

The impact of corruption and poverty on VAT Gap in Central and Eastern Europe

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Abstract. According to the recent statement (December 2021) of the EU Commissioner for Economic Affairs - Paolo Gentiloni "Despite the positive trend registered in the last few years, the VAT Gap remains a major concern – particularly in view of the immense investment needs our Member States must address in the coming years". VAT Gap is defined as the difference between the total theoretical VAT liability (VTTL) and VAT actually collected (VAT Revenue). Thus, as per the latest report of the European Commission (2021) within EU, in 2019, the VAT Gap reached around EUR 134 billion. Therefore, for the evaluation of the VAT Gap should be taken into account not only the economic context, but also the ethical, legal and other dimensions that affect the business environment, implicitly, society. More than 15 years after the great wave of enlargement of the European Union, the countries of Central and Eastern Europe are still facing several problems related to the functioning of the institutions. This article analyzes the impact of Corruption Perceptions Index (CPI) and People at risk of poverty or social exclusion (AROPE) on VAT Gap for Central and Eastern European countries. Our study covers 10 years (2009-2018), the period after the financial crisis. Within the study, we developed 3 econometric models, using panel data regression tested for fixed and random effects.

Keywords: VAT evasion, VAT Gap, corruption, poverty, social exclusion

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

1. Introduction

According to the OECD the group of countries referred to as Central and Eastern European Union Member States comprises the following countries: Bulgaria, Croatia, Czechia, Hungary, Poland, Romania, Slovakia, Slovenia, and the Baltic States: Estonia, Latvia and Lithuania.

More than 15 years after the great wave of enlargement of the European Union, the countries of Central and Eastern Europe are still facing several problems related to the functioning of the institutions. At the same time, economic and institutional changes are also accompanied by the appearance of the phenomenon of tax evasion, especially VAT evasion. In order to reduce the gap in comparison with the countries of Western and Northern Europe, among the austerity measures adopted, those relating to value added tax are significant. Thereby, measures like increasing the standard rate or the reduced VAT rates have generated a number of dissatisfaction among taxpayers.

Since 2008, the European Court of Auditors has concluded that most VAT evasion is associated with undeclared economic activities. Recently, in December 2021 Paolo Gentiloni, the EU Commissioner for Economic Affairs has stated that "Despite the positive trend registered in the last few years, the VAT Gap remains a major concern – particularly in view of the immense investment needs our Member States must address in the coming years" (European Commission, Press release

Brussels, 2 December 2021).

Moreover, VAT revenue losses have an extremely negative impact on the ability of governments to provide quality public goods and services, on which we all depend, like hospitals, schools or transport. As VAT forms a significant contribution both at EU level and to the budget of each Member State, the VAT Gap is relevant to be assessed for both the Member States and groups of countries.

This article analyses for Central and Eastern European countries the impact of Corruption Perceptions Index (CPI) and People at risk of poverty or social exclusion (AROPE) on VAT Gap, during 2009 – 2018. In this paper, we will refer to the estimation of the VAT Gap as % of VTTL provided by the European Commission CASE study reports (2018, 2019, 2020, 2021).

2. Review of the literature

The EU countries are facing large losses of revenue because of VAT fraud and non-compliance. According to Barbone et al. (2017), thousands of millions of Euro do not reach the public budget due to fraud (Butu and Brezeanu, 2021).

For estimating the VAT Gap is not an adequate way to rely. In the available literature, there are two methods of estimating the VAT Gap, precisely: "*bottom-up*" and "*top-down*" (Reckon, 2009) or the direct and the indirect methods (Borselli, 2011). The "*top-down*" method is the most commonly used to estimate VAT evasion, which is also used by the European Commission. Stavjaňová (2014) considers that top down methods are generally used for indirect taxes.

Moreover, top down methods are well described in the European Commission reports on VAT Gap in the EU (Butu and Brezeanu, 2021). Hence, from the perspective of the latest European Commission report (2021) the VAT Gap is calculated as difference between the theoretical VAT obligation, in other words, the total VAT that should have been collected under the applicable VAT Law (further only as VTTL) and the VAT actually collected by public budgets (VAT revenue). The VAT Gap thus estimated includes loss of revenue from tax evasion, financial insolvency, bankruptcy, and errors. Other factors that could affect the level of the VAT Gap could be the quality of national statistics and economic developments. Also, the same report (European Commission, 2021) shows that in 2019, the VAT Gap varies from 1% in Croatia and 1.4% in Sweden to 34.9% in Romania.

It is not enough to estimate the actual VAT Gap if basic factors are not also analyzed. Firstly, Majerova (2016) analyzed the influence of three variables on the VAT Gap in EU countries for the period 2001-2011. The author has regressed each variable separately, and the results have shown a significant statistical impact of the corruption index on the VAT Gap, a reduced impact of the Gross domestic product (GDP) growth rate, while the VAT standard rate had not influenced the VAT Gap.

The results of the study conducted by Zidkova (2014) highlighted that for the year 2002 the following variables influenced the VAT Gap: standard VAT rate, VAT revenue, final consumption from GDP, and the size of the shadow economy. On the other hand, the results of the same study showed that for the year 2006 besides the VAT revenue and final consumption from GDP, VAT Gap was influenced by the number of VAT rates, the country's share in gross trade and household consumption associate to hospitality industry services. In the same field, Aizenman and Jinjirak (2008) showed in a study of 44 countries that the opening of a country to trade influences positively the VAT revenue ratio.

Secondly, Reckon (2009) through a regression analysis of potential variables explaining the VAT Gap for EU countries showed that the position of legal institutions in the country is an important variable with a statistically significant influence on the VAT Gap. More detailed studies on the VAT Gap are provided by European

Commission CASE studies (2020) in which regression analysis of several explanatory variables of the VAT Gap were applied for Member States. The findings of the study revealed that the difference in output and the standard VAT rate are the main explanatory variables of the VAT Gap. In addition to this, in the regressions were included control variables, such as: (1) the logarithm of real GDP per capita, to seize the changes in economic activity, (2) an indicator for the years following the EU's accession and (3) the corruption perception index, to examine the effect of corruption in the public sector.

Thirdly, other studies have examined the institutional factor as a determinant factor of VAT revenue. In this field, the IMF report *"Growth and Institutions"* (2003) suggests that the main *"responsibility"* for the widening of the gaps is represented by the institutional factor. In addition, the productivity of VAT varies notably, from one country to another in terms of revenue growth. In this field, the authors Butu and Brezeanu (2021) analyzed, for the period 2000-2018 the relationship between the VAT Gap as dependent variable, and the following independent variables: government effectiveness, fiscal freedom, and the human development index. On one hand, the results showed that at EU level there is a negative connection between VAT Gap and fiscal freedom and human development index, on the other hand it resulted a positive relation between VAT Gap and government effectiveness, with the remark that government effectiveness was not statistically significant (Butu and Brezeanu, 2021).

3. Aims of the research and defining the variables

The aim of the study is to analyse for Central and Eastern European countries, the relationship between Corruption Perceptions Index (CPI) and People at risk of poverty or social exclusion (AROPE) on the one hand, and VAT GAP on the other hand, during 2009 – 2018. In this paper, we will refer to the estimation of VAT Gap as % of VTTL provided by the European Commission CASE studies.

The proposed econometric model is a panel data model and incorporates the data for the Central and Eastern European countries, exactly for 11 countries: Bulgaria, Croatia, Hungary, Romania, Latvia, Lithuania, Estonia, Czech Republic, Slovakia, Slovenia and Poland, with some limitations. Due to lack of available data, Croatia was excluded from the analysis. Thus, the analysis considers 10 countries and covers the next 10 years after the financial crisis (2009-2018), so the total amount of observations is 100.

In the following, we will present the dependent variable, the VAT Gap, and the independent variables: Corruption Perceptions Index (CPI) and People at risk of poverty or social exclusion (AROPE) for the Central and Eastern European countries in comparison with the EU average.

3.1 VAT Gap

In this paper, we will refer to the estimation of VAT Gap as % of VTTL provided by the European Commission CASE study, final report 2021. Thus, the VAT Gap is calculated using the following formula:

$$\text{VAT Gap} = \text{VTTL} - \text{VAT revenue} \quad (1)$$

where, VTTL = all VAT revenue that should have been collected according to the applicable VAT Law; VAT Revenue = VAT effectively collected by the public budget.

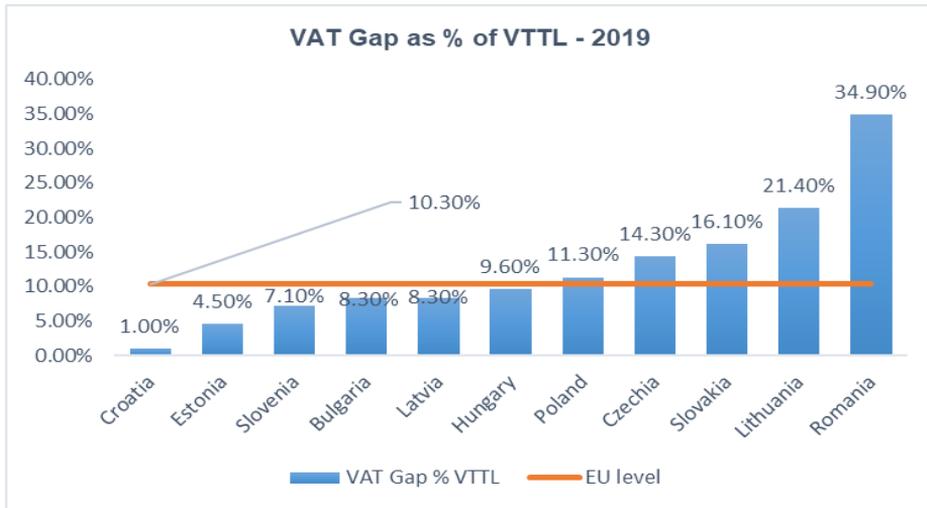


Figure 1: VAT Gap in the Central and East European countries for the year 2019
 Source: own compilation based on Study and Reports on the VAT Gap in the EU-28 Member States, Final report, 2021

The first remark we can note from Figure 1 is that almost half of Central-Eastern countries had higher levels of the VAT Gap compared to the EU average. Even if 30 years have passed since the transition of the Central and Eastern European countries to democracy and the market economy, the VAT Gap has high levels in some of the Central and Eastern European Member States, in comparison to the other European groups of countries (Butu and Brezeanu, 2021). Thus, in 2019 Romania registered the highest level of the VAT Gap with 34.9 % followed by Lithuania with 21.40% and Slovakia (16,10 %). On the other pole, Croatia registered the lowest rate, only 1% in 2019, followed by Estonia (4.5%) and Slovenia (7.10%). Around the EU average, we have countries like Poland and Czechia with VAT Gap levels above the EU level average and countries like Hungary and Latvia with VAT Gap levels below the EU average.

3.2 Corruption Perceptions Index (CPI)

The Corruption Perceptions Index (CPI) is published annually by Transparency International and gives the meaning of corruption as an "*abuse of private power*" (Transparency International, 2020). The index is calculated based on the results of 13 polls and assessments of corruption, collected by various reputable institutions. Furthermore, it is a composite index that ranks countries according to how corrupt the public sector of a country is perceived to be by experts and business executives. Higher values of the index are associated with lower perceived corruption in a given country. Instead, the more corruption is perceived, the lower the value of the CPI.

Figure 2 provides an overview of Corruption Perceptions Index in the Central-Eastern states of the European Union for the period 2009-2018. The values are represented in ascending order of the arithmetic mean of the CPI values for the analyzed period.

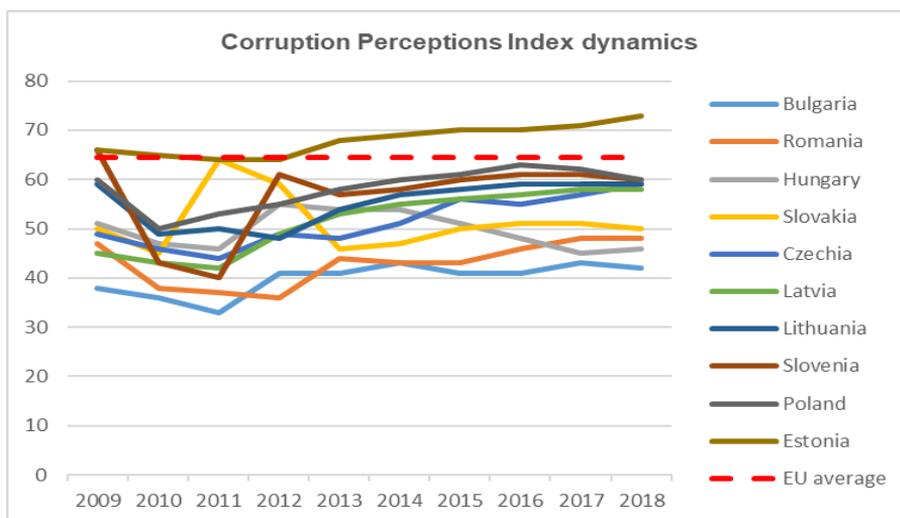


Figure 2: Corruption Perceptions Index dynamics

Source: own processing based on Transparency International

The first remark we can note from Figure 2 is that, except Estonia, all the Central-Eastern Member States had lower levels of the CPI compared to the EU, the arithmetic mean (64.45) of the CPI. Thus, in Central-Eastern countries, corruption perceived by experts and business executives has high values. This suggests that after more than 13 years since the largest expansion of the European Union, the countries of Central and Eastern Member States still face problems with public sector corruption.

3.3 People at risk of poverty or social exclusion (AROPE)

The indicator is provided by Eurostat and was calculated in 2010 as a new and extensive primary indicator of poverty and social exclusion, in order to measure the intangible and multidimensional aspects of poverty and exclusion from the labor market. Furthermore, the results indicated that this new indicator is associated with political compromise.

According to Eurostat, People at risk of poverty or social exclusion (AROPE) is a composite index of three distinct indicators and refers to the sum of persons who are: (1) at risk of poverty after social transfers; (2) severely materially deprived or (3) living in households with very low work intensity. The first risk factor refers to persons with incomes below 60% of the median equivalent income. The second risk factor "severely materially deprived" refers to persons who, due to lack of financial means, cannot afford minimum four of the following items of material deprivation: adequate heating, including meat or fish in every day meal, annual holiday, facing unexpected expenses, mortgage or rent arrears, utility bills, or other loan payments, a telephone, a color television set, or a car. The third risk factor refers to the number of adults aged 18-59 who worked less than 20% of the total number of months they could have worked in the reference period.

Poverty and social exclusion are detrimental to individual lives and limit people's opportunities to reach their full potential, affecting their health and well-being and reducing educational attainment. This, in turn, reduces the chances of a successful life and increases the risk of poverty.

Figure 3 provides an overview of AROPE in the Central-Eastern Member States for the period 2009-2018. In order to emphasize the countries with the highest values

of AROPE, the results are presented in descending order of the arithmetic mean of the AROPE values for the analyzed period.

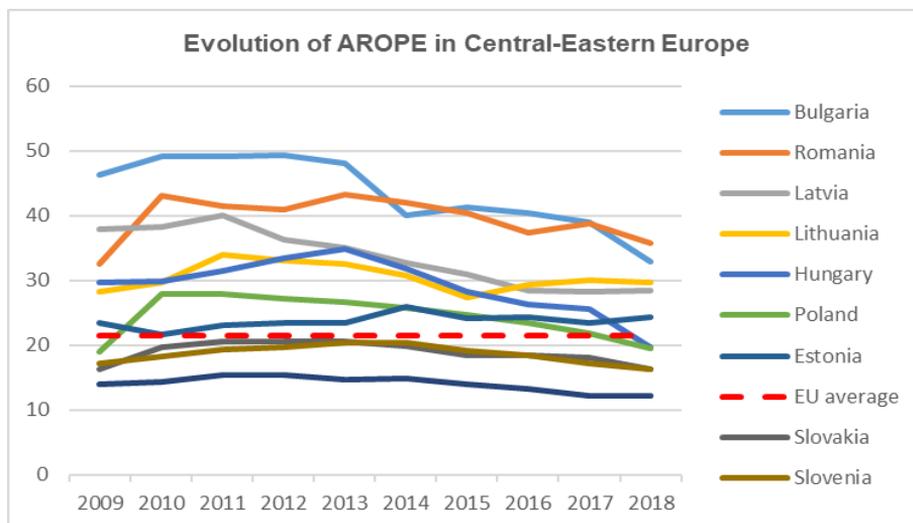


Figure 3: Evolution of AROPE in the Central and Eastern European countries
Source: own processing based on Eurostat

From Figure 3 it can be observed a decrease in the size of AROPE for the period analyzed in all Central-Eastern Member States. Moreover, from the Central-Eastern Member States, only Slovakia, Slovenia, and Czechia registered values of AROPE below the European average. Thus, in these three countries there are fewer persons who are at risk of poverty after social transfers, severely materially deprived, or living in households with very low work intensity, which it might mean a higher standard of life.

On the other pole, Bulgaria registered the highest value of the arithmetic mean of the AROPE values for the analyzed period (43.53), followed by Romania (39.52) and Latvia (33.62) which are all developing countries. Thus, these countries are characterized by a higher number of person affected by the effects of poverty and social exclusion, such as limiting people's opportunities to reach their full potential in order to increase their well-being and education.

Next, the relationship VAT Gap – Corruption Perceptions Index - People at risk of poverty or social exclusion will be included in a panel model, in which the VAT Gap will be the dependent variable and the independent variables will be: Corruption Perceptions Index and People at risk of poverty or social exclusion.

4. Research methods and results

The study is based on econometric models built on the regression method. The literature reflects that the main purpose of regression is to determine a statistical connection between endogenous (dependent) and exogenous (independent) variables or factors of influence. The study aims to demonstrate that increasing the level of Corruption Perceptions Index (less corruption is perceived) and decreasing the sum of persons at risk of poverty or social exclusion would be associated with decreasing the level of the VAT Gap in Central and Eastern European Member States.

The econometric model was performed using Eviews. Furthermore, the model was built based on least squares (OLS) and tested for the existence of fixed effects and random effects. For the OLS model R^2 has a value of 32,5374% and this means

that the independent variables in the model influence the dependent variable in a proportion of 32,5374%. Also, all the parameters for the two variables included in the model are statistically significant for a significance level of 5% and the model is a valid one (F-statistic = 23.39167 and Prob F-statistic = 0.0000%). Further, we performed the Hausman test to determine which of the fixed or random effects models is more appropriate. Considering the probability obtained in our model is higher than the level of significance of 0.05%, the random effects model should be chosen. The results are highlighted in Table 1.

Table 1. The influence of Corruption Perceptions Index and People at risk of poverty on VAT Gap as % of VTTL in Central and Eastern Europe

VAT Gap / Independent var.	OLS	Fixed effects	Random effects
C	0.311762	0.009223	0.038897
(Prob)	0.0001	0.8784	0.545
CPI	-0.003695	-0.0015	-0.00161
(Prob)	0.001	0.0522	0.0346
AROPE	0.003254	0.010044	0.009177
(Prob)	0.002	0.0000	0.0000
R²	0.325374	0.888781	0.488386
R²Adj.	0.311464	0.874878	0.477837
F	23.39167	35.28783	46.29802
Prob	0.0000	0.0000	0.0000
No obs	100	100	100
Hausman T	0.1001		

In Table 1 we can note a moderate relevance of the model in terms of elevated levels of the R² and F-statistic, which means that the dependent variable is influenced by the two independent variables in a proportion of 32,5374%.

The results of the regressions presented in Table 1 show that in all three models the variables maintain their signs of the coefficients and are statistically significant. Thus, we can conclude there is a negative relationship between VAT Gap and Corruption Perceptions Index and a positive relationship between VAT Gap and People at risk of poverty or social exclusion.

In all three models, the coefficients of the variable Corruption Perceptions Index (CPI) had an opposite sign and are statistically relevant, except the fixed effects model. Thus, in Central and Eastern European Union countries the less corruption is perceived by business executives and experts, which is related to a higher value of CPI, will determine a reduction of the VAT Gap, by improving VAT collection. Contrary to the results of our paper presented hereby, other studies have highlighted a direct relationship. Thus, Bikas and Malikonytė (2020) assessed the variables that impact the VAT Gap in Lithuania, which is part of Central and Eastern European group, for the period 2006-2016. The authors concluded that if the value of Corruption index increases, the VAT Gap is also widening.

Regarding the variable People at risk of poverty or social exclusion (AROPE), there is a positive relationship between VAT Gap and this variable and it is statistically significant for all three models. This suggests that in Central and Eastern European Member States, the variable People at risk of poverty or social exclusion can be treated as a significant factor in appraising the VAT Gap. In other words, in countries part of Central and Eastern European group with a high poverty and social exclusion, which is affecting their health and well-being and reducing educational attainment, the tendency not to comply with VAT requirements is higher, so that the VAT Gap will be

wider.

Finally, although the results differ in the 3 models performed and may differ from country to country, and the impact of factors is fluctuant in strength and direction, we consider that trends will harmonize when almost all Member States will achieve the proper economic development level.

5. Conclusions

According to the literature, besides fiscal and budgetary policies, the effectiveness of the institutions have an important role in defining the main aspects of the economic environment. The effectiveness of the VAT taxation system is also reflected by the VAT Gap values as% of VTTL for Central and Eastern European countries, which includes developing countries. Considering the high levels of VAT Gap in countries like Romania and Lithuania, the measures already taken or proposed to curb VAT fraud are still insufficient.

Following the analysis, we appreciate that the OLS model led to obtain statistically and econometrically valid results. Thus, we can assert there is a negative relationship between VAT Gap and Corruption Perceptions Index and a positive relationship between VAT Gap and People at risk of poverty or social exclusion.

Furthermore, our paper shows that in Central and Eastern European countries with (1) a high level of Corruption Perceptions, translated through less corruption perceived by experts and business executives, and with (2) a lower level of poverty or social exclusion expressed through a lower number of people at risk of poverty after social transfers, severely materially deprived or living in households with very low work intensity, the taxpayers are more inclined to voluntarily pay the VAT. Their determination to conform may be reflected in a lower level of the VAT Gap.

In conclusion, as VAT has a significant contribution to the state budget, from which public goods and services are financed, on which we all depend, like hospitals, schools or transport, this relationship between the VAT Gap as dependent variable and the independent variables, such as Corruption Perceptions Index and People at risk of poverty or social exclusion is relevant for the business environment and economic development. The analysis can be extended for other groups of European Member States and, as well, the period can be longer.

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