

## Analysis of the Decisive Factors of the VAT Gap

Associate Professor Radu CIOBANU, PhD<sup>a</sup>, Associate Professor Adriana Florina POPA, PhD<sup>b</sup>,  
Associate Professor Daniela-Nicoleta SAHLIAN, PhD<sup>c</sup>

<sup>a, b, c</sup> Bucharest University of Economic Studies, Romania

### Abstract

*This paper aims to identify the possible factors that influence the value added tax gap – the VAT gap. The VAT gap is an estimate of the unpaid VAT in the economy, calculated as the difference between the theoretical obligation for the value added tax that can be collected in respect with all the transactions in the economy and the actual VAT paid to the state budget. A high value of this indicator may highlight issues related to tax evasion and the inefficiency of the tax system. The article summarizes existing studies that quantify the VAT gap and aims to identify the relationship between the VAT gap or the VAT revenues and various economic, fiscal and social factors present in EU member countries. The panel regression and clustered regression models have been used in this paper in order to determine the statistically significant variables that have an impact on the VAT gap.*

**Key terms:** VAT, VAT gap, collection deficits, tax fraud, tax evasion

**JEL Classification:** F15, H21, H22, C23

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### ➔ Introduction

The VAT gap represents the deficit in value added tax collection, more precisely the difference between the amount of VAT that should be transferred to the state budget and the actual amount collected by the state. The VAT collection shortfall results from tax losses due to fraud, insolvency, bankruptcy, administrative errors and evasion.

The analysis and quantification of VAT collection deficits have become important for tax administrations in the European Union in recent years due to the increase in tax fraud and tax evasion. The increase in the VAT deficit can indicate either the existence of tax evasion or inefficiency with regard to tax collection. Quantifying its extent can contribute to the development of well-oriented new measures, but also to their long-term monitoring.

Losses in VAT revenues have a negative impact on the expenditure that public administrations allocate for public goods and services. Identifying the nature and causes of the VAT deficit is also a problem facing many researchers. Understanding the influencing factors could help reduce them by changing the system and adjusting the VAT policy.

The purpose of this article is to identify the main social, political and cultural factors that can influence the size of the VAT gap. In this sense, we performed a statistical analysis based on a panel regression in order to find out the impact of the determinants on the size of the VAT gap in the EU member states.

Hereinafter the article is organized as follows: the review of the specialized literature with the main studies carried out in this regard, the presentation of the methodology and the database used and finally the rendering of the results and conclusions.

## ➤ Literature review

Taxes and dues can be used to guide the economy towards achieving specific social or economic goals. Therefore, an important issue is the determination of their optimal amount and the structure of the tax system that allows the creation of economic growth, the stimulation of production, consumption and investments (Bonucchi *et al.*, 2015). Building an efficient tax system is one of the basic tasks of tax policy. On the one hand, this system should provide the state with important revenues necessary to cover budget expenses, and on the other hand, not to act as a brake on economic growth. Today, the value added tax is the one that provides the budgets of the EU member states with the highest revenues (European Commission, 2011). In its underlying assumption, it is a very simple tax, but the diversity of tax rates, the often ambiguous allocation of rate levels, as well as tax discrepancies between countries make VAT often the subject of tax fraud.

At the level of the EU member countries, there is talk of a VAT gap (Poniatowski *et al.*, 2019). The value added tax system in the European Union, which is based on legislation adopted at EU level and applied at national level, has many shortcomings which result in it not being fully efficient and compatible with the requirements of a real single market, and the structural solutions integrated into the power of statutory provisions are vulnerable to fiscal abuse (Andrejovská *et al.*, 2020). Evidence of the difficulties in the operation of the VAT system in the EU was published in the Green Paper (European Commission, 2010), in which the European Commission highlighted its complexity and its susceptibility to tax fraud. According to studies, the costs of complying with VAT rules represent a significant administrative burden for businesses in the European Union, making the EU area increasingly less attractive for investment. The essence of VAT, as a tax imposed on the generated added value, is to pay a part of the tax at each stage of the sales chain, which eliminates the risk of payment evasion by the seller. On the other hand, the number of transactions and entities to be controlled is increasing, making supervision by tax authorities more difficult and increasing the costs of tax collection (Sokolovska and Sokolovskyi, 2015).

Thus, in the specialized literature there is a consensus regarding the determinants of the VAT gap, which could be grouped into the following categories: macroeconomic, demographic, institutional and related to citizens' trust in the state. Among the macroeconomic and demographic factors of the formation of the VAT gap, the key role is played by the economic condition described mainly as the level of real GDP per capita, the share of the underground economy, the openness of the economy, as well as the size of the population. Research results point out that more developed countries with a higher level of GDP per capita, are characterized by a lower VAT gap (Aizenman and Jinjarak, 2008).

Unregistered activity within the underground economy certainly increases the scale of the VAT gap (Zídková, 2014). Challenges in assessing the true size of the underground economy limit the accuracy of estimating potential losses to the budget. The size of countries, measured by the number of inhabitants, has a negative influence on the VAT gap (European Commission, 2009). This conclusion is largely based on the residents' lack of confidence that they would actually benefit from the redistribution of budget revenues. In addition, it is a matter of morality and the possibility of potential punishment - the probability of an audit is lower in a large group of taxpayers. In the case of European countries, the size of the VAT gap also depends on EU and Eurozone membership (Poniatowski *et al.*, 2017). Eurozone members appear to be more effective in limiting the size of the VAT gap than non-Eurozone countries.

VAT tax fraud can be classified according to the techniques used to avoid paying the tax and the scheme of successive transactions that take place between the participants in an intra-community chain fraud. A more restrictive approach to the classification of VAT fraud at the intra-community level can be found in Bukhsh and Weigand (2015), who delineate three major tax-related fraud categories, namely procurement fraud, carousel fraud and counter-trading fraud.

Some authors (Zídková, 2014) stated that the VAT gap is not determined only by tax evasion, but rather by a combination of factors such as tax planning allowed by legislation, insolvency of taxpayers, inefficiency of public authorities in tax collection, but also the inefficiency of fiscal policies.

Bukhsh and Weigand (2015) link VAT fraud to the abuse of the rules that guide the common tax mechanism regarding transactions between EU member states, analyzing the categories of fraud, but also the possible solutions that lead to their detection both by the competent bodies and by other taxpayers who take part (knowingly or unknowingly) in a chain fraud. Indeed, the detection of fraud at national and/or community level can take place by identifying certain characteristics specific to fraudulent transactions, by implementing verification (as well as prevention) procedures from the institutions and by automating the entire state apparatus.

Sokolovska (2016) confirms through her analysis that the implementation of the common VAT mechanism increases the risk of fraud, as the administration of the tax becomes more complicated as cross-border transactions multiply. It also becomes necessary to implement some economic, institutional, procedural and technical measures in order to discourage fraud and, therefore, to reduce the VAT gap.

Smith and Keen (2007) demonstrate that the loss of revenues to the state budget and the formation of the VAT gap are influenced by the degree of fiscal non-compliance, which determines tax fraud and evasion. But their research is a limiting one, covering only selectively the member states of the European Union, without dealing in depth with the instruments implemented by the best performing countries in terms of reducing this indicator.

The most recent reports on the VAT gap (Poniatowski *et al.*, 2020; Śmietanka *et al.*, 2021) confirm the loss of revenues to the state budgets of member countries, which comes from fraud and tax evasion, optimization/planning tax, bankruptcy and insolvency of companies, errors and inefficiencies of the competent public administration in the management of tax revenues. These losses generate an impact on the redistribution of resources at the state level in the form of social expenses, which contribute to increasing the welfare of taxpayers and their trust in the administrative apparatus.

Indeed, in member countries, the VAT gap shows a downward trend, indicating a higher degree of tax compliance. But the annual reports on the VAT gap only detail the changes in the tax rates in the member countries, not the tax policies implemented, the instruments and procedures adopted at national and community level.

In order to provide a more accurate picture of the evolution of the VAT gap within the European Union, it is necessary to analyze the indicator for a longer period of time and establish the factors that generated its decrease/increase, in order to identify the most effective and sustainable member countries regarding the prevention (and detection) of VAT fraud.

### ➔ Analysis of VAT gap in Romania

With the accession to the EU, Romania underwent important changes related to the economic and fiscal policy, particularly regarding direct and indirect taxes. In this context, the indirect taxation system has been regulated in such a way as to be in accordance with the community *acquis* as regards VAT since 1999, and since

2007, our country has aligned its legislation in the field of VAT according to the Directive 2006/112/EC of the Council of 28 November 2006 on the common system of value added tax.

The dynamics of VAT tax revenues does not resemble that of the VAT gap recorded by Romania in the same period, in the sense that, although the latter decreases after 2009, the share of VAT revenues in total tax revenues also decreases, these two indicators having, as a rule, an inverse correlation (Table 1). However, from the data presented below, the share of tax revenues from VAT is significant, meaning that the tax is an important source of income for the national budget, which requires more and more generous resources in order to ensure the sustainability of a potential economic growth.

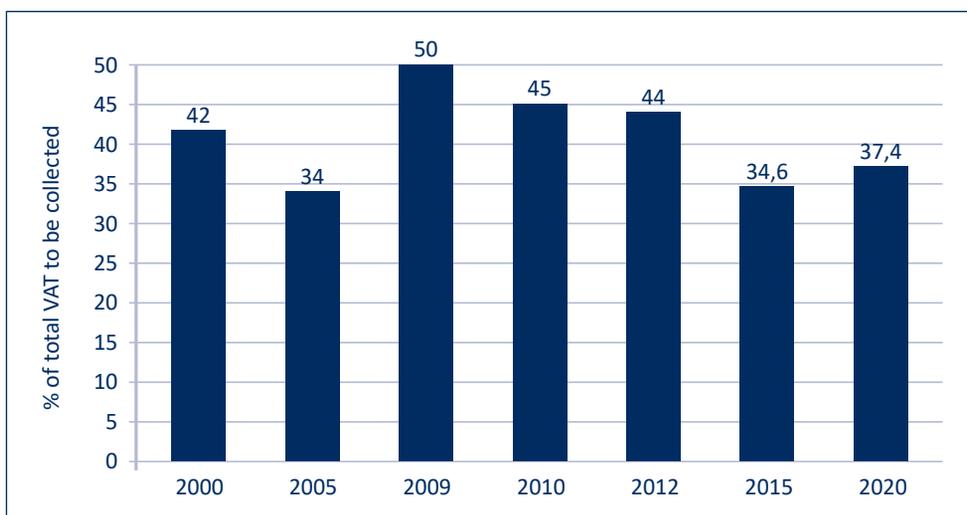
Considering the previously presented arguments, we will analyze the factors that determined the evolution of the VAT gap in Romania, the member state with the worst results in terms of the gap of the collected tax to the budget.

Table 1. Romania’s VAT tax revenues in the period 2000-2020

Indicator	2000	2005	2009	2010	2012	2015	2020
Tax revenues from VAT (Millions of Euros)	2,632.9	6,439.3	9,493.9	11,003.1	12,939.2	13,795.0	2,672.9
Tax revenues from VAT (% of total tax revenues)	21.2	28.3	28.0	29.8	28.9	23.1	21.4

Source: Eurostat.

From Graph 1 we can see that in Romania the dynamics of the VAT gap is satisfactory in terms of its downward trend since 2009, the year in which it recorded the value of 50% of the VAT revenues that the Romanian state should have collected from its taxpayers, being the highest value of the indicator. Practically, during crisis periods, evasion in the VAT area is high. Considering the difficulties existing at the moment, we expect an increase in the indicator also in the period 2022-2023.



Graph 1. Dynamics of Romania’s VAT gap in the period 2000-2020

Source: Own processing according to the annual reports of the European Commission regarding the VAT gap.

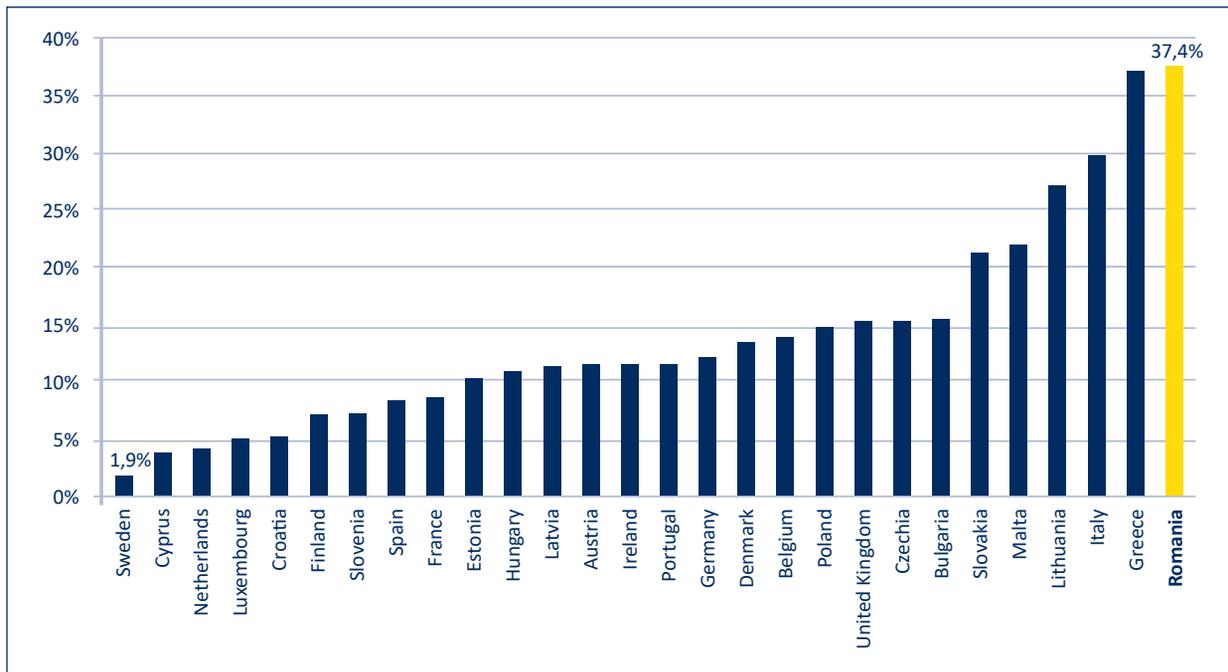
## ➤ Analysis of VAT gap at EU level and its determinants

In order to analyze the determinants of the VAT gap, we considered a sample made up of variables recorded in the period 2012-2020 for all the states of the European Union. The influencing variables are as shown below (Table 2). To analyze the political, social and economic factors, we used linear regression models, using the variables that characterize the economy of the countries and that can express the cultural, social and political dimension of a certain state, which can be seen in Table 2. For each variable we specified how to represent it, namely: the gap indicator is calculated as a percentage of VTTL (VAT total tax liability), the value of the corruption perception index is represented by a score from 0 to 100, 0 meaning that the respective country is very corrupt, and 100, that it is not corrupt. Exports of goods and services, imports of goods and services, and the merchandise trade are expressed as a percentage of GDP, and the regulatory quality index and government effectiveness, as a score in the range -2.5-2.5, -2.5 meaning a weak value, and 2.5, a strong one. Inflation and population growth are expressed as percentages, and GDP per capita is expressed in current USD. The Gini index, which measures social discrepancies in a country, is also represented as a score, i.e. a value of 0 indicates perfect equality, while a value of 100 indicates perfect inequality.

Table 2. Variables used in the model

Indicator	Explanation	Source
VAT gap	Percentage of VTTL	Publications Office of the European Union
Corruption perception index	From 0 – very corrupt to 100 – not corrupt	Trading Economics
Exports of goods and services	Percentage of GDP	World Bank database
Imports of goods and services	Percentage of GDP	World Bank database
Inflation, consumption prices	Percentage	World Bank database
Population growth	Annual percentage	World Bank database
Gini index	From 0 – perfect equality to 100 – perfect inequality	World Bank database
Trade of goods	Percentage of GDP	World Bank database
GDP per capita	USD	World Bank database
Quality of regulations index	From -2.5 – weak to 2.5 – strong	The Global Economy
Government effectiveness	From -2.5 – weak to 2.5 – strong	The Global Economy

In Graph 2 we present the evolution of the VAT gap in 2020 for all European Union countries. As can be seen, the highest value of the indicator was recorded in Romania, which has a VAT collection deficit of 37.4%, being followed in the inefficiency ranking by Greece and Italy. At the opposite end there are Sweden, with 1.9% in terms of VAT deficit, Cyprus and the Netherlands.



Graph 2. The evolution of the VAT gap in 2020 at the level of the European Union

Source: Own processing according to the annual reports of the European Commission regarding the VAT gap.

In the case of the analyzed panel regression model (Table 3), the independent variable is represented by the VAT gap indicator, and the dependent variables are the corruption perception index, exports of goods and services, imports of goods and services, inflation, consumption prices, population growth, Gini index, merchandise trade, GDP per capita, regulatory quality index and government effectiveness.

Table 3. Estimated results of the model

	1	2	3	4	5
Corruption perception index	-0.00229				
	<b>0.0006***</b>				
Exports of goods and services	0.0006			-0.00013	0.015603
	0.772			0.8111	0.8473
Imports of goods and services		-3.11			
		<b>0.0870*</b>			
Inflation, consumption prices	-0.00355	-0.00286	-0.00019	-0.00249	-0.00187
	<b>0.0664*</b>	0.1293	0.9199	0.1959	0.3368
Population growth		0.03144			
		<b>0***</b>			
Gini index	0.006172			0.005958	3.53
	<b>0.0018***</b>			<b>0.0118***</b>	0.9146

	1	2	3	4	5
Trade of goods			-3.9		
			0.8786		
GDP per capita			0.11584		
			<b>0.002***</b>		
Quality of regulations index					-0.06479
					<b>0.0175**</b>
Government effectiveness				0.070773	
				<b>0.065*</b>	

**Note:** Next to each indicator, on the first line there is the statistical coefficient, and on the second, the p-value. The statistical significance threshold is \*\*\* < 1%, \*\* < 5% and \* < 10%.

According to the results, we identified a negative influence on the VAT gap from the corruption perception index, imports of goods and services, inflation, consumption prices and the regulation quality index. In the case of the first three, the higher the value of the variable, the lower the value of the VAT gap, the relationship being practically inversely proportional. Population growth, the Gini index, GDP per capita and government effectiveness positively affect the value of the VAT gap, which produces its significant increase. Exports of goods and services and trade of goods do not influence the VAT gap in the analyzed period.

## ⇒ Conclusions

Both developed and developing countries face the VAT gap issue. The consequences of this phenomenon are serious for both the public and private sectors, which underlines the need for a proper diagnosis of its determinants, as well as effective policy measures to minimize its extent. Limiting the size of the VAT gap results in higher budget revenues and, more importantly, a fair market competition and a sound business environment. According to specialized literature, the sources of the VAT gap can be of a macroeconomic, demographic or institutional nature, but also refer to the citizens' trust in the state.

In conclusion, we can state that the design of the tax system, i.e. the number of VAT rates or their distribution, is not a key determinant of the VAT gap, which suggests that the Council's recommendation to limit the use of reduced VAT rates is quite hard to justify. The reform of the tax system involving the reduction of tax rates or their distribution may not necessarily contribute to a reduction of the VAT gap.

IT spending in tax administration could improve the efficiency of value added tax collection. Attention should also be paid to greater efficiency of tax administration in the context of reliable data collection that allows comprehensive analyses whose implementation could increase the detection of tax fraud rate. Countries that invest heavily in IT systems in tax administration, for example, Sweden, the Netherlands and Finland, report low levels of the VAT gap.

At the same time, the quality and transparency of public institutions induce citizens' confidence in the state and in terms of the fairness of redistribution, which, in turn, leads to a greater efficiency of tax collection. Countries characterized by a high institutional culture do not face serious problems of the VAT gap.

## References

1. Aizenman, J., Jinjark, Y. (2008), *The Collection Efficiency of the Value Added Tax: Theory and International Evidence*, The Journal of International Trade & Economic Development, Vol. 17, No. 3, pp. 391-410.
2. Andrejovská, A., Konečná, V., Hakalová, J. (2020), *Tax Gap as a Tool for Measuring VAT Evasion in the EU Countries*, AD ALTA: Journal of Interdisciplinary Research, Vol. 10, No. 2, pp. 8-13.
3. Bonucchi, M., Ferrari, M., Tomasini, S., Tsenova, T. (2015), *Tax Policy, Investment Decisions and Economic Growth*, Revue de l'OFCE, No. 141, pp. 225-262.
4. Bukhsh, F.A., Weigand, H. (2015), *VAT Fraud: Possible Technical and Ontological Solutions*, Tilburg University, Madalmaad.
5. Poniatowski, G., Bonch-Osmolovskiy, M., Belkindas, M. (2017), *Study and Reports on the VAT Gap in the EU-28 Member States: 2017 Final Report*, CASE Reports, No. 492.
6. Poniatowski, G., Bonch-Osmolovskiy, M., Durán-Cabré, J.M., Esteller-Moré, A., Śmietanka, A. (2019), *Study and Reports on the VAT Gap in the EU-28 Member States: 2019 Final Report*, CASE Reports, No. 500.
7. Poniatowski, G., Bonch-Osmolovskiy, M., Śmietanka, A. (2020), *Study and Reports on the VAT Gap in the EU-28 Member States: 2020 Final Report*, CASE Reports, No. 503.
8. Sokolovska, O. (2016), *Cross-Border VAT Frauds and Measures to Tackle Them*, MPRA Paper No. 70504, University Library of Munich, Munich.
9. Sokolovska, O., Sokolovskyi, D. (2015), *VAT Efficiency in the Countries Worldwide*, MPRA Paper No. 66422, University Library of Munich, Munich.
10. Śmietanka, A., Poniatowski, G., Bonch-Osmolovsky, M. (2021), *VAT Gap in the EU. Report 2021*, CASE – Center for Social and Economic Research.
11. Smith, S., Keen, M. (2007), *VAT Fraud and Evasion: What Do We Know, and What Can Be Done?*, SSRN Electronic Journal 964339.
12. Zídková, H. (2014), *Determinants of VAT Gap in EU*, Prague Economic Papers, Vol. 23, No. 4, pp. 514-530.
13. European Commission, Directorate-General for Taxation and Customs Union (2009), *Study to Quantify and Analyse the VAT Gap in the EU-25 Member States: Report 2009*, Publications Office of the European Union, Luxembourg.
14. European Commission (2010), *Green Paper on the Future of VAT Towards a Simpler, More Robust and Efficient VAT System*, Brussels, Belgium.
15. European Commission (2011), *A Retrospective Evaluation of Elements of the EU VAT System*, Publications Office of the European Union, Luxembourg.
16. <https://ec.europa.eu>