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The Results of the Fiscal Control Activity in the Member States of the European Union in the field of VAT

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Abstract

The article presents an analysis of the influence that the results of the control activity obtained by the Member States had on the value-added tax. An important part of the work is dedicated to the activity of international fiscal control due to international cooperation resulting from cross-border economic activities. Analyzing the budgetary control activity carried out by the 28 member states of the European Union during 6 consecutive years, a series of similarities and differences can be noted both in terms of the implementation method and the results obtained. Among the financial obligations taxpayers owe, the proposed econometric analysis focuses on the value-added tax. Thus, to carry out the econometric analysis, we used the dependent variable: VAT related to fiscal revenues, and as an independent variable: additional VAT established, as a result of fiscal control, against the total of additional budgetary obligations resulting from fiscal control activity. The result indicates a statistically valid linear regression model, whereby a percentage increase in the value-added tax established by the tax control activity leads to a 0.14% increase in the total tax revenues collected.

Keywords: fiscal inspection, additional tax obligations, government performance, TVA.

JEL: G20, G32, H11

INTRODUCTION

The fiscal control activity at the national and international levels proves its role as a good collector of the financial obligations due. The results of this activity materialize in the establishment of additional financial call obligations that the taxpayer either did not declare to the competent fiscal bodies or their declaration was made partially. Since the tax collection activity of all governments is known to form the budget revenues, the importance of understanding the results of the tax control work becomes a subject of substantial interest.

The objectives of the paper present highlighting the role of fiscal control activity in the collection of fiscal obligations, especially regarding the value-added tax and its share in fiscal revenues. The choice of value-added tax as a derivative research tax is justified

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by the contribution of this tax to the total tax obligations.

The research methodology used is primarily the comparison of the annual data published by the Organization for Economic Cooperation and Development (OECD) regarding the results of the European Union counties members for the period: 2014-2019 in value-added taxes established by the activity of fiscal control. These data will be analyzed and presented by the level of fiscal collection of fiscal revenues offered for each state by the official „Eurostat" website.

The first part of the paper is dedicated to the analysis of various materials published by various authors or international organizations regarding the activity of fiscal control and its causal link with the degree of collection of fiscal revenues related to the value-added tax. The result of the analysis drew to my attention the fact that the studies related to the topic either covered a certain country or stopped at a single year of research. Thus, I considered it appropriate to expand the research area to all the member states of the European Union for a period of 6 consecutive calendar years.

In the second part, the paper presents the research methodology used to design the econometric model of the influence of the value-added tax established by the tax control bodies on the level of duty revenue collection.

The applied theory part of the paper involves implementing the econometric model on the 102 observations by testing its hypotheses (intensity and validity of the model, absence of measurement errors, descriptive statistics, average deviations of the model, homoscedasticity/heteroscedasticity of the model, normality of the residual series—Durbin–Watson test).

The findings of this research led to the creation of a statistically valid linear regression model with a direct link between variables.

The analysis carried out proves its usefulness considering that the research in the field of fiscal control activity is limited and generally includes only one state. The work is an extension of the previous works as it covers all EU member states for an extended period of six years.

Last but not least, the special importance of fiscal control activity in detecting fiscal fraud in the VAT field, especially in the context of the development of economic activities, should be discussed among states.

1. LITERATURE REVIEW

The relationship between taxpayers and tax authorities was strictly hierarchical and was characterized by retrospective tax controls, completed with fines as a means of enforcing compliance with tax legislation, Enăchescu J. et al. argue (2018, p:81). On this aspect, significant changes have taken place, fiscal control becoming an interpenetration of the state's needs and requirements with taxpayers' obligations in terms of declaring and paying taxes, but also in terms of the relationship between states, as a result of cross-border operations.

In the tax game, the main forces are the taxpayers' efforts to avoid paying taxes and the tax authority's effort to enforce tax compliance (Lorenz J., 2019).

First, the government must establish a tax code that regulates the details of liability for taxation and provides equity capital for its implementation.

Another very important element of the tax control activity is that of discovering and punishing tax evasion considered as the amount of taxes evaded up to the risky limit.

Given that some taxpayers have low absolute risk aversion, the increase in the tax rate affects their reporting decisions in two ways: an effect of realized income((less wealthy taxpayers take more risks and a substitution effect that makes tax evasion more profitable. As in the case of tax evasion, the reaction of the authority (i.e., the probability of an audit) is based on the taxpayer's income ratio.

The amount of the fine and the probability of hadith has an indirect effect. A higher probability and an expensive fine cause the most frequent payments. (Mauro L., 2019)

Individuals reporting income levels below a certain threshold are audited with maximum probability, while taxpayers reporting income of at least this threshold are not audited at all. (Stadler I. et al., 1996). In the face of this audit function, taxpayers whose income levels are below the discount amount honestly declare their earned income. Taxpayers earning income above the threshold will only report this level.

If not audited, reported income is assumed to be true. The penalty schedule is exogenous and proportional to the level of evasion. People who declare more than their true income do not receive any award.

Taxpayers, faced with a given penalty and a given probability of detection, will choose the amount of evasion that maximizes expected utilities. (Bodway R., 2000).

The audit function represents a given probability for all reports below a pre-determined value (which includes non-reporters) but the taxpayer who reports at least the threshold value will never undergo an audit. However, the optimal audit policy leads to different behavioural tax provisions, depending on how easily it is disguised for tax-exempt taxpayers. This, in turn, depends on the size of the defaulter population, as this factor determines the difficulty of detecting an evader hiding among exempt persons.

The tax inspector's effort determines the probability of successful detection of tax evasion - best thought of as the product of the probability of an audit (assumed to be equal to one) and the possibility of detection conditional on the audit - with greater effort increasing the possibility that true income will be verified. (Kotsogiannis C., Konstantinos I., 2016)

The government can choose tax rates, audit probabilities, and penalties for misreporting income. The government can also choose to reward honest reporting, and this proves to be an important political tool (Boadway R., 2000).

Under the conditions of a market economy in which capital and labour move easily between countries based on the dominant evolution of computer technology, which facilitates business communication, the taxable base tends to become more mobile. Fiscal control must and is beginning to cover an international area. Thus, the fiscal regulations in the field issued at the level of the member states of the European Union (EU) become necessary.

Each country applies the tax policy that it considers most suitable for its economy, but in many EU member states, tax cooperation is done by complying with rules developed by bodies (commissions or institutions) belonging to the EU. "Policy in the area of taxation within the European Union: priorities for the coming years" represents the fiscal policy strategy that the EU applies, where it is very clearly stated that the member states have the freedom to eliminate, introduce, or modify the taxes and fees that they apply. However, the EU has established some tax policy priorities for member countries, to remove

tax-related obstacles to the development of economic activities between states, as well as combating tax fraud.

At the EU level, fiscal strategies with common objectives are applied to all member states, but there are difficulties as each member state appeals to its character of fiscal sovereignty. However, the EU continues to adopt several financial regulations and recommendations.

Tax control activity creates: "A high reliance on voluntary compliance, but meeting tax requirements can require a lot of effort and cost, and tax collection is often a 'downstream' activity (OECD, 2020, p:12).

Under the auspices of the International Monetary Fund (IMF), Edmund Biber (IMF, 2010) starts from the general control function of examining the taxpayer's situation if he has correctly reported and evaluated the tax obligations due, to highlight the fact that: "the role of an audit program in a modern tax administration must extend beyond a simple verification of a taxpayer's reported obligations and the detection of discrepancies between a tax declared by the payer and the supporting documents".

"Tax examiners and auditors must, at all times, perform their duties by the laws, policies, and procedures that apply in their country" (OECD, 2013, p:2).

The performance of tax administrations was debated and analysed in Paris in 2020 when a document entitled "Digital transformation of tax administration" was drawn up under the auspices of the OECD. In this material, reference is also made to the fiscal control activity subject to the digitization era, identifying the following stages (OECD, 2020, p:58):

1. Tax inspectors evaluate the activity carried out by taxpayers in a random way. The fiscal inspection is carried out on types of taxes and charges according to specific strategies. Software provided by hardware suppliers as digital partners is used.
2. A tax compliance risk is detected as a result of automated anomaly detection programs. Fiscal control comes in the analysis of these anomalies, focusing on all aspects made available by the analysed taxpayer.
3. The establishment of the tax burden is done following an analysis of the data provided and analysed by various tax bodies through tax information exchange networks.
4. Having compliance support ensures quality, improves tax certainty, and reduces the need for tax inspections.
5. An ecosystem with a high level of trust is pursued. The tax administration must provide clear and precise information so that tax collection is ensured.

For the existence of an efficient and fair tax system, the increase in tax revenues must be achieved without discouraging economic activities (Coman Linţa 2021, Pîrvu et al. 2021) through collaboration and fiscal guidance between inspectors and taxpayers.

At the European level, each country has adopted a tax policy appropriate to its needs, so tax control has acquired various values, but there are several similarities, but also differences in terms of tax control carried out in different states.

Tax control activity was defined, in the EU member states studied, as activities routinely carried out by revenue authorities to check whether taxpayers have properly reported their tax liabilities. The main verification activity undertaken by the revenue bodies is usually described by the term "audit" or "control" ("tax audit" or "taxes control").

Revenue bodies, as the institutions with fiscal control attributions, which are called by the Organization for Economic Cooperation and Development (O.C.D.E., 2021, p. 353), carry out, in addition to specific auditing activities, various other activities, such as, telephone surveys and scoring tax returns, which may lead to changes in taxpayers' obligations compared to those reported by them.

The analysis of the specialized literature, regarding the studies on the impact of fiscal control activity, involved the completion of a stage of extracting relevant articles for the topic addressed from the Web of Science, Springer, Scopus, and Elsevier databases. We used relevant keywords as a selection method, but also the period of appearance of the articles, respectively we considered relevant materials published in the period 2014 - 2022.

A first review of the search results allowed me to observe that most of the analysed studies offer research on the relationship between fiscal control activity and fiscal compliance. Some authors such as Mendoza (2017), and Chalu and Mzee (2018) argue that a higher level of tax controls leads to higher levels of tax compliance. These researches focused on the number of fiscal control actions per 100 taxpayers and fiscal compliance. The authors argue that the tested data series indicate a "U" shaped association between tax control and tax evasion.

The efficiency of fiscal controls was approached through the lens of fiscal compliance after the checks were performed. Kasper (2022), as well as Beer et al. (2020), suggest that as a result of effective tax audits in which undeclared tax revenues have been identified, lead to future tax compliance. Their research investigates the effectiveness of fiscal control activity through fiscal compliance that occurs after the audit. At the same time, the studies indicated that the efficiency of fiscal controls also depends on the taxpayer's behaviour in terms of prior reports. Also, "more pedagogical approaches in the case of taxpayers, to ensure tax education at the expense of the application of sanctions, are factors that lead to an increase in tax compliance (Ban and Rusu, 2019), but the tax system must ensure that all taxpayers contribute to the formation of budget revenues. (where does the quote end?).

On the one hand, analysing the increase in tax compliance depending on the type of tax control, Erard (2019), Kotsogiannis (2021), and Salmina (2015) conclude that direct audits carried out at the taxpayer's headquarters positively influence future tax compliance, while a check of the office tends to have a negative effect. Contrary to them, D'Agosto et al. (2021) argue that office-based fiscal control is most effective at the expense of field checks. For Nigeria, Olatunji Olaoye (2018) calls for an intensification of desk audits and audits because both contribute greatly to keeping tax evasion under control and increasing tax compliance.

On the other hand, there are opinions from a few authors regarding which fiscal controls do not in any way influence the degree of fiscal compliance with the conditions where the selection criteria of taxpayer subject to verification are known (Alm, 2019; Alm and Kasper, 2021). Tabakan et al. (2021) highlight, based on a logistic regression analysis, the fact that the activity of fiscal control along with the fiscal amnesty, tax rates, and, fiscal information have significant effects on the voluntary compliance of taxpayers. Thus, the study carried out by the mentioned authors concludes that an increase in tax control activity leads to a decrease in tax compliance,

but also the fact that the sample used felt negatively affected by the tax checks carried out.

Irawan and Utama (2021), using a panel data regression method with a fixed effect model, explain the impact of tax control activity on tax evasion. Their claims assume that the impact of tax control activity is insignificant for tax evasion, and corruption significantly increases tax evasion and undermines the benefits of a tax audit. Mustaqiim (2020), following econometric research, concluded that, in the period 2016-2018, in Indonesia, the impact of fiscal control is positive on tax avoidance practices, with an increased level of auditing leading to a decrease in tax evasion. For states such as Jordan (Qatawneh and Alqtish, 2021), Kazakhstan (Serikov et al., 2020), Nigeria (Olaoye et al., 2019, Adediran, 2013) and Italy (Mazzolini, 2021), statistical data was analysed and a direct correlation between tax revenues and the audit activity of the state. According to the research, the increase in the level of state audit provides an increase in tax revenues. Using classical ordinary least square regression, Olaniyi and Ilesanmi (2019) developed previous research and concluded that tax revenues are higher during the tax audit period (2010-2016) than during the pre-tax audit period (2003-2016). Clive S. Lennox et al. (2015), following the research carried out on the controls made in China, claim that tax revenues increase post-tax checks, with taxpayers trying to avoid tax evasion penalties in the future. D'Agosto et al. highlights the effect of tax controls on tax compliance in 2021 through the work "Tax audits and tax compliance," which highlights the effect of tax controls on tax compliance according to various types of taxes (VAT, profit tax, and regional business tax) and the type of tax inspection used (full/partial office tax check, total/partial field tax check).

The conclusions of the study carried out for the period 2006-2011 on the tax controls carried out in Italy highlight the fact that following tax checks, the most significant increase in income is achieved in VAT, followed by profit tax and regional business tax. Research on the impact of fiscal control following a VAT refund shows restraint in the taxpayer's economic development, a fact that leads to a decrease in budget revenues. Simultaneous control of VAT refunds is required (Kmetova et al., 2017). For Indonesia, following a study covering the period 2015-2019, Fitriyani (2020) concludes that the tax inspection has a positive but insignificant effect on VAT revenues. A recent study by Mu R. (2022) on the Amhara region of Ethiopia showed that VAT auditing and tax education significantly influence tax revenue collection performance.

2. RESEARCH METHODOLOGY

The review of the specialised literature formed the basis of the scientific research that will include the presentation of the fiscal control activity carried out by the EU member states over 6 years, which would ensure a more accurate measurement of the dimensions and highlight the causes and influencing factors that act on it.

The materials and working methods used refer to the analysis of the specialized literature, the analysis of statistical data, economic and mathematical econometric models, analyses of the legislation, analyses of the positions of international bodies, comparative analyses, and empirical analyses. Various statistical, text editing, or graphic software was used as research tools, such as Microsoft Excel

spreadsheets, Microsoft Word processors, and EViews statistical software.

The econometric analysis was used to identify the extent to which certain factors related to the tax control activity influence the level of efficiency of this activity and affect tax collection. VAT is the most important tax revenue, so we aimed to model the influence of fiscal control on this tax.

Since the analysed studies (for example, D'Agosto, 2018, Fitriyani, 2020, Renyan Mu, 2022) were carried out based on the information available at the level of a single state, we considered it appropriate to continue and develop them by increasing the research area at the level of the states EU members by using a uni-criteria regression method, using the EViews 12 software, in which we considered:

- the dependent variable Y= VAT, related to tax revenues, denoted to simplify the application of the EViews program with "VAT vf";
- the independent variable X= VAT, established as a result of the fiscal control, related to the total financial obligations resulting from the budgetary control activity, marked "VAT subtotal control".

This approach is based on a linear regression panel-type econometric model, estimated with the help of the EViews 12 software and interpreted according to the classical econometric theory in the specialized literature. The data collected and presented statistically include information related to the 28 countries over 6 years (2014-2019). For the establishment of the dependent variable Y "VAT vf the data provided by the official "Eurostat" website were used, respectively: value-added taxes (VAT) and total receipts from taxes and social contributions (including imputed social contributions) after deduction of amounts assessed but unlikely to be collected. Regarding the establishment of the independent variable "VAT sup total control," the data communicated by the member states to the OECD were used.

Since some of the 28 countries did not present the necessary information for the entire analysed period, the states that did not submit information for all 6 years were eliminated from the research sample, and the arithmetic mean of the other years was used to reconstruct some annual information. 17 countries remained in the research: Austria, Bulgaria, Cyprus, Croatia, Denmark, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Malta, Poland, Portugal, Romania, and Slovakia.

To obtain a linear regression equation, I ordered the information in the Excel computer program in a panel form. Each piece of information was ordered vertically for all 6 years analysed, horizontally written the indicators on which we looked for the economic correlation.

3. THE RESULTS OF FISCAL CONTROL ACTIVITY IN THE VAT FIELD

The econometric model analysed took into account the dependent variable Y= the share of VAT revenues in the total tax revenues (" VAT vf") and the independent variable marked X= the share of VAT additionally established in the total of additional tax obligations established following the fiscal control (VAT subtotal control).

According to the statistics of the model (fig. 1.1. Econometric panel model), the size of the panel is represented by the data on 17 EU member states, over a period of 6

chronological calendar years, resulting in a number of 102 observations.

As a first step, we tested the linearity, this being a satisfied hypothesis according to the graph (Fig no. 1.2. Graphic representation vat vf/vat suptotalcontrol), which shows the connection between the variable Y-vat vf and the variable Xi-vat suptotalcontrol

The correlogram obtained from the data clearly reveals a standard linear model:

yi=α+β(xi)+εi, with

where:

i=1,2,...,n

yi= dependent variable

xi= independent variable

α = coefficient of the model to be identified (meeting point of the regression function with the Oy axis). The parameter α indicates the value of the variable yi when the factorial variable xi is zero

β= the regression coefficient to be identified representing the slope of the regression line, i.e. the elasticity of yi depending on xi

εi= (ε; ε2;...εn) residual variable (random or of the rest of non-essential factors, with random action).

Considering the variables on which we looked for the econometric regression model, the equation takes the following shape:

tvavf i=α+β (tvasuptotalcontrol)+εi,

Workfile structure: panel-Annual		
Panel dimension:17X6		
Range:2014 2019X17 102 obs		
Object	Count	Data Points
series	5	510
alpha	1	102
coef	1	750
TOTAL	7	1362

Fig no. 1.1. Panel econometric model
Source: own creation of the Eviwes 12 program

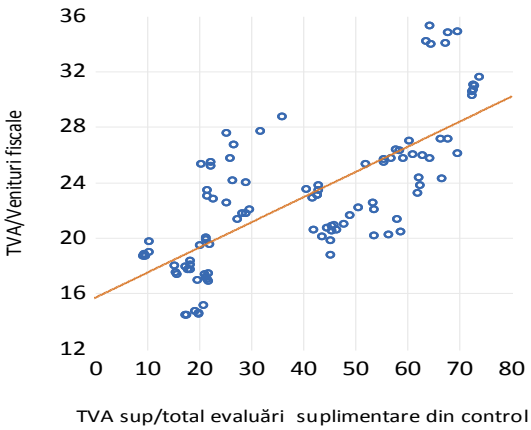


Fig no. 1.2. The link between the variable Y-tvavf and the variable Xi-tvasuptotalcontrol
Source: own creation of the EViews 12 program

where i=2014, 2015, 2016, 2017, 2018, 2019 (n =6), and the values of the parameters α and β are positive according to the graphic image.

Individually, the distribution of the variables used is as follows:

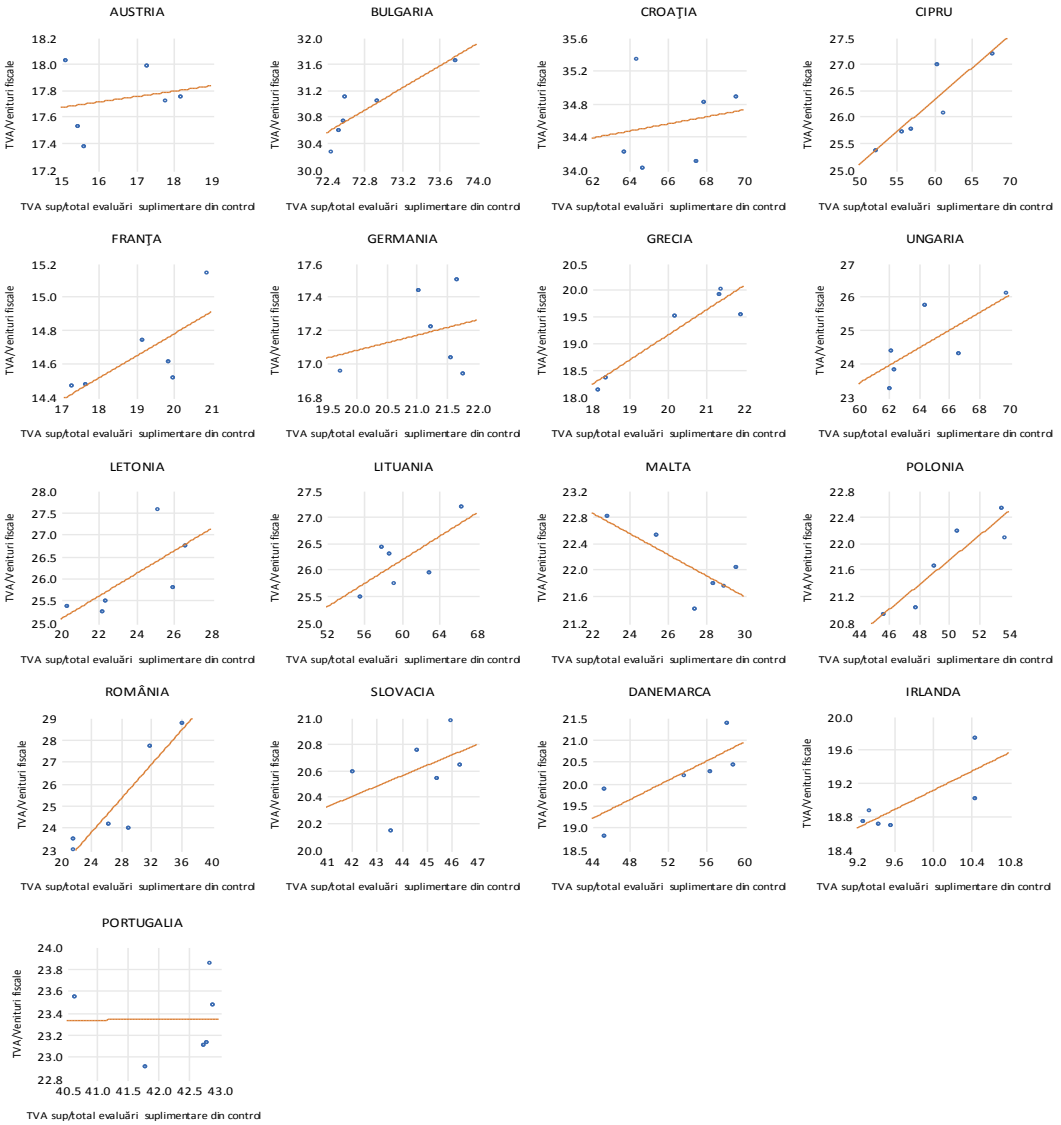


Fig no. 1.3. Individual graphic tvavf/ tvasuptotalcontrol

Source: own creation of the EViews 12 program

Using the EViews 12 program generates the unifactorial linear regression evaluation shown in Fig no. 1.4. "Evaluation of results":

Dependent Variable: TVAVF				
Method Panel Least Squares				
Sample: 2014 2019				
Periods included: 6				
Cross-sections included: 17				
Total panel (balanced) observations: 102				
Variable	Coefficient	std.Error	t-Statistic	Prob.
C	**15,68671**	**0.761056**	**20,61178**	**0,0000**
TVASUPTOTALCONTROL	**0.181312**	**0.017072**	**10,62029**	**0,0000**
R-squared	0,530054	Mean dependent var		22,91206
Adjusted R-squared	0,525355	S.D. dependent var		5,000365
S.E. of regression	3,444975	Akaike info criterion		5,331124
Sum squared resid	1186,786	Schwarz criterion		5,382594
Log-likelihood	-269,8873	Hannan-Quinn criteria		5,351966
F-statistic	1127906	Dublin-Watson stat.		0,046012
Prob(F-statistic)	0,00000			

Fig no. 1.4. Evaluation of results
Source: own creation of the EViews 12 program

The estimators of the model parameters take the following shape:

yi=α+β(xi)+εi, transformed into VAT vf i=α+β (tvasuptotalcontrol i)+εi

or tvavf i= 15.68671 + 0.181312 (tvasuptotalcontrol i)+ εi

The computer program generates the regression equation:

TVAVF = 15.686711751 + 0.181311894583 * TVASUPTOTALCONTROL

To accept the linear regression model, we proceeded to test its assumptions and analysed:

- **the intensity of the model**

Analysing the direct connection between the variables, it is observed that it is of moderate intensity, 53% (R-squared), so the model is accepted as the indicator shows a direct dependence between the variables. It is thus noted that VAT receipts, at the level of the states in the sample, are influenced by the level of VAT additionally established by the fiscal inspection bodies. The influence is positive because the β indicator is positive.

- **the validity of the model**

I consider hypothesis H0: in which the model is not statistically valid (X independent variable, the VAT established in addition to the control activity does not influence the variable Y, the level of VAT in the total tax revenues)

The second hypothesis H1 represents a statistically valid model (X - the independent variable VAT established additionally by the

control activity influences the variable Y- the level of VAT in the total tax revenues).

We evaluated the F-test by comparing the calculated F (test statistic) with the tabulated values of the Fisher–Snecor distribution.

If Fcalculat>Fcritical I will reject H0 and accept H1.

The regression model generated by Eviews shows a Fcalculated= 112.79 for a significance level of 0.05.

Fcritic = 27,587 (Egner, T., 2019)

Since 112.79 > 27.587, I reject hypothesis H0 and accept hypothesis H1, the generated regression model being statistically valid at a significance threshold of 5%.

- **the absence of measurement errors in the observed values Xi is verified by validating the relationships**

$x \in (X \pm 3\sigma x)$ şi $y \in (y \pm 3\sigma y)$.

	TVASUPL	TVAVF
Mean	39,85036	22,91206
Median	42,36176	22,36629
Maximum	73,75799	35,34551
Minimum	9,261617	14,47008
Std. Dev.	20,0787	5,000365
Skewness	0,143846	0,59047008
Kurtosis	1,585785	2,938359
Jarque-Bera	8,851773	5,943389
Probability	0,011964	0,051216
Sum	4064,736	2337,03
Sum Sq. Dev.	40718,58	2525,368
Observations	102	102

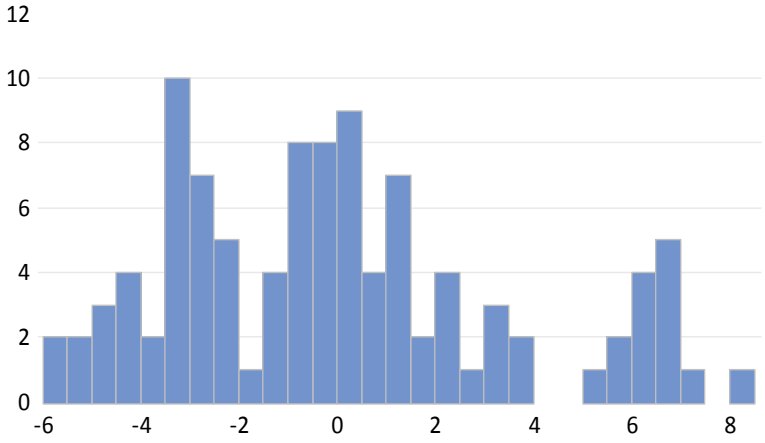
Fig no. 1.5. Measurement errors
Source: own creation of the EViews 12 program

The validation $x \in (X \pm 3\sigma x)$ is realized by 39.85036 ± 3*20.07870, respectively (20.38574; 100, 8646) and captures inside it all the values of yi (TVAVF).

The validation of $y \in (y \pm 3\sigma y)$ is realized by 22.91206 ± 3*5.000365, respectively (-7.910965; 37.913155) and captures inside it all the values of xi (TVASUPTOTALCONTROL).

The assumption regarding the absence of measurement errors in the observed values xi and yi is practically satisfied by capturing all these values in the calculated intervals.

- Through d**escriptive statistics,** it is verified whether its average tends rapidly to zero or is even equal to zero (Fig. 1.6 Average model deviations):



Series: Standardized Residuals
Sample 2014 2019
Observations 102

Mean	5.08e-15
Median	-0.311800
Maximum	8.005925
Minimum	-5.886500
Std. Dev.	3.427879
Skewness	0.551492
Kurtosis	2.582730
Jarque-Bera	5.910421
Probability	0.052068

Test for Equalitv of Medians Between Series					
Sample: 2014 2019					
Included observations: 102					
Method	df	Value	Probability		
Wilcoxon/Mann-Whithey		5,392728	0,00000		
Wilcoxon/Mann-Whithey(tie-adj.)		5,392729	0,00000		
Med. Chi-square	1	17,64706	0,00000		
Adi. Med Chi-square	1	16,49020	0,00000		
Kruskal-Wallis	1	29,09430	0,00000		
Kruskal-Wallis(tie-adj.)	1	29,09432	0,00000		
var der Waerden	1	25,41474	0,00000		
Category Statistics					
Variable	Count	Median	Median	Mean Rank	Mean Score
TVAVF	102	22,36629	36	80,20588	-0,345919
TVASP	102	42,36176	66	124,7941	0,345919
ALL	204	24,25695	102	102,5000	-2,64E-07

Fig no. 1.6. Average model deviations
Source: own creation of the EViews 12 program

We get the relation: $5{,}08*10^{-15,}$

The unifactorial linear regression econometric model is accepted, as its mean tends to be 0.

- **The homoscedasticity/heteroscedasticity of the model** (constant variation of the residual variable in relation to any value of the variable xi). The signal of homoscedasticity or heteroscedasticity is identified using the LR test (Fig. 1.7 Homoscedasticity of the model):

Panel Cross-section Heteroskedasticity LR Test
Equation: UNTITLED
Specification: TVAVF C TVASUPTOTALCONTROL
Null hypothesis: Residuals are homoskedastic

	Value	df	Probability
Likelihood ratio	119.4658	17	0.0000

LR test summary:

	Value	df
Restricted LogL	-269.8873	100
Unrestricted LogL	-210.1544	100

Unrestricted Test Equation:
Dependent Variable: TVAVF
Method: Panel EGLS (Cross-section weights)
Date: 06/08/22 Time: 23:10
Sample: 2014 2019
Periods included: 6
Cross-sections included: 17
Total panel (balanced) observations: 102
Iterate weights to convergence
Convergence achieved after 8 weight iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.76615	0.239666	65.78380	0.0000
TVASUPTOTALCONTROL	0.175565	0.005043	34.81416	0.0000

Weighted Statistics

R-squared	0.923782	Mean dependent var	65.96569
Adjusted R-squared	0.923020	S.D. dependent var	70.66967
S.E. of regression	3.450234	Akaike info criterion	4.159891
Sum squared resid	1190.412	Schwarz criterion	4.211361
Log likelihood	-210.1544	Hannan-Quinn criter.	4.180733
F-statistic	1212.026	Durbin-Watson stat	0.412396
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.528618	Mean dependent var	22.91206
Sum squared resid	1190.412	Durbin-Watson stat	0.045065

Fig no. 1.7. Homoscedasticity of the model
Source: own creation of the EViews 12 program

Graphically, the situation is as follows:

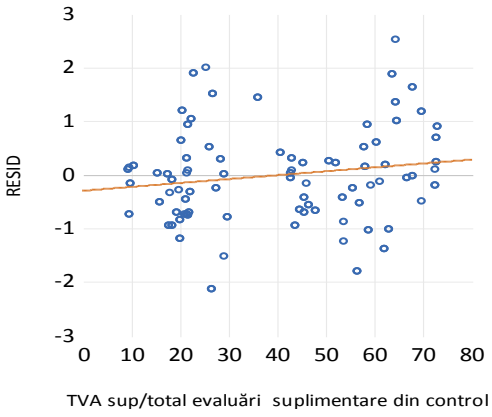


Fig no. 1.8. residual value in relation to variable x
Source: own creation of the EViews 12 program

It is found that the two variables are correlated, respectively while the variable xi (observed on the abscissa) increases and ε̂i (observed on the ordinate) increases, the hypothesis of homoscedasticity cannot be accepted, but the alternative hypothesis of heteroscedasticity of the model is accepted as it results and from the LM test provided by the EViews program.

The EViews program uses the Jarque-Bera test, which asserts the normality of the residual series generated by the model at any probability associated with the test (0.05). According to distribution χ 2, the critical value of the Jarque-Bera test for a statistical significance level of 0.05 is 5.99 and the calculated JB statistic for the series of values of the residual variable is 5.91(Fig no. 1.9 Average deviations of the VAT model) less than 5.99, so the null hypothesis is accepted with a confidence level of 95 cases out of 100.

According to the generated regression model, Jarque-Bera= 5.91, and Probability= 0.052, the residuals have a normal distribution.

We consider the hypothesis:

H0: β =0 (where the slope parameter β is not statistically significant)

H1: β ≠0 (with the statistically significant β slope parameter)

In this case, I reject the initial hypothesis H0, the slope parameter β being statistically significant (H1 accepted).

From the ANOVA table (Fig. 1.10 Residual values) we distinguish the confidence interval: (0.14744112< β < 0.215182677).

In this case, with a long-term 95% confidence coefficient, for 95 out of 100 cases, the calculated range (0.14744112< β < 0.215182677) will include the true value of the β parameter.

Referring to the statistical tables related to the Durbin – Watson tests with two tabular values with a significance threshold of 0.05 (Egner, T., 2019), one lower and one higher, where n is given by the number of state variants (17) and K the number of exogenous variables (1), the information is obtained:

$d_L = 1.33$ *and* $d_2 = 1.391$.

We have the following assumptions:

-0 < d < d1 identifying a positive autocorrelation;

-d1 ≤ d ≤d2 indecisive, the test is not conclusive (it is at the limit of positive autocorrelation);

-d2 < d < 4 − d2 errors are independent;

-4−d2 ≤ d ≤ 4−d1 indecision, the test is not conclusive (it is at the limit of negative autocorrelations);

By comparison, it is found that the Durbin–Watson test is not verified, since the calculated value of the test, dc = 0.046 is outside the level d1(1.33), being in the case of the first hypothesis.

Since the hypothesis of independence was not verified, we proceeded to correct it.

To correct the econometric model, we used the following correction algorithm:

Regression function: t = r t-1 + ut, where: r is the slope of the regression function and it is the disturbance related to this function.

With the help of the Excel program, we obtain the residual values.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,72804841							
R Square	0,530054487							
Adjusted F	0,525355032							
Standard E	3,444975411							
Observatio	102							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regressio	1	1338,582866	1338,582866	112,7906264	4,33882E-18			
Residual	100	1186,785559	11,86785559					
Total	101	2525,368424						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	15,68671175	0,76105553	20,61178341	8,79385E-38	14,17679926	17,19662425	14,17679926	17,19662425
TVA sup/t	0,181311895	0,017072212	10,62029314	4,33882E-18	0,147441112	0,215182677	0,147441112	0,215182677

Fig no. 1.11. Residual values

Source: own creation in the Excel program

The slope of the regression function, r, was determined using the relationship:

$$r = \frac{\sum_{t=2}^{n} \varepsilon_t \cdot \varepsilon_{t-1}}{\sum_{t=1}^{n} \varepsilon_t^2} = 987,3376/\ 1186,786 = 0,831943$$

The analysed econometric model is valid for any moment considered, at moment t – 1 the relationship is valid: TVAVF t = α+β TVASUPTOTALCONTROL t-1 + t-1

The corrected function was obtained by multiplying the equation by r and subtracting it from the original model equation:

$VAT\ VF_t^* = \alpha \times (1 - r) + \beta \times TVA\ SUPTOTALCONTROL_t^* + u_{t,}$

where: $VAT\ VF_t^* = VAT\ VF_t - r \times TVAVF_{t-1}$;

$VATSUPTOTALCONTROL_t^* = TVASUPTOTALCONTROL_t - r \times TVASUPTOTALCONTROL_{t-1}$; $u_t = e_t - e_{t-1}$

With the help of the computer program EViews 12, we obtained the corrected variables, using the correction coefficient r=0.0.83, respectively:

-TVASUPTOTALCONTROL 1 is the corrected independent variable;

-TVAVF1 is the corrected dependent variable.

The new corrected model shown in figure 1.12 is obtained. “Corrected VAT model”:

Dependent Variable: TVAVF1				
Method Panel Least Squares				
Sample: 2015 2019				
Periods included: 5				
Cross-sections included: 17				
Total panel (balanced) observations: 85				
Variable	Coefficient	std.Error	t-Statistic	Prob.
C	2,934766	0,17192	17,07051	0,0000
TVASUPTOTALCONTROL	0,140309	0,02033	6,90167	
R-squared	0,364632	Mean dependent var		3,918575
Adjusted R-squared	0,356977	S.D. dependent var		1,105000
S.E. of regression	0,886085	Akaike info criterion		2,619241

Sum squared resid	65,16717	Schwarz criterion	2,676715
Log likelihood	-109,3177	Hannan-Quinn criter	2,642358
F-statistic	47,63301	Dublin-Watson stat.	1,396933
Prob(F-statistic)	0,00000		

Fig no. 1.12. The corrected model
Source: own creation in the EViews 12 program

In this case, the Durbin–Watson test check is confirmed d_c = 1,396, the hypothesis of autocorrelation of the random variable is rejected. The econometric regression function is statistically correct. The values of the random variable are independent of each other, and the data in the sample are independent.

Following the correction of the random variable, the regression equation of the model becomes:

TVAVF = 2,9347 + 0.140309*TVASUPTOTALCONTROL

In this case, the value of the parameter α (2.934) shows the influence that VAT has additionally established by the control bodies as a weight in the total of additional financial obligations on the collection of VAT revenues in the total tax revenues and the value of the parameter β (0.140309) shows the regression slope.

It is thus noted that, with an average increase of one percentage point in the VAT weight additionally established by the fiscal control bodies in the total additional fiscal obligations, an increase in the VAT receipts in the total fiscal income of 0.140309% is obtained.

CONCLUSIONS

The tax control activity offers valuable support in increasing the level of information about taxpayers at the level of tax administrations, amending tax legislation as a result of detecting the tax practices of taxpayers who look for and use the weak points of the law, educating and guiding taxpayers, the unitary approach to tax provisions, harmonizing the legislative provisions in the member states, and increasing the degree of fiscal compliance.

The planning of a tax control activity should start from the way of organization within the tax administrations. The approach must have two dimensions in mind. The first one takes place at the headquarters of the fiscal administration and is responsible for the management, monitoring, and analysis of budgetary control. The organizational activity of the headquarters of the fiscal control refers to the development and continuous updating of programs, procedures, and guides for the performance of the fiscal control function, the preparation and implementation of the risk analysis for the selection of fiscally audited persons, the development of annual work plans, the classification, selection and assigning cases for examination based on the annual work plans, allocating the financial and material resources necessary to carry out the fiscal control activity, evaluating the results obtained as a result of the monthly, quarterly and annual reports, ensuring measures and resources for staff training, evaluating employees for the activity of fiscal control carried out.

The second dimension is the operational one, referring to the actual activity of fiscal verification carried out mainly by the taxpayer.

This is the main point of contact between the tax authorities and the taxpayer. The attributions indicate that the tax inspectors assume the responsibilities delegated by the headquarters. Of course, employees with tax control duties who carry out field activity have support from the administrative staff at the headquarters.

The effectiveness of a fiscal oversight task is enhanced by the presence of a concise legislative framework, preventing fiscal interpretations. Fiscal control activity results can lead to the drafting of legislative proposals, the development and obtaining of a lasting fiscal legislative framework, as tested by the solutions pronounced by the court, and also to an increase in the level of training of fiscal inspectors.

We sought to identify the extent to which certain factors related to fiscal control activity influence the level of efficiency of this activity and affect fiscal collection. The analysis of the research carried out in the field of fiscal control activity revealed that the studies were carried out strictly for a certain country. Most of the research aimed to establish the influence of fiscal control on the degree of fiscal compliance. Fiscal control was found to have little influence on the level of fiscal revenue collection.

As part of the fiscal control activity, tracking compliance by taxpayers with their VAT payment obligations is very important. There are periodic fiscal audits on VAT, office audits (desk audits) to comply with certain legal limits, fiscal audits for VAT refunds, cross-border audits regarding intra-community operations, etc.

Thus, through the developed econometric model, we sought to determine the influence of fiscal control on this tax. Previous research on the subject has revealed that the amount of additional VAT established by tax control bodies influences total tax revenues collected at the state level.

We decided to develop this research primarily by widening the study area, namely by extending it to more states and over a longer period. To obtain a uni-criteria regression model, using the EViews12 software, we considered the dependent variable Y= the share of VAT receipts in the total tax revenues, and the independent variable X= the share of VAT established additionally as a result of fiscal control in the total obligations additional taxes.

For the establishment of the dependent variable, the data provided by the official "Eurostat" website were used, and as regards the independent variable, the data communicated by the member states to the OECD were used.

The econometric model used is a linear regression panel model that was estimated using the EViews 12 software and interpreted using classical econometric theory from the specialized literature. The data collected and statistically presented include a variety of information related to the 17 countries that provided information over 6 years (2014-2019). The correlogram obtained from the data revealed to me a positive standard linear model. We obtained a linear regression model with a direct relationship between variables (R-squared) of 53% intensity, which confirms a direct dependence between variables.

The model is a statistically valid (X the independent variable, VAT established additionally following the fiscal control, which influences the Y variable, the level of VAT receipts in the total tax revenues) aspect confirmed by the statistical F test.

The research carried out showed that the share of VAT established by the fiscal

control bodies in the total of additional fiscal obligations is 2,934%. Along with an average increase of one percentage point in the VAT weight additionally established by the tax control bodies in the total additional tax obligations, an increase in VAT collections in the total tax revenues of 0.140309% is obtained.

The obtained econometric model is justified considering the special importance of VAT for the tax systems of the EU member states.

Unfortunately, the study was limited to the data in the field provided by the member states to the OECD. The transmission of data is not mandatory, the information is obtained by completing questionnaires by the tax administrations in each state. Thus, the data were non-existent for some member states under research.

Future research will be able to be carried out based on more complete and accurate data, perhaps taken into account other taxes and charges verified by the fiscal control activity.

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