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EFEKTÍVNOSŤ ZDAŇOVANIA VO VYBRANÝCH ČLENSKÝCH ŠTÁTOCH EURÓPSKEJ ÚNIE

THE EFFICIENCY OF TAXATION IN SELECTED EUROPEAN UNION MEMBER STATES

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Článok analyzuje efektívnosť zdaňovania v nových členských štátoch Európskej únie so zameraním na identifikáciu faktorov, ktoré určujú úroveň výberu daňových príjmov. Vzhľadom na mnohé výzvy, ktorým daňová správa čelí, analýza efektívnosti zdaňovania v nových členských štátoch EÚ odhalila potrebu modernizácie daňovej správy. Taktiež podčiarkla potrebu prijatia niektorých osvedčených postupov efektívnych daňových systémov ako nástrojov implementácie budúcich daňových stratégií. Pre dosiahnutie cieľa článku aplikujeme regresnú analýzu. Analýza efektívnosti zdaňovania sa vykonáva na základe údajov z obdobia rokov 2010 až 2019.
Kľúčové slová: efektívnosť, daňové systémy, výber daňových príjmov, regresná analýza, Európska únia

This paper analyzes the efficiency of taxation in the new member states of the European Union, focusing on identifying the factors that determine the level of tax revenue collection. Given the many challenges the tax administration faces with, the analysis of the efficiency of taxation in the new EU member states revealed the need to modernize the tax administration and to adopt some good practices of efficient tax systems as tools of implementing future tax strategies. To reach the purpose of the paper we apply regression analysis. The analysis of taxation efficiency is performed on the basis of data renge from 2010 to 2019.
Key words: efficiency, tax systems, tax revenue collection, regression analysis, European Union
JEL: C50, H21

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1 INTRODUCTION

Tax revenues have a special importance in the economy of a country, they have not only a financial role but also an economic one. When they are used as levers if the goal is to either stimulate or limit an activity and a social one that manifests itself in the attributions of the state to protect certain social categories. In essence, a sustainable system of collecting budget revenue means constantly improving of voluntary compliance and increasing the efficiency and effectiveness of tax administrations' actions in combating tax evasion.

This paper aims to analyze the efficiency of tax revenue collection in the new European Union (EU) member states (Poland, Czech Republic, Hungary, Slovakia, Slovenia, Estonia, Latvia, Lithuania, Bulgaria, and Romania) and to achieve an econometric modeling of the correlation between the tax efficiency index and the share of tax revenues in gross domestic product (GDP) in the new EU member states by tax revenue categories, to determine whether collection issues can be explained by the efficiency of the collection process. The theoretical foundation of the researched problem was created by applying some general empirical research methods. We apply the analytical method, through which we reached the essence of the researched problem, the synthesis method, used to establish connections between the researched phenomena, and graphical objects in order to expose and interpret the studied economic phenomena and processes. The indicator this study was based on is the efficiency index, calculated as the ratio between the default tax rate and the legal rate.

The results of the research provide an overview of the efficiency of the taxation in the new EU member states, offering the opportunity to take good practices from each other. According to current studies, the digital contact channels, which allow the online filing of tax returns, as well as their online payments, the proactive approach to managing non-compliance risks (such as the introduction of electronic invoicing) and some measures to increase taxpayer confidence in tax administration are features of an efficient tax system. At the same time, the existence of a partnership between the tax administration and the taxpayers, the simple and friendly tax procedures and the modern and complete services provided qualify a tax system in the category of efficient ones.

2 LITERATURE REVIEW

Tax revenues are particularly important in economy both financially and economically, since they are used as levers to stimulate or limit an activity; their social role results from the attributions of the state to protect certain social categories. The state authorities collect tax revenues in order to meet the general interest needs. Most of the tax revenues are directed to finance important areas to ensure the highest possible level of well-being for the population, such as: education, health care, social

protection, infrastructure, etc. Organisation for Economic Co-operation and Development (2014) states the efficiency of taxation assumes that „compliance costs to business and administration costs for governments should be minimised as far as possible“.

The fiscal policy of any state aims at achieving economic, social and political objectives. The ensuring efficiency of taxation is an important objective of the state. The efficiency of taxation minimizes the cost of compliance and minimizes distortions in the economy caused by taxes (Raimondos and Woodland 2004, Hudson and Teera 2004, Clemens et al. 2007, Langford and Ohlenburg 2016). Thus, an efficient fiscal system contributes to achieving the objectives of fiscal policy.

The tax revenue collection involves administrative costs and influences the economic activities and processes in member states, so that the European Commission considers it pertinent to ask: how can we collect a certain level of tax revenues in a way that maximizes the social welfare and minimizes the possible unwanted distortions, given the two objectives are not mutually exclusive (European Commission 2021, p. 16). The tax authorities play an important role in achieving the above objectives since they should collect sufficient revenue to cover the public spending and ensure that all taxpayers contribute to the government funds (Ban and Rusu, 2019).

The specialized literature shows that an efficient and correct fiscal system should generate revenue increase from fiscal incomes, without discouraging the economic activities (Fauvelle-Aymar 1999, Wahl et al. 2010, Lames 2012, Lisi 2015, Hammerschmid et al. 2016, Pantamee and Mansor 2016, Pîrvu et al. 2021).

The efficiency of a tax system is evaluated in terms of the high degree of tax revenue collection, given the low costs for the taxpayers and the tax administration. Therefore, it is necessary to study the performance of collected tax revenues, to improve the tax revenue management both by analyzing the methodologies of assessing the fiscal potential and by identifying new ways to solve the problems related to their collection system. The actual economic and social circumstances, characterized by instability and uncertainty, require even more efficiency of taxation. Numerous studies have highlighted the digitization as the main method that would lead to improved tax revenue collection, combating tax evasion and fraud, and increasing tax compliance (Gupta et al. 2017, Pinto et al. 2017, OECD 2018).

3 DATA AND METHODOLOGY

The research methodology is based on a quantitative approach, corresponding to the issues investigated in the paper. Quantitative research was based on the centralization, processing and analysis of a large volume of relevant data. To perform the econometric modeling, we used the regression method between the tax efficiency index on the four types of tax revenues analyzed in the report (value added tax, social

security contributions, corporate income tax, personal income tax) as an independent variable and the share of tax revenues in GDP on the four four types of tax revenues as a dependent variable. The analysis was made for each of the countries in the new member state group for the period 2010–2019.

The demo version of EViews 11.0 Enterprise Edition for Windows software was used as a technical tool in the econometric modeling process. The general matrix form of the regression model used is described by the relation:

$$Y = \alpha + \beta X + \mathcal{E} \tag{1}$$

Where Y is the dependent or endogenous variable (the share of budget revenues in GDP) of size 1×t, X is the matrix of independent or exogenous variables of size k×t; β is the vector of the coefficients of size k×1, and $\mathcal{E}$ is the error variable.

First we defined the regression models from the different scenarios and we used the functions implemented in the Eviews 11.0 program to perform the validation tests – F statistic for model validation, Durbin Watson statistic for error autocorrelation testing, and Jarque Bera for residual series normality testing. The hypotheses formulated are:

- *H0* – the distribution is normal,
- *H1* – the distribution is not normal.

The probability of the Jarque-Bera test > 0.05 results in accepting the data coming from a normal distribution. The interpretation of the Kurtosis flattening coefficient is:

- K> 3 => a leptokurtic distribution,
- K=3 => a normal distribution,
- K<3 => a platykurtic distribution.
-

When using the regression model, Eviews provided the following information for each of the types of tax revenues analyzed, of which we will interpret the most relevant indicators.

4 RESULTS

From the point of view of the efficiency index of value added tax collection for the new EU member states in 2019, Romania registered the lowest value (0.68), away from countries such as Estonia (0.98), Hungary (0.98), Slovenia (0.98), Bulgaria (0.92), Czech Republic (0.87) or Poland (0.82) (Table 1).

Table 1: Taxation efficiency index (value added tax)

Country	Taxation efficiency index									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
BG	0.72	0.71	0.70	0.75	0.74	0.84	0.91	0.87	0.9	0.93
CZ	0.68	0.69	0.72	0.71	0.74	0.83	0.85	0.86	0.86	0.87
EE	0.83	0.82	0.84	0.81	0.84	0.94	0.95	0.97	0.97	0.98
LV	0.50	0.49	0.54	0.56	0.58	0.65	0.67	0.69	0.74	0.75
LT	0.58	0.59	0.58	0.57	0.57	0.64	0.63	0.65	0.66	0.69
HU	0.64	0.64	0.63	0.63	0.69	0.91	0.86	0.91	1.00	0.98
PL	0.55	0.55	0.50	0.49	0.50	0.70	0.71	0.77	0.82	0.82
RO	0.56	0.54	0.55	0.56	0.52	0.71	0.72	0.7	0.68	0.68
SI	0.75	0.72	0.71	0.74	0.73	0.97	0.98	0.95	1.00	0.98
SK	0.57	0.58	0.52	0.56	0.59	0.67	0.71	0.73	0.73	0.76

Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

In the ranking of taxing efficiency, Romania occupied the last position in 2019, compared to the penultimate one in the previous year, Slovenia being the one that occupied the last position in 2018–2019.

However, it should be noted that this ranking must be interpreted considering the structural differences of the analyzed states because in Romania, for example, the population living in rural areas represents an important percentage of the self-consumption component and therefore the non-taxable peasant market impacts the value of this index. At the same time, we notice that, starting with 2016, compared to the other new member states, Romania has registered the lowest weighted average quota, a fact generated by the reduction of the standard quota (Table 2).

Table 2: Taxation efficiency (value added tax)

Country	Weighted average value added tax rate (%)			Default tax rate* (%)		
	2017	2018	2019	2017	2018	2019
BG	17	16.9	16.7	14.8	15.2	15.6
CZ	18.8	18.8	18.7	16.2	16.2	16.3
EE	18.6	18.6	18.6	18	18	18.2
LV	19.5	19.3	19.2	13.5	14.3	14.5
LT	19.3	19.2	19.1	12.6	12.6	13.1
HU	20.7	19.9	20.4	18.9	19.9	20
PL	17.3	17.1	17.1	13.3	14	14
RO	14.1	14.5	14.2	9.9	9.9	9.7
SI	16.3	15.9	15.9	15.9	15.9	15.7
SK	17.1	17.3	17.1	12.6	12.6	12.9

Note: * – determined by reporting the VAT income to final consumption of households and IFSLSG.

Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

In this context, the value added tax revenues accounted for 6.2% of GDP in Romania in 2019, compared to 9.7% in Hungary, 9.3% in Bulgaria, 8.9% in Estonia, 8.1% in Slovenia, 8% in Poland or 7.7% in the Czech Republic. Romania also recorded a weighted average value added tax rate of 14.2%, compared to 20.4% in Hungary, 18.7% in the Czech Republic, 18.6% in Estonia, 17.1% in Poland, 16.7% in Bulgaria and 15.9% in Slovenia (Fiscal Council, 2019).

After checking the distribution of variables, the share of value added tax in GDP (% value added tax of GDP) and the index of efficiency of taxation for value added tax (tax efficiency index – value added tax) we found the values K = 2.644854 (a platykurtic distribution of the variable close to the normal distribution), respectively K = 4.612934 (a leptokurtic distribution of the variable close to the normal distribution). The probability of the Jacque-Bera test > 0.05 means that we accept the data coming from a normal distribution.

In the case of value added tax, the result of the regression shows that there is a significant relationship between the efficiency index of value added tax (VAT) taxation and the share of value added tax revenues in GDP. The following table shows the result of the model validation test:

Table 3: Result of the model validation test – relationship between VAT share to GDP and tax efficiency index-VAT

Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
% VAT of GDP	5.315467	0.393315	13.51452	0.0000
Tax efficiency index-VAT	3.548855	0.531446	6.677729	0.0000
R-squared	0.312725	Mean dependent var		7.893000
Adjusted R-squared	0.305712	S.D. dependent var		0.906793
S.E. of regression	0.755576	Akaike info criterion		2.297124
Sum squared resid	55.94771	Schwarz criterion		2.349228
Log likelihood	-112.8562	Hannan-Quinn criter.		2.318212
F-statistic	44.59207	Durbin-Watson stat		2.244007
Prob (F-statistic)	0.000000			

Source: processed by author.

P-value is less than 0.05 which indicates that the regression coefficients are statistically significant. R-squared has a value of 0.312725 which means that the dependent variable – the efficiency index of VAT collection – explains in proportion of 31.27% the dependent variable, respectively the share of value added tax revenues in GDP. Thus, we can appreciate that there is a moderate link between the endogenous variable and the exogenous variable. Prob. (F-statistic) 0.00000 < 0.05 indicates that the statistical link between the independent and the dependent variable is significant.

Since the probability associated with Jarque-Bera statistics is 3.679973> 0.05, we accept *H0*, so the residues have a normal distribution. Hence the distribution of the

residue series is: the value of the Jarque-Berra statistics suggests a normal distribution in terms of asymmetry and flattening.

The lowest efficiency index of the corporate income tax in 2019 was recorded in Latvia, and the highest reduction was recorded in Hungary, from 0.36 in 2018, to 0.32 in 2019, generated by the decrease of the corporate income tax rate from 19% in 2017 to 9% in 2018 and 2019 (Table 4).

Table 4: Taxation efficiency index (corporate income tax)

Country	***Taxation efficiency index***									
	2010	***2011***	***2012***	***2013***	***2014***	***2015***	***2016***	***2017***	***2018***	***2019***
BG	0.42	0.38	0.37	0.44	0.44	0.46	0.46	0.49	0.50	0.51
CZ	0.36	0.37	0.37	0.34	0.35	0.35	0.37	0.38	0.39	0.37
EE	0.16	0.14	0.17	0.20	0.22	0.27	0.24	0.19	0.25	0.24
LV	0.14	0.19	0.21	0.23	0.24	0.24	0.27	0.25	0.11	0.11
LT	0.14	0.11	0.17	0.18	0.18	0.21	0.24	0.22	0.23	0.24
HU	0.14	0.14	0.16	0.15	0.17	0.22	0.30	0.55	0.36	0.32
PL	0.21	0.22	0.22	0.18	0.18	0.19	0.19	0.24	0.27	0.25
RO	0.23	0.23	0.19	0.19	0.20	0.22	0.22	0.25	0.27	0.26
SI	0.27	0.24	0.20	0.19	0.19	0.23	0.25	0.25	0.28	0.30
SK	0.26	0.25	0.24	0.24	0.27	0.34	0.32	0.34	0.33	0.32

Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

In the period 2018–2019, the reduction of taxation efficiency in the case of corporate income tax can be observed in 6 of the 10 analyzed countries (Table 5).

Table 5: Taxation efficiency (corporate income tax)

Country	***Standard corporate income tax rate (%)***			***Default tax rate* (%)***		
	2017	***2018***	***2019***	***2017***	***2018***	***2019***
BG	10	10	10	4.9	5.0	5.1
CZ	19	19	19	7.1	7.4	7.0
EE	20	20	20	3.9	5.1	4.8
LV	15	20	20	3.7	2.3	2.2
LT	15	15	15	3.2	3.4	3.6
HU	9	9	9	5.0	3.3	2.9
PL	19	19	19	4.6	5.2	4.7
RO	16	16	16	4.0	4.3	4.2
SI	19	19	19	4.8	5.2	5.8
SK	21	21	21	7.2	6.9	6.7

Note: * – determined by reporting the current taxes paid by enterprises on income, wealth, etc. to the government and the rest of the world to the gross operating surplus.
Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

In most new member states, the corporate sector recorded a relatively low competitiveness over a long period of time. And the situation remained the same, with companies postponing their efforts to increase their competitiveness and because they knew that any surplus revenue would somehow have been confiscated later through taxes. Thus, the informal economy expanded, with companies opting to expand their activities in the gray area of the economy, which led to a decrease in the budget revenues (Directorate-General for Taxation and Customs Union, 2019).

After checking the distribution of variables, the share of the corporate income tax in GDP (% corporate income tax of GDP) and the index of efficiency of taxation for corporate income taxes (tax efficiency index corporate income tax) we have found value K = 2.802312 (a platykurtic distribution of the variable close to the normal distribution), respectively K = 3.334002 (a leptokurtic distribution of the variable close to the normal distribution). The probability of the Jacque-Bera test > 0.05 means that we accept the data coming from a normal distribution.

We can notice that in the case of corporate income tax, the result of the regression shows that there is a significant relationship between the corporate income tax (CIT) efficiency index and the share of income from corporate taxation in GDP (table 6).

Table 6: Result of the model validation test – relationship between CIT share to GDP and tax efficiency index CIT

Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
% CIT of GDP	0.543920	0.220670	2.464850	0.0154
Tax efficiency index CIT	4.863631	0.787848	6.173314	0.0000
R-squared	0.279993	Mean dependent var		1.825000
Adjusted R-squared	0.272646	S.D. dependent var		0.879896
S.E. of regression	0.750420	Akaike info criterion		2.283429
Sum squared resid	55.18673	Schwarz criterion		2.335533
Log likelihood	-112.1715	Hannan-Quinn criter.		2.304517
F-statistic	38.10981	Durbin-Watson stat		2.901597
Prob. (F-statistic)	0.000000			

Source: processed by author.

P-value is less than 0.05 which indicates that the regression coefficients are statistically significant. R-squared has a value of 0.279993 which means that the dependent variable – the efficiency index of profit taxation – explains in proportion of 27.99% the dependent variable, respectively the share of income from corporate income tax in GDP. Thus, we can appreciate that there is a moderate connection between the endogenous variable and the exogenous variable. Prob. (F-statistic) 0.00000 < 0.05 indicates that the statistical link between the independent and the dependent variable is significant.

Since the probability associated with Jarque-Bera statistics is 1.617742 > 0.05, we accept *H0*, so the residues have a normal distribution. Hence the distribution of the residue series: the value of the Jarque-Berra statistics suggests a normal distribution in terms of asymmetry and flattening. Also, the residue diagram does not show any deviation from normality and no violation of the hypothesis that the errors have the same constant dispersion.

The analysis of the personal income tax efficiency index in the new member states shows Slovenia as the country with the lowest level in 2019, the tendency being decreasing in most of the analyzed states (Table 7).

Table 7: Taxation efficiency index (the personal income tax)

Country	***Taxation efficiency index***									
	2010	***2011***	***2012***	***2013***	***2014***	***2015***	***2016***	***2017***	***2018***	***2019***
BG	1.03	1.03	1.07	0.85	0.92	0.91	0.90	0.94	0.95	0.97
CZ	0.55	0.59	0.58	0.60	0.63	0.61	0.63	0.73	0.76	0.77
EE	0.74	0.75	0.76	0.76	0.79	0.81	0.84	0.82	0.77	0.75
LV	0.75	0.78	0.75	0.71	0.70	0.70	0.73	0.78	0.71	0.65
LT	0.82	0.84	0.85	0.78	0.79	0.81	0.78	0.76	0.79	0.80
HU	0.62	0.74	0.77	0.78	0.80	0.80	1.05	1.06	1.07	0.94
PL	0.72	0.74	0.58	0.57	0.58	0.61	0.62	0.63	0.65	0.63
RO	0.86	0.86	0.88	0.84	0.84	0.86	0.85	0.80	0.71	0.79
SI	0.59	0.60	0.62	0.44	0.45	0.46	0.52	0.41	0.42	0.42
SK	0.57	0.61	0.62	0.53	0.53	0.58	0.56	0.54	0.56	0.58

Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

In 2019, Romania recorded the lowest default tax rate, due both to the increase of salaries during the economic boom and the decrease of the single income tax rate (Table 8).

In the states with a low efficiency of personal income tax collection, the benefits of progressive taxation are promoted, which is not a definite solution for increasing the budget revenues, in my opinion.

After checking the distribution of variables, the share of personal income tax in GDP (% personal income tax of GDP) and the index of efficiency of taxation for the personal income tax (tax efficiency index PIT), we have found value K = 2.406775, respectively K = 2.856391 (a platykurtic distribution of the variable close to the normal distribution). The probability of the Jacque-Bera test > 0.05 means that we accept the data coming from a normal distribution.

We can notice that in the case of the personal income tax, the result of the regression shows that there is a significant relation between the personal income tax (PIT) efficiency index and the share of revenue from personal income taxation in GDP (Table 9).

Table 8: Taxation efficiency (the personal income tax)

Country	Legal income tax* (%)			Default tax rate** (%)		
	2017	2018	2019	2017	2018	2019
BG	10	10	10	9.4	9.5	9.7
CZ	15	15	15	11	11.4	11.6
EE	20	20	20	16.4	15.4	14.9
LV	23	23	23	18	16.3	15
LT	15	15	20	11.4	11.8	16.1
HU	15	15	15	15.9	16	14.2
PL	25	25	25	15.8	16.1	15.8
RO	16	10	10	12.8	7.1	7.9
SI	33.2	33.2	33.2	13.7	14.1	14
SK	22	22	22	12	12.4	12.8

Note: * – in the case of Latvia, Lithuania, Poland, Slovenia and Slovakia, countries that use a progressive taxation system, the reported figure is the average tax rate. ** – determined by reporting the current taxes paid by households and IFSLSG on income, wealth, etc., to the government and the rest of the world on gross salary income. These do not include the social contributions paid by the employer.
Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

Table 9: Result of the model validation test – relationship between PIT share to GDP and tax efficiency index PIT

Variable	Coefficient	Std. Error	t-Statistic	Prob.
% PIT of GDP	0.288996	0.27130	1.065223	0.2901
Tax efficiency index PIT	5.806288	0.945610	6.140259	0.0000
R-squared	0.325859	Mean dependent var		1.862500
Adjusted R-squared	0.317216	S.D. dependent var		0.964217
S.E. of regression	0.796740	Akaike info criterion		2.408106
Sum squared resid	49.51398	Schwarz criterion		2.467656
Log likelihood	-94.32422	Hannan-Quinn criter.		2.431981
F-statistic	37.70278	Durbin-Watson stat		3.146880
Prob. (F-statistic)	0.000000			

Source: processed by author.

P-value is less than 0.05 which indicates that the regression coefficients are statistically significant. R-squared has a value of 0.325859 which means that the dependent variable – the efficiency index of income taxation – explains in proportion of 32.58% the dependent variable, respectively the share of income from income tax in GDP. Thus, we can appreciate that there is a moderate connection between the endogenous variable and the exogenous variable. Prob. (F-statistic) 0.00000 < 0.05 indicates that the statistical link between the independent and the dependent variable is significant.

Since the probability associated with Jarque-Bera statistics is 2.817589 > 0.05, we accept *H0*, so the residues have a normal distribution. Hence the distribution of the residue series: the value of the Jarque-Berra statistics suggests a normal distribution in terms of asymmetry and flattening. The residue diagram does not indicate any significant deviation from normality and no violation of the assumption that the errors have the same constant dispersion.

Regarding the efficiency index of social security contributions, Latvia remained on the last position in the new member states ranking during the whole period analyzed, while Lithuania ranks first. In most of the analyzed states, the index has increased (Table 10).

Table 10: Taxation efficiency index (social security contributions)

Country	***Taxation efficiency index***									
	2010	***2011***	***2012***	***2013***	***2014***	***2015***	***2016***	***2017***	***2018***	***2019***
BG	0.74	0.73	0.70	0.71	0.72	0.72	0.70	0.71	0.70	0.73
CZ	1.05	1.06	1.05	1.05	1.05	1.06	1.07	1.0	1.00	1.00
EE	0.98	0.93	0.90	0.88	0.93	0.89	0.88	0.89	0.89	0.90
LV	0.71	0.71	0.77	0.73	0.70	0.66	0.63	0.64	0.66	0.66
LT	0.91	0.89	0.89	0.90	0.90	0.88	0.88	0.89	0.92	1.04
HU	0.75	0.82	0.77	0.81	0.82	0.83	0.83	0.88	0.89	0.85
PL	0.91	0.97	1.06	1.07	1.07	1.03	1.02	0.97	0.96	0.96
RO	0.66	0.74	0.73	0.75	0.72	0.75	0.69	0.69	0.78	0.78
SI	0.87	0.87	0.91	0.91	0.91	0.91	0.90	0.95	0.95	0.94
SK	0.87	0.86	0.89	0.97	0.97	0.97	0.96	1.04	0.96	0.95

Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

Both the legal share of social security contributions and the default tax rate decreased significantly in Lithuania (the state with the highest rate of tax efficiency – social security contributions) in 2019, compared to 2018 (Table 11).

Since the system of taxes and duties in some new member states records a low efficiency, the reform process must be a continuous one and even if this process is successful, any tax and duty reductions must be made only ex-post, respectively only after the reform proves that it can generate long-term results.

After checking the distribution of variables, the share of social security contributions in GDP (% social security contributions of GDP) and the index of efficiency of taxation for social security contributions (tax efficiency index social security contributions), we have found value K = 1.947522, respectively K = 1.871049 (a platykurtic distribution of the variable close to the normal distribution). The probability of the Jacque-Bera test > 0.05 means that we accept the data coming from a normal distribution.

Table 11: Taxation efficiency (social security contributions)

Country	***Legal rate of social contributions* (%)***			***Default tax rate** (%)***		
	2017	***2018***	***2019***	***2017***	***2018***	***2019***
BG	32	33	33	22.7	23.1	24
CZ	48	48	48	47.9	48	48.1
EE	35.4	35.4	35.4	31.4	31.6	31.8
LV	34.1	35.1	35.1	21.8	23.1	23.3
LT	40	39.5	21.0	35.5	36.2	21.7
HU	40.5	38	38	35.8	33.9	32.2
PL	41.5	41.5	41.5	40.2	40	39.8
RO	39.4	37.3	37.3	37.3	28.9	28.9
SI	38.2	38.2	38.2	36.3	36.1	36.1
SK	45.6	48.6	48.6	47.3	46.6	45.9

Note: * – aggregate data for employee and employer. In the case of changes in quotas during the year, the weighted average quotas were reported. ** – determined by reporting the sum of the social contributions of employers and the social contributions of the population to the gross salary income.
Source: processed by author based on the information available in the annual reports of the Romanian Fiscal Council.

Regarding the social security contributions, the result of the regression shows that there is a significant relationship between the tax efficiency index – social security contributions (SSC) and the share of income from social security contributions in GDP (Tabel 12).

Table 12: Result of the model validation test – relationship between SSC share to GDP and tax efficiency index SSC

Variable	***Coefficient***	***Std. Error***	***t-Statistic***	***Prob.***
% SSC of GDP	19.56002	2.426094	8.062349	0.0000
Tax efficiency index SSC	14.73300	2.770426	5.317954	0.0000
R-squared	0.223951	Mean dependent var		32.33500
Adjusted R-squared	0.216032	S.D. dependent var		3.833251
S.E. of regression	3.394036	Akaike info criterion		5.301714
Sum squared resid	1128.909	Schwarz criterion		5.353817
Log likelihood	-263.0857	Hannan-Quinn criter.		5.322801
F-statistic	28.28063	Durbin-Watson stat		2.788864
Prob. (F-statistic)	0.000001			

Source: processed by author.

P-value is less than 0.05 which indicates that the regression coefficients are statistically significant. R-squared has a value of 0.223951 which means that the dependent variable – the efficiency index of social security contributions collection – explains in proportion of 22.39% the dependent variable, respectively the share of social security contributions revenues in GDP. Thus, we can appreciate that there is

a moderate connection between the endogenous variable and the exogenous variable. Prob. (F-statistic) 0.000001 < 0.05 indicates that the statistical link between the independent and the dependent variable is significant.

Since the probability associated with Jarque-Bera statistics is 2.555862 > 0.05, we accept H0, so the residues have a normal distribution. Hence the distribution of the residue series: the value of the Jarque-Berra statistics suggests a normal distribution in terms of asymmetry and flattening. The residue diagram does not indicate any significant deviation from normality and no violation of the assumption that the errors have the same constant dispersion.

4 CONCLUSIONS

Correlating the above information, we appreciate that:

- there is a statistically significant relationship between the value added tax collection efficiency index and the share of value added tax revenues in GDP, so that in the case of value added tax, the problems of collection can be explained by the efficiency of taxation;
- there is a statistically significant relationship between the profit tax efficiency index and the share of income tax revenue in GDP, so that in the case of corporate income tax the problems of collection can be explained by the efficiency of taxation;
- there is a statistically significant relationship between income tax efficiency indices and the share of income tax revenue in GDP, so that in the case of income tax the problems of collection can be explained by the efficiency of taxation;
- there is a statistically significant relationship between the efficiency indices of collecting social security contributions and the share of income from social security contributions in GDP, so that even in the case of social security contributions the problems of collection can be explained by the efficiency of taxation.

The differences between the tax rates practiced in the new member states, as well as the different approaches regarding the fiscal administration have determined various levels of taxation efficiency. As differences in the efficiency of taxation can be observed in some states with a similar level of taxation, we can conclude that the problems in tax collection influence the efficiency of taxation.

For the states the analysis of the taxation efficiency was performed, the most important problem related to the efficiency of tax revenue collection concerns the value added tax field is noticed in Romania, which registered the highest value added tax collection gap.

Overall, the regression analysis performed in this paper indicates the existence of a significant link between the tax efficiency index on the four categories of income and the share of tax revenues (on the four categories analyzed) in GDP. Thus, we can conclude that, in the studied states, the collection problems can be explained by the efficiency of the collection process.

The proactive approach to managing non-compliance risks, acting in the phases prior to filing tax returns (such as the introduction of electronic invoicing), as well as a series of measures to increase taxpayers' confidence in tax administration are features of an efficient tax system. At the same time, the existence of a partnership between the tax administration and taxpayers, the simple and friendly tax procedures and the modern and complete services provided qualify a tax system in the category of efficient ones.

Therefore, the countries with low tax efficiency should borrow good practices from other member states in the field of tax administration, such as real-time transaction analysis, mandatory electronic invoicing, the introduction of the electronic international standard for data exchange between companies and tax authorities, which may lead to an increase in the collection of tax revenues.

REFERENCES:

1. BAN, C. – RUSU, A. (2019): Romania's fiscal poverty. What explains it and what (can) be done. [Online.] In: *FES*, 2019. [Cited 10.5.2021.] Available online: <https://library.fes.de/pdf-files/bueros/bukarest/15915.pdf>.
2. CLEMENS, J. – VELDHUIS, N. – PALACIOS, M. (2007): Tax Efficiency: Not All Taxes Are Created Equal. [Online.] In: *Studies in Economic Prosperity*, 2007. [Cited 01.12.2021.] Available online: <https://www.fraserinstitute.org/sites/default/files/TaxEfficiency.pdf>.
3. DIRECTORATE-GENERAL FOR TAXATION AND CUSTOMS UNION (2019): *Taxation trends in the European Union*. Luxembourg: Luxembourg publication office of the European Union, 2019. 302 p. ISBN 978-92-76-32071-5.
4. EUROPEAN COMMISSION (2021): *Annual Report on Taxation 2021, Review of taxation policies in the EU Member States*. Brussels: European Commission, 2021, 130 p. ISBN 978-92-76-19995-3.
5. FAUVELLE-AYMAR, C. (1999): *The Political and Tax Capacity of Government in Developing Countries*. In: *Kyklos*, 1999, 52, 3, pp. 391-413.
6. GUPTA, S. – KEEN, M. – SHAH, A. – VERDIER, G. (2017): *Digital Revolutions in Public Finance*. Washington, D.C.: International Monetary Fund, 2017, 362 p. ISBN: 9781484315224.
7. HAMMERSCHMID, G. – VAN DE WALLE, S. – ANDREWS, R. – BEZES, P. (2016): *Public Administration Reforms in Europe*. Cheltenham: Edward Elgar Publishing, 2016, 304 p. ISBN: 978-1-78347-539-1.

8. HUDSON, J. – TEERA, J. (2004): *Tax performance: A comparative study*. In: *Journal of International Development*, 2004, 16, 6, pp. 785-802.
9. LAMES, A. (2012): *Measuring, Explaining, and Controlling Tax Evasion: Lessons from Theory, Experiments, and Field Studies*. In: *Tulane Economics Working Paper Series*, 2012, 1213.
10. LANGFORD, B. – OHLENBURG, T. (2016): *Tax revenue potential and effort: An empirical investigation*. [Online.] In*: IGC Working Paper*, 2016. [Cited 01.12.2021.] Available online: <https://www.theigc.org/wp-content/uploads/2016/01/Langford-Ohlenburg-2016-Working-paper.pdf>.
11. LISI, G. (2015): *Tax morale, tax compliance and the optimal tax policy*. In: *Economic Analysis and Policy*, 2015, 45, pp. 27-32.
12. OECD (2014): *Addressing the Tax Challenges of the Digital Economy, OECD/G20 Base Erosion and Profit Shifting Project*. Paris: OECD Publishing, 2014, 202 p. ISBN 978-92-64-21877-2.
13. OECD (2018): *Tax and digitalisation. OECD Going Digital Policy Note*. Paris: OECD Publishing, 2018.
14. PANTAMEE, A.A. – MANSOR, M.B. (2016): *A modernize tax administration model for revenue generation*. In: *International Journal of Economics and Financial Issues*, 2016, 6, 7, pp. 192-196.
15. PINTO, M.S. – KŐVÁGÓ, Á. – CRAWFORD. M. (Ed.) (2017): *Impact of digitalisation on the transformation of tax administrations*. Budapest: Intra-European Organisation of Tax Administrations, 2017, 72 p. ISBN 978-615-5908-01-9.
16. PÎRVU, D. – DUȚU, A. – MOGOIU, C. (2021): *Clustering Tax Administrations in European Union Member States*. In: *Transylvanian Review of Administrative Sciences*, 2021, 63, pp. 110-127.
17. RAIMONDOS, P. – WOODLAND, A. (2004): Measuring Tax Efficiency: A Tax Optimality Index. [Online.] In: *CESifo Working Paper Series*, 2004. [Cited 01.12.2021.] Available online: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=573242>.
18. ROMANIAN FISCAL COUNCIL (2019): Annual Reports. [Online.] In: *Cosiliul fiscal*, 2019. [Cited 17.5.2021.] Available online: <http://www.consiliulfiscal.ro/>.
19. WAHL, I. – KASTLUNGER, B. – KIRCHLER, E. (2010): *Trust in Authorities and Power to Enforce Tax Compliance: An Empirical Analysis of the Slippery Slope Framework*. In: *Law & Policy*, 2010, 32, 4, pp. 383-406.