

The 3rd International Conference on Economics and Social Sciences
Innovative models to revive the global economy
October 15-16, 2020
Bucharest University of Economic Studies, Romania

**The Influence of Economic Freedom,
Government Effectiveness and Human Development
on Shadow Economy in the European Union**

Sorina Emanuela ȘTEFONI¹

DOI: 10.2478/9788395815072-089

Abstract

Decreasing the size of the shadow economy is a priority for the states that want their economy to evolve. But shadow economy encompasses all spots of economic environment. Being such a complex phenomenon, it is imperative not to neglect the factors that shape the behaviour of citizens in general, but especially of taxpayers, when it comes to shadow economy activities. Therefore, this paper intends to highlight the influences involved by the standard of human development, the economic freedom a taxpayer perceives and the government effectiveness, in relation to the shadow economy and to add another piece in understanding the tax compliance puzzle. The paper covers the 28 EU member states for a period of 20 years.

Keywords: shadow economy, fiscal freedom, government effectiveness, human development, tax behaviour

JEL Classification: E26, G38, G41, O15

1. Introduction

Understanding the economic behaviour of the taxpayer is a challenge for a European fiscal context in which the public financial system is at the borderline of economic and political aspects. Decisions of the individuals, seen as social beings with different values and attitudes, but from an economic prospect, are difficult to quantify. In the scholarly literature, in most cases the exclusive focus is placed on economic analyses, minimizing, or even completely neglecting sometimes the impact of human factors. Thus, there are many experts who have developed models for shaping constructive policies as regards the authorities and the society.

This research brings new lines that must be followed by states that want to improve the level of the shadow economy. It intends to highlight the influences

¹ Bucharest University of Economic Studies, Bucharest, Romania, stefonisorina@gmail.com.

involved by the standard of human development, the economic freedom a taxpayer perceives and the government effectiveness, in relation to the shadow economy and to add another piece in understanding the tax compliance puzzle. In addition to the novelty that these factors are analysed together, in this form, the period subject to analysis is itself an element of novelty. Economic changes are constantly evolving, and the analysed period comes bundled with a series of economic innovations, which will be reflected in the final conclusions of this paper.

2. Problem Statement

Tax systems, even in developed countries, grapple with the matter of shadow economy daily. A high level of the shadow economy is usually associated with the weak performance of the authorities in collecting taxes. There are many factors that influence the volume of the shadow economy activities and many of them, like abstruse tax laws, the absence of incentives, the faint tax enforcement, were highly debated in the literature. Besides these, this paper aims to point out the influence that some variables such as human development, economic freedom, and government effectiveness manifest on shadow economy.

According to *Torgler (2007)*, the activities covered by the shadow economy are unlimited, but the most frequently investigated area is tax evasion. Whether it arises from commissive actions or from omission actions at times, this concept excludes behaviours resulting from not imputable noncompliance of the agent such as the lack of knowledge, mental problems, or miscalculations. In one of his researches (*Braşoveanu, 2010*), the author explains these concepts, pointing out that tax evasion can be intercepted and quantified by the state, naming it identified, whereas the one not noticeable by the state is actually the one included in the shadow economy.

Tax compliance represents the taxpayer behaviour in the sense of declaring all his/her income and paying the related taxes (*Alm, 1991*). In a simple definition, tax compliance is the meticulous observance of the tax regulations by the taxpayer (*James and Alley, 2002*). According to *Dumitru (2018)*, the increase in taxation suffocates the taxpayers, causing them to evade the path of paying taxes. Therefore, the tax burden is a factor of influence for the taxpayers and, by extension, for the tax collection.

Gobena & Van Dijke (2017) have been analysing the procedural role of the competent tax authorities, the trust of the taxpayers regarding the management of the tax revenues by the government and their identification with the nation reported to the level of voluntary tax compliance. Based on their research, the procedural justice results should be seen as being a tool in stimulating the social-psychological behaviour of the taxpayers in the matter of complying with tax law.

This correlation is sustained by the slippery slope mechanism at the level of tax compliance (*Kirchler et al., 2008*), which implies that the trust and the power of constraint tax authorities possess are critical dimensions in understanding this phenomenon. Specifically, while authorities' coercive power determines forced compliance with fiscal obligations, the trust in the way public authorities handle

the revenue collected from the taxpayers determines their voluntary compliance (Kirchler, 2007). The framework argues that if taxpayers perceive a higher likelihood of tax evasion being detected and punished by competent authorities (this is interpreted as a coercive power), the level of compliance with tax obligations will also increase.

3. Research Questions / Aims of the Research

As support for the arguments exposed in the previous section, it is suitable that an econometric model is consolidated, in order to consider different taxation climates, but the model will be restricted to the 28 member states of the European Union² (herein referred to as the “EU Member States”). Current European context is competitive in terms of taxation. States devise their fiscal policies, depending on their needs to attract investors and resources, to encourage the development of certain sectors of activity or, sometimes, even to remove certain categories of investors from national markets. Thus, EU Member States are all restricted by the EU authorities, hence, it is accurate to affirm that all of them shape their strategies on the same prerequisites.

4. Research Methods

The econometric model will be designed using EViews – version 10.2. The timeframe to be analysed is 1996 - 2015, for all EU Member States and the data set consists of 560 observations. The variables that were selected relied on other empirical studies carried out by *Dronca (2016)*, *Schneider and Feld (2010)*, *Schneider and Williams (2013)*, and *Schneider and Buehn (2012)*. As tax evasion is difficult to measure because the individuals involved usually remain untraceable, the shadow economy is used as a proxy for the volume of the tax evasion. From the extensive research drawn regarding this analysis, there are no estimates of the tax revenues evaded regarding the EU Member States. In the next table, the 4 variables used in the model are defined.

Table 1. Variables included in the EViews model

Variable	Meaning	Source
Dependent variable		
Shadow Economy (ShEco)	It encompasses the number of transactions of goods & services that are not reported to the public authorities and, therefore, they cannot be identified by tax collectors and regulators.	Medina & Schneider ³

² The United Kingdom will also be included in this study, as during the period for which the data were processed, it was part of the EU.

³ Medina, L., Schneider, F. (2018). *Shadow Economies Around the World: What Did We Learn Over the Last 20 Years?*. International Monetary Fund.

Variable	Meaning	Source
Independent variables		
Index of Economic Freedom (IEF)	It scores and ranks countries according to their significance on economic freedom.	Heritage Foundation ⁴
Government Effectiveness (GE)	It scores and ranks 5 dimensions of the governance (regulatory quality, rule of law, control of corruption, political stability and voice and accountability).	The World Bank ⁵
Human Development Index (HDI)	It scores and ranks 3 dimensions of the human development (educational attainment, life expectancy and GDP/capita).	United Nations Development Programme ⁶

Source: Medina & Schneider, Heritage Foundation, The World Bank, United Nations Development Programme

5. Findings

5.1. Data processing and results

The results of the estimation of the panel equation were obtained using the OLS method (LS - Least Squares (LS and AR)) and they are presented in Table 2. *Results from the EViews model.* The corrections for fixed and random effects were made using the Redundant Fixed Effects - Likelihood Ratio, respectively Correlated Random Effects - Hausman Test. As per the Hausman test and Likelihood Ratio test, the probability obtained is below the significance threshold of 5%, so both random and fixed effects can be neglected.

The model under analysis is valid (F-statistic = 276.2773 and Prob(F-statistic) = 0.0000%). Also, the indicator R^2 has a value of 59.8507%, which means that the variance of the shadow economy is influenced by the independent variables included in the model in a proportion of approximately 60%. The improved version of the R^2 (adjusted R^2), that considers the amount of independent indicators included in this regression, is 59.6341%. Specifically, if new independent variables are included in the equation and they manifest no relevance or low relevance on the shadow economy, this effect will be penalized through R^2 . All indicators analysed in the model presented hereby are statistically significant for a significance threshold of 5%.

⁴ <https://www.heritage.org/index/>, accessed on 20.01.2020.

⁵ <https://datacatalog.worldbank.org/>, accessed on 20.01.2020;

⁶ <http://hdr.undp.org/>, accessed on 20.01.2020.

Table 2. Results from the EViews model

	No effects	Fixed effects	Random effects
IEF	- 0.139294	-0.139294	-0.086547
Prob.	0.0004	0.0004	0.0260
HDI	-27.11226	-27.11226	-31.75997
Prob.	0.0000	0.0000	0.0000
GE	-5.619194	-5.619194	-5.557029
Prob.	0.0000	0.0000	0.0000
C	56.66321	56.66321	56.73954
Prob.	0.0000	0.0000	0.0000
R ²	0.598507	0.598507	0.633695
R2 adjusted	0.596341	0.596341	0.618688
F-statistic	276.2773	276.2773	42.22690
Prob(F-statistic)	0.000000	0.000000	0.000000
T. Hausman	0.0000		
Redundant Fixed Effects Tests	0.0001		

Source: Own estimations using EViews

For the analysed variables, the correlation matrix is presented in Table 7. *EViews – Correlations*. The results obtained are between (-0.706606) and (+0.621605), which means that there are correlations between variables, some positive, which means that they are influenced positively, respectively negative ones, which means that there is a negative influence between variables.

In order to have a more comprehensive perspective on the analysis undertaken, the model was also estimated using the Robust Least Squares method, which provides improved regression coefficient estimates when outliers exist. This procedure identifies the outliers and minimizes their influence on the estimation of the coefficients. The results are presented in Table 8. *EViews Output (Robust Least Squares)*. The results highlight the same negative link between shadow economy and economic freedom, government effectiveness and human development.

From the analyses on the econometric model, the conclusion is that there is an inverse connection between shadow economy and the 3 independent variables. This aspect is in accordance with the literature that in numerous studies (e.g., *Gemmell, 2001; Princen & Mourre, 2013; Lopez, Thomas & Wang, 2010*) indicates that fiscal policies and budget policies have such a defining role regarding the characteristics of the economic framework and thus influencing individuals' behaviour.

As regards the economic freedom, citizens are living in probably the wealthiest and most economically prosperous period, a period that offers various opportunities for exploring any kind of decisions, within the law, regarding their own labour and ownerships. It is said that economic freedom is associated with prosperity for individuals, but the way it impacts the welfare of states is questionable. In order to obtain an answer for the second aspect, the results in the modelled pattern should be viewed.

The shadow economy and the index of economic freedom are linked by a negative coefficient. When an individual does not feel the pressure of state factors in its economic decisions, not feeling the constraint or coercion, his/her desire to hide and try to fulfil his/her options through hidden and evasive methods will decrease. So, in order to improve the level of the registered underground economy, a state must give its taxpayers enough freedom so that they do not feel the necessity to protect themselves for maintaining liberty itself.

The results in the model commissioned in conjunction with the second independent variable are in the sense of the existence of an inverse connection between the human development index and the shadow economy. This means that when the human development that is registered within a state is increasing, the level of the shadow economy will decrease.

For understanding this connection, it is mandatory to see how the human development index is quantified. As per the United Nations Development Programme, it has 3 dimensions, measuring the educational attainment, life expectancy and the GDP/capita. These 3 directions outline a fuller picture of how a state is handling the satisfaction of its citizens and if the state has a citizens-orientated approach in the national policy choices.

Regarding the efficiency in governance, it expresses the trustworthiness of the citizens in the government's commitment to fulfil the obligations assumed, to increase the prosperity through policies outlined on the needs of the state and to act in a fair and legal manner. The civil services and the perception of the individuals regarding their quality is a very important tool in decreasing the level of the shadow economy, as per the analyses hereby presented. When governments establish clear policies and balanced budgets so that the state's main needs are met, and development is also felt by the citizens, the sense of fairness of taxpayers will be improved, and their focus on evasion activities will be significantly diminished.

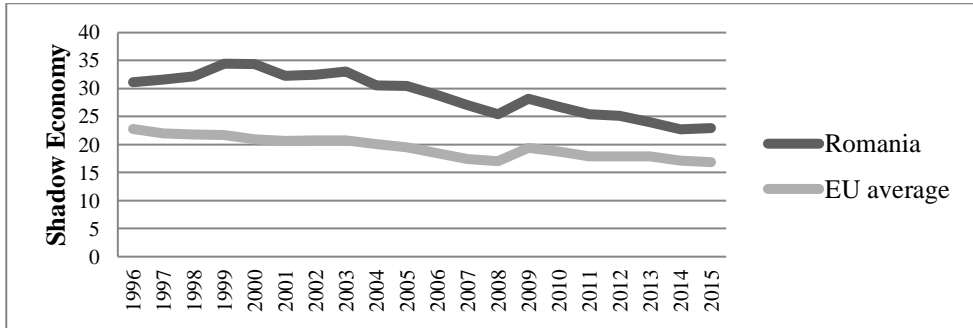
5.2. Analysis of the Romanian framework

As regards the evolution of the shadow economy in Romania, predominantly it was a descending one, reaching from the level of 31.12% reported in 1996 to 22.94% reported in 2015. If, until 1999, the shadow economy in Romania was steadily growing, from 1999, when Romania adopted the National Plan of Accession to the European Union, it began to have a downward trend.

During the analysed period, the lowest level for shadow economy was reported in 2014, and the highest value for the shadow economy was reported in 1999. According to the Romanian Fiscal Council⁷, 2014 brought a considerable improvement in the transparency of fiscal policy in Romania. Also, for 2014 the Romanian economy registered economic growth for the fourth consecutive year, the advance in the real gross domestic product (GDP) being 2.8%.

⁷ Romanian Fiscal Council (2015), *Annual Report 2014*, www.consiliulfiscal.ro, accessed on 20.01.2020.

Graph 1. Trend of the shadow economy in Romania, 1996 - 2015



Source: Own data-processing based on Schneider

As Zaman & Goschin (2013) mention in their study, it is essential to notice the dynamics of the underground economy from different angles. In terms of GDP and GDP per capita, the levels of the shadow economy are as described in the next Table 1. *Shadow economy indicators, Romania, 1996-2015*. The trend of the volume of shadow economy per capita (in euro) is dissimilar from the trend of the shadow economy as percent of the GDP. Actually, shadow economy per capita (in euro) had an upward trend till 2008 (EUR 1,805.64), but starting with 2008, its trend has reversed, mainly because of the lengthened recession.

Table 3. Shadow economy indicators, Romania, 1996-2015

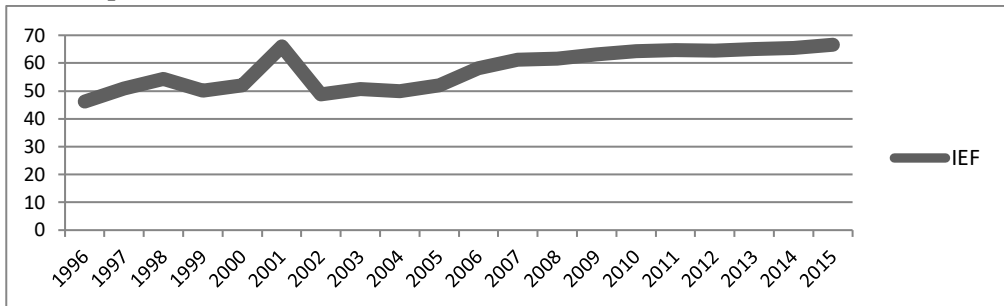
ROMANIA	GDP (million euro)	GDP per capita (euro)	Shadow economy (% GDP)	Shadow economy (million euro)	Shadow economy per capita (euro)
1996	29,035.4	1,281.57	31.12	9,035.82	398.82
1997	31,450.5	1,392.73	31.65	9,954.08	440.80
1998	38,063.3	1,689.74	32.18	12,248.77	543.76
1999	33,726.8	1,499.73	34.45	11,618.88	516.66
2000	40,594.9	1,807.79	34.40	13,964.65	621.88
2001	45,143.6	2,012.60	32.33	14,594.93	650.67
2002	48,695.7	2,230.32	32.51	15,830.97	725.08
2003	51,108.5	2,363.12	33.03	16,881.14	780.54
2004	60,402.0	2,806.64	30.57	18,464.89	857.99
2005	79,223.9	3,705.11	30.49	24,155.37	1,129.69
2006	97,215.6	4,573.34	28.88	28,075.87	1,320.78
2007	127,632.0	6,040.18	27.03	34,498.93	1,632.66
2008	146,590.6	7,097.63	25.44	37,292.65	1,805.64
2009	125,213.9	6,125.84	28.23	35,347.88	1,729.32

ROMANIA	GDP (million euro)	GDP per capita (euro)	Shadow economy (% GDP)	Shadow economy (million euro)	Shadow economy per capita (euro)
2010	125,408.8	6,179.39	26.76	33,559.39	1,653.61
2011	131,925.4	6,531.26	25.41	33,522.24	1,659.59
2012	133,147.1	6,625.55	25.14	33,473.18	1,665.66
2013	143,801.6	7,182.87	23.97	34,469.24	1,721.73
2014	150,458.0	7,542.77	22.73	34,199.10	1,714.47
2015	160,297.8	8,067.06	22.94	36,772.32	1,850.58

Source: Own data-processing based on Eurostat⁸ and Medina & Schneider (2018)

The economic freedom in Romania reflects the economic performance of the country within 1996-2015. This index is in a continuous ascending trend since 2002, this growth being maintained even during the crisis period between 2008 and 2012. If in 1996, Romania ranked 28th (with 46.2 points), reporting the lowest level of the economic freedom index; in 2015, Romania surpassed states such as Italy or France, ranking 21st among EU member states (with 66.6 points). In this regard, Romania must remain on the same path and pursue the sustained growth of this index.

Graph 2. Evolution of the index of economic freedom in Romania, 1996-2015

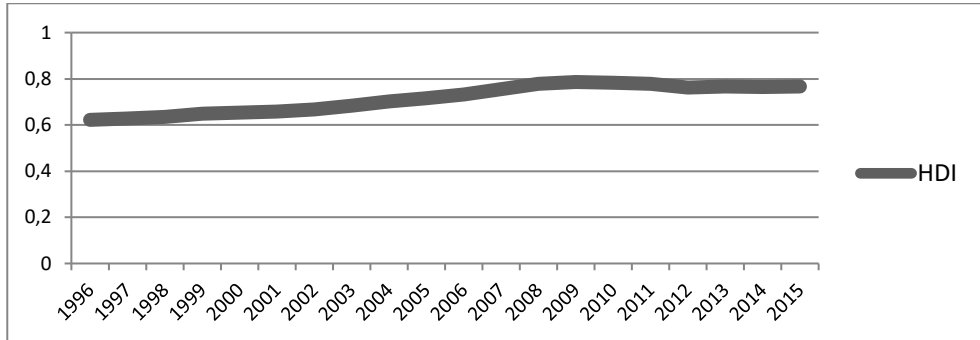


Source: Own data-processing based on World Bank

As concerns the human development index, it was reported a moderate dynamics during the period under analysis, in the light of the adversarial internal structural variations and adverse external shocks. The ascending trend of the human development index was acquired mainly due to the increase in the gross domestic product per capita. Even after more than 30 years since the collapse of communism, the political background in Romania continues to be unfavourable for the adequate human development.

⁸ <https://ec.europa.eu/eurostat/data/database>, accessed on 08.02.2020.

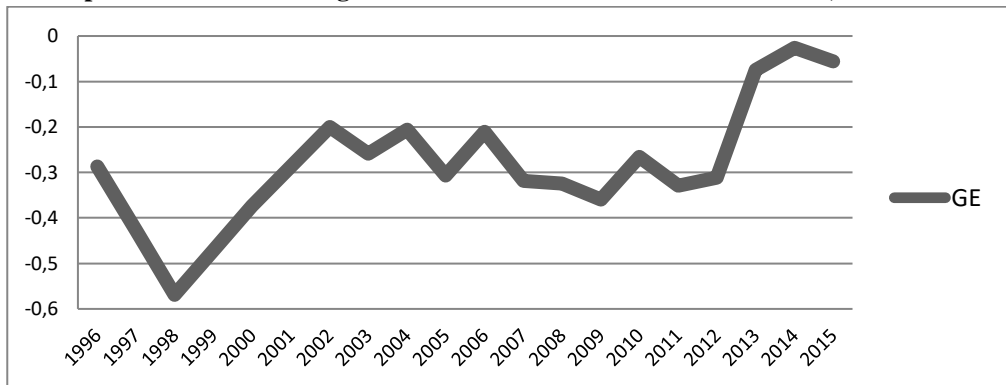
Graph 3. Evolution of the human development index in Romania, 1996-2015



Source: Own data-processing based on World Bank;

The results regarding the government effectiveness index reveal a strong progress on the governance infrastructure, but Romania ranks last among the other countries in European Union, each year in the period analysed. As stated in section 3.2 of this paper, the government effectiveness has a strong influence on the level of shadow economy. So, this is one of the reasons Romania has such a precarious performance when it comes to tax evading activities. Starting with 2013, the evolution of the government effectiveness index begins to be an ascending one, but even nowadays it is far from becoming a strengthening governmental environment.

Graph 4. Evolution of the government effectiveness index in Romania, 1996-2015



Source: Own data-processing based on World Bank

As concerns the results within the hereby analysis, in order to reduce the level of tax evasion in Romania, the Romanian government should pay more attention to the human development, especially to the education component, the quality of the institutions and their efficiency, as well as to the legal regulations so as to provide more economic alternatives of investment for the individuals to explore. Indeed, in the last 10 years under analysis (2005-2015), the trend of the shadow economy has been a decreasing one for Romania, being also influenced by the positive evolution of the 3 independent variables in the econometric study.

6. Conclusions

To conclude, as per the terms of reference and the methodology of the study, the taxpayer behaviour is influenced by a streamlining government, which ensures rational spending attempts to increase the level of efficiency. Also, the fiscal freedom taxpayers feel within the environment they are living in influences their tax-evading approach. As the rulings of a state are more predominant in the sense of creating a higher standard of education and quality of life, this attitude will be reflected in the level of the shadow economy reported by the state, in a positive manner.

Anyhow, as our society is, in all its aspects, dependent on how taxpayers react, the economically statistical analyses should be concentrated on the taxpayer behaviour. This is why this kind of methods in discovering patterns on how the taxpayer can influence the level of the shadow economy should continue in order to reveal forecasts and descriptions applicable on nowadays reality.

References

- [1] Alm, J. (1991). *A Perspective on the Experimental Analysis of Taxpayer Reporting*. The Accounting Review, 66, pp. 577-593.
- [2] Braşoveanu, I. V. (2010). *Underground economy and corruption: major problems of the Romanian economy*. Theoretical and applied economics, VII, pp. 68-80.
- [3] Dumitru, I. (2018). *The unobserved economy in Romania – causes and consequences*. Romanian Fiscal Council website;
- [4] Dronca, A. (2016). *The influence of fiscal freedom, government effectiveness and human development index on tax evasion in the European Union*. Theoretical and Applied Economics, XXIII, pp. 5-18.
- [5] Gemmill, N. (2001). *Fiscal Policy in a Growth Framework*. WIDER Working Paper Series no. 2001/84.
- [6] Gobena, L. B., Van Dijke, M. (2017). *Fear and caring: Procedural justice, trust, and collective identification as antecedents of voluntary tax compliance*. Journal of Economic Psychology, 62, pp. 1-16.
- [7] James, S., Alley, C. (2002). *Tax compliance, self assessment and tax administration*. Journal of Finance and Management in Public Services, 2, pp. 27-42.
- [8] Kirchler, E. (2007). *The economic psychology of tax behaviour*. Cambridge, UK: Cambridge University Press.
- [9] Kirchler, E., Hoelzl, E., & Wahl, I. (2008). *Enforced versus voluntary tax compliance: The “slippery slope” framework*. Journal of Economic Psychology, 29, pp. 210-225.
- [10] Lopez, R., Thomas, V., & Wang, Y. (2010). *The Effect of Fiscal Policies on the Quality of Growth*. The World Bank.
- [11] Medina, L., Schneider, F. (2018). *Shadow Economies Around the World: What Did We Learn Over the Last 20 Years?*. International Monetary Fund.
- [12] Princen, S., & Mourre, G. (2013). *The role of tax policy in times of fiscal consolidation*. Economic Papers 502.
- [13] Romanian Fiscal Council (2015). *Annual Report 2014*, www.consiliulfiscal.ro.

- [14] Schneider, F., & Feld, L. (2010). *Survey on the Shadow Economy and Undeclared Earnings in OECD Countries*. German Economic Review, 11, pp. 225-245.
- [15] Schneider, F., & Buehn, A. (2012). *Shadow economy around the world: novel insights, accepted knowledge, and new estimates*. International Tax and Public Finance, 19, pp. 139-171.
- [16] Schneider, F., & Williams, C. (2013). *The Shadow Economy*. Institute of Economic Affairs.
- [17] Torgler, B. (2007). *Tax compliance and tax morale: a theoretical and empirical analysis*. Edward Elgar Publishing.
- [18] Zaman, G., & Goschin, Z. (2013). *A new multidimensional ranking of shadow economy for EU countries*. Procedia Economics and Finance.

Appendix

This paper is based on data processing using the EViews software. In this appendix, the outputs that have been generated and interpreted accordingly will be attached.

Table 4. EViews Output

Dependent Variable: SHECO
 Method: Panel Least Squares
 Date: 09/14/20 Time: 10:16
 Sample: 1996 2015
 Periods included: 20
 Cross-sections included: 28
 Total panel (balanced) observations: 560

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.66321	2.452098	23.10805	0.0000
IEF	-0.139294	0.038971	-3.574270	0.0004
HDI	-27.11226	3.352747	-8.086583	0.0000
GE	-5.619194	0.392682	-14.30980	0.0000
Root MSE	4.623297	R-squared		0.598507
Mean dependent var	19.50534	Adjusted R-squared		0.596341
S.D. dependent var	7.302996	S.E. of regression		4.639898
Akaike info criterion	5.914379	Sum squared resid		11969.93
Schwarz criterion	5.945293	Log likelihood		-1652.026
Hannan-Quinn criter.	5.926450	F-statistic		276.2773
Durbin-Watson stat	2.491206	Prob(F-statistic)		0.000000

Source: Own estimations using EViews.

Subsequently, two methods were applied for testing the existence of random, respectively fixed effects, with the help of the Hausman and Redundant Fixed Effects tests (for the time component). According to these two tests, both fixed and random effects can be neglected. Hereinafter, the two outputs from EViews obtained after running the 2 tests are attached.

Table 5. EViews Output – 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	45.383539	3	0.0000

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
IEF	-0.086547	-0.139294	0.000069	0.0000
HDI	-31.759970	-27.112263	0.853847	0.0000
GE	-5.557029	-5.619194	0.009944	0.5330

Period random effects test equation:

Dependent Variable: SHECO

Method: Panel Least Squares

Date: 09/13/20 Time: 20:47

Sample: 1996 2015

Periods included: 20

Cross-sections included: 28

Total panel (balanced) observations: 560

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.73954	2.403959	23.60254	0.0000
IEF	-0.086547	0.038775	-2.232051	0.0260
HDI	-31.75997	3.387099	-9.376747	0.0000
GE	-5.557029	0.394469	-14.08736	0.0000

Effects Specification

Period fixed (dummy variables)

Root MSE	4.416053	R-squared	0.633695
Mean dependent var	19.50534	Adjusted R-squared	0.618688
S.D. dependent var	7.302996	S.E. of regression	4.509633
Akaike info criterion	5.890513	Sum squared resid	10920.86
Schwarz criterion	6.068267	Log likelihood	-1626.344
Hannan-Quinn criter.	5.959921	F-statistic	42.22690
Durbin-Watson stat	2.398245	Prob(F-statistic)	0.000000

Source: Own estimations using EViews.

Table 6. EViews Output – Redundant Fixed Effects Tests

Redundant Fixed Effects Tests

Equation: Untitled

Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	2.715005	(19,537)	0.0001
Period Chi-square	51.365109	19	0.0001

Period fixed effects test equation:

Dependent Variable: SHECO

Method: Panel Least Squares

Date: 09/13/20 Time: 19:51

Sample: 1996 2015

Periods included: 20

Cross-sections included: 28

Total panel (balanced) observations: 560

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.66321	2.452098	23.10805	0.0000
IEF	-0.139294	0.038971	-3.574270	0.0004
HDI	-27.11226	3.352747	-8.086583	0.0000
GE	-5.619194	0.392682	-14.30980	0.0000

Root MSE	4.623297	R-squared	0.598507
Mean dependent var	19.50534	Adjusted R-squared	0.596341
S.D. dependent var	7.302996	S.E. of regression	4.639898
Akaike info criterion	5.914379	Sum squared resid	11969.93
Schwarz criterion	5.945293	Log likelihood	-1652.026
Hannan-Quinn criter.	5.926450	F-statistic	276.2773
Durbin-Watson stat	2.491206	Prob(F-statistic)	0.000000

Source: Own estimations using EViews

The correlation matrix is presented in Table 7. *EViews - Correlations*.

Table 7. EViews – Correlations

	GE	HDI	IEF	SHECO
GE	1.000000	0.452753	0.621605	-0.706606
HDI	0.452753	1.000000	0.616039	-0.587393
IEF	0.621605	0.616039	1.000000	-0.617846
SHECO	-0.706606	-0.587393	-0.617846	1.000000

The output was also generated using the *Robust Least Squares* method and the results are presented in Table 8. *EViews Output (Robust Least Squares)*.

Table 8. EViews Output (Robust Least Squares)

Dependent Variable: SHECO
 Method: Robust Least Squares
 Date: 09/13/20 Time: 19:32
 Sample: 1996 2015
 Included observations: 560
 Method: M-estimation
 M settings: weight=Bisquare, tuning=4.685, scale=MAD (median centred)
 Huber Type I Standard Errors & Covariance

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	56.91051	2.466206	23.07614	0.0000
IEF	-0.184952	0.039196	-4.718692	0.0000
HDI	-23.74868	3.372036	-7.042830	0.0000
GE	-5.656503	0.394941	-14.32241	0.0000
Robust Statistics				
R-squared	0.569913	Adjusted R-squared	0.567593	
Rw-squared	0.672655	Adjust Rw-squared	0.672655	
Akaike info criterion	525.6112	Schwarz criterion	544.3703	
Deviance	10161.12	Scale	4.424485	
Rn-squared statistic	849.7462	Prob(Rn-squared stat.)	0.000000	
Non-robust Statistics				
Mean dependent var	19.50534	S.D. dependent var	7.302996	
S.E. of regression	4.652034	Sum squared resid	12032.63	

Source: Own estimations using EViews

List of graphs and tables

Tables

1. Table 1. Variables included in the EViews model;
2. Table 2. Results from the EViews model;
3. Table 3. Shadow economy indicators for Romania, 1996-2015;
4. Table 4. EViews Output;
5. Table 5. EViews Output – Hausman Test;
6. Table 6. EViews Output – Redundant Fixed Effects Tests;
7. Table 7. EViews – Correlations;
8. Table 8. EViews Output (Robust Least Squares).

Graphs

1. Graph 1. Trend of the shadow economy in Romania, 1996-2015;
2. Graph 2. Evolution of the index of economic freedom in Romania, 1996-2015;
3. Graph 3. Evolution of the human development index in Romania, 1996-2015;
4. Graph 4. Evolution of the government effectiveness index in Romania, 1996-2015.