Evaluation of the shadow economy influencing factors: Lithuanian case

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Abstract: The aim of the article is to evaluate the factors that influenced the scope of shadow economy in Lithuania during the period of 2000 – 2011. The theoretical solutions provided in the scientific literature revealed the scope of shadow economy is mainly influenced by the factors of political and economic environment. Applying the methods of regression and multiregression, the factors that have the biggest influence on the scope of shadow economy in Lithuania have been evaluated. The results of the empirical research have revealed that crediting of private sector and business freedom index are the most influential factors in this respect. Calculated negative values propose that more flexible crediting policies as well as creation of business-favourable conditions would have the negative impact on the scope of shadow economy in Lithuania. Apart from the most influential factors mentioned above, it has been established that the situation in the labour market and the volumes of international trade also have a significant influence on the scope of shadow economy in Lithuania. Thus, the government of the country should focus on such aspects as improvement of labour market conditions and promotion of international trade with appropriate measures.

Key-Words: -shadow economy, the factors of shadow economy, the scope of shadow economy, Lithuania.

1 Introduction

Relevance of the topic. Striving to remain competitive in the market, both business companies and individual entrepreneurs increasingly apply cost-cutting strategies, which are directed towards tax evasion/hiding, non-declared income and other activities referred to as "shadow". The main reasons of shadow economy highlighted in the scientific literature are legal and business regulation gaps in the political and economic environment. The problem of the influence of particular factors on the scope of shadow economy was rather widely researched in the scientific literature by such scholars as Schneider, et al., 2010 [1]; Buehn, Schneider, 2012a [2]; 2012b [3]; Acosta-González, et al. 2014 [4]; Tafenau et al., 2010 [5]; Putniņš, Sauka, 2011 [6]; Joo, 2011 [7]; Dreher, et al., 2009 [8] and others. Some researchers (Herwartz, et. al., 2013 [9]; Enste, 2010 [10]; Buehn, Schneider, 2012 b [3]; Alañón, Gómez-Antonio (2005) [11]; Tafenau et. al. (2010) [5]; Choi and Thum (2005) [12]; Picur, Riahi-Belkaoui (2006) [13], etc.) focused on institutional quality (bureaucracy, regulation freedom, laws, corruption and weak legal system). This attitude is based on the presumption that the government is created on non-constitutional base, thus, they apply coercive powers to exploit their citizens. Although economic players would be inclined to accept a reasonable fiscal burden they are not prepared for an extortionate demand. This raises *the scientific problem*: which economic and political factors have the biggest influence on the scope of shadow economy? Does the influence of the above mentioned factors on shadow economy differ in particular countries depending on the level of their development?

The aim of this research is to evaluate the factors that influenced the scope of shadow economy in Lithuania during the period of 2000 – 2011. The methods of the research include systematic and comparative analysis of the scientific literature, correlation analysis, Pearson correlation coefficient, regression and multiregression analysis.

Size of the shadow economy varies greatly among European countries. It is considered that the largest underground economies are in Central and Eastern European and South European countries (Žukauskas, 2013) [14]. With reference to the results of the research carried out by Schneider (2013) [15], the largest shadow economies in terms of GDP in 2013 entrenched in Bulgaria, Romania, Croatia and Lithuania. According to the Survey of the Lithuanian Economy (2014) [16], the scope of shadow economy in this country is gradually decreasing. Shadow economy made the biggest

share of GDP in 2010, when its scope was 28 per cent of GDP; in 2011 and 2012, it decreased to 27 per cent; in 2013, it declined by one more percentage point. In 2014, market participants prognosticated the further decrease, i.e. shadow economy was expected to decrease to 25 per cent of GDP. However, in comparison to the prognosis of 2013, they were not so optimistic – following the prognosis for 2013, the share of shadow economy should have made 24 per cent of GDP whereas following the prognosis for 2014, that share of shadow economy should have made 23 per cent of GDP. The statistical data (Schneider (2013) [15]) shows that the scope of shadow economy in Lithuania is higher than the EU average by 9 per cent. Thus, identification of the most influential shadow economy factors would enable to select appropriate target measures to decrease its scope.

2 Causal factors of shadow economy: theoretical aspects

Up to now, the number of studies have analysed the phenomenon of shadow economy. The authors of this article focus only on the causal factors that influence the scope of shadow economy in the particular country. With reference to the report of the European Commission (2013) [17], shadow economy includes the economic activities and revenues that are hidden from the government or the declaration of which is avoided due to the mandatory tax paying. A significant part of shadow economy is taken by the undeclared employment, which is expressed as the wages undeclared by business due to tax avoidance or labour market overregulation. The definition of shadow economy presented above proposes that political factors are the main ones while explaining the scope of shadow economy in selected countries. It is generally accepted that the increased taxes and social insurance contributions (Schneider, Enste, 2000 [18]; Davis, Henrekson, 2005 [19]; Schneider, et al., 2010 [20]). Having researched the impact of the tax burden and labour market regulation on the scope of shadow economy in Greece during the period of 2003 - 2008, Manolas, et al. (2013) [21] established that labour and credit markets and the tax burden both in the sense of the direct cost on entrepreneurial activity and the cost of compliance to the tax administration framework, are the most important factors affecting the part of the economic activity that takes place outside the official sector, that is the shadow or underground economy. Regulation of the labour market and business environment, including the legal acts restricting particular aspects of the labour market such as employment of the foreigners, barriers for free trade, etc., reduces motivation of individuals to operate in officially accounted economics (Schneider, Enste, 2004 [22]). As a result, strict regulation increases labour costs in officially accounted economics leading to more intensive activities in the shadow.

The dynamics of Economic Freedom Index, which includes Freedom from Corruption and Business Freedom indexes, and their links with the scope of shadow economy in OECD and European countries were comprehensively analysed by Freytag, Schneider (2013) [23]. It was concluded that higher Economic Freedom Index determines lower scope of shadow economy, when other terms stay ceteris paribus. Scientists also established the effect of another important factor – freedom to trade internationally – on shadow economy. It was found that more favourable conditions of international trade enable the reduction of the scope of shadow economy. Apart from the previously discussed factors of political environment, shadow economy is also influenced by the factors of economic environment. The analysis of the scientific literature has revealed that some scientists (Tandrayen-Ragoobur, 2014) [24] studied the personal reasons why individuals retreat to shadow. The initially raised question was why individuals are inclined to shadow activities which associate with low and unstable income as well as high poverty risk. Assessing from an economic point of view, high unemployment rate means that the majority of low-income population in developing countries are forced to engage particular strategies of survival to meet their basic needs. This reason is the one that pushes individuals to informal employment (Tandrayen-Ragoobur, 2014) [24]. Another labour market related factor that influences the scope of shadow economy is self-employment. The analysis of the scientific literature has revealed that higher rate of self-employment generates conditions to perform bigger number of activities in shadow economy, ceteris paribus.

Williams (2014) [25] highlights formation of the shadow through the particular forms of self-employment, starting with "false self-employment", where a person works for one employer but actually is self-employed and pays no wage tax, has no rights, such as dismissal protection and no vacation entitlements, and finishing with "proper self-employment". As it was noted by the author, this is conducted either by the declared self-employed conducting a portion of their trade in the shadow economy or by those operating unregistered

enterprises trading wholly in the shadow economy. (p. 47).

Summarising, it can be concluded that the factors describing political (Business Freedom index, Corruption freedom index, total income and etc.) and economic environment (GDP, labour force rate, inflation, international trade, credit policy and etc.) have to be included in the calculations seeking to assess their influence on the scope of shadow economy.

3 The Methodology of the Research

Before selecting the method of the research, the aim of the empirical research was formulated – to establish the impact of the shadow economy factors on the scope of Lithuanian shadow economy during the period of 2000 – 2011. In order to fulfil the defined aim of the empirical research, mathematical methods (correlation analysis, Pearson correlation coefficient and multiregression analysis) were engaged to identify the factors that influence the scope of the shadow economy in Lithuania.

Quantitative methods of *correlation analysis* and *multiregression analysis* enabled to identify what economic and political factors with numerical values have the most significant impact on the scope of shadow economy in Lithuania. Correlation analysis revealed whether the variables are dependent (i.e. whether the increase of a particular factor causes the increase of another one, and vice versa), what the strength of the link is and whether correlation is statistically significant (not coincidental).

With a view to ensuring purposefulness of the calculations, the existence of the correlation between such factors as *corruption freedom index, business freedom index, government final consumption expenditure, households consumption expenditure, export of goods and services, import of goods and services, workforce participation rate, unemployment rate, the number of the population beyond the labour market, crediting of private sector, tax income, tax payments, inflation, GDP growth, electric energy consumption* and *the scope of shadow economy* in Lithuania during the period of 2000 – 2011 was verified. Verification of the hypotheses on the normality of the factors describing the political, economic environment and unrecorded economy revealed positive results, i.e. the normality condition was satisfied (value $p < 0.05$). The detailed description of the factors that influence shadow economy and that were included in the correlation analysis has been presented in Table 1.

Table 1. Description of the influential factors that were included in the correlation analysis (source: compiled by the authors with references to World Bank [26]; [27]; International Labour Organization [28]; Heritage Foundation [29])

Independent variable, x	The concept of independent variable
Political factors	
Business freedom index	Business freedom is a general index of governmental business regulation efficiency. Quantitative grade of the index is calculated assessing business start-up, development and closing barriers. The value of business freedom index for a particular country varies from 0 to 100 points, where 100 points stands for the absolutely free business environment (Source: Heritage Foundation [29]).
Corruption freedom index	Corruption destroys economic freedom and induces the feelings of unsafety and uncertainty into economic relations. This index is obtained from *Transparency International* Corruption Perception Index. The value of the index falls into the scale of 10 points, where 10 points stand for very low corruption rate, and 0 points – for a highly-corrupted government of the country (Source: Heritage Foundation [29]).
Total government consumption expenditure, in value added, current prices	Total government consumption expenditure (government final consumption) includes the total value of the current governmental expenditure for goods and services (including compensations for employees). They also include the expenditure of national security and defence, but governmental military expenditure, which is a part of the governmental capital formation, is excluded (Source: Statistical Database of the United Nations).
Tax income (per cent of GDP)	Tax income means mandatory transfers to the central government for public purposes. Particular transfers such as fines, interest, most payments of social insurance are not included. Returned payments as well as the corrections of the erroneously collected taxes are treated as negative income (Source: World Bank [26]).
Economic factors	
GDP growth (annual), per cent.	It stands for the percentage growth of annual GDP in local currency, market prices. Aggregate indicators are based on the comparative prices of 2005, in dollars (Source: World Bank [26]).
Labour force rate, per cent	All employed and unemployed population (Source: International Labour Organisation)
Unemployment rate, thousands	The index is expressed as the ratio between the number of the unemployed and the labour force (Source: International Labour Organisation [28])
Number of the population beyond the labour market	Population beyond the labour market includes all the working population that was not included in the labour force as the employed or the unemployed during the researched period. The working-age population is defined as 15-year-old and older population, but the definition can differ

	depending on the term formulation in a particular country (Source: International Labour Organisation [28]).
Inflation, in consumer prices (annual), per cent	Inflation is measured by consumer price index which reflects annual percentage cost changes for an average consumer obtaining the set of goods and services at defined or changed intervals, for instance annually. It is commonly calculated by Laspeyres formula. (Source: World Bank [27]).
Export of goods and services (per cent of GDP)	Export of goods and services means the value of all goods and market services, including transportation, insurance, royalties, licence fees, construction, communications, finance, information and others, provided for businesses, individuals or governments in foreign countries. Export of goods and services does not include compensations for employees, investment income and transfers (Source: World Bank [26]).
Import of goods and services (per cent of GDP)	Import of goods and services means the value of all goods and market services, including transportation, insurance, royalties, licence fees, construction, communications, finance, information and others, obtained for businesses, individuals or governments from foreign countries. Import of goods and services does not include compensations for employees, investment income and transfers (Source: World Bank [26]).
Crediting of private sector, per cent of GDP	Crediting of private sector means funding of the private sector with financial resources provided by financial corporations, engaging such funding forms as loans, equities, trade credits, etc. In particular countries, crediting also includes the governmental sector. Financial corporations include money managing institutions and banks as well as other financial corporations whose data is available (i.e. corporations that do not accept transferable deposits, but accept such obligations as savings deposit or fixed-term deposits). Finance and leasing enterprises, money creditors, insurance companies, pension funds and currency exchange companies are other examples of a financial corporation. (Source: World Bank [26]).
Tax payments (numbers)	Tax payments made by business companies refer to a number of the paid taxes, including the payments by e-banking. Taxes are calculated as paid once a year, even if in practice they are paid more frequently (Source: World Bank [26]).
Energy consumption (in the equivalent of a kg of petroleum per capita)	Energy consumption means the initial energy consumption before the transformation of energy to any other fuel of final consumption. It is equal to local production plus imports and fluctuations of resources and minus exports and the fuels supplied to ships and aircrafts engaged in international trade (Source: World Bank [26]).

After the calculations of correlation with SSPS (*Statistical Package for the Social Sciences*) software, multiregression analysis was carried out, performing the calculations only for the factors with value *r* higher than 0.6.

4 The Results of the Empirical Research

The correlation analysis has enabled to select the factors with value *r* strongly correlating with the scope of shadow economy in Lithuania, i.e. r is not lower than 0.6 (see Table 2).

Table 2. The results of the empirical research: the factors that influenced the scope of shadow economy in Lithuania during the period of 2000 – 2011 (compiled by the authors)

Independent variable, x	*r (correlations)* and *p (probabilities)* values
Workforce participation rate, per cent	*r = 0.703820; p = 0.0106*
Export of goods and services, per cent of GDP	*r = -0.787391; p=0.0024*
Import of goods and services, per cent of GDP	*r = -0.786529; p = 0.0024*
Corruption Freedom Index	*r =-0.697001; p = 0.0118*
Business Freedom Index	***r = -0.820409; p = 0.0011***
Crediting of private sector, per cent of GDP	***r = -0.912220; p=0.0000***

The results of the correlation analysis have revealed that the biggest impact on the scope of shadow economy in Lithuania was made by such political factors as business freedom index and crediting of private sector.

Further in the research, multiregression analysis was performed (see Table 3).

Table 3. The results of the multiregression analysis

Dependent Variable: Shadow economy in Lithuania
Method: Least Squares
Date: 09/04/14 Time: 10:08
Sample (adjusted): 2000 2011
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	41.91443	15.34215	2.731980	0.0412
Labour force	-0.101937	0.227577	-0.447922	0.6730
Export	0.122623	0.108791	1.127138	0.3109
Import	-0.209966	0.125002	-1.679708	0.1538
Corruption Perceptions Index	-0.012970	0.054470	-0.238119	0.8212
CREDIT	-0.058161	0.021342	-2.725193	0.0415
Business Freedom Index	0.058442	0.083885	0.696689	0.5171

R-squared	0.952100	Mean dependent var	30.80000
Adjusted R-squared	0.894620	S.D. dependent var	1.957271
S.E. of regression	0.635374	Akaike info criterion	2.221993
Sum squared resid	2.018502	Schwarz criterion	2.504855

Log likelihood	-6.331955	Hannan-Quinn criter.	2.117267
F-statistic	16.56406	Durbin-Watson stat	3.002888
Prob(F-statistic)	0.003689		

As it can be seen from Table 3, total R^2 of all the factors that were included in the multiregression analysis is equal to 0.95. It means that the statistical model explains the changes of the independent variables by 95 per cent. Although not all coefficients are statistically significant, F test statistics is acceptable, p (probability) < 0.05, thus, the general reliability of the coefficients is sufficiently high.

Taking a deeper insight in the values of the variables, the problem of the multicolinearity can be suspected since the correlations calculated for independent variables are rather high. Statisticians propose the solution of the problem of multicolinearity by eliminating the variables that show the strongest correlation, but value R^2 has to remain the same or can change insignificantly. The other parameters of the regression model have to show improvement. After the performance of different trials to eliminate particular variables from the model, it was concluded that the elimination of corruption freedom index improves value p as well as Durbin-Watson statistics, and decreases the problem of autocorrelation whereas value R^2 remains unchanged (see Table 4).

Table 4. The results of multiregression analysis after elimination of corruption freedom index (source: prepared by the authors)

Dependent Variable: Shadow economy in Lithuania
Method: Least Squares
Date: 09/04/14   Time: 10:16
Sample (adjusted): 2000 2011
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	40.59319	13.13121	3.091353	0.0214
Labour force	-0.094357	0.206869	-0.456120	0.6643
Export	0.131737	0.093488	1.409124	0.2085
Import	-0.222911	0.103336	-2.157151	0.0744
CREDIT	-0.060636	0.017112	-3.543488	0.0122
Business Freedom Index	0.067923	0.067781	1.002100	0.3550

R-squared	0.951557	Mean dependent var	30.80000
Adjusted R-squared	0.911188	S.D. dependent var	1.957271
S.E. of regression	0.583294	Akaike info criterion	2.066602
Sum squared resid	2.041392	Schwarz criterion	2.309056
Log likelihood	-6.399613	Hannan-Quinn criter.	1.976837
F-statistic	23.57134	Durbin-Watson stat	2.881987
Prob(F-statistic)	0.000706		

The results of the empirical research have revealed that coping with the scope of shadow economy in Lithuania during the period of 2000 – 2011, crediting of private sector (r = -0.91) and business freedom index (r = -0.82) were the most influential factors. The negative value of coefficient r in both cases shows that under the better conditions of private business crediting, the scope of shadow economy has the tendency to decrease as well as under the conditions of business freedom expansion. Strong correlation has also been observed for such factors as the impact of international trade and workforce participation rate. All the factors mentioned above explain the growth of the scope of shadow economy by 95 per cent.

5 Conclusions

The results of the empirical research have revealed that the scope of shadow economy in Lithuania is high due to the strict regulation of the labour market (high labour taxation, regulation gaps in the Labour Code, high minimal wages) and unfavourable private business crediting conditions. It has also been established that the labour market, business environment, crediting environment and international trade explain the scope of shadow economy in Lithuania by 95 per cent during the analysed period. In 2014, the share of the value created in shadow economy was taken by unofficial wages "in envelopes" and illegal work, which was the consequence of the strict regulation of the country's labour market. Thus, solution of this key problem, i.e. improvement of the conditions in the country's labour market via the reduced business and labour taxation would enable to decrease the percentage of shadow economy in the total economics of the country.

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