RevistaEconomică
Journal of economic-financial theory and practice

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

IS THERE AN OPTIMAL VALUE ADDED TAX RATE?

Alexandra SMEDOIU-POPOVICIU[1], Alexandra-Lavinia HOROBET[2], Lucian BELASCU[3]

[1]Bucharest University of Economic Studies, Romania, 0000-0001-5536-5275
[2] Bucharest University of Economic Studies, Romania, 0000-0001-5821-0244
[3]Lucian Blaga University of Sibiu, Romania, 0000-0002-7711-3746

Abstract:
With VAT being one of (if not the) largest contributors to country budgets, many Governments are preoccupied with maximising VAT collections. However, a simplistic view of increasing the VAT rate is not appropriate, as research shows there is inverse relationship between marginal collections and marginal VAT rates. Instead, as results in this Generalized Method of Moments estimation proposed by this paper shows, Governments should look at effective rates of taxation based on the composition of their economy. Also, providing generalized or large-scale reductions or exemptions depresses the effective rate of taxation and reduces the VAT productivity index, although we see them as very popular in European Union countries. A connected but important area is the level of collection, which is influenced by a cumulus of factors, starting with the tax rate (negative correlation), to digitalisation of the administration (positive correlation) and economic culture of a country (positive correlation). In any case, consumption taxes such as VAT seem to be less distortionary to economic activity and investment than direct taxes, so more attention is required to setting an optimal VAT rate that generates maximum marginal collection.

Keywords: *Taxation, Indirect Taxes, Fiscal Revenues, Romania, European Union*

JEL classification: *E62, H21, H30*

1. Introduction

In the current macro-economic context, where governments of most European Union countries are running large deficits on account of COVID and post-COVID support measures offered to individuals and business alike, discussions about re-balancing the budget deficit are more than never centred around a potential increase in taxes. Based on the average composition of tax revenues, the Value Added Tax, i.e., an indirect tax on consumption, is generally the largest contributor to the state budget for both developed and emerging economies. Therefore, should one aim to increase tax revenues, a logical step would be to increase the VAT rate. But is it that simple? Is a 1% increase in the VAT rate leading to a one-on-one increase in tax revenues, or to an increase smaller than 1% or worse, even a reduction of tax revenues? It all depends on the optimal rate of taxation, which is the level that can be supported by the consumers and does not disincentivize consumption.

There were some attempts throughout time to determine the optimal VAT rate, but except papers using Laffer curve theory, the existing literature rather looks at the issue from the angle of maximising Government revenue. This theory is analysed from many perspectives, such as: (i) which point in the business cycle is the economy in; (ii) how does the fiscal policy of the Government look like - cyclical or counter-cyclical (e.g., reducing VAT to stimulate consumption); (iii) how distortionary to capital allocation decisions is direct taxation (while, *per a contrario*, indirect taxation is less so). However, the right answer depends on many factors, among others, the structure of the economy, the cultural or historical propensity to spend (e.g., to "catch up" on modern goods and / or services) and accessibility of money / credit.

[1] *alexandra.smedoiu@gmail.com* - corresponding author*
[2] *alexandra.horobet@rei.ase.ro*
[3] *lucian.belascu@ulbsibiu.ro*

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

In this paper, we aim to assess whether the VAT rate in the case of Romania leads a maximal level of tax revenues, as measured by indicators such as the VAT productivity index and come up with conclusions and public policy recommendations and potential future research directions. We thus enrich the literature in the field by looking at the fiscal fundamentals of a European Union country (i.e., Romania) and trying to infer if tax collections are maximised at a given rate of effective taxation.

The remaining of the paper is structured as follows. The next section provides an overview of the relevant literature in the field, followed by the presentation of the research methodology. Next, we highlight the most important findings of our research. The final section of the paper concludes and outlines several directions for future research.

2. Literature review

Part of the literature on efficiency of governments and collection of tax revenue refers to the so-called "Laffer curve", a theory proposed by American economist Arthur Laffer in the 1970's. According to this theory, there is, in principle, an "optimal" level of taxation for each type of tax, i.e., a level that is not so high to disincentivize economic activity or even incite to tax evasion, and at the same time not so low to leave the state budget unfunded. Therefore, there is a reverse proportionality between the level of tax and tax evasion, and, at its worse, a 100% tax would cease economic activity altogether.

First, when it comes to VAT, theory proponents view that indirect taxes, i.e., taxes transferred to the ultimate consumer, like VAT/consumption taxes or excise duties, are less distortionary on economic decision-making than direct taxes like corporate income tax and personal income tax (Gemell, Knelles, Sanz, 2013; Grochulski, 2009; Surugiu, 2012). Therefore, it is proposed that governments use fiscal policy tools that make use of indirect taxes, as opposed direct taxes, which may negatively affect capital allocation decisions (Mura, 2015).

Second, based on data from selected European Union countries, covering periods of the 1980's and 1990's, it appears that the revenue-maximising VAT rate should be somewhere between 18% - 19.3%, for given assumptions of non-compliance (Matthews, 2003). The optimal level of taxation has been estimated using pooled data on tax revenues from 14 European Union countries and the results also seem to support the unified VAT regime across European Union countries, based on the Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax (the "EU VAT Directive"). Nonetheless, given that, within the European Union, fiscal policy is an attribute of the national states, while the rules have been unified, the actual level of the rates has not, as it is shown in our descriptive section. Results confirm that a percentage point increase in VAT reduces the marginal utility but increases tax avoidance.

Accordingly, when the VAT rate increases, people tend to reduce their consumption and avoid tax compliance when possible. Of course, the latter depends, among others, on the cultural propensity of the economy towards non-compliance (Guedes de Oliveira & Costa, 2015). There are limited studies concerning the level of tax evasion in European Union countries. Ferreira-Lopes, Martins & Espahnol (2019) similarly explore how the economic and financial conditions of each country influence the value for the tax rate and find that there is a strong divide between the values of the optimal maximum tax rates for Eastern European countries (which usually exhibit lower tax rates) and Western European economies (with higher tax rates).

More specifically, empirical analysis over countries such as the Czech Republic (Mach, 2018) has shown that the standard rate of VAT is behind the revenue maximising rate and that decreasing the rate would help the taxpayer as well as the state budget. There were several attempts in the literature to determine an optimal VAT rate by looking at the country VAT revenue using a quadratic flexible functional form and this approach finds, not surprisingly, an effect on the VAT revenue of the business cycle: when GDP is declining, such as in a recession, VAT revenue is typically lower, and the VAT rate that maximizes the revenue is lower than in other years, as a rax reduction is a tool to encourage economic activity. This is part of the so-called counter-cyclical fiscal policy referred to in several papers (Budnevich, 2002), which analyse the effect of reducing the VAT rate to stimulate economic growth.

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

Other papers look at the distortionary effect of direct taxation (corporate income tax, personal income tax) and conclude that indirect taxation such as VAT has a much more neutral effect on economic decision – making (Hines, 1998; Widmalm, 2001). Also, Benos (2009) finds, using ordinary least squares regression, that distortionary taxation depresses growth, which reduces tax collections etc.

In the European Union, the European Commission monitors on a yearly basis the VAT gap, being the difference between the actual VAT collected and the maximum theoretical VAT that may be collected (Poniatowski, Bonch-Osmolovskiy and Śmietanka, 2022). According to the Commission, the reasons for the VAT gap are principally VAT fraud and evasion, including avoidance practices, and, to a lesser extent, bankruptcies and insolvencies. Therefore, it would be interesting to analyse to what extent, if any, the VAT collections can be improved by a change in the VAT rate, rather than by operational efficiency (e.g., digitalization of the administration, real-time reporting, better risk analysis etc.). According to the latest report, Romania has largest VAT gap in the European Union. Therefore, more research would be welcomed regarding the sources and reasoning of this gap. One direction of research can look at the rate of VAT from the perspective of the Laffer efficiency theory, which is the main research objective of this study.

As regards Romania, the fiscal policy went through directional changes, from procyclical loosening (prior to 2008), to tightening (2010 – 2015) going forward (Szymańska, 2019). At the level of 2020, with a standard rate of VAT of 19% and three preferential rates of 9%, 5% and 0% respectively, the effective rate of VAT taxation stands at 12.4%. It would be interesting to understand if this effective rate of taxation is optimal from the perspective of minimizing the VAT gap.

On the other hand, several other factors may also influence the level of the VAT collection, such as the level of cash transactions in the economy (Madzharova, 2014) and the relationship between the state and the citizen, namely the probability of audit and by the penalty on underpaying (Aizenman & Jinjarak, 2008).

To conclude on existing research and literature, there is some evidence about the distortionary effect of direct taxation, which leads to the preference of Governments for indirect taxation such as VAT. However, maximizing tax collections from VAT is an equilibrium task rather difficult to achieve, as it is affected by many factors, such as: level and propensity for non-compliance, the need or political desire for counter-cyclical fiscal measures, the place in the business cycle and the general level of taxation.

3. Brief analysis of VAT rates and revenues in Romania versus European Union countries

Before proceeding with the research methodology, we consider a brief analysis of VAT rates and revenues in Romania over the 2011-2020 period. We use in this paper the standard VAT rates, but at the same time, all European Union member states have fiscal policies aimed at giving a preferential VAT treatment to certain categories of transactions, such as:

- Reduced rates – typically between 5% to 10% for access to basic goods and services such as food and medicine; the reduced rate is aimed to improve access to such basic needs to people with the lowest income;
- 0% rate for certain types of transactions such as exports and intra-community supplies between legal entities; this rate is a policy choice aimed at encouraging intra-community trade, therefore removing the need to apply supplier VAT on invoices is a great enhancer for intra-community transactions because of the cash flow advantage of not having to pre-finance input VAT on acquisitions.

Based on the composition of the economy, an effective rate of VAT can be computed (based on number and value of transactions to which a specific VAT rate applies). The calculation of the effective tax is an estimate by the European Commission.

Like most European Union member states, Romania operates with both a standard rate and preferential VAT rates. The current standard VAT rate in Romania is 19%, but in the analyzed period it was as follows: 24% between 2011 and 2015 including, 20% in 2016 and 19% from 2017 onwards. In terms of preferential rates, throughout the entire analyzed period, the following rates were in existence:

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

0%, 5% and 9%, subject to the conditions mentioned above (with more products and services added in the preferential rate category throughout time).

Table 1 shows the discrepancies between standard rates and preferential rates in EU countries, allowing us to notice that the effective rates of taxation are rather minimal. The reduced rates in the table refer to rates which are non-standard for certain categories of products and services, based on public fiscal policy. The effective tax rate is estimated by the European Commission based on the composition of the respective countries' economies (i.e., transactions with standard rate and transactions with preferential rates).

Table 1: VAT rate structure in EU countries, 2020

Member state	Standard rate (%)	Reduced rate(s) (%)	Effective rate (%)
Belgium	21	6 / 12	9.9
Bulgaria	20	9	13.6
Czech Republic	21	10 / 15	12.1
Denmark	25	-	15.0
Germany	19	7	9.3
Estonia	20	9	12.7
Ireland	23	4.8/ 9 / 13.5	11.1
Greece	24	6 / 13	10.6
Spain	21	4 / 10	8.3
France	20	2.1 / 5.5 / 10	9.4
Croatia	25	5 / 13	15.5
Italy	22	4 / 5 / 10	9.6
Cyprus	19	5 / 9	9.9
Latvia	21	5 / 12	11.6
Lithuania	21	5 / 9	12.9
Luxembourg	17	3 / 8	11.3
Hungary	27	5 / 18	13.9
Malta	18	5 / 7	12.4
Netherlands	21	9	10.7
Austria	20	10 / 13	10.9
Poland	23	5 / 8	12.2
Portugal	23	6 / 13	10.9
Romania	19	5 / 9	12.4
Slovenia	22	5 / 9.5	11.1
Slovakia	20	10	10.9
Finland	24	10 / 14	12.0
Sweden	25	6 / 12	13.5

Source: Authors' representation based on data from the European Commission

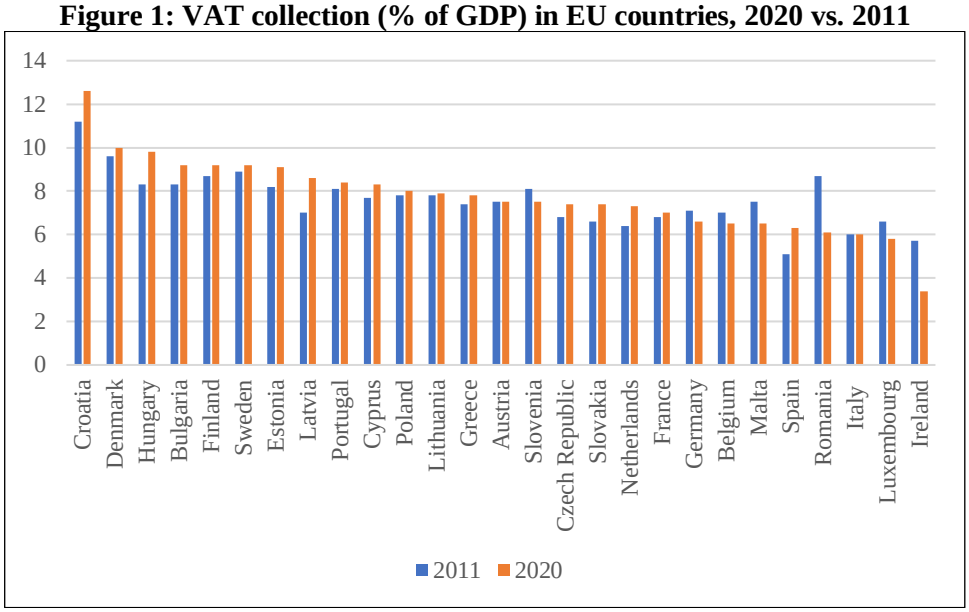
As it can be seen from the table above, Romania is part of a cluster of countries that collects revenues from VAT as a percentage of GDP of less than the median (the median being 7.5%). According

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

to the European Commission's yearly report about the VAT collection gap[3], the reasons for the relatively large gap in Romania and countries with similar large gaps refer to: an "inherent gap" coming from own consumption (goods and services for own use), a "policy gap" (i.e. transactions or persons which are exempt from VAT or benefit of a reduced rate rather than the standard rate) and a "collection gap" (i.e. tax evasion or avoidance of VAT collection through either non-declaration or non-payment).

At the same time, revenue collected from VAT, normalized as a percentage of the Gross Domestic Product, shows that there is a declining trend over the last 10 years in some countries such as Slovenia, Germany, Belgium, Malta, Romania, Luxembourg and Ireland – see Figure 1. An overarching feature of these countries is a reduction of the standard VAT rates and / or introduction of reduced rates over the period.

Figure 1: VAT collection (% of GDP) in EU countries, 2020 vs. 2011



Source: Authors' representation based on data from the European Commission

In Romania, during 2011 and 2022 there has been a substantial decline in VAT collections as a percentage of GDP, 30%, one of the largest decreases. One explanation has to do with the gradual reduction of the standard rate (i.e., from 24% to 19%), but also with several extensions of the applicability of reduced rates (e.g., 9% from bread and other basic products to virtually all food stuff).

It would be relevant to address the issue of revenue collection (normalized as a percentage of GDP) versus the rate of taxation, an indicator referred to as the VAT productivity index. In our paper, we use an "adjusted" VAT productivity index in the sense that, rather than using the standard rate of taxation, we use the effective rate of taxation, which basically considers exemptions and preferential rates applied for certain categories of products and services. For instance, in Romania, besides the 19% standard VAT rate, we currently have: (i) 9% rate for medicines, health services, food and certain beverages; (ii) 5% for hospitality, books and social housing; and (iii) 0% for exports and intra-community supplies. These reduced rates are a result of public fiscal policy choices aimed at improving access of low-income and impoverished families and communities to basic needs (food and medicine, social housing – i.e., dwellings with a reduced surface) or promoting the touristic industry of Romania (in the case of hospitality) and education (in case of books). As regards the 0% rate for exports and intra-community supplies, this is a European Union public policy for promoting intra-community trade.

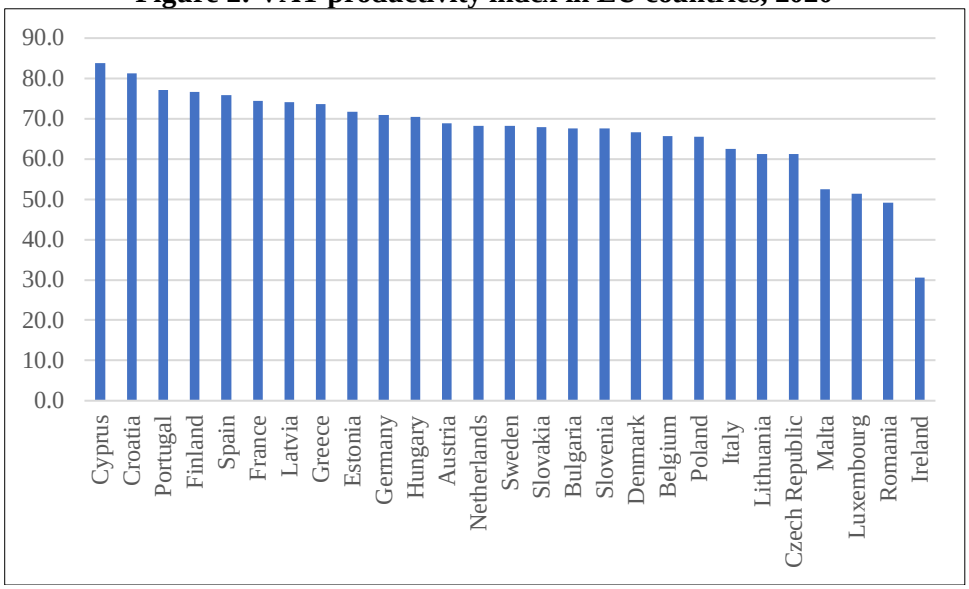
If we look at this adjusted VAT productivity index, we note that, as opposed to countries with similar levels of effective VAT taxation rates (such as Malta, Poland, Czech Republic and Finland), Romania has lower VAT productivity, i.e., level of collections for the given effective tax rate. The

[3] https://taxation-customs.ec.europa.eu/taxation-1/value-added-tax-vat/vat-gap_en

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

differential ranged from half a percentage point of GDP to up to 3 percentage points of GDP (if we compare to Finland) in 2020 – see Figure 2.

Figure 2: VAT productivity index in EU countries, 2020



Source: Authors' representation based on data from the European Commission

A useful analysis related to the topic at hand is the European Commission's yearly estimate of the VAT "gap", being the difference between the actual revenue collected from VAT and the theoretical expected VAT revenues from the applicable rates and the composition of the economy. Overall, the average EU VAT Gap is 10%, based on the latest report (data for 2020). On the country level, Romania had the highest VAT compliance gap in 2020 with 35.7% of VAT revenues going missing, followed by Malta (24.1%) and Italy (20.8%). The smallest gaps were observed in Finland (1.3%), Estonia (1.8%), and Sweden (2.0%).

Having regard to the importance of VAT in revenues collected to the state budget, as well as its role in encouraging or hindering consumption, the composition of Romanian's GDP growth, which is mostly based on consumption, and the observed collection gap in revenues, warrants a discussion about the optimal VAT rate that can maximize economic activity.

4. Research methodology

The main objective of this paper is to assess the impact of the VAT rate on the revenues collected by the government from goods and services in whose case VAT is being paid in Romania. We undertake our analysis over the 2011-to-2022-time frame, using quarterly data. Data was collected from the Ministry of Finance in Romania and from Eurostat (European Commission) and is summarized in Table 2.

Table 2: Description of variables

Variable	Notation	Description
VAT rate	VAT	The standard sales tax (VAT) rate in Romania.
Revenues collected from VAT	VATREV	Total revenues collected from VAT in Romania.
VAT productivity	VATPROD	The ratio of revenue collected from VAT (as a percentage of GDP) and the standard VAT rate. The ratio measures how much each percentage point of the standard VAT rate collects in terms of GDP.
REVGDP	REVGDP	The ratio of revenues from VAT collection to the nominal GDP.

Source: Authors' work

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

The model we estimate is the following:

$$Y_t = \alpha_t + \beta_1 Y_{t-1} + \beta_2 X_t^1 + \beta_3 X_t^2 + \varepsilon_t \qquad (1)$$

where Y_t is the dependent variable – VATREV -, Y_{t-1} is the one-quarter lag of the dependent variable, X_t^1 is VAT, and X_t^2 is VATPROD. β_1 to β_3 are the parameters to be estimated, and ε_t is the model error.

We use the Generalized Method of Moments (GMM) to conduct the estimations. GMM, first formalized by Hansen (1982) is a widely used method in time series econometrics that allows for estimation and testing of models with weak assumptions about the distribution of the error term (Hall, 2015). This is particularly advantageous when dealing with a relatively short time series, as is the case in many economic and financial applications. Moreover, GMM is well suited in time series analysis due to its ability to handle endogeneity issues and incorporate instrumental variables (Wooldrige, 2001; Hansen, 2022).

We estimate three GMM models, where the independent variables are (1) VAT; (2) VATPROD; and (3) VAT and VATPROD. In all estimations, VATREV is the dependent variable. Also, we employed the one-quarter lag of VAT, VATREV and REVGDP as instrumental variables in the GMM models. All variables have been used as logarithms, to reduce the biasedness induced by non-normal distributions.

5. Results and discussion

The table below summarizes the descriptive statistics of the selected data: the mean, the median, the standard deviation, as well as data sample characteristics (skewness, kurtosis, Jarque-Bera normal distribution test and probability) of both variable and dependent variables used in our research methodology, cumulative for the period under analysis (i.e., 2011 - 2022). As it can be seen from the standard deviation measure, there are no significant differences between the standard VAT rates of the European Union countries, but there are statistically significant differences when it comes to revenue collected (VATREV), probably due to the existence of outliers.

The data set is also symmetrical, given the values of skewness close to 0.5 / -0.5. Kurtosis values show that the data may not be normally distributed and the distribution is rather peaked.

Table 3: Descriptive statistics of variables

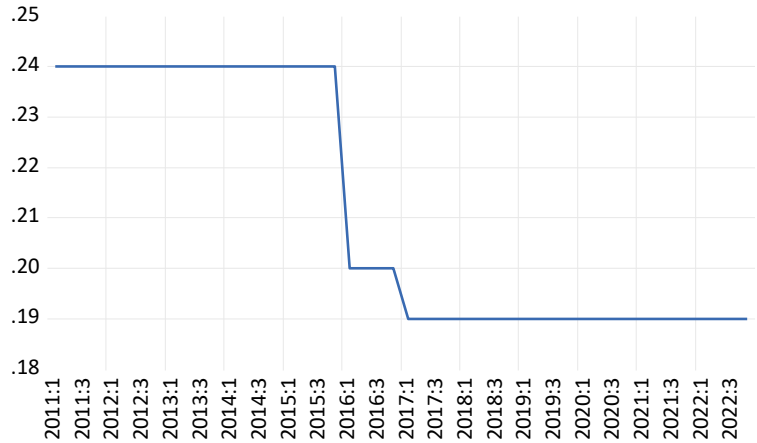
Indicator	VAT	VATPROD	VATREV	REVGDP
Mean	0.212	0.084	15057.830	0.018
Median	0.195	0.084	13893.500	0.017
Maximum	0.240	0.150	25026.000	0.036
Minimum	0.190	0.008	10268.000	0.002
Standard deviation	0.024	0.017	3642.668	0.005
Skewness	0.304	-0.618	1.279	0.503
Kurtosis	1.128	13.108	3.711	9.283
Jarque-Bera	7.749	207.418	14.107	80.983
Probability	0.021	0.000	0.001	0.000

Source: Authors' work

Figure 3 below shows the evolution of the standard VAT rate in Romania, during 2011 and 2022, which shows a significant decrease in 2016, of 4 percentage points, and a further 1 percentage point decrease in 2017.

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

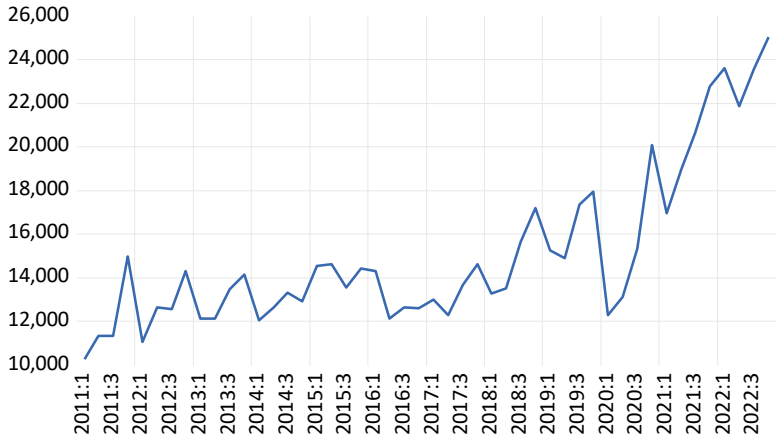
Figure 3: VAT rate in Romania, 2011-2022



Source: Authors' work

The total revenues collected from VAT in Romania during the period 2011 – 2022 on a quarterly basis are presented in Figure 4. Although the standard VAT rate dropped by one fifth in 2016, the drop in revenues was much less significant. Also, the figure shows the substantial decline in VAT-related revenues recorded Iin the first quarter of 2020, as a direct consequence of the Covid-19 imposed lockdown.

Figure 4: Total revenues from VAT collection in Romania, 2011-2022 (million RON)



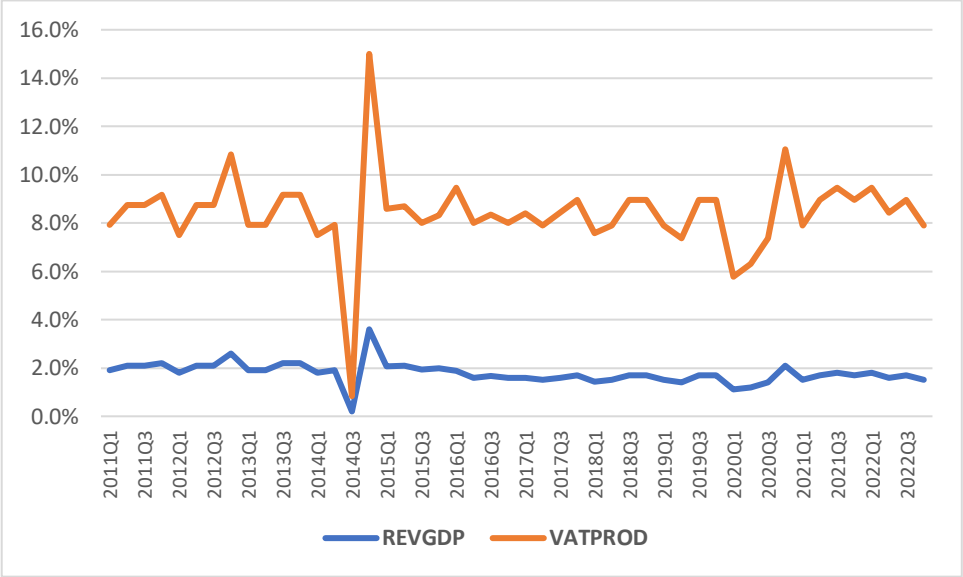
Source: Authors' work

Figure 5 presents the VAT revenues as a percentage of VAT and the VAT productivity index in Romania over the period 2011 – 2022, where we see a change in 2014. According to GDP decomposition data provided by the National Statistics Institute[4], we note a drop in GDP in the third trimester of 2014 which appears to be mostly generated by a reduction in agricultural output and thus the contribution of the agricultural sector to the GDP, because of a difficult crop year due to draughts.

[4] https://insse.ro/cms/ro/content/produsul-intern-brut-anul-2014

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

Figure 5: VAT revenues to GDP and VAT productivity in Romania, 2011-2022



Source: Authors' work

In Table 4, we present the results of the three model estimations using GMM and the selected data set, where VATREV is the dependent variable. We use the adjusted R-squared to test model accuracy and the extent to which the variance in collected VAT revenues is explained by the variables chosen. With an adjusted R-squared of above 0.6 in all three models, we can conclude that the selected variables explain to a large extent our dependent variable.

The findings indicate that the VAT level is negatively correlated with revenues collected from VAT, but not statistically significant, in both models where VAT level is included. This means that over the period analysed, increases in VAT led to declines in fiscal revenues, and vice-versa. This is consistent with existing research (Matthews, 2003, Heijman and van Ophen, 2005) that conclude that VAT avoidance and evasion are positively related to VAT rate, i.e., the higher the rate of taxation, the higher the incentive for non-compliance and the less than proportional collections from VAT to the state budget. Existing models map out VAT collections as a product of three components: general income (measured by GDP), forfeited income (measured by level of unproductive population) and hidden income (unreported). The second and the third component are significantly positively correlated with the VAT rate, in the sense that a high rate of taxation deters entrants into the marketplace (hence, inactivity from a part of the population) and encourages avoidance and evasion to escape the higher tax.

For what concerns the VAT productivity, we find no influence on VAT revenues; the inconclusive relationship between the two variables is highlighted by the different signs of the VAT productivity in the models where it is included. According to existing research (Barreix, Bes and Roca, 2012), there is inconclusive evidence between VAT productivity and VAT revenues from an analysis of Latin American economies.

We go on to test autocorrelation in the model's residuals using Durbin Watson statistics and we conclude that with a value around 2.5 there is a slight negative autocorrelation that does not invalidate our results. We also use J statistics to test the validity of the model and the results provide comfort that the model is suitable for the purpose.

Table 4: Results of GMM estimations

	Model 1	Model 2	Model 3
LOG_VATREV(-1)	0.998	1.030	0.963
	(0.000)	(0.000)	(0.000)
LOG_VAT	-0.022	--	-0.165
	(0.821)	--	(0.071)

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

LOG_VATPROD	--	0.108	-0.052
	--	(0.548)	(0.627)
Adjusted R-squared	0.643	0.629	0.615
Durbin-Watson statistic	2.576	2.596	2.504
J-statistic	0.616	0.023	3.729
Prob(J-statistic)	0.432	0.879	0.053

Note: P-values are in paratheses.
Source: Authors' work

6. Conclusions and recommendations

The paper provides an empirical assessment of the relationship between the VAT rate and fiscal revenues in Romania, moderated by the VAT productivity index. The results of the GMM regression model show that VAT revenues are explained by the level of the VAT rate and the evolution of the GDP – the latter is indirectly included in the model, through the VAT productivity. When a government needs to collect more revenue from tax rate policy, it can look at an increase in the policy rate, however, the increase is not like for like due to some negative correlation between taxes and economic activity, i.e., an increase in tax generally hinders economic activity. On the other hand, a decrease in the tax rate can keep collections constant or even increase collections, due to the compliance effect it generates on the economy (i.e., at a lower rate there is reduced benefit from the risk of non-compliance).

Countries that aim to improve their tax collections, where VAT is one of, if not the major contributor to the state budget revenues, should look at effective rates of taxation based on the composition of their economy. Also, providing generalized or large-scale reductions or exemptions depresses the effective rate of taxation and reduces the VAT productivity index.

Also, in the case of Romania, a review of the composition of the rates and an improved focus on collection seem to be mandatory to reduce the VAT collection gap. Focus in digitalisation of reporting and compliance of VAT, in-time revenue reporting, mandatory e-invoicing rules and reduction of the number of cash transactions, as main way of non-compliance, are a must.

Further research and extension of the analysis is needed to determine the sensitivity of VAT collections to changes in VAT rates, as well as policy comparisons between different states, where there seem to be the same effective rate of taxation (policy choice), but better productivity index (improved compliance?).

References

- Aizenman, J., Jinjarak, Y. (2008). *The collection efficiency of the Value Added Tax: Theory and international evidence*, The Journal of International Trade & Economic Development, 17, issue 3, Pages 391-410
- Barreix, A.D., Bes, M., & Roca, J. (2012). *Solving the Impossible Trinity of Consumption Taxes: Personalized VAT*, Inter-American Development Bank: Washington, DC, USA
- Benos, N. (2009). *Fiscal policy and economic growth: empirical evidence from EU countries*, MPRA Paper 19174, University Library of Munich, Germany
- Budnevich, C. (2002). *Countercyclical Fiscal Policy: A Review of the Literature, Empirical Evidence and some Policy Proposals*, WIDER Working Paper Series DP2002-41, World Institute for Development Economic Research (UNU-WIDER)
- Ferreira-Lopes, A., Martins, L., Espanhol, R. (2019). *The relationship between tax rates and tax revenues in eurozone member countries - exploring the Laffer curve*, Bulletin of Economic Research, Volume 72, Issue 2, Pages 121-145
- Gemell, N., Kneller, R., Sanz, I. (2013). *Fiscal decentralization and economic growth: spending versus revenue decentralization*, Economic Inquiry, Volume 51, Issue 4, Pages 1915-1931
- Grochulski, B. (2009). *Distortionary taxation for efficient redistribution*, Economic Quarterly, Federal Reserve Bank of Richmond, vol. 95(Sum), Pages 235-267

Vol. 75, issue 1 Year 2023
DOI: 10.56043/reveco-2023-0007

- Guedes de Oliveira, F., Costa, L. (2015). *The VAT Laffer Curve and the Business Cycle in the EU27: An Empirical Approach*, Economic Issues Journal Articles, Economic Issues, vol. 20(2), pages 29-43
- Hall, A. R. (2015). Econometricians have their moments: GMM at 32. *Economic Record*, *91*, 1-24.
- Hansen, B. (2022). *Econometrics*. Princeton University Press.
- Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the econometric society*, 1029-1054.
- Heijman, W.J.M., van Ophem, J.A.C. (2005). *Willingness to pay tax: The Laffer curve revisited for 12 OECD countries*, Journal of Behavioral and Experimental Economics (formerly The Journal of Socio-Economics), Elsevier, vol. 34(5), Pages 714-723
- Hines, J. (1998), *Three Sides of Harberger Triangles*, No 6852, NBER Working Papers, National Bureau of Economic Research, Inc.
- Mach, P. (2018). *VAT Rates and their Impact on Business and Tax Revenue*. European Research Studies Journal, Volume XXI, Issue 1, Pages 144-152
- Madzharova, B. (2014). *The impact of cash and card transactions on VAT collection efficiency.* Journal The usage, costs and benefits of cash–revisited, Deutsche Bundesbank, Pages 521-559
- Matthews, K. (2003). *VAT evasion and VAT avoidance: Is there a European Laffer Curve for VAT?*, International Review of Applied Economics, Issue 17, Pages 105-114.
- Mura, P. (2015). *Tax Composition and Economic Growth. A Panel-Model Approach for Eastern Europe*, Annals - Economy Series, 1II, issue, Pages 89-101
- Poniatowski, G., Bonch-Osmolovskiy, M., Śmietanka, A. et al. (2022), *VAT gap in the EU – Executive summary 2022*, European Commission, Directorate-General for Taxation and Customs Union, Publications Office of the European Union, 2022, https://data.europa.eu/doi/10.2778/01447
- Surugiu, C., Surugiu M. (2012). *Tax Competition, Harmonization and Development: Challenges and Consequences*, Argumenta Oeconomica, Volume 1(28), Pages 139 - 154
- Szymańska, A., 2019. *A Comparative Analysis of Fiscal Policy Changes in Selected European Union Countries outside the Eurozone*, Comparative Economic Research, Sciendo, vol. 22(3), Pages 131-143
- Widmalm, F. (2001). *Tax Structure and Growth: Are Some Taxes Better Than Others?*, Public Choice, Springer, vol. 107(3-4), Pages 199-219
- Wooldridge, J. M. (2001). Applications of generalized method of moments estimation. *Journal of Economic perspectives*, *15*(4), 87-100