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The Impact of Fiscal Freedom, Government Effectiveness
and Human Development Index on the VAT GAP
in the European Union

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Abstract

The present study analyses the value added tax (VAT) from the perspective that the state cannot collect, due to influencing factors such as tax evasion, exemptions and reduced rates. According to the European Commission (2020), in the EU, the VAT Gap (the difference between VVTL- the VAT total tax liability and VAT actually collected) reached round EUR 140 billion. As the VAT Gap cannot be ignored, each country is focusing on tackling VAT fraud and limiting the size of this phenomenon. The aim of this paper consists of analysing the relationship between fiscal freedom (FF), government effectiveness (GE), and human development index (HDI), as independent variables, and VAT GAP % of VTTL, as a dependent variable within EU countries during 2000-2018. In the study, we developed 3 econometric models, using panel data regression with fixed and random effects, aiming to point out whether these three independent variables are significant in strengthening strategies by states to tackle VAT fraud in order to minimize the amount of VAT Gap.

Keywords: tax evasion, VAT fraud, VAT Gap, fiscal freedom, government effectiveness, human development index.

JEL Classification: E26, G1, G41, H11, H26.

1. Introduction

The tax system includes a set of taxes, but in most of the countries value added tax, herein referred to as VAT, is the main element. In the 1920s, the German businessman Von Siemens introduced first the idea of VAT, but France is credited with the first value added tax, adopted in 1954 (Ionela et al., 2019).

According to the European Commission, VAT is a major source of revenue in the European Union (EU), yielding € 1,131 billion in 2018 alone. Moreover, with an average standard VAT rate in the EU of 21.46%, VAT brought 18.2% of total tax

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revenues and total VAT income in EU represented 7.1% of the total EU GDP in 2018.

Although the VAT structure is basically the same in all member states, there are differences among countries, starting from different tax rates for specific products to specific antifraud measures. These differences are shown in the share of VAT in the government budgets of each country. The share of VAT in total taxation in 2018 ranges from 14.8 % in Italy to 34.9 % in Croatia. Regarding VAT to GDP, it varies widely: from 4.4 % in Ireland to 13.5 % in Croatia (Eurostat, 2020). Thus, reducing VAT Gap seems to be more relevant for countries where the share of VAT in total taxes is higher (Porumboiu et al. 2019).

The purpose of applying VAT is to increase budget revenues. Cnossen (1990) argues that *"purely from a revenue point of view"*, VAT is probably the best tax ever invented. On the other hand, Tait (1988) admits, *"Like other taxes, VAT is evaded"* (Luitel, 2005). In the same field, in OECD countries, there is no apparent increase in the rate of VAT to GDP (OECD 2016). One of the reasons could be the increase in VAT evasion and fraud (Manea & Manea, 2011). Nevertheless, most of the gap is caused by VAT fraud. (Hangacova & Stremy, 2018).

2. Overview of VAT Gap and Methods of Estimation

Member States are facing big losses in revenue from VAT fraud and noncompliance. Every year, thousands of millions of Euros are not collected because of fraud (Barbone et al., 2017). Over the past two decades, the volume of VAT evasion has been alarming, so at European level the VAT issue focused mainly on its sensitivity to tax evasion. Official statistics by the European Commission indicate that EUR 140 billion in potential VAT revenues were lost in 2018, equating about 11.01% of VAT Theoretical Liability (hereinafter referred to as VTTL). The report also predicts a potential increase of VAT revenue losses in 2020 due to the effects of the coronavirus pandemic on the global economy. The loss is forecasted to be €164 billion in 2020 (European Commission, 2020).

VAT evasion is often estimated by the VAT Gap, which is defined as the difference between theoretical VAT liability, in other words, the total VAT that should have been collected according to the applicable VAT law, and VAT actually collected by public budgets. However, fraud is only a fraction of the VAT Gap and its size is subject to intense debate. Other factors such as mistakes, bankruptcies, and insolvencies preventing firms from paying VAT are also included in the VAT Gap (European Commission, 2020). The latest report (European Commission, 2020) shows that in 2018, VAT Gap ranges from 1% in Sweden to 33.8% in Romania.

Empirical studies investigating the effects of different factors related to VAT Gap have provided relevant results. Some studies revealed that in more developed countries, with higher levels of income per capita and literacy and lower levels of agricultural activity, VAT revenues are higher (Ebrill et al. 2001). Secondly, the results of some studies made in Italy, indicate a positive relationship between VAT Gap and the fiscal morale of the geographical area (D'agosto et al., 2014). The results of the regression model for the period 2000 – 2011 used in the study of European

Commission CASE (2013) indicated that the increase in unemployment is linked to higher levels of VAT Gap. Third, another study that focused on 25 EU countries between 2000 and 2006 indicated a positive relationship between VAT Gap and administrative costs related to VAT collection (Barbone, Bird and Vázquez-Caro, 2012). On the other hand, studies related to VAT fraud are not based only on the VAT Gap as a dependent variable. Authors like Agha and Haughton (1996) used the self-compliance rate for the year 1987 in 17 OECD countries. Their results showed that an increase in the number of VAT rates and an increase in the standard VAT rate will lead to a decrease in voluntary compliance in the payment of taxes.

There is not one single way to estimate the VAT Gap. In the available literature, there are two methods for estimating VAT Gap, namely: „*bottom-up*” and “*top-down*” (Reckon, 2009). Similarly, Schneider (2000a) and Thomas (1992) classified the methods to estimate VAT Gap in micro approach and macroeconomic approach. The same and Borselli (2011) proposed two ways for estimating VAT fraud: the direct approach and the indirect approach. (Butu et al., 2020).

Table 1. Comparative view of the methods used for estimating VAT Gap

| Method | Main features |
|--|--|
| Bottom up - micro – direct methods | <ul style="list-style-type: none"> - are generally preferred for direct taxes (Stavjaňová, 2014); - are based on micro data for individuals and enterprises collected directly by tax administrations, including surveys and audits (Isachsen et al., 1982); - surveys include a random sample of taxpayers for all categories that are analysed, and then extrapolated to the entire population; - are used to estimate noncompliance to VAT for certain taxpayer groups and types of noncompliance (European Commission, 2020); - the quality of results will be highly related to the sample size and it focuses on a selected group of taxpayers, the statistical criterion applied, and knowledge of the system from the respondent elements; - the results are extrapolated to the entire population, so the results would be overestimated; - countries using the method: Estonia, Slovenia, and UK. |
| Top down – macro – indirect methods | <ul style="list-style-type: none"> - are generally preferred for indirect taxes (Stavjaňová, 2014). For the estimation of tax gap data not necessarily related directly to the tax process are used - “<i>indirect method</i>”; - are based on national accounts data and the information from the supply-use tables (SUT) of National Accounts; - are based on the estimated theoretical tax, which is then compared with the actual tax revenue; - the statistics and data on private consumption, intermediate consumption and investment of central and local governments apparently play the most important role in the assessment of the VAT Gap estimation; - are used by the European Commission and are well described in CASE’s annual reports on VAT Gap in the EU (European Commission, 2020). |

Source: Adapted by authors based on literature review.

Table 1 outlines the main particularities of the two methods. Although both have advantages and disadvantages (Schneider, 2000a), in all cases the preferred method depends on the availability of the data. Thus, the most used approach to estimate the

uncollected level of VAT is "top-down" method. The information can be found in the supply-use tables (SUT) of National Accounts.

3. Aims of the Research

In this paper, we started from the econometric model proposed by Alexandru Dronca in his paper "The influence of fiscal freedom, government effectiveness, and human development index on tax evasion in the European Union" (2016). While the author used the amount of tax evasion as a percentage of GDP as the dependent variable, we have chosen VAT Gap as % of VTTL as dependent variable. The present study aims to continue the period 1999-2000 analysed for the 28 European Union Member States by the author Alexandru Dronca. Therefore, we have analysed a timeseries corresponding for 19 years, from 2000 to 2018.

The proposed econometric model proposed is a panel data model and incorporates the data for 28.

The proposed econometric model proposed is a panel data model and incorporates the data for 28 European Union Member States, with some limitations. Because not all data are available for all countries, we excluded Cyprus and Croatia from the analyses. On the other had, we included United Kingdom, given that during the analysed period it was still part of the European Union. The analysis considers 19 years (2000-2018), so the total amount of observations is 494.

The objective of the study is to highlight the relationship between the dependent variable, VAT Gap as a percentage (%) of VTTL and the independent variables: fiscal freedom (FF), government effectiveness (GE) and the human development index (HDI). Next, we will present the variables used in the panel data model.

3.1. VAT Gap

VAT Gap report published by European Commission provides data about VAT Gap. According to the latest report published (European Commission, 2020), VAT Gap is calculated as follows:

$$VAT\ Gap = VTTL - VAT\ revenue, \text{ where} \tag{1}$$

VTTL = all VAT that should have been collected according to the applicable VAT law; VAT Revenue = VAT actually collected by the public budget.

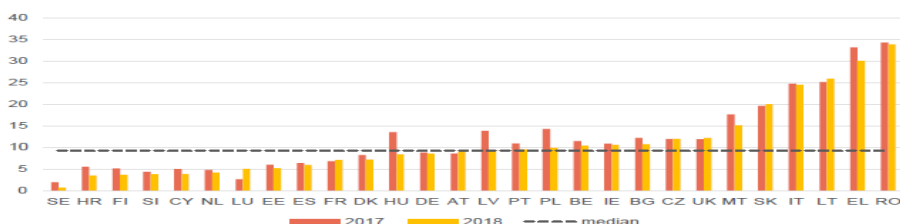


Figure 1. VAT Gap as percent of the VTTL in EU-28 Member States, 2018 and 2017
 Source: Study and Reports on the VAT Gap in the EU-28 Member States, 2020, p. 18.

The first conclusion we can draw from Figure 1 is that in 2018 to 2017, the VAT Gap percent of VTTL decreased in 21 countries. Hungary is the country that registered the biggest decrease in the VAT Gap share, -5.1 percentage points (pp), followed by Latvia (-4.4 pp), and Poland (-4.3 pp). By contrast, the biggest increase was registered in Luxembourg, +0.8 pp, followed by Austria +0.5 pp. Secondly, Figure no. 1 shows that, for the year 2018, while the smallest Gaps were registered in Sweden (0.7 %), Croatia (3.5%), and Finland (3.6%), the largest VAT Gap was registered in Romania (33.8 %) followed by Greece (30.1 %) and Lithuania (25.9 %).

3.2. Fiscal Freedom (FF)

The Index of Economic Freedom (FF) is provided by Heritage Foundation and measures the economic freedom using 12 quantitative and qualitative factors, grouped into four pillars, as follows:

- Rule of Law (property rights, government integrity, judicial effectiveness);
- Government Size (government spending, tax burden, fiscal health);
- Regulatory Efficiency (business freedom, labour freedom, monetary freedom);
- Open Markets (trade freedom, investment freedom, financial freedom).

Each factor is graded on a scale of 0 to 100. The score of a country is obtained by averaging these twelve numerical variables, which are equally weighted. The data for each factor are converted into a 100-point scale using the following equation:

$$\text{Fiscal freedom}_{ij} = 100 - \alpha (\text{Factor}_{ij}), \text{ where} \quad (2)$$

$\text{Fiscal freedom}_{ij}$ = the fiscal freedom in country i for factor j ; Factor_{ij} = the value (based on a scale of 0 to 100) in country i for factor j ; α = a coefficient set equal to 0.03.

One of the benefits of the Index of Economic Freedom is that it analyses the positive relationship between economic freedom and a variety of economic goals. Reducing tax evasion through decreasing VAT Gap can be considered part of one of the economic goals.

3.3. Government effectiveness (GE)

The World Bank is providing the value of Government effectiveness (GE) indicator that is related to the perceptions regarding the quality of public services, the quality of the civil service, and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. According to the World Bank, each country is scored from approximately -2.5 to 2.

Besides, in the construction of the Government effectiveness indicator different individual variables from each data source measure in the Worldwide Governance Indicators were used, such as: quality of bureaucracy/institutional effectiveness – from the Economist Intelligence Unit Riskwire & Democracy Index (EIU); quality

of road infrastructure or of port infrastructure – from the World Economic Forum Global Competitiveness Report (GCS); infrastructure disruption/state failure/policy instability – from the Global Insight Business Conditions and Risk Indicators (WMO).

3.4. Human Development Index (HDI)

Human Development Index (HDI) is provided by United Nations Development Programme, which defines the index as a summary measure of the results of achievements in three key pillars of human development: a long and healthy life, access to knowledge, and a decent standard of living. HDI is the geometric mean of the normalized indices for each of the three dimensions. Each country ranks from 0 to 1, being greater as it approaches 1. It is an approach focused on people and their opportunities and choices. At the same time, the HDI captures only part of what human development means. It does not consider poverty, inequality, human security, or empowerment.

4. Research Methods

The following econometric models are based on the regression method. The literature describes that the main scope of regression is to determine a statistical connection between the endogenous (dependent) and exogenous (independent) variables or influencing factors. Nowadays, panel data model is increasingly used which consists of estimating regression equations in which the series used are both time series and cross-sectional data.

The study aims to estimate three linear regression models on panel data in EViews. Within the models, the dependent variable is VAT Gap and the independent variables are added, respectively, in each model: Fiscal Freedom (FF), Government Effectiveness (GE), and Human Development Index (HDI), as follows:

Model 1: The influence of fiscal freedom on VAT Gap - Equation model:

$$VAT\ Gap = \alpha + \beta * FF + \varepsilon \quad (3)$$

Model 2: The influence of fiscal freedom and government effectiveness on VAT Gap - Equation model:

$$VAT\ Gap = \alpha + \beta * FF + \gamma * GE + \varepsilon \quad (4)$$

Model 3: The influence of fiscal freedom, government effectiveness, and human development index on VAT Gap - Equation model:

$$VAT\ Gap = \alpha + \beta * FF + \gamma * GE + \delta * HDI + \varepsilon \quad (5)$$

In order to test the most robust model, we run sequentially the three models by adding a new variable in addition to the existing ones. Furthermore, each model was built based on least squares (OLS) and tested for the existence of fixed effect and random effects. Thus, there resulted three econometric models and the outcomes are

presented in Table No 2. The next step was the Hausman test, to decide which model is better: the one with fixed effects or the one with random effects.

5. Findings

Firstly we checked the value of the correlation coefficients, through a correlation matrix, which indicates whether there is a linear relationship between two variables. A value of 0 indicates that there is no relationship whereas a value of 1 indicates that there is a perfect correlation and the two variables vary together. The results are presented in Table 2. While we notice a moderate correlation between VAT Gap with FF and HDI, there is no relationship between VAT Gap and GE. Regarding the sign of the correlation coefficients, it turned out there is an inverse relation between VAT Gap with FF and HDI and a direct relation between VAT Gap and GE.

Table 2. Correlation Matrix of the variables

| Variables | VAT Gap | FF | GE | HDI |
|-----------|---------|------|-------|-----|
| VAT Gap | 1 | | | |
| FF | -0.46 | 1 | | |
| GE | 0.01 | 0.00 | 1 | |
| HDI | -0.56 | 0.59 | -0.03 | 1 |

Source: Own processing in E-views 11 Student version.

Table 3 lays out the results of running the above three models for 28 European Union countries, except for Cyprus and Croatia, and including United Kingdom, in total 26 countries for the period 2000-2018, which generated 494 observations.

Table 3. The influence of fiscal freedom, government effectiveness, and human development index on VAT Gap as % of VTTL in Member States

| Independent var. | M1 | | | M2 | | | M3 | | |
|---------------------|----------|---------------|----------------|---------|---------------|----------------|---------|---------------|----------------|
| | OLS | Fixed effects | Random effects | OLS | Fixed effects | Random effects | OLS | Fixed effects | Random effects |
| C | 0.6355 | 0.3151 | 0.2873 | 0.6331 | 0.2753 | 0.3039 | 1.1520 | 0.3325 | 0.4075 |
| (Prob) | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| FF | -0.0070 | -0.0023 | -0.0019 | -0.0070 | -0.0019 | -0.0023 | -0.0029 | -0.0014 | -0.0017 |
| (Prob) | 0.0000 | 0.0005 | 0.0051 | 0.0000 | 0.0048 | 0.0005 | 0.0000 | 0.0728 | 0.0320 |
| GE | - | - | - | 0.0020 | 0.0114 | 0.0095 | -0.0001 | 0.0100 | 0.0073 |
| (Prob) | | | | 0.7420 | 0.3749 | 0.4057 | 0.9832 | 0.4379 | 0.5133 |
| HDI | - | - | - | - | - | - | -0.9168 | -0.1007 | -0.1664 |
| (Prob) | | | | | | | 0.0000 | 0.3146 | 0.0868 |
| R ² | 0.2104 | 0.0243 | 0.8048 | 0.2106 | 0.8051 | 0.0253 | 0.3404 | 0.8055 | 0.0337 |
| R ² Adj. | 0.2088 | 0.0223 | 0.7939 | 0.2074 | 0.7938 | 0.0213 | 0.3364 | 0.7938 | 0.0278 |
| F | 131.1099 | 12.2637 | 74.0742 | 65.4904 | 71.3277 | 6.3886 | 84.3260 | 68.8184 | 5.6993 |
| Prob | 0.0000 | 0.0005 | 0.0000 | 0.0000 | 0.0000 | 0.0018 | 0.0000 | 0.0000 | 0.0007 |
| No obs | 494 | 494 | 494 | 494 | 494 | 494 | 494 | 494 | 494 |
| Hausman T | - | - | 0.0184 | - | - | 0.0657 | - | - | 0.0020 |

Source: Own processing in E-views.

In Table 3 we can notice a relatively good relevance of the model in terms of elevated levels of the F-statistic and R². Model 3 is considered the most relevant, which shows that the model can be explained by the chosen variables, with reservations regarding GE, because its Probability value is higher than the level of significance of 0.05%, and is not statistically relevant.

After applying the Hausman test, the probability obtained in our models was below the level of significance of 0.05%, excepting model M2. Thus, it can be concluded that the fixed effects model would be the most appropriate in models M1 and M3. Regarding the sign of the coefficients, it is notable that excepting for Government effectiveness, in all three models the sign is negative, as was expected.

The M1 model presents the influence of fiscal freedom on VAT Gap. The results show that the effect of Fiscal Freedom is negative. Thereby, increases of Fiscal Freedom lead to a decrease in the VAT Gap. This can be explained by the fact that a high level of fiscal freedom, translated through quantitative and qualitative factors like property rights, tax burden, fiscal health, investment freedom, or financial freedom will determine the taxpayers to voluntary comply to pay VAT.

The M2 model presents the influence of Fiscal Freedom and Government effectiveness on VAT Gap. As a result of the implementation of the Hausman test for Model 2, it was observed that, unlike the other models, the probability obtained is above the level of significance of 0.05%, which means that the random effects method has to be chosen. What is surprising in this model is that the Government effectiveness influence on VAT Gap is positive and does not have a negative sign, as was expected. GE has a negative sign only in the third model, M3, which was built based on least squares (OLS). At the same time, we have to consider that the Probability value is higher than the level of significance of 0.05%. Other studies suggested that a high level of GE translated through the perceptions of citizens on the quality of public services, the quality of the civil service, and the degree of its independence from political pressures will reduce tax evasion (Dronca, 2016). VAT Gap is a part of tax evasion and from the model M2 it turns out that GE does not have the expected influence on the VAT Gap. The results show that increasing Government effectiveness leads to increasing VAT Gap, which does not fold to reality.

The M3 model presents the influence of Fiscal Freedom (FF), Government effectiveness (GE) and Human Development Index (HDI) on VAT Gap. As it can be seen, the sign of all coefficients is negative, proving their accuracy in choosing them, excepting GE, which is not statistically relevant because its *p value* is higher than the level of significance of 0.05%. A high level of GE in member states reduces VAT Gap. Thus, increasing the credibility of government authorities and improving public services would lead to reduce VAT Gap by increasing the efficiency of VAT collection. The independent variable VAT Gap is negatively influenced by HDI, which is focused on people and their opportunities and choices. Thus, a high level of standard of living and a higher access to knowledge are linked with reducing VAT Gap, by improving VAT collection. We consider the model M3 the most descriptive one in showing a robust relationship between VAT Gap and the independent variables: Fiscal Freedom, Government effectiveness and the Human Development Index, even the statistical *p* for GE is not relevant.

The results should be interpreted with caution. On the one hand, the model is limited by the size of the panel, so the results cannot be extrapolated to all situations. On the other hand, some data are measured subjectively, such as government

effectiveness, which is measured as a perceptual feeling that citizens have regarding particular aspects of the country.

6. Conclusions

The values of VAT Gap and their percentage in VTTL reflect the effectiveness of the VAT tax system. Given the relatively high VAT Gap values at the national level of Member States, the measures proposed or already taken to limit VAT fraud are still insufficient.

A low level of VAT collection conducts to a decrease in VAT revenue, which will further contribute to an increase in the budget deficit. This can be transposed into less public investment that would affect quantitative and qualitative factors of Fiscal Freedom Index, such as government spending, tax burden, or fiscal health. If taxpayers trust their tax authorities, the former will cooperate and contribute easier, and this will increase voluntary compliance.

After analysing the three panel data models performed within this paper, we can conclude there is a negative connection between VAT Gap and the 2 independent variables: fiscal freedom and human development index, and a positive relation between VAT Gap and government effectiveness, with reservations regarding GE, because its *p value* is higher than the level of significance of 0.05% and is not statistically relevant.

As a conclusion, the model M3 built based on OLS shows that the sign of all coefficients, including GE, is negative, proving their accuracy in choosing them. Thus, increasing the credibility of government authorities and improving public services would lead to reducing VAT Gap by increasing the efficiency of VAT collection. The independent variable VAT Gap is influenced by the HDI, which is focused on people and their opportunities and choices. Thus, a high level of standard of living and a higher access to knowledge are linked with reducing VAT Gap by improving VAT collection.

This relationship VAT Gap - FF - GE - HDI can be studied in future studies elaborated for countries that rely more on VAT revenues and countries where the share of VAT revenue in total taxes is lower. As well, the period of the research may be extended as the data are being published by the responsible bodies.

References

- [1] Barbone, L.-B.-O. (2017). Study and Reports on the VAT Gap in the EU-28 Member States: Final Report. Directorate General for Taxation and Customs Union.
- [2] Barbone, L.-B.-V. (2012). The Costs of VAT: A Review of the Literature [Case Network Reports, No. 106/2012]. Warsaw: Center for Economic and Social Research.
- [3] Butu, I., Brezeanu P., Ghețu R. (2020). Strategica International Academic Conference - eighth edition. The 12th international management conference Strategica Preparing for Tomorrow, Today, October 15-16, Bucharest, Romania, pp. 396-410.

- [4] Butu, I., Brezeanu P., Porumboiu, A., Ghețu R. (2019). Theoretical Considerations on VAT Structure Rates in the European Union. *Finance–Challenges of the Future*, pp. 54-61.
- [5] Cnossen, S. (1990). Taxing Value Added: The OECD Experience. *International VAT Monitor* 5, pp. 2-16.
- [6] D’agosto, E., Marigliani, M., Pisani, S. (2014). Asymmetries in the Territorial VAT Gap. [Working Paper, No. 02/2014.]. Roma: Agenzia della Entrate.
- [7] Dronca, A. T. (2016). The influence of fiscal freedom, government effectiveness and human development index on tax evasion in the European Union. *Theoretical and Applied Economics*, XXIII (2016), 4(609), pp. 5-18.
- [8] Ebrill, L., Keen, M., Bodin, J.P. y Summers, V. (2001). *The Modern VAT*, Washington D.C.: International Monetary Fund.
- [9] European Commission (2020). Study and Reports on the VAT Gap in the EU-28 Member States, Final Report, Directorate General Taxation and Customs Union, Center for Social and Economic Research.
- [10] European Commission (2019). Study and Reports on the VAT Gap in the EU-28 Member States, Final Report, Directorate General Taxation and Customs Union, Center for Social and Economic Research.
- [11] European Commission (2018). Study and Reports on the VAT Gap in the EU-28 Member States, Final Report, Directorate General Taxation and Customs Union, Center for Social and Economic Research.
- [12] Hangacova, N., Stremy, T. (2018). Value Added Tax and Carousel Fraud Schemes in the European Union and the Slovak Republic, *European Journal of Crime, Criminal Law and Criminal Justice*, 26, p. 134.
- [13] Isachsen, A.J., Klovland, J.T., Strøm, S. (1982). The hidden economy in Norway, in Tanzi Vito (ed). *The underground economy in the United States and Abroad, Health*, Lexington, pp. 209-231.
- [14] Luitel, H. S. (2005). Essays on value added tax evasion and tax amnesty programs. Graduate Theses, Dissertations, and Problem Reports G2246.
- [15] Manea, A. C., Manea, L. (2011). Cooperation between EU Member States to prevent international tax evasion and fraud. Proceedings of the International WSEAS Conference. Brasov, Romania.
- [16] OECD (2016). Consumption Tax Trend 2016: VAT/GST and excise rates, trends and policy issues. Paris: OECD Publishing.
- [17] Porumboiu, A.E., Butu, I., Ghetu, R., Brezeanu, P. (2019). Fiscal Risk of VAT Uncollected in European Union, *The Annals of the University of Oradea*, XXVIII (2), pp. 200-207.
- [18] Reckon LLP. (2009). Study to quantify and analyse the VAT gap in the EU-25 member states. European Commission, Directorate-General for Taxation and Customs Union.
- [19] Schneider, F. (2000a). Illegal Activities, But Still Value Added Ones (?): Size, Causes and Measurement of the Shadow Economies All over the World, CESifo Working Paper 305.
- [20] Stavjaňova, J. (2014). Value Added Tax Gap in the Czech Republic. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 62(6), pp. 1427-1436.

- [21] Strémy, N. H. (2018). Value Added Tax and Carousel Fraud Schemes in the European Union and the Slovak Republic. *European Journal of Crime Criminal Law and Criminal Justice*, 26(2), pp. 132-159.
- [22] Thomas, J. J. (1992). *Informal Economic Activity LSE Handbooks in Economics*. London: Harvester Wheatsheaf.