

Impact of education and government effectiveness on the shadow economy

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Abstract. *Shadow economy activities are a central focus around the world and countries engage in trying to contain these activities through regulations, education, and public services. The attempts to constraint the size of this phenomenon are increasingly and a lot of countries are fighting against the advancement of the informal sector. Therefore, this paper aims to estimate what is the effect of education and government efficiency on the shadow economy and whether these two components are essential in strengthening strategies by states to combat fraudulent activities specific to the underground economy.*

Keywords: shadow economy, government effectiveness, education index.

JEL Classification: E26, G38, G41, O15.

1. Introduction

Education has a huge influence on the economic development of a country, because it makes people aware of the socio-economic aspects. Therefore, policymakers must implement multiple measures in order to increase the access to education and determine people to become better citizens. Also, the perception of the citizens on the government and its interventions influence the compliance decisions and the perceived fairness of the public system. This research aims to help authorities in developing more efficacious and cost-effectively strategies for increasing taxpayer compliance and the decrease of the shadow economy phenomenon.

2. Literature review

The role of education in contemporary societies has important repercussions, including in the economic sector. The way citizens are able to understand what society as a whole means, the relevance of paying taxes and how their payments are managed by the state, is essential in the formation of common values and tax morality from an early age. After outlining these primary directions and a valid basis regarding the process of the tax revenues in a state, citizens will be able to weigh correctly whether the government decisions have the expected results or not.

The issue of what is causing shadow economy has been progressively investigated. Recent studies indeed find evidence of implications of education and government in such areas as underground economy. Schneider (2017, 2018) shows that tax morality and quality of public sector services are two of the main elements that cause underground activities. The informal area is expanding due to the failure of government to promote efficient actions and to fulfill with the preferences of the citizens.

According to Buehn and Farzanegan (2013), education and its interaction with the public institutions are essential components for understanding the dynamics of the shadow economy. Also, their conclusion based on the panel model regarding over 80 states from all over the world, for a period of 9 years, is that the political institutions also have an impact for the influence manifested by the education on shadow economy.

Gërzhani and van de Werfhorst (2013) undertake in their study an analysis on education in the context of the informal economy, focusing on the need for enlightenment on shadow economy for the people. They provide information regarding the tax morality and the pessimism of the people on formal institutions. The conclusions of the authors are that education, (1) through increased revenue and opportunity costs and (2) by formation of attitudes, reflects positively on the shadow economy.

Discussion of education role inevitably leads to questions on the effect expected on the underground activities. Also, government measures and actions are viewed critically by citizens, and the way in which they will be perceived may imply consequences on the economic outcomes. The main objective of this paper is to establish a casual relationship between education and government effectiveness, on one side, and the shadow economy, on the other side.

3. Econometric model

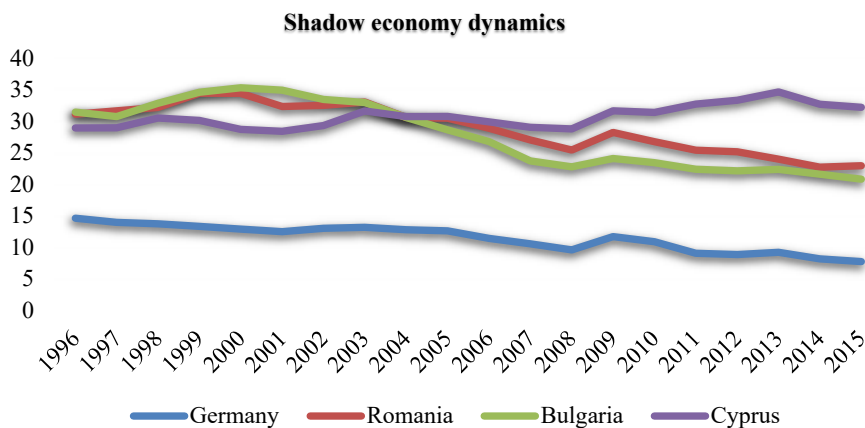
3.1. Presenting the data

In order to understand the impact that citizens' education and government effectiveness have on the phenomenon of the shadow economy, it was developed an econometric model that takes into account the 28 member states of the European Union (hereinafter referred to as "Member States"), so as to analyze the situations of some states that are guided by the same indications fostered within the European Union. The analysis considers 20 years (1996-2015), so the number of observations is 560.

Next, we will present the variables used to estimate the regression and we will make an analysis of the values recorded by these 3 variables for 4 states: (1) Germany, which is one of the most performing and developed countries in the UE; (2) Romania, because it is a state in which the political sphere manifests a lot of pressure on the economic sector, (3) Bulgaria which has an economy close to Romania's and it is interesting to note the trend of these 2 states that joined UE at the same time and (4) Cyprus, which is a state with high values of the shadow economy.

A) Shadow economy is calculated as percentage of GDP and it includes the activities that are stashed willfully from the public authorities. Even if this phenomenon is hard to measure, Medina and Schneider (2018) managed to quantify it through MIMIC model. The data published by the two specialists were used in the present paper. Moreover, according to the authors, this index is also a core input for estimation of tax evasion.

Graph 1. *Shadow economy dynamics*

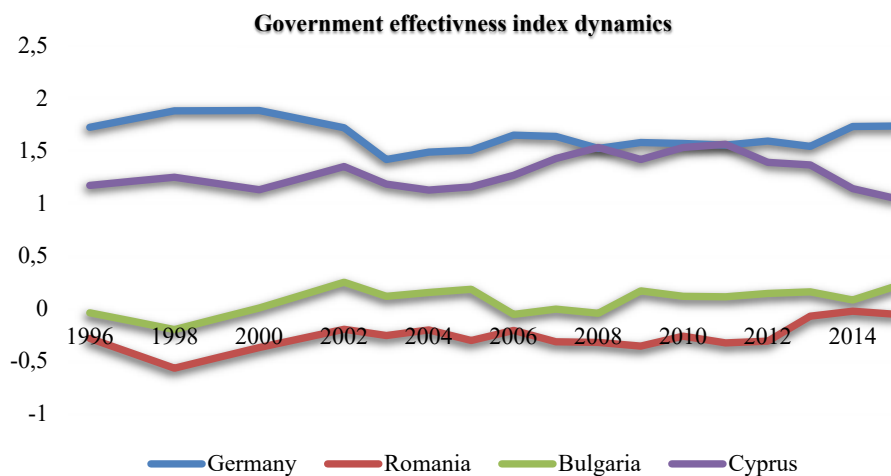


Source: own processing based on Medina and Schneider (2018).

In many states, shadow economy declined in the last decade, as Germany, Romania and Bulgaria, while in others – for example Cyprus – it increased. According to Graph 1, in 2015 Cyprus recorded a level of 32.2%, three times higher than the level recorded by Germany, 7.75%. During the analyzed period, Romania and Bulgaria, developing states, recorded similar values of the shadow economy, and the trend of this phenomenon was in the same direction of decrease, respectively increase, with small fluctuations.

B) Government effectiveness is an indicator developed by The World Bank and it reflects the perceptions of citizens on different aspects of the measures taken by the Government. The quality of the public services, the implementation and conducting of public policies, the tackling of the political pressures and the trustworthiness of the government are envisaged for the quantification of this indicator. Each country is ranked from approximately -2.5 to 2.

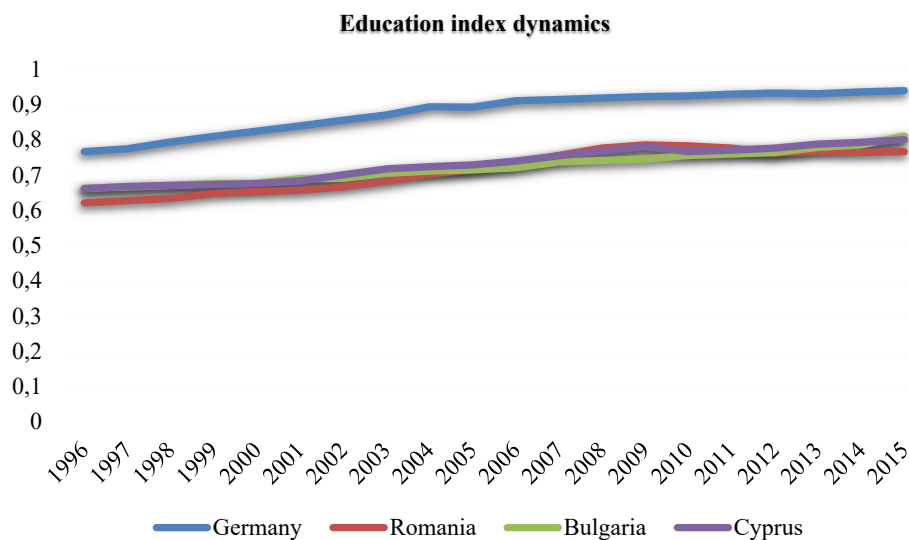
Graph 2. *Government effectiveness index dynamics*



Source: own processing based on The World Bank (2018).

The government effectiveness in Romania shows a precarious situation of this state, being the state with the lowest value registered in 2015. On the opposite side, there are the Nordic states together with Germany, whose quality of public services is the highest registered among the states in the European Union. Despite the expedited technological progress, in less developed countries, where the political sector often influences citizens and does not allow integral access to information about government measures and their consequences, the government effectiveness index has the lowest values (e.g., Bulgaria, Romania).

C) Education index is quantified based on two variables: mean years of schooling (“MYS”) and expected years of schooling (“EYS”). MYS represents the years of education for a person aged 25 and older in their lifetime and EYS represents the years of schooling a child is expected to attend. The index is published by Human Development Report and each country is ranked from approximately 0 to 1.

Graph 3. Education index dynamics

Source: own processing based on Human Development Report (2018).

In terms of education, the country that registered the highest values throughout the analyzed period is Germany. In 2015, Romania recorded a level of 0.762, while Cyprus and Bulgaria recorded 0.811, respectively 0.805. A positive aspect of this indicator is that the majority of states in the analyzed period show an upward trend in education, which means that state strategies are directed towards the education sector.

Graph 1, Graph 2 and Graph 3 provided the relevant data to outline an overview over the situation of the 3 variables to be analyzed in the following section. As a hypothesis, from the provided data and the graphs presented previously, it can be observed that states that register higher levels of government effectiveness and education index, also have a lower level of the shadow economy.

The most important caveat with the literature on government effectiveness and education reviewed is that they do have significant impact on the economic behavior of citizens. Next, the relationship shadow economy – education index – government effectiveness will be included in a panel model, in which education and government effectiveness will be the independent variables, and the shadow economy will be the dependent variable.

3.2. Data processing and results

The econometric model was performed using EViews – version 11 and the outputs are presented in Table 2, Table 3 and Table 4, attached as an annex to this paper. Within the model, the dependent variable is shadow economy and the independent variables are education index and government effectiveness.

The model was tested for the existence of fixed effect and random effects and for both cases the probability was below the limit of 5%, so both random effects and fixed effects can be disregarded. R^2 has a value of 54.8152% and this means that the 2 dependent variables in

the model influence the independent variable in a proportion of 54.8152%. Also, all the parameters for the 3 variables included in the model are statistically significant for a significance level of 5% and the model is a valid one (F-statistic = 337.8581 and Prob (F-statistic) = 0.0000%). The results are presented in Table 1.

Table 1. *The results from the EViews model*

Shadow Economy	No effects	Fixed effects	Random effects
C	44.62438	44.62438	44.47226
Prob.	0.0000	0.0000	0.0000
Education Index	-21.70035	-21.70035	-21.68662
Prob.	0.0000	0.0000	0.0000
Government Effectiveness	-7.053123	-7.053123	-6.929769
Prob.	0.0000	0.0000	0.0000
R ²	0.548152	0.548152	0.577649
R ² adjusted	0.546530	0.546530	0.561163
F-statistic	337.8581	337.8581	35.03908
Prob(F-statistic)	0.000000	0.000000	0.000000
T. Hausman	0.0000		
Redundant Fixed Effects Tests	0.0082		

Source: own estimations using EViews.

The regression results depicted by Table 1 is that education and government effectiveness have impact on shadow economy. This conclusion is in accordance with the studies that have approached this subject and that have captured the causes and consequences of the phenomenon of shadow economy, such as Buehn and Farzanegan (2013), Gërxhani and van de Werfhorst (2013), Medina and Schneider (2018).

The relation between education index and shadow economy is a negative one, so when the education index increases, the activities specific to the underground economy will diminish. Wöbmann and Hanushek (2007) study the impact of education quality in an economic context and conclude that significant structural amendments in the schooling sector, for developing states, would have a positive effect on economic growth. In the same vein, the present paper states that education, quantified by education index, has to be one of the central elements in the strategies states undertake in order to improve economic conditions and to decrease the propensity of citizens for underground activities.

The biggest problem when it comes to education nowadays is that the way in which information is provided in schools is difficult for current generations of students to digest. Precisely for this reason, in the forefront it must be considered educational reforms that emphasize the founding of a reliable school accountability system. Individuals are rational beings that continuously weigh the benefits and costs when considering an underground activity and based on this assessment they are going to participate, fully or partially in the informal sector. In shaping this reasoning, the education of individuals and the amount of information they possess are the basis to consolidate their arguments.

The results on the shadow economy and government effectiveness interaction is indicating that shadow economy indeed depends on the government effectiveness, because we live in an era of provision of services. The negative coefficient of the variable shows that if a state undergoes a weak quality of the public services, the impact on the shadow economy is negative. In other words, countries with stronger and efficient public services can confine underground activities.

The fringes of the public sector are getting blurry because of the policy of the government and the modalities of service delivery. With technological developments, bureaucracy can be eliminated, and the government's ability to respond properly to citizens' requirements can be improved. National governments are expected to be receptive with the societal challenges and to diminish the distrust of the citizens with regard with their measures and responses. Increasing the government effectiveness will extend on the size of the shadow economy in a favorable manner.

Finally, the observed relationships reflect inverse causality, that is, that societies are increasing so fast that need to pay consistent attention to the necessary resources for economic performance. The underground activities develop in line with the evolution of contemporary society and states should take measures to limit and control them in order to encourage people to comply with the legislation in force.

4. Conclusions and limitations of the paper

The accumulated evidence from the panel analyses performed within this paper is that education and government effectiveness have effect on the level of underground activities and have an important role in explaining the dynamics of the shadow economy size. Higher values, impregnated by education, and consolidated trust in government, resulting from efficiency measures, should enhance the reluctance to get to fraudulent activities. Through these 2 variables, the government can be strengthened, because when citizens get worthwhile public services, they are more inclined to comply with the regulations in force and to properly pay the taxes.

This connection shadow economy – education – government efficiency can be studied in future researches more detailed for categories of samples of developed and developing countries and using other data sources that quantify the same factors. The analysis period may also be extended to the extent that additional data is going to be published by the competent bodies.

As a conclusion, education is an important asset for a state, as there are whopping benefits, particularly on the reduction of the shadow economy level, because choice without fundamental information about tax system and performance of a society has uncertain outcomes enclosed. More precisely, public policymakers have to implement strategies to increase the trust and consciousness of the citizens through education and government measures in order to keep under control the size of the shadow economy.

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APPENDIX

The results of the panel model in EViews are presented hereby in the present appendix.

Table 2. Output EViews

Dependent Variable: ECOSUB
Method: Panel Least Squares
Date: 05/17/20 Time: 14:58
Sample: 1996 2015
Periods included: 20
Cross-sections included: 28
Total panel (balanced) observations: 560

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	44.62438	2.093854	21.31208	0.0000
EI	-21.70035	2.796145	-7.760812	0.0000
GE	-7.053123	0.347830	-20.27748	0.0000
Root MSE	4.904661	R-squared		0.548152
Mean dependent var	19.50534	Adjusted R-squared		0.546530
S.D. dependent var	7.302996	S.E. of regression		4.917851
Akaike info criterion	6.028963	Sum squared resid		13471.19
Schwarz criterion	6.052149	Log likelihood		-1685.110
Hannan-Quinn criter.	6.038017	F-statistic		337.8581
Durbin-Watson stat	2.419649	Prob(F-statistic)		0.000000

Table 3. Output EViews – Redundant Fixed Effects Tests

Redundant Fixed Effects Tests
Equation: Untitled
Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	1.977523	(19,538)	0.0082
Period Chi-square	37.804133	19	0.0063

Period fixed effects test equation:
Dependent Variable: ECOSUB
Method: Panel Least Squares
Date: 05/17/20 Time: 17:26
Sample: 1996 2015
Periods included: 20
Cross-sections included: 28
Total panel (balanced) observations: 560

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	44.62438	2.093854	21.31208	0.0000
EI	-21.70035	2.796145	-7.760812	0.0000
GE	-7.053123	0.347830	-20.27748	0.0000
Root MSE	4.904661	R-squared		0.548152
Mean dependent var	19.50534	Adjusted R-squared		0.546530
S.D. dependent var	7.302996	S.E. of regression		4.917851
Akaike info criterion	6.028963	Sum squared resid		13471.19
Schwarz criterion	6.052149	Log likelihood		-1685.110
Hannan-Quinn criter.	6.038017	F-statistic		337.8581
Durbin-Watson stat	2.419649	Prob(F-statistic)		0.000000

Table 4. Output EViews – Hausman Test

Correlated Random Effects – Hausman Test				
Equation: Untitled				
Test period random effects				
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	
Period random	20.097584	2	0.0000	
Period random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
EI	-21.686618	-21.699591	0.255536	0.9795
GE	-6.929769	-7.051693	0.012287	0.2714
Period random effects test equation:				
Dependent Variable: ECOSUB				
Method: Panel Least Squares				
Date: 05/17/20 Time: 17:41				
Sample: 1996 2015				
Periods included: 20				
Cross-sections included: 28				
Total panel (balanced) observations: 560				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	44.47226	2.078390	21.39746	0.0000
EI	-21.68662	2.797257	-7.752815	0.0000
GE	-6.929769	0.359877	-19.25593	0.0000
Effects Specification				
Period fixed (dummy variables)				
Root MSE	4.741873	R-squared	0.577649	
Mean dependent var	19.50534	Adjusted R-squared	0.561163	
S.D. dependent var	7.302996	S.E. of regression	4.837855	
Akaike info criterion	6.029313	Sum squared resid	12591.80	
Schwarz criterion	6.199339	Log likelihood	-1666.208	
Hannan-Quinn criter.	6.095704	F-statistic	35.03908	
Durbin-Watson stat	2.324745	Prob(F-statistic)	0.000000	