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Selected aspects of the social protection system's financial security in the context of shadow economy

Abstract
Introduction. The level of social protection in the country depends on a number of socio-economic factors that affect the formation of its financial sources positively as well as negatively. The shadow economy in the country is one of the key factors. The *purpose* of the article is to conduct an economic and statistical analysis of the impact of the shadow economy on the financial support of social safety. *Results.* The level of the shadow economy is one of the most important factors influencing the financial security of the social protection system. The economic and statistical analysis of the empirical data on the OECD countries for the period of 1980-2014 with the use of the correlation and regression analysis and analytical grouping shows a direct correlation between the level of the shadow economy and the level of social spending per capita.
The empirical regression equation *y = 123777.7 - 331.625x* shows that the growth in size of the shadow economy by 1% leads to a decrease in social spending per capita in PPP $ 331.62 (assuming constancy of other factors that influence the effective feature). The results confirm that countries with a higher level of shadow economy have lower social spending per capita. It is connected with the reduction of the sources of social safety funding. The situation of the shadow economy in Ukraine is extremely difficult, and it is such even if compared to not only developed countries. It has been revealed that shadow employment as a form of the shadow economy is one of the greatest reasons for the lack of financial resources in the system of social safety. It is calculated that annual financial losses of the social safety system are about 401.5-1147.2 million UAH. These losses are caused by the spread of informal employment in Ukraine. *Conclusions.* The analysis proves a need to combat the shadow economy and its manifestations today. However, existing methods of preventing this phenomenon are not effective, which is confirmed by the sustained performance of the shadow economy in Ukraine. From our perspective, it is explained by incomplete understanding of its main factors by the state. These factors influence the formation of the economy and the use of ineffective tools (increased administrative burden on taxpayers, increased fines, etc. The government initiative to reduce the amount of insurance premiums to the payroll has not reached its goal because of various conditions that constrain its positive side. It is advisable to concentrate further studies within the area of research on the ideas, methods and tools for reducing the shadow economy. It can be done with the help of an objective analysis of social and economic factors affecting the level of the shadow economy.
Keywords: Financial Security; Social Protection; Financial Resources; Shadow Economy; Informal Employment
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Окремі аспекти формування фінансового забезпечення соціального захисту населення в контексті тіньової економіки

Анотація
У статті оцінюється вплив рівня тіньової економіки на фінансове забезпечення соціального захисту. За допомогою економіко-статистичних методів дослідження виявлено тісний взаємозв'язок між рівнем тіньової економіки та розміром соціальних витрат на душу населення. Отримані результати засвідчують той факт, що країни з більшим рівнем тіньової економіки мають менші соціальні витрати на душу населення, що пов'язано, насамперед, зі скороченням джерел фінансування соціального захисту. Досліджено основні тенденції розвитку тіньової економіки в Україні. Виявлено, що тіньова зайнятість як одна з форм тіньової економіки є однією з найбільших причин дефіциту фінансових ресурсів у системі соціального захисту населення. Розраховано, що фінансові щорічні втрати системи соціального захисту населення від поширення неформальної занятості в Україні складають близько 401,5–1147,2 млн грн.
Ключові слова: фінансове забезпечення; соціальний захист; фінансові ресурси; тіньова економіка; неформальна зайнятість.

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Отдельные аспекты формирования финансового обеспечения социальной защиты населения в контексте теневой экономики

Аннотация. В статье оценивается влияние уровня теневой экономики на финансовое обеспечение социальной защиты. С помощью экономико-статистических методов исследования выявлена тесная взаимосвязь между уровнем теневой экономики и размером социальных расходов на душу населения. Полученные результаты свидетельствуют о том, что страны с большим уровнем теневой экономики имеют меньшие социальные расходы на душу населения, что связано, прежде всего, с сокращением источников финансирования социальной защиты. Исследованы основные тенденции развития теневой экономики в Украине. Выявлено, что теневая занятость как одна из форм теневой экономики является одной из важнейших причин дефицита финансовых ресурсов в системе социальной защиты населения. Рассчитано, что ежегодные финансовые потери системы социальной защиты населения от распространения неформальной занятости в Украине составляют около 401,5–1147,2 млн. грн.

Ключевые слова: финансовое обеспечение; социальная защита; финансовые ресурсы; теневая экономика; неформальная занятость.

1. Introduction

The level of social protection in the country depends on a number of socio-economic factors that affect the formation of its financial sources both positively and negatively. The shadow economy in the country is one of the key factors. That is because the growth of the shadow economy level has a negative impact on the financing of social protection both directly (amount of tax revenues, budget revenues and obligatory funds of social insurance, a decreasing number of payers of insurance premiums, etc.) and indirectly, i.e. through its impact on the formation and development of other socio-economic factors that can ensure the development of social protection, e.g. the growth of the shadow economy has a detrimental effect on the financial market, which reduces the financial capacity of the National Pensions Fund and insurance companies). The growth of the shadow economy is acknowledged as a global risk to the world economy in future [1].

Therefore, a comprehensive determination of the shadow economy impact on the financial security of social protection of the population is currently of the most immediate interest.

2. Brief Literature Review

The problem of formation and development of the financial security of social protection and, in particular, examination of the influence of the shadow economy has always been of supreme concern to national and foreign scientists considering socio-economic processes in the global economy. Vital issues of the formation of financial support of the social protection system under the influence of the shadow economy are displayed in works of many domestic scientists, such as Z. S. Varnalii [2], V. B. Tropina [3], O. Ya. Malinovska, R. O. Rudzinska, etc., as well as foreign scientists and experts, among whom are M. Tsichon, V. Sholz, A. van de Meerendonk, K. Khahemeier, F. Bertranou and P. Plamondon (2004) [5], J. Tomas (1999) [6], S. Johnson, D. Kaufmann, P. Zoido-Lobaton (1998a) [7], F. Schneider (2010; 2012) [8-9], D. Teobaldelli (2011) [10], etc. However, despite a considerable amount of researches on a particular subject, the problem of an objective estimation of the shadow economy impact on the financial support for the social protection system is studied insufficiently and requires a follow-up study.

3. The purpose of the article is to conduct an economic and statistical analysis of the impact of the shadow economy on the financial support for the social protection system.

4. Results

The level of the shadow economy is one of the most important factors influencing the financial support for the social protection system. An economic and statistical analysis of empirical data for OECD countries over a period of 1980-2014 shows a direct correlation between the level of the shadow economy and the level of social expenditures per capita with the use of the correlation and regression analysis and analytical grouping (Table 1).

The connection between expenditures on social protection in OECD countries and the level of the shadow economy for the review period is average. However, there are some factors that influence the effective feature and are not fitted into the model. The variability of the effective feature of the following regression model is determined to 34,8% by the variability of the chosen factor. The estimated regression equation $y = 12377.7 - 331.625x$ demonstrates that the growth of the shadow economy by 1% leads to a decrease in social expenditures per capita in GDP $ 331.62 (assuming the constancy of other factors affecting the effective feature). The correlation between the effective feature and the factorial feature is confirmed by the analytical grouping as well (average performances of the level of the shadow economy and social expenditures per capita were taken for the period of 1999-2014) as you can see in Table 2.

Obtained results of the grouping indicate the fact that countries with a higher level of shadow economy have lower social expenditures per capita. This is primarily due to the reduction of the sources of funding of social protection. The observational correlation relation between these factors was $\eta = 0.4423$ (Figure 1).

It proves that the correlation between the condition Y and the factor X is moderate. In this case, the determination coefficient is only $\eta 2 = 0.1956$. In other words, the variation in effective rate is

Tab. 1: **The results of the correlation and regression analysis**

1. Regression statistics					
Correlation coefficient, R				0.59	
Determination coefficient, R square				0.35	
Standard R square				0.35	
Standard error				2861.76	
Experimental observation/ inquiry				448	
2. Analysis of variance					
	df	SS	MS	F	Importance F
Regression	1	1.95E+09	1.95E+09	238.535	2.05E-43
Excess	446	3.65E+09	8189675		
Total	447	5.61E+09			
3. **Estimate of parameters in regression equation**					
	Coefficients	Standard error	t- statistics	P- Significance	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Y- transverse	12377.7	409.18	30.2499	4.1E-110	11573.5	13181.	11573.5	13181.8
Disposal variable X_1	-331.625	21.471	-15.444	2.05E-43	-373.824	-289.42	-373.824	-289.426

Source: Own calculations based at statistics of OECD countries [11]

Tab. 2: **The results of analytical grouping of OECD countries by the average performances of the shadow economy level and social expenditures per capita for 1999-2014**

Groups	Countries	The number of countries in the group	Central tendency of the level of shadow economy,%	Average social spending per capita dollars. US GDP
8.23 - 11.89	Austria, Japan, Luxembourg, Switzerland, the USA	5	9.38	9353.88
11.89 - 15.55	Australia, Canada, France , Germany, Iceland, Netherlands, New Zealand, the United Kingdom of Great Britain and Northern Ireland	8	13.85	7051.97
15.55 - 19.21	Czech Republic, Denmark, Finland, Iceland, Norway, Slovakia, Sweden	7	17.1	7629.01
19.21 - 22.87	Belgium, Chile, Portugal, Spain	4	21.19	5497.86
22.87 - 26.53	Estonia, Hungary, Italy, Poland	5	25.32	3817.65
26.53 - 30.19	Greece, Mexico, Turkey	3	28.92	2516.41
Total		32		

Source: Own calculations based at statistics of OECD countries [11]

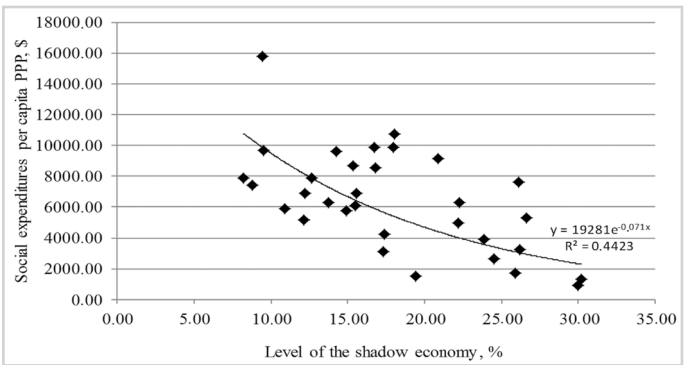

Fig. 1: **The correlation between the level of the shadow economy and social expenditures in OECD countries (average performances for the period of 1999-2014)**
Source: Own calculations based on statistics of OECD countries [11]

determined by the distinctions between features in 19.56% and in 80.44% by other factors. However, it should be noted that the factorial feature influences the factors that affect our effective feature. This gives grounds to hypothesise that the correlation between the size of the shadow economy and social expenditures per capita is closer than the one in mathematically proven calculations.

According to the authors' point of view, this proves the importance of the combat against the shadow economy due to the formation of financial support for social protection in the country.

The situation with the level of the shadow economy in Ukraine is extremely difficult, and it is such even if compared to not only developed countries. Despite the measures taken by the government, the rate of decrease in the size of the shadow economy is low and its growth may be expected in some years. In the past decade, the level of the shadow economy in Ukraine has changed from 35% to 50%, which is a high rate. The conducted country grouping (the average level of the shadow economy in 163 countries over the period of 1999-2014) has indicated that Ukraine is among 30 countries with the highest level of the shadow economy (Table 3).

Tab. 3: **The results of 163 countries grouping by an average index of the shadow economy for 1999-2014**

Groups	Average level of the shadow economy, %	Position of the country in the group
8.5 - 15.7	12.1	17
15.7 - 22.9	19.3	24
22.9 - 30.1	26.5	22
30.1 - 37.3	33.7	39
37.3 - 44.5	40.9	33
44.5 - 51.7	48.1	19 (Ukraine)
51.7 - 58.9	55.3	5
58.9 - 66.1	62.5	4
Total		163

Source: Own calculations based at statistics released by the World Bank [12] and Eurostat [13]

Over the studied period, the average level of the shadow economy in the world was 32.86%, while in Ukraine it amounted to 49.7%. Herewith, the largest extremum was observed in Bolivia (66.1%) and the lowest one was in Switzerland (8.5%). The situation with the shadow economy in Ukraine deteriorates not by its size but by the dynamics. A decrease in this indicator is observed worldwide, whereas it remains almost the same in Ukraine. Over the period of 1999-2014, the average level of the shadow economy decreased from 34% to 31% in 163 countries throughout the world.

The shadow economy can become apparent in different forms. Researchers distinguish three main types of the shadow economy: 1) informal economy - legal production of commodities and provision of services; 2) underground economy - contraventions within the acceptable business operations; 3) illegal economy - the implementation of prohibited practice [2]. From the perspective of our research, we are interested in the first two forms of the shadow economy because of their consequences (informal employment, hidden wages and other incomes, reduction of taxable incomes) which have a direct impact on the formation of two main sources of funding of the social safety net. They are the state budget and social insurance funds (both state and public).

Shadow employment is one of the major reasons for the lack of financial resources in the system of social protection. The shadow economy in Ukraine has certain peculiarities which are determined by the following factors: evasion of taxes and social expenditures (when workers are not registered in revenue bodies and the officially paid salary is understated), as well as evasion as a result of employment in the informal economy when, for example, members of personal farms are not included neither into the tax system nor into the state-sponsored social insurance system. During the studied period, the growth trend of those employed in the informal sector has assumed a serious dimension. According to the State Statistics Service of Ukraine, there were 2.4 million people employed in the informal sector of the economy representing 11.71% of the economically active population aged 15-70 in the year 2000, whereas in 2014 the number of such people was 4.6 million representing 24.77% of the economically active population of the same age group. It should be noted that the indices of 2014 of the temporarily occupied territories are not considered [14].

As a result, potential financial losses of the social protection system on the part of such employment increase yearly. According to our calculations, in the year 2000, financial losses from the employment in the informal economy varied within a range of 1.7-3.9 billion UAH, whereas the amount was 40.1-114.7 billion UAH in 2014. In other words, they increased by 24-29 times, whereas GDP in Ukraine increased only 7.3-fold. This trend is primarily caused by the increase in the number of people employed in the informal sector of the economy and a gradual increase in the minimum as well as the average wages (these two indicators were used by the authors while calculating potential financial losses).

Consequently, the legalisation of people employed in the informal sector of the economy is one of the potential sources of increase in financial receipts to the social safety net. According to the authors' calculations, the legalisation of only 1% of all those employed in the informal sector of the economy in 2014 (on condition that they pay insurance premiums) makes it possible to expand financial resources of the social protection system within 401.5-1147.2 million UAH (Figure 2).

Employment growth in the informal sector causes current problems (a reduction in income) and has a long-lasting effect. The point is that an increase in the number of people employed in the informal sector of the economy leads to the lack of va-

rious kinds of social security benefits for them both nowadays and in future (a lack of insurance premiums and pension insurance records). It should be noted that the number of young people employed in the informal sector of the Ukrainian economy increases every year. In 2006, 65.3% of people aged between 60 and 70 were employed in the informal sector of the economy. In other words, pensioners who do not pay insurance fees and taxes were employed in the informal sector of the economy. In 2014, the number of those people reduced to 41.1%. Thus, the amount of people employed in the informal sector of the economy was down by 24.2% as a result of the expansion of employment among the population aged 15-24 (from 30.4% in 2006 to 33.2% in 2014); 25-29 (from 19.3% to 25.4%); 30-34 (from 17.4% to 23.5%); 35-39 (from 17.4% to 23.9%); 40-49 (from 16.7% to 23.3%) respectively. In 2006, the number of working age population employed in the informal sector was 79.7%, and in 2014 it increased to 92.3%. In future, this situation can lead to a sharp increase in poverty among the population, which will require extra financial resources from the national budget.

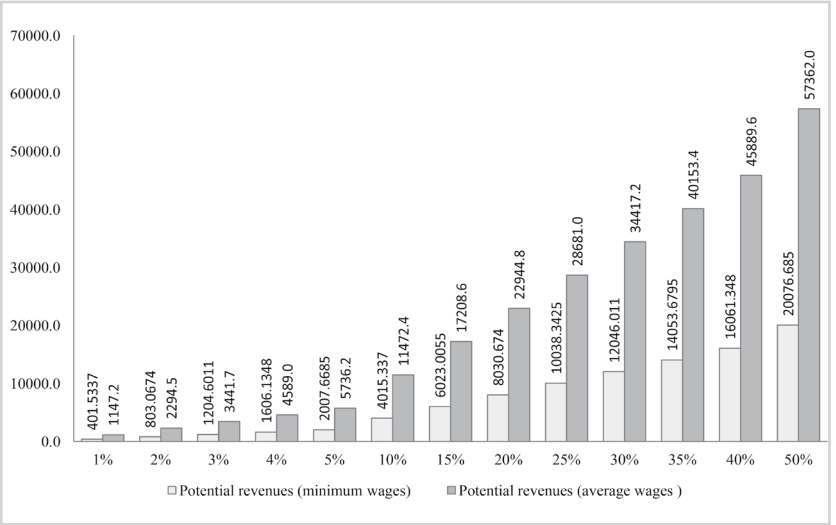

Fig. 2: **Potential revenues to social protection conditioned upon the reduction of employment in the informal sector of the economy in Ukraine**
Source: Own calculations based on [14]

5. Conclusions

Nowadays, the shadow economy reduces the amount of financial resources in the social security net. At the same time, it increases pressure on public finances for social welfare benefits. According to the analysis conducted by the authors, the combat against the shadow economy and its manifestations is absolutely necessary. However, existing methods of controlling this phenomenon in Ukraine have no positive effect because of incomplete understanding of the main factors influencing the formation of our economy the State part. Therefore, according to the authors' point of view, further research within the subject should be focused on the ways, methods and tools aimed at reducing the shadow economy. This can only be done with the full and objective analysis of the impact of the social and economic factors that affect the level of the shadow economy.

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