational. The above expectations are based not only on uncertainty about the process of their formation and changes associated with the overall process of socio-economic development of the country, but also depend on the psychological characteristics and attitudes of man.

The neoclassical model (as the probability of deviation from the planned result (Lee et al. 2018) assumes the return of the situation to the normal level after adaptation. This model does not give an idea of how the subject can take into account the factor of external influences on their own actions, how it is possible to return to the normal level, and what this level can be. Here there appear difficulties with the adequacy of the hypothesis of adaptive expectations, which takes into account the instantaneous adaptive response of individuals, but is unable to explain changes in the economic model of behavior of subjects depending on the circumstances.

However, for the sake of objectivity, it should be noted that the manifestations of risk can have positive consequences, which can explain the risky behavior of a person who hopes for a winning outcome as the risk-bearing behavior is nothing other than a balancing between random losses and random benefits (Seeleib-Kaiser and Spreckelsen 2018).

Social risks are an expression of the positive probability of restructuring the institutional field in favor of certain social groups, supporting these changes by the largest and (or) most active parts of society (Albuquerque et al. 2019).

The approach according to which risk is understood as the social phenomenon owing to the fact that it explains, forms, depicts and defines a society, and vice versa seems rather original. Only through risk one can understand society, and only with society one can understand risks (Heidenstrøm 2021).

M.G. Christoffersen emphasizes that social risk as a social phenomenon combines in its structure the risks manifested in various spheres of human life. These are demographic risks, employment risks (job loss, underemployment, inadequate employment), poverty risks (low level of income and expenses, low level of material security), risks of loss of health and ability to work, risks of disability and downward social mobility, unregulated labor migration, social instability, unsatisfactory ecological condition and its deterioration, etc. (Christoffersen 2018).

M.K. Ghuman and J.S.M. Bikram define social risk as the level of loss of any socially significant component of everyday life, and regardless of the nature of the source (technical,

economic, environmental, etc.), it can be expressed as a comprehensive quantitative and qualitative assessment (Ghuman and Mann 2018).

M. Fleurbaey and S. Zuber suggest that social risks are understood as risks that are significant for a person as a social being in his daily life, affecting his life, relationships with other members of society and social groups, determining the place of a person in the social structure of society, etc. (Fleurbaey and Zuber 2017).

According to K. Lurtz and K. Kreutzer, the concept of social danger is used in the national security system, and a risk is the first step in the development of danger, which consistently poses a threat that grows into a dangerous event adversely affecting human and social development (Lurtz and Kreutzer 2017). Social risks should be indicators of regional development and their reduction, they should be defined as a priority area of state regional policy. It is significant regional differences in demographic development, level, conditions and quality of life, environmental conditions, labor market, social environment, etc. cause the formation of social risks in the state and its regions, pose a danger to a person and society.

The COVID-19 crisis exacerbated the employment problem, leading the unemployment rate to rise from 8.5% to 9.9%. The unemployed population was 1.6 million (Razumkov Centre 2021). In particular, 17% of the workforce at the peak of quarantine were in a state of hidden unemployment—the employment of these people was reduced or they were on unpaid leave. Also, the weekend quarantine, which was in force in Ukraine in November, provoked the second peak of unemployment growth—361 thousand unemployed were recorded, and as of the beginning of December 2020—420 thousand. On average in Ukraine, six unemployed persons applied for one vacancy (as of 1 November 2019—three persons) (State Employment Service of Ukraine 2021). As of 1 November 2020, the number of vacancies declared by employers amounted to 68 thousand, which is 34% less than on the corresponding date of the previous year. It is noted that the real incomes of citizens in the first half of 2020 decreased by 7.3% compared to the same period of 2019. This was the first drop in real income since 2016. The main reasons for this were the decline in business activity, wages, and growing unemployment.

In Ukraine, the highest unemployment rate in four years was recorded in the first quarter of 2021 at 10.5%. At the same time, the number of employed was 15.4 million (55%).

The level of employment decreased among citizens of all ages, except for people aged 50–59, among whom this figure increased from 68.1% to 68.5% (Government Portal of Ukraine 2021). The highest level of employment is observed among persons aged 30–50 years (from 74.7% to 76.8%), and the lowest among persons aged 60–70 years (13.6%) and 15–24 years (25.9%). Among women aged 15–70, the number of the employed population decreased by 304 thousand people (to 7.7 million people), and the employment rate decreased from 53.2% to 51.5%. Among men, the number of the employed population decreased by 323 thousand people (to 8.3 million people), and the employment rate decreased from 64.1% to 62.0%. In the third quarter of 2020, the number of employed people aged 15–70 decreased by 1.0 million people and amounted to 15.9 million people compared to the same period of 2019. The employment rate of the population aged 15–70 decreased from 59.3% to 56.1%.

Paying tribute to the scientific achievements of these authors, it should be noted that a comprehensive study of risk issues from the standpoint of the development of the social and labor sphere is currently absent. It should also be emphasized that the system of social risks is not stable, it changes in accordance with certain directions of development of the state and the values proclaimed by it. This necessitates the development and implementation of theoretical-methodical and practical approaches to the evaluation and formation of a qualitatively new policy to minimize them.

The purpose of this paper is to form the basis of a comprehensive study of social risks in the labor sphere and to develop practical recommendations for minimizing their negative consequences.

## 2. Materials and Methods

The methodological basis of the work is economic theory, management theory, and general and special methods of cognition. The study is based on the use of a dialectical method of analysis of economic and social processes and a systematic approach to the study of the category of social risk.

The following general and special methods of cognition were used to achieve the purpose and solve the set tasks: dialectical method—to highlight the essential characteristics of the subject of study in the historical aspect of its development; hypothetical-deductive method—to build deductively related hypotheses and formulate statements about empirical ones; method of proliferation—to select the factually true original theory; and analysis of knowledge systems—to distinguish between empirical and theoretical knowledge, as well as to study the possibilities of extending previously formulated theories to new subject areas.

To determine the main factors influencing the probability for the unemployed not to work in the specialty they have trained in, it is proposed to use the data of the micro-level survey on economic activity of the population.

Sample survey of the population (households) on economic activity (hereinafter—PEAS) is the main source of information on the composition and structure of the labor force; employment and areas of professional activity of the population; and real unemployment rate, which takes into account the total supply of labor and is used as an important indicator of the analysis of the current state of the economy of the country. The survey data allow assessment of the real volume and changes in labor supply in the labor market of Ukraine, to analyze trends in its conditions.

The PEAS methodology corresponds to the basic concepts and definitions of the International Labor Organization, the survey is conducted on the basis of polling of a set of non-institutional households, which is formed by the procedure of stratified multi-stage random sampling. Since 2004, 11.1 thousand households representing all regions of Ukraine have been selected for a monthly survey.

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The units of observation in the PEAS are both households and their members of working age (15–70 years old), so the survey tools provide information for these two categories, namely, the survey is conducted using two questionnaires:

Form 1—EAS “Questionnaire of sample survey of the population (households) on economic activity”;

Form 2—EAS “Household questionnaire”.

The form 1 questionnaire has about 40 questions that allow identification of the respondent as employed, unemployed, or economically inactive.

The form 2 questionnaire obtains data on all household members, even those who do not fall into the age range of 15–70 years old, or are temporarily absent at the time of the survey, regarding their socio-demographic characteristics, i.e., birth date, marital status, family relations, sex, citizenship, education, profession according to education diploma, and type of pension. Additionally, changes in the composition of the household and the status of their members are monitored compared to the previous round of the survey.

When building models for estimating the probability of being employed in a role other than their specialty for different socio-demographic groups of households, it is advisable to consider their distribution by sex, age groups, level of education, area of residence.

Two analytical models were built in the study.



Model 1. In the course of the study, it was established that the application of linear regression models using conditional (structural) variables is the most acceptable approach in identifying the factors that affect the probability of employment of the unemployed in a role other than their specialty.

The general form of a linear model with structural variables is set by the formula:

$$P = \beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_nx_n \quad (1)$$

where:

$P$ —the probability of the unemployed not working in the specialty;  $x_1$ —binary variables (age, sex, region of residence, etc.),  $n = 1, 2, \dots, n$ ;  $\beta_0$ —free member, which has the value of the empirical level of probability of the unemployed not working in the specialty, which corresponds to the zero values of all binary variables;  $\beta_1$ —regression coefficients that reflect the influence of each variable (if  $b_i = 1$ ) on the probability of the unemployed not working in the specialty,  $n = 1, 2, \dots, n$ .

It should be noted that in models of this type all factorial features are binary variables, i.e., they can take only one of two possible values: 0 or 1.

For the models of probability of the unemployed not working in the specialty, by the method of stepwise regression with “inclusion” and “exclusion” the following characteristics of the unemployed are selected:

sex: male; female;

education level: complete higher education; incomplete (basic) higher education or vocational education;

profession group according to the classifier of professions: high level (combining 1–3 classification groups, namely: legislators, senior civil servants, executives, managers, professionals, specialists); medium or low level (combining 4–9 classification groups, namely: technical workers, workers in trade and services, skilled workers in agriculture and forestry, fish farming and fishing, skilled workers with tools, workers for maintenance, operation and control of processing equipment, assembly of equipment and machinery, the simplest professions).

Based on the above, the model for the probability of the unemployed not working in their specialty ( $P_w$ ) will include the following variables:

$x_1$ —a male person (variable takes the value “1”, if the person is a man; the variable takes the value “0”, if the person is a woman);

$x_2$ —a person with complete higher education (“1”—yes; “0”—no);

$x_3$ —a person belonging to a high-level profession group (“1”—yes; “0”—no).

Model 2. This model is intended mainly for a qualitative description of the probability of the unemployed not working in the specialty, depending on a number of factors. The following factors are identified for the model:

1. Place of residence: urban area; rural area.
2. Education level: complete higher education; incomplete (basic) higher education or vocational education.
3. Age group: up to 35 years; 35 years and older.
4. Economic sector: formal; informal.
5. Qualification level: high and highest levels; medium and low levels.

Thus, the model for the probability of the unemployed not working in the specialty ( $P_w$ ) includes the following variables:

$x_1$ —a person living in an urban area (“1”—yes; “0”—no);

$x_2$ —a person with complete higher education (“1”—yes; “0”—no);

$x_3$ —a person aged 35 and older;

$x_4$ —a person employed in the formal economic sector;

$x_5$ —a person with the high or the highest level of qualification (“1”—yes; “0”—no).

It should be noted that there is a problem of multicollinearity in many calculations. The test for multicollinearity was carried out in the article. In the presence of a loose multicollinearity, the estimates formally exist, the basic preconditions of regression analysis are not violated (Fossati 2018). But at the same time, there are drawbacks—estimates have large standard errors, which leads to the following negative consequences (Bonoli et al. 2017): a small change in the input data (deletion/addition) leads to a significant change in regression estimates, which makes the model unsuitable for analysis and forecasting; the coefficients become insignificant, although the equation as a whole is significant; very wide confidence intervals. The presence of collinearity makes it difficult to interpret the parameters of multiple regression as characteristics of factors in the “pure” form; linear regression parameters lose their meaning; it is possible to obtain an incorrect sign of the regression coefficient (Gallego and Marx 2017). It is difficult to determine the contribution of each of the explanatory variables to the variance of the dependent variable explained by the regression equation (Dekker and Veen 2017).

The method of a matrix of pair correlation coefficients is used. The value of the pair correlation coefficient exceeds 0.7, which indicates the collinearity between the two factors. Of the two correlating factors, the one that correlates better with the effective feature was left.

Information resources, statistical data of the European Union, the World Bank, the State Statistics Service of Ukraine, the results of sociological studies, international legal acts in the field of labor, study results of leading scientists, scientific and statistical Internet resources were the information base of the study.

### 3. Results

Risk management in the labor sphere is a special and quite complex type of activity, as it is related not only with ambiguous understanding of the concept of risk, but also with the diversity of its manifestations and the ability to minimize its negative consequences. In general, it is advisable to identify three possible areas of managerial influence aimed at reducing the likelihood of negative social consequences of risks: management by way of influencing the causes of risks, management through the impact on cause-and-effect relations, and a combination of the first two options.

The main manifestation of unemployment in the social context is the imbalance in relations between social groups that have different socio-economic status in society and differ in their role function in the social organization of labor. The economic activity of the unemployed in Ukraine is extremely low, which is due to reduced motivation for productive employment. As a result of long-term joblessness, the unemployed lose their professional skills and qualifications, which complicates the process of returning to productive employment.

Two analytical models were built in the study.

In the final form, the model 1 can be represented as follows:

$$\begin{cases} P_w = 0.745 \times x_1 + 0.095 \times x_2 - 0.547 \times x_3, \\ R^2 = 0.968; R_{crit}^2 = 0.575; \\ F = 70.6; F_{crit} = 5.14. \end{cases} \quad (2)$$

The critical values of the given characteristics of the quality of the model correspond to 95% probability of a relationship between the resultant and factor variables.

Since the actual values of the coefficient of determination and ratio significantly exceed their critical values, there is reason to believe that the relationship between effective and factorial features is adequately described by the obtained equation. The proximity of the actual value of to one means that the relationship between the features is close, and 90% of the variation in the probability of the unemployed not working in the specialty is explained by gender, level of education, and profession group.

The importance of regression coefficients is shown by *t*-statistics.

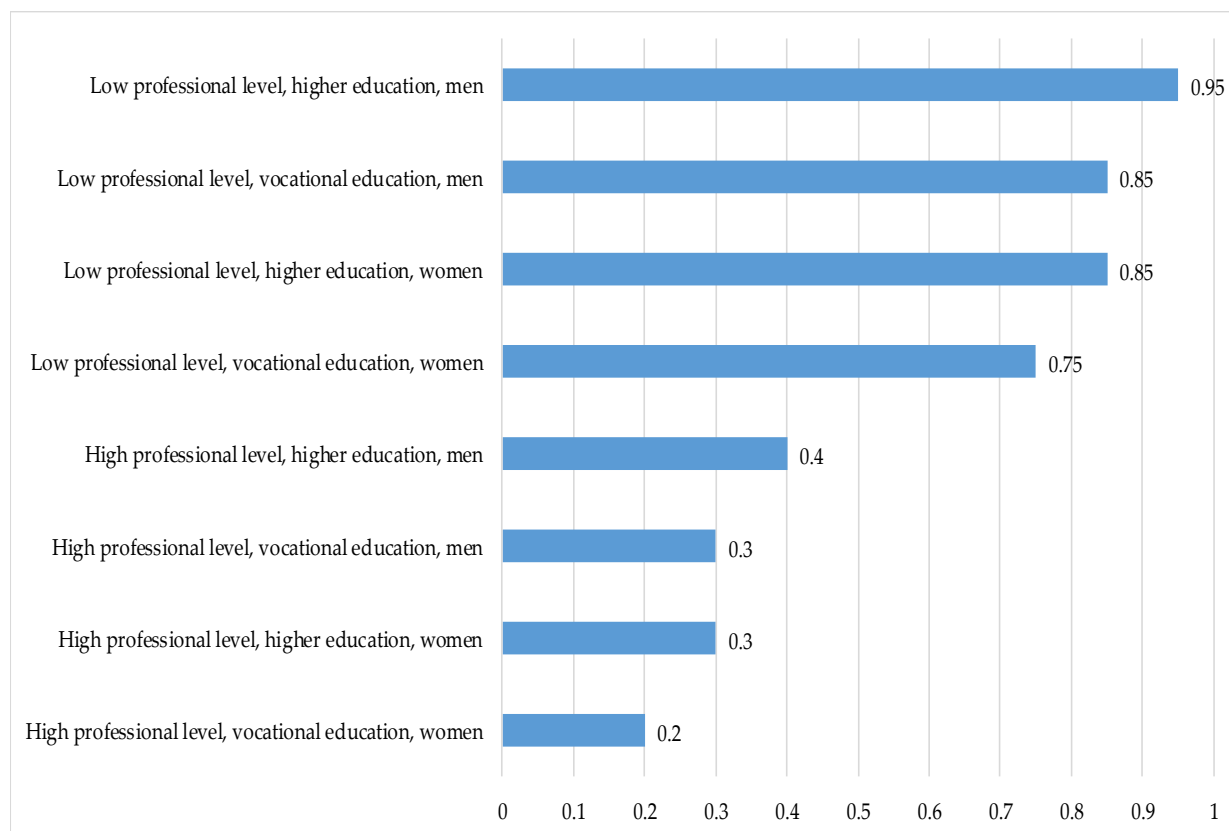
Their values, as well as the interpretation of the model parameters are given in Table 1.



**Table 1.** Interpretation of model parameter values (author’s calculations).

Parameter	Parameter Value	Explanation
Equation free member ( $t = 21.8$ )	+0.75	This is the average probability of not working in their specialty for unemployed women with incomplete or basic higher education or vocational education belonging to profession groups of medium and low levels.
The regression coefficient for the variable $x_1$ ( $t = 2.4$ )	+0.10	All other things being equal, for unemployed men, $P_w$ increases by an average of 0.10. That is, the probability of not working in their specialty for such persons is an average of 0.85.
The regression coefficient for the variable $x_2$ ( $t = 2.5$ )	+0.10	All other things being equal, for the unemployed with a complete higher education $P_w$ increases by an average of 0.10. That is, the probability of not working in their specialty for such persons is an average of 0.85.
The regression coefficient for the variable $x_3$ ( $t = -14.1$ )	-0.55	All other things being equal, for the unemployed of the high-level profession group $P_w$ decreases by an average of 0.55. That is, the probability of not working in their specialty for such persons is an average of 0.30.

The results of calculations according to the model (2) presented in Figure 1 illustrate the empirical probabilities of not working in the specialty for different population groups.



**Figure 1.** Probability of not working in the specialty by population group (author’s research).

Thus, from the modeling results it can be generally concluded that the unemployed men with complete higher education looking for a job in a group of middle or low level professions have the highest chance of not working in their specialty; unemployed women with incomplete (basic) higher education or vocational education looking for a job in a high level profession group have the lowest chance of not working in their specialty.

The final form of the model 2:

$$\begin{cases} P_w = 0.762 + 0.031 \times x_1 + 0.138 \times x_2 + 0.028 \times x_3 - 0.065 \times x_4 - 0.512 \times x_5, \\ R^2 = 0.862; R_{crit}^2 = 0.260; \\ F = 39.9; F_{crit} = 2.69. \end{cases} \quad (3)$$

In terms of quality characteristics, the model is quite adequate. The proximity of the actual value of  $R_2$  to one means close relations between the features of area type, level of education, age, sector of the economy, and qualification level, which explains 86.2% of the variation in the probability of the unemployed not working in their specialty. Interpretation of model parameters is given in Table 2.

**Table 2.** Interpretation of model parameter values (author’s calculations).

Parameter	Parameter Value	Explanation
Equation free member	0.76	This is the average probability of not working in their specialty for unemployed persons aged 35 and older with incomplete or basic higher education or vocational education, medium or low qualification, living in rural areas and looking for a job in the informal economy sector.
The regression coefficient for the variable $x_1$	+0.03	All other things being equal, for the unemployed living in urban areas, $P_w$ increases by an average of 0.03. That is, the probability of not working in their specialty for such persons is an average of 0.79.
The regression coefficient for the variable $x_2$	+0.14	All other things being equal, for the unemployed with a complete higher education, $P_w$ increases by an average of 0.14. That is, the probability of not working in their specialty for such persons is an average of 0.90.
The regression coefficient for the variable $x_3$	+0.03	All other things being equal, for people aged 35 and older, $P_w$ increases by an average of 0.03. That is, the probability of not working in their specialty for such persons is an average of 0.79.
The regression coefficient for the variable $x_4$	−0.06	All other things being equal, for the unemployed looking for a job in the formal economy sector, $P_w$ decreases by an average of 0.06. That is, the probability of not working in their specialty for such persons is an average of 0.70.
The regression coefficient for the variable $x_5$	−0.51	All other things being equal, for the unemployed with high or highest qualification, $P_w$ decreases by an average of 0.51. That is, the probability of not working in the specialty for such persons is an average of 0.25.

The obtained results of calculations by Equation (3) illustrate the empirical probabilities of not working in the specialty for different groups of population.

Based on the modeling results, it is advisable to conclude that for unemployed people under and over 35 with a complete higher education, with a medium or low level of qualification, residing in urban areas and looking for a job in the informal sector of the economy (probability = 0.96) have the highest chance of not working in their specialty.

Unemployed people under the age of 35 with incomplete (basic) higher education or vocational education, with a high or the highest level of qualification, who reside in rural areas and who are looking for a job in the formal sector of the economy (probability = 0.19) have the lowest chance of not working in their specialty.

Thus, the suggested approach for assessing the risk of not working in specialty enabled identification of the following main factors influencing this probability: gender, age, level of education, level of qualification, and profession group, as well as place of residence and employment sector.

#### 4. Discussion

The recommended main tasks in the field of labor remuneration are as follows: modernization of existing standards and norms of labor productivity, improvement of labor legislation, establishment of the minimum wage at a level not lower than the subsistence level for able-bodied persons, introduction of regular review of the consumer basket which forms the subsistence level, etc. In our opinion, the above provisions relate to the conditions in which the risks of declining incomes of the population are realized, and not the actual social risks in the field of labor.

For the labor market, the priority of employment of the economically active population requires not only the achievement of macroeconomic stabilization and financial recovery of the economy, ensuring the investment attractiveness of the country and encouraging the working population to be active in the labor market. The growth of negative phenomena in the national labor market is associated primarily with growing unemployment, the spread of forced underemployment, reducing employment opportunities for the unemployed. That is, the suggested measures also relate, first of all, to the environment in which the relevant social risks in the field of labor are realized.

The developed recommendations for improving the system of monitoring of social risks in the field of labor are based on the fact that a certain limited system of indicators characterizing the main types of adverse events, the occurrence of which leads to the spread of such phenomena as unemployment, loss of income, poverty, etc., is subject to monitoring.

The key tasks of improving the quality of monitoring are: limiting the set of indicators only to those that can provide a comprehensive analysis of social risks; ensuring multi-vector use of its results; ensuring quality control of monitoring results. The main function of monitoring should be to assess the effectiveness of measures to minimize social risks, which involves analyzing cause and effect relationships, effectiveness, and, if necessary, assessing the impact and forecasting the consequences of measures to prevent factors that actualize social risks in the field of labor.

#### 5. Conclusions

As a result of applying the method of economic-mathematical modeling, in particular the basics of probability theory, the models of social risks of unemployment in terms of occupational groups and employment of unemployed persons not in the specialty they have trained in were developed. The models developed made it possible to formalize and identify patterns of dynamics of supply and demand of labor in terms of professions, as well as to identify the main factors influencing the change in the probabilistic characteristics of employment of unemployed persons not in the specialty they have trained in.

The author's concept of social risk management in the labor sphere is based on the provision of the correspondence of the negative consequences of the event to the degree of probability of its occurrence. Effective management of social risks involves their consideration as multifaceted complex objective-subjective phenomena characterized by uncertainty, ambiguity, and diversity. The study of social risks of unemployment from the standpoint of the managerial approach made it possible to identify, the negative and positive consequences of their realization, in particular for development of the private sector and innovation.

The main areas of managerial influence aimed at reducing the likelihood of negative social consequences of the actualization of social risks in the field of labor are: management through the impact on the causes of risks, management through the impact on cause-and-effect relations, and a combination of the first two areas.

**Author Contributions:** Conceptualization, O.S. and T.K.; methodology, M.S.; software, L.K.; validation, H.S.; formal analysis, O.S.; investigation, T.K.; resources, M.S.; data curation, L.K.; writing—original draft preparation, H.S.; writing—review and editing, O.S.; visualization, T.K.; supervision, M.S.; project administration, L.K.; funding acquisition, H.S., please turn to the CRediT taxonomy for explanation of terms. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.

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