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THE INFLUENCE OF VAT ON ECONOMIC GROWTH

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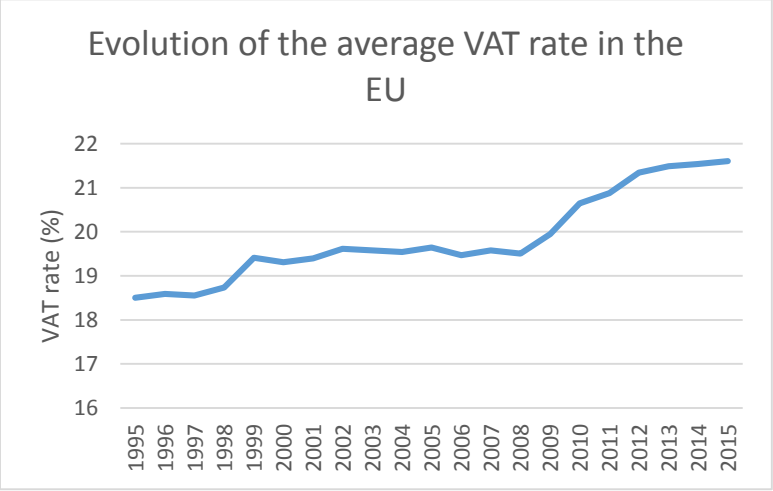
ABSTRACT

In order to keep pace with today's fast changing economy, the world's tax systems must continuously adapt. Tax equilibrium is hard to obtain due to the dynamic nature of the economy. Taxes must be set so that governments fulfill their objectives without creating economic distortions. VAT might be a solution in this way, since it only limits consumption and not production or investments. Therefore, in this paper we analyze VAT from two perspectives: the business environment, measuring the impact of VAT on economic growth, and the Government, determining an optimal VAT rate. Our results indicate that the negative influence of other taxes on the economy are greater than those of VAT, also depending on the way Government resources are used. The optimal VAT rate determined is above the average VAT rate in the EU, indicating that tax evasion is caused mostly by other factors than a VAT rate that is too high.

INTRODUCTION

The theory of Bodin, Keen and Summers (2001), according to which VAT has a less negative impact on the economy because it only limits consumption and not production or investments is proven by the current popularity of VAT as a Government resource around the world. In the European Union it is one of the main sources of Government revenue, as shown in the following chart:

Chart 1: The evolution of the average VAT rate in the EU-28



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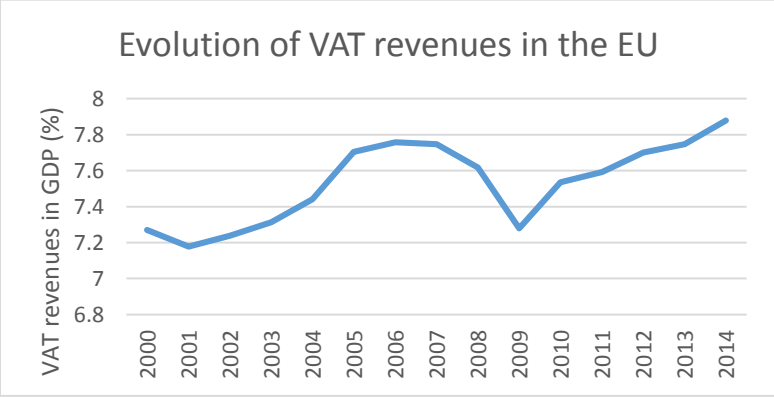
The average VAT rate applied by EU member states has grown gradually up to 21.6% in 2015. Compared to the 1995 level of 18.5% we see a significant rise, proving EU member states' preference for this revenue source, and also an increase in Government operational costs.

Furthermore, we analyze how the importance of VAT as a Government resource has grown in EU member states compared to the total GDP, using annual data from EUROSTAT:

Chart 2: The evolution of VAT revenues in the EU-28



The negative impact of the economic recession of 2008 is noticeable on the chart, as revenues dropped a considerable amount. Nevertheless, since the year 2000, VAT revenues have risen approximately 0.6% of GDP, becoming one of the most important sources of revenue for Governments.

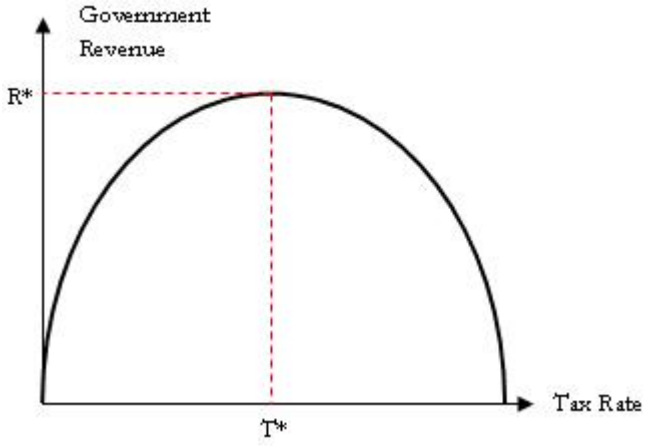
One of the main issues VAT faces, even more than in the case of other taxes, is tax evasion. As detailed by Matthews (2003), tax evasion can be of two types:

- Legal tax evasion, or tax avoidance – this phenomenon happens when the taxpayer uses legal gaps to obtain an economic benefit
- Illegal tax evasion – the taxpayer obtains an economic benefit by breaking the law.

The European Commission (2004) analyzes tax evasion by determining the gap between the theoretical and actual VAT revenues. In their study, they determine the fact that Romania has the highest VAT gap in the European Union (a difference of 48% between the theoretical VAT calculated on the final consumption for the different VAT rates used, and the actual collected VAT). The discrepancy was enlarged by the economic crisis of 2008, as consumption dropped along with a rise in tax evasion.

Among the first authors who mentioned the relationship between the share of taxes and revenues collected from state budgets was Wanniski (1978). Represented graphically, this relationship has been demonstrated to have a parabola shape, so-called "Laffer Curve". In other words, there are two tax rates that bring the same income, less the peak of the function, where the optimal tax rate.

Chart 3: The Laffer Curve



For a 0% tax rate, the tax collected will obviously be 0. Similarly, for a 100% tax rate, the tax will be collected all null, due to the economic meltdown in the tax burden.

Laffer (2004) decomposes the influence of the tax rate on revenues in two opposite effects: one arithmetic direct relationship between the rate and income collected, and an economic one, an inverse relationship between tax and revenue collected. This would be the result of stimulation/ inhibition of the economy, and therefore the tax base.

Up to the optimum point mentioned above, the direct effect is greater than indirect one, and a tax rate increase brings a greater contribution to the state budget. For a tax rate that exceeds the optimal point one enters the "prohibitive zone" and the reverse effect will exceed the direct one, resulting in a lower level of budget revenues.

Matthews (2003), breaks down the opposite effect into two components: a tax rate increase will cause a reduction in revenues to the state budget due to lower consumption on the one hand, and an increase in tax evasion, on the other hand. The author indicates a direct relationship between tax rates and tax evasion and avoidance. This breakdown is used by Hejman and Ophena (2005), who state that an increase in the tax rate leads to a tax avoidance increase (decrease labor, investment, consumption, etc.) and increased tax evasion.

Yu (1996) confirmed the existence of the Laffer curve in his study on data from the United States for the period 1959 to 1991, obtaining an optimal income tax rate in the range of 32% - 35%. Other authors who have tested the relationship between the rate of taxes and the state budget revenues are Dalamagas (1998) - which states that an expansionary fiscal policy may lead to lower budget deficits in countries where the effects of "crowding-out" are present, and Hansson and Stuart (2003) - who suggest that it is difficult for states to collect budgetary revenues at a level above 70% of GDP.

Regarding the relationship between the VAT rate and budget revenues from this source, Matthews (2003) calculated the optimal share of tax in the range 18% - 19.3% for the EU 14 in the period 1970-1998. Oliveira and Costa (2013) calculated for the EU 27 in the period 2000-2010 an optimum VAT rate of 22.5% for which maximum budget revenues would be recorded, using the following model:

$$VBTVA_{i,t} = \beta 0_i + \beta 1_t + \beta 2 c_{i,t} + \beta 3 c_{i,t}^2 + u_{i,t}$$

Where:

VBTVA = VAT revenues

C = standard VAT rate

In an attempt to determine an optimum tax rate that maximizes economic growth for the United States of America for the period 1929-2004, Scully (2006) based his research on the following equation:

$$lnY = ln\, a + b\, ln(t) + c\, ln(1 - t)$$

Where:

Y = Real GDP

t = Government expenditure to real GDP, considering revenue=expenditure

1-t = resources available to the population after taxes

The optimum tax rate in terms of economic growth determined by the author is 23.5%, concluding that the US government sets taxes based on political reasons and not in order to improve the economy.

Desiring to determine the relationship between fiscal policy and growth, Cashin (1995) used the following panel model on a sample of 23 developed countries in the period 1971-1988:

$$GRWKRi,t = \beta 1ln(IGOVi,t) + \beta 2ln(SOCSECi,t) + \beta 3ln(CURREVi,t) + \varepsilon i,t$$

where:

i = analyzed state

t = the period under review

GRWKR = real GDP growth per capita

IGOV = ratio of public investment / GDP

CURREV = ratio of budget revenues / GDP

SOCSEC = ratio Transfers / GDP;

The results of the study argue that targeting public resources to productive areas (through investments, transfers) leads to an increase in GDP, while the public sector size size financed through taxes has a negative effect on economic growth.

DATA AND EMPIRICAL MODEL

Our study aims to analyze the impact of VAT on economic growth in the Member States of the European Union, and to determine the optimal VAT rate which maximizes budget revenues. Given the trends of tax harmonization at EU level, the study sample represents all 28 EU Member States for the period 2000 to 2013 and 2000 to 2014. The data used has annual frequency, expressed as percentage and has the same origin, for comparison purposes (using the same methods for collecting, processing and calculation).

The computer software used for data processing are Microsoft Office Excel and Eviews.

One of the problems encountered in developing such a study is the fact that not enough data is available. For an econometric model to be relevant, it must include a large number of observations, often unavailable to the public. As a result, the models used by us to determine the influence of VAT on economic growth and for determining the optimal VAT rate that maximizes revenue, are balanced panel with fixed effects, thus obtaining a larger sample survey that gives greater relevance.

Although the European Commission (2004) estimates that 70% of the total transactions in the EU use the standard VAT rate, we consider this indicator as a proxy for the real rate of VAT of the European economy, since the influences of the reduced rates are included in the fixed effects for each Member State and period analyzed.

To investigate the effect of VAT on economic growth we have used a similar methodology to that of Cashin (1995). Wishing to obtain a more detailed analysis, we initially included in our model other public expenditures such as health and education, considered by the authors as having a positive influence on economic growth. In addition, we wanted separate budget revenues from VAT and those from other sources, to highlight the distinct influence on the dependent variable. The availability of the data allowed us to analyze the EU-28 for the period 2000-2013. Therefore, the initial model tested is of the following form:

$$\Delta\%PIB_{i,t} = \beta 0_i + \beta 1_t + \beta 2 \ln(VTVA_{i,t}) + \beta 3 \ln(AV_{i,t}) + \beta 4 \ln(educatie_{i,t}) + \beta 5 \ln(sanatate_{i,t}) + \beta 6 \ln(servicii_{i,t}) + \beta 7 \ln(social_{i,t}) + \beta 8 \ln(investitii_{i,t}) + u_{i,t}$$

Where:

Variabile	**Description**	**Source**
Δ%PIB	Percentage change of real GDP to the previous period	Eurostat
VTVA	VAT revenues, as a percentage of GDP	Eurostat
AV	Other tax revenues, as a percentage of GDP	Eurostat
educatie	Education expenditures, as a percentage of GDP	Eurostat
sanatate	Health expenditures, as a percentage of GDP	Eurostat
servicii	Public service expenditures, as a percentage of GDP	Eurostat
social	Social expenditures, as a percentage of GDP	Eurostat
investitii	Public investments, as a percentage of GDP	Eurostat
i	Member State	
t	Year	
β 0	Cros-section fixed effect	
β 1	Period fixed effect	

Considering, however, that targeting public funds towards areas such as education and health, which have the effect of increasing the quality of labor, observable only after long periods of time, and the estimation obtained for budget revenues other than from VAT were statistically insignificant we refined our model to take the following form:

$$\Delta\%PIB_{i,t} = \beta 0_i + \beta 1_t + \beta 2 \ln(VTVA_{i,t}) + \beta 3 \ln(servicii_{i,t}) + \beta 4 \ln(social_{i,t}) + \beta 5 \ln(investitii_{i,t}) + u_{i,t}$$

To generate VAT Laffer curve and thus determine the optimum rate of VAT at EU level, we used the methodology used by Oliveira and Costa (2013), adding however our analysis of Croatia and the years 2013 and 2014.

Assuming that the relationship between the VAT rate and budget revenues can be described graphically through a parable, the model used by us is:

$$VBTVA_{i,t} = \beta 0_i + \beta 1_t + \beta 2 cotaTVA_{i,t} + \beta 3 cotaTVA_{i,t}^2 + u_{i,t}$$

Where:

Variable	**Description**	**Source**
VBTVA	VAT revenues as a percentage of GDP	Eurostat, AMECO
Cota TVA	Standard VAT rate	European Commission
i	Member State	
t	Year	
β 0	Cross-section fixed effects	
β 1	Period fixed effects	

RESULTS

The panel OLS estimation results of the first model are:

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.065372	0.134688	0.485356	0.6277
LOG(VENITURI_TVA)	0.057235	0.027103	2.111786	0.0354
LOG(ALTE_VENITURI)	-0.006143	0.043168	-0.142315	0.8869
LOG(EDUCATIE)	0.004890	0.032320	0.151286	0.8798
LOG(SANATATE)	-0.016028	0.022883	-0.700443	0.4841
LOG(SERVICII)	0.021662	0.017057	1.270002	0.2049
LOG(SOCIAL)	-0.080545	0.025172	-3.199739	0.0015
LOG(INVESTITII)	0.045268	0.009340	1.564045	0.0573
R-squared	0.363726		Mean dep. var	0.029564
Adjusted R-squared	0.276793		S.D. dep. var	0.041797
F-statistic	4.183986			

Prob(F-statistic)	0.000000		Observations	392

The results of our estimation indicate that the independent variables are responsible for 36.4% of the variation in GDP. Variables statistically significant to a threshold of 5% are revenues from VAT and social public expenditure and for the 10% threshold we can include investments in this category. Similar results were obtained by Cashin (1995) and Helms (1985), whom quantify the negative coefficient of the variable "income from sources other than VAT" indicate that taxation has a negative effect on economic growth but is countered by targeting resources towards productive sectors collected (investment services), while public social expenditure had a negative impact on GDP.

Consistent with the findings of Bodin, Keen, Summers (2001), the results suggest that the VAT is more favorable to growth than other taxes, because of the fact that it only limits consumption. However, a positive coefficient that corresponds to the variable is not in line with the expectations of the authors. This result can be attributed to the fact that there is a Granger causality in both directions between budget revenues from VAT and growth. Because a large part of growth occurs due to an increase in consumption to which VAT is applied, economic growth will be accompanied by increased budget revenues from VAT.

The estimation results for the second model are the following:

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	0.106229	0.093990	1.130213	0.2592
LOG(VENITURI_TVA)	0.059997	0.026716	2.245710	0.0254
LOG(SERVICII)	0.021651	0.016230	1.334040	0.1831
LOG(SOCIAL)	-0.082491	0.024137	-3.417681	0.0007
LOG(INVESTITII)	0.025060	0.009257	1.546624	0.0585
R-squared	0.362802		Mean dep. var	0.029564
Adjusted R-squared	0.282004		S.D. dep. var	0.041797
F-statistic	4.490258			
Prob(F-statistic)	0.000000		Observations	392

As can be seen, the chosen variables explain the variation of GDP by 36.3% ($R \wedge 2 = 0.362802$), although not all of them are statistically significant. For the significance threshold of 5%, budget revenues from VAT and social expenditures are significant, and while using the significance threshold of 10%, investments can be considered significant as well.

Consistent with the results of Cashin (1995) and Helms (1985), unproductive social expenditure leads to a decline in economic growth, which is observable by the negative coefficient for the variable. Targeting VAT revenues to investment and public services lead to an increase in GDP. We find still a positive correlation between VAT revenue and growth, suggesting that the

restrictive effect of the tax is lower than the increase in revenue collected from the increase in consumption.

This result suggests that the VAT rate for the sample analyzed is in the Laffer Curve permissible area, and budget revenues increase due to increasing consumption rather than an increase in the tax rate.

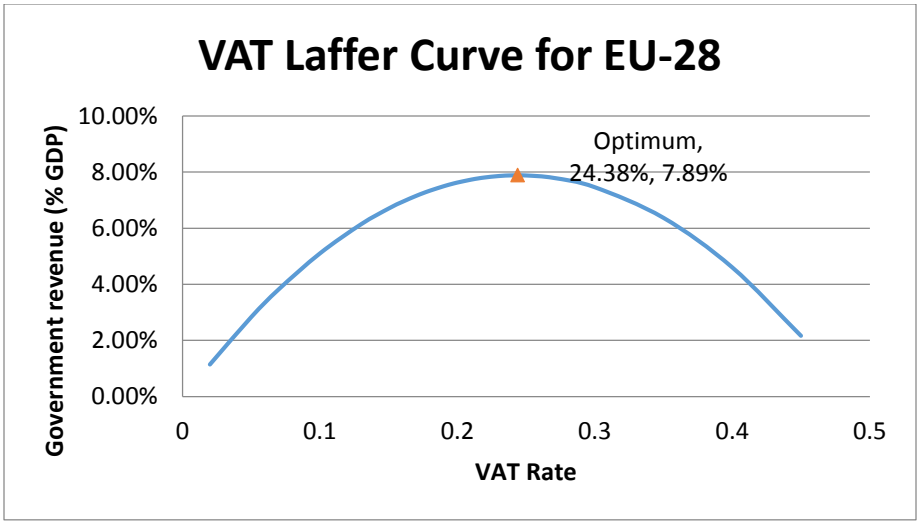
Estimating the VAT Laffer Curve provides the following results:

Variable	Coefficient	Standard Error	t-Statistic	Probability
C	-0.001166	0.012844	-0.090797	0.9277
COTA_TVA	0.656564	0.128717	5.100830	0.0000
COTA_TVA^2	-1.346308	0.325599	-4.134860	0.0000
R-squared	0.894794		Mean dep. Var	0.075333
Adjusted R-squared	0.882762		S.D. dep. var	0.013748
F-statistic	74.37033			
Prob(F-statistic)	0.000000		Observations	420

As the base model equation is a relatively simple relationship (Revenue from VAT = VAT rate x VAT tax base) the chosen variables explained variations in VAT revenues by 89.5% (R ^ 2 = 0.894794), the difference up to 100 % can be attributed to avoidance and evasion. Both the rate of VAT and its square (used to represent the non-linear relationship) are statistically significant, even for statistical threshold of 1%. Positive coefficient in VAT, negatively correlated with the its square suggests a parabola relationship, and therefore can be plotted like the Laffer curve, which Wanninsky empirically demonstrated in 1978.

Using the coefficient estimates offered by OLS to generate the graphical representation of the function we obtained the VAT Laffer curve.

Chart 4: The EU-28 VAT Laffer curve

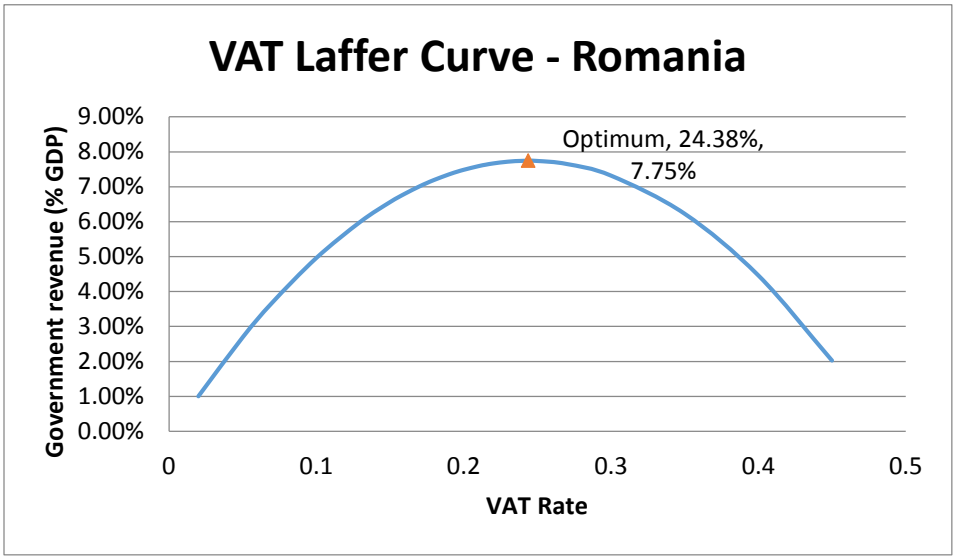


The graphical representation of the function complies with the findings of Wanniski (1978), Matthews (2003), Yu (1996) and Oliveira and Costa (2013). The optimal VAT rate was

calculated is 24.38% for the EU-28, which corresponds to a level of 7.89% of budgetary revenues.

The result shows a shift to the optimal point, which translates into increased tolerance to this tax European economies compared to the study of Oliveira and Costa (2013), which was 22.5% for EU27.

Using cross-sectional fixed effect related to Romania (-0.001407) we have generated the Laffer curve for VAT in Romania. For the same level of optimal rate of VAT (24.38%) the maximum budgetary revenues are estimated to be 7.75% of GDP.



Our model estimation results indicate that the optimal level of this tax is above average Community level. Therefore, most EU countries are found in the permissible area of the Laffer curve.

Given this fact, the recently communicated intention of the Romanian Government to reduce the VAT rate for food at 9%, and to reduce the standard VAT rate to 20% may lead to a budget deficit difficult to fill.

In this sense we have achieved an estimate of the budget deficit thus created. Using standard rate of 20% (although the use of reduced rates of 9% and 5% lead to lower average real rate), the budget revenues from VAT in Romania would be 7.48% of GDP. Compared to the level of 7.75% of GDP for the budget revenues at the rate of 24.38%, a deficit of around 0.3% of GDP will be created.

For 2014, Romania's budget deficit was 1.5% of GDP, according to Eurostat. Therefore, the reduction in VAT would lead to an increase in the budget deficit by 20%.

Although the VAT gap is the largest in Romania in the EU-28 (48%), countering the decrease in budget revenues occasioned by the reduction of the VAT rate by an increase in tax collection due to relaxation is unlikely, since, apparently, Romania is presently found in the permissible area of the VAT Laffer curve.

On the other hand, anti-fraud measures and tighter fiscal controls by the National Authority for Fiscal Administration (ANAF) could lead to improvements in the collection of VAT by reducing disparities. However, anti-fraud measures taken may prove to have an inhibiting effect on businesses, which would result in an economic downturn.

CONCLUSIONS

In this paper we wished to create an empirical analysis of the influence of VAT on economic growth in the EU-28 for the period 2000-2013 / 2014 and to determine an optimum level of this tax rate in what regards Member States' budgetary revenue . The two elements are analyzed simultaneously because of the close relationship between them.

Based on the conclusions of authors such as Helms (1985), Cashin (1995) and Scully (2006), according to which taxes negatively influence economic development, and linking this finding with the result Bodin, Keen and Summers (2001) which concludes that the VAT creates economic distortions lower than other taxes because it discourages less production and savings, we estimate an econometric panel model with fixed effects to quantify the relationship between budget revenues from VAT and growth.

Our results confirm the findings of Bodin, Keen and Summers (2001) as the negative influence of other taxes on growth is greater than the VAT. The results of Helms (1985) and Cashin (1995) were confirmed due to positive coefficients for productive public expenditure (investment and public services) negative correlation with social expenditures.

Due to significant dependence between GDP and consumption, on which VAT is applied, the result indicates that our budget revenues are directly related to GDP growth. The distortions created by the VAT on the economy, as stated by Ramsey (1927), are not observable, since GDP growth will result in improving revenue. Furthermore, the fact that budget revenues have increased due to an increase in consumption and not on account of an increase in the VAT rate, suggests that the level of consumption taxation is not in the restrictive area of theLaffer curve.

Using standard VAT rates applied by Member States of the current EU-28 (a viable proxy for actual VAT rate), we have updated the study by Oliveira and Costa (2013) for the EU-27, generating the VAT Laffer Curve.

The result of our model estimation was consistent with those of Wanniski (1978), Matthews (2003) and Yu (1996), plotting the Laffer curve shape. The optimal VAT rate determined (24.38%) by identifying the maximum point of the function, suggests that tolerance for VAT in the EU-28 increased compared with the result of Oliveira and Costa study (2013) of 22.5%. On average, EU-28 is in the permissible VAT area (21.5%), therefore tax evasion and avoidance only gain momentum for a higher level of tax than the optimum determined.

However, the VAT gap in Romania, the largest of the EU (48%) correlated with the Romanian Government's intentions of tax cuts would create a budget deficit increase by 20% if the

collection does not improve. The VAT rate applied in Romania, lower than optimum determined in our study suggests that the shortcomings of collection are due to other factors rather than the VAT rate.

REFERENCES

Brooks, C. (2002). "Introductory econometrics for finance." *International edition*, 490-519.

Cashin, P. (1995). Government spending, taxes, and economic growth. *Staff Papers-International Monetary Fund*, 237-269.

Cataramă, D. (2011). Moşteanu T., cond. şt.". *Evaziunea fiscală şi sistemele de interese", teză de doctorat, ASE, Bucureşti*.

Dalamagas, B. (1998). Endogenous growth and the dynamic Laffer curve.*Applied economics*, *30*(1), 63-75.

Dawson, G. (2006). Economics and Economic Chenge. FT / Prentice Hall. p. 205.

Ebrill, L., & Keen, M. J ean-Paul Bodin, and Victoria Summers, 2001. The Modern VAT (Washington: International Monetary Fund).

European Commission - Barbone, L., Belkindas, M., Bettendorf, L., Bird, R. M., Bonch-Osmolovskiy, M., & Smart, M. (2013). Study to quantify and analyse the VAT Gap in the EU-27 Member States. CASE Network Reports, (116).

European Commission - Barbone, L., Bonch-Osmolovskiy, M., & Poniatowski, G. (2014). 2012 Update Report to the Study to quantify and analyse the VAT Gap in the EU-27 Member States. *CASE Network Reports*, (120).

European Commission – PwC Study on the feasibility of alternative methods for improving and simplifying the collection of VAT through the means of modern technologies and/or financial intermediaries (2010), TAXUD/2009/AO-05.

European Commission (2015) – VAT rates applied in the Member States of the European Union, Taxud.c.1(2015) – EN

Eurostat and European Commission. (2010). Taxation trends in the European Union–Data for the EU Member States. Iceland and Norway (Luxembourg).

Hansson, Å., & Stuart, C. (2003). Peaking of fiscal sizes of government.*European journal of political economy*, *19*(4), 669-684.

Heijman, W. J. M., & Van Ophem, J. A. C. (2005). Willingness to pay tax: The Laffer curve revisited for 12 OECD countries. *The Journal of Socio-Economics*,*34*(5), 714-723.

Heinäluoma, E. Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax. Official Journal of the European Union (English edition) Volume, 49(11).

Helms, L. J. (1985). The Effect of State and Local Taxes on Economic Growth: A Time Series--Cross Section Approach. *The Review of Economics and Statistics*, 574-582.

Hoanță, N. (2010). Evaziune fiscală Ed. a II-a revizuită și adăugită

http://ec.europa.eu/taxation_customs/taxation/vat/how_vat_works/vat_history_en.htm

http://economyincrisis.org/content/now-is-the-time-to-reform-the-income-tax-with-a-vat

http://stats.oecd.org/glossary/detail.asp?ID=1163

Laffer, A. B. (2004). The Laffer curve: Past, present, and future.

Matthews, K. (2003). VAT evasion and VAT avoidance: Is there a European Laffer curve for VAT?. *International Review of Applied Economics*, *17*(1), 105-114.

Ministerul Economiei din Franța: http://www.performance-publique.budget.gouv.fr/

Oliveira, F. G. D., & Costa, L. (2013). *The VAT LAffer Curve and the Business Cycle* (No. 02). Faculdade de Economia e Gestão, Universidade Católica Portuguesa (Porto).

Ramsey, F. P. (1927). A Contribution to the Theory of Taxation. The Economic Journal, 47-61.

Scully, G. (2006). Taxes and economic growth. *Policy Report*, *292*.

Wanniski, J. (1978). NEW LOOK AT TAXATION. 1. TAXES, REVENUES, AND LAFFER CURVE. *Public Interest*, (50), 3-16.

Yu Hsing (1996). Estimating the Laffer curve and policy implications. *The Journal of Socio-Economics*, *25*(3), 395-401.