THE CORRELATION BETWEEN FISCAL REVENUES OF ROMANIA AND GROSS DOMESTIC PRODUCT IN THE LAST 12 YEARS

Loredana Andreea Cristea, Alina Daniela Vodă
Department of Doctoral Studies, Faculty of Economic Sciences, "Lucian Blaga" University of Sibiu, Romania
crs.loredana@yahoo.com
alina.voda3@yahoo.ro

Abstract: *The aim of this paper is to study and analyze the evolution of the Romanian fiscal pressure between 2006 and 2017, from a statistical point of view, and the main purpose is to highlight the correlation between fiscal revenues of Romania and gross domestic product. The first part of the paper is based on a comparative research into the level of taxation at the level of direct, indirect taxes and social contributions. This study seeks to highlight the impact of the Romanian fiscal pressure on the economy. The second part of the article seeks to see the correlation between fiscal revenues and gross domestic product (GDP), especially the impact of fiscal revenues on the growth or decline of GDP. In order to study the correlation, we used the Eviews9 statistical interpretation program. The research methodology was based on obtaining data from the main official sources, such as the National Institute of Statistics and the Ministry of Finance; the study of the specialized literature; the study of the evolution of the fiscal pressure, as well as the interpretation of the data obtained from the influence of the fiscal revenues on the gross domestic product. At the end of the paper some conclusions were drawn, as well as some proposals regarding the studied ones.*

Keywords: *fiscal pressure; tax revenues; gross domestic product; evolution; correlation.*

JEL Classification: *H2; H71.*

1. Introduction

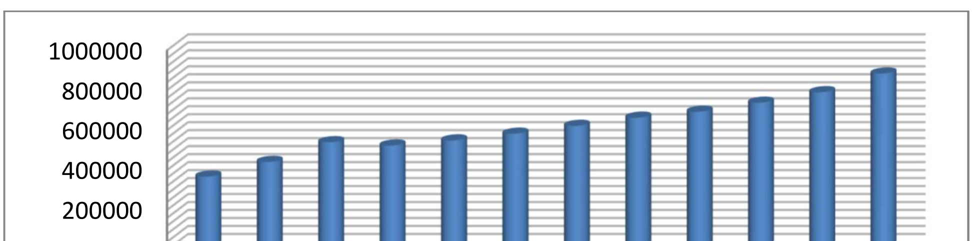
The fact that the state cannot exist without taxes is a well-known and self-evident thing. Thus, at the beginning of the article it will be made a short presentation of the literature. The case study will be concretized by analyzing the evolution of the gross domestic product, as well as the fiscal pressure related to the direct taxes and indirect taxes, as well as the fiscal pressure related to the social contributions, during 2006-2017. This study is a first step in discovering the influence of taxes in Romania's economy, in stimulating or inhibiting citizens' interest in carrying out economic activities or carrying out commercial relations with foreign states, in consuming goods and services, etc. Thus, the actuality of the studied topic is conditioned by the importance of taxes on the development or even the economic growth. The objective of this paper is to study the economic situation of Romania in the period 2006-2017, in terms of evolution of gross domestic product, but also fiscal pressure. The research methods used are the deduction, synthesis and the study of the evolutionary trend.

2. Literature review

The relationship between the tax system and the economy has been extensively studied both by autochthonous and foreign authors.
For example, if it is desired an economic growth, sustained and stimulated by countries' financial development, must be implemented anti-inflationary measures along with effective labor market policies, to reduce the high unemployment rate, which on the long run can lead to high economic growth (Afonso and Blanco-Arana, 2018).
Also, fiscal pressure influences not only budget revenues but also investment, demand, supply and prices. All of these have a direct and indirect influence on economic activity and production capacity (Abuselidze, 2012). However, the impact of taxes on economic growth is contradictory, which may be the consequence of the fact that different fiscal policy instruments can lead to opposite effects on economic growth: on the one hand, a greater involvement of the public sector in the economy tends to promote growth, but on the other hand, high taxation affects economic growth (Braşoveanu-Obreja, 2007).
Castro, Ramirez Camarillo (2014), Stoilova (2017), Mahdavi (2008) and Ungureanu (2017) are among the authors who studied the fiscal pressure on the tax and fees system and made comparisons in several developed and developing countries in Europe. They also attempted to show the connection between the fiscal pressure and the changes in the economic indicators.

3. Evolution of the Romanian fiscal pressure during 2006-2017

Analyzing the trend of gross domestic product, the main indicator characterizing the evolution of the national economy, from own processing, based on data available from the National Institute of Statistics and Ministry of Finance, it can be noticed that during the first part of the analysis period it recorded a significant increase in 2007 and 2008, compared to 2006, which can be explained by the accession of Romania to the European Union. The sharp decline of 3.24 percentage points in 2009 compared to 2008 is mainly due the emergence of the economic-financial crisis, which has also impacted Romania.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
PIB	342418	416007	514700	498008	523693	557348	596,68	637583	667577	712659	765135	858660

Figure 1: Evolution of Gross Domestic Product
Source: own processing, based on data available from the National Institute of Statistics

However, following the analysis of the evolution of this indicator in the post-2009 period, from Figure 1, GDP has been steadily rising, with a significant year-on-year increase. Calculating the evolution based on the data available in the INSSE statistical bulletins, these increases were 5.16% in 2010, 6.43% in 2011, 7.06% in 2012, 6.85% in 2013, 4.70% in 2014, 6.75% in 2015 and 7.36% in 2016, as compared to the previous year, reaching a maximum of 858.660 million lei in 2017.
Based on the analysis of Romania's tax pressure in the period 2006-2017, from Figure 2, calculated by the ratio between the tax revenues and the gross domestic product, it can be observed that this indicator has a oscillating trend from year to year. The decrease of the fiscal pressure at the time of Romania's accession to the European Union in 2007 had as objective the alignment with the European tax regulations. Over the analyzed period, the highest value was in 2006 -28.26%, while the lowest values, namely 25.84% and 24.68%, have been in the last 2 years of analysis, at 5 years difference from the last attained minimum, namely 26.5% in 2009.

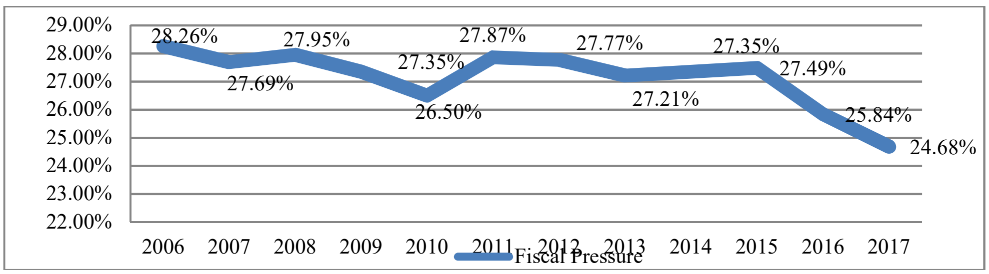
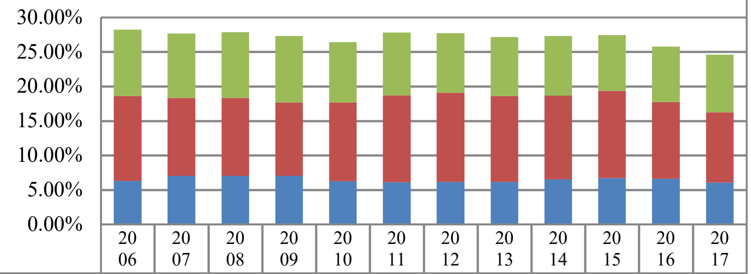


Figure 2: Evolution of the fiscal pressure
Source: own processing, based on data available from the Ministry of Finance (Consolidated General Budget for the years 2006-2017)

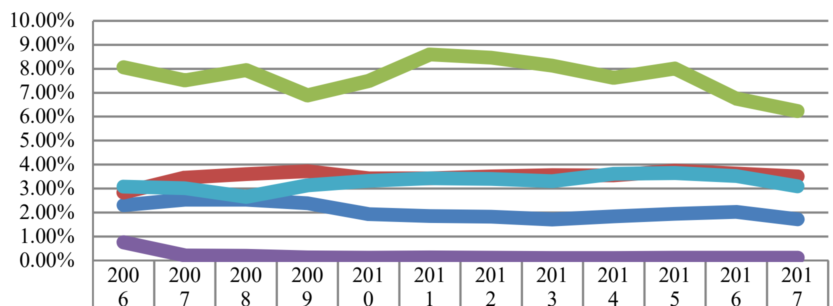
Next, we will study the fiscal pressure on direct, indirect taxes and social contributions in the 12 years of analysis. Thus, as can be seen in Figure 3, the highest fiscal pressure we encounter in the case of indirect taxes with values between 10.15-12.88%, the minimum value being in 2017 and the maximum in 2012. The low level of fiscal pressure from indirect taxes occurring after 2015 can be mainly explained by the drop of the standard VAT rate from 24% to 20% from 1 January 2016 and to 19% from 1 January 2017, but also the application of the 9% rate for certain categories of services and products (Law 227/2015 regarding Fiscal Code), which may suggest a relaxation of the taxpayer regarding his tax burden.
Regarding the tax burden related to direct taxes, over the period under review, this tax pressure has half the value of indirect taxes' tax burden. Its values are on a relatively constant trend, around 6-7%, values that can be explained by keeping the 16% tax rate for income and profit tax.
Analyzing the evolution of the tax burden on social contributions, its level is at half the tax burden on taxes (indirect+ direct taxes), and its trend is ascending, registering a peak in the first half of the analysis period, followed by a downward trajectory after 2011, reaching the minimum value of 8.01% in 2016.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Fiscal Pressure- social contributions	9.63%	9.34%	9.52%	9.61%	8.73%	9.09%	8.66%	8.53%	8.63%	8.08%	8.01%	8.35%
Fiscal Pressure- indirect taxes	12.28	11.28	11.31	10.59	11.44	12.60	12.88	12.45	12.13	12.63	11.11	10.15
Fiscal Pressure- direct taxes	6.32%	7.03%	7.03%	7.07%	6.25%	6.12%	6.17%	6.17%	6.53%	6.71%	6.62%	6.09%

Figure 3: Evolution of fiscal pressure on taxes and social contributions
Source: own processing, based on data available from the Ministry of Finance

The tax pressure calculated for the main types of taxes, such as profit tax, income tax, value added tax, excise duties and customs duties, has undergone an interesting evolution in the analyzed period, as can be seen in Figure 4. On the basis of the data obtained from the Romanian Consolidated General Budgets and based on the calculations made, we have found that the lowest limits are encountered in the case of the tax burden related to customs duties, with a low weight in the gross domestic product, namely between 0.1 and 0.75%. The evolution of this indicator followed a year-on-year downward trend, similar to the profit tax, which reached relatively linear values between 1.71-2.54%.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Profit tax	2.30%	2.54%	2.54%	2.39%	1.93%	1.85%	1.82%	1.71%	1.83%	1.94%	2.02%	1.72%
Income tax	2.83%	3.46%	3.59%	3.73%	3.43%	3.42%	3.51%	3.57%	3.55%	3.74%	3.63%	3.51%
VAT	8.06%	7.51%	7.94%	6.89%	7.49%	8.60%	8.47%	8.13%	7.62%	8.02%	6.75%	6.24%
Custom duties	0.75%	0.21%	0.19%	0.13%	0.11%	0.12%	0.12%	0.10%	0.10%	0.11%	0.12%	0.11%
Excise duties	3.07%	3.01%	2.65%	3.13%	3.32%	3.43%	3.40%	3.31%	3.61%	3.65%	3.52%	3.10%

Figure 4: Evolution of the tax burden related to the main taxes
Source: own processing, based on data available from the National Institute of Statistics and Ministry of Finance

Analyzing the graph above, we can observe that tax pressures of the excise duties and income tax overlap in the reference period, predominantly in 2010-2016. These

fiscal pressures, combined, are close to the fiscal pressure from value added tax, which shows that VAT exerts a double or even a triple tax pressure, compared to other taxes. The decreasing of consumption, which was an effect of the 2009 economic and financial crisis, led to a decrease in the collection of VAT to the state budget.
The recovery of this tax took place in 2010, when the VAT rate has increased from 19% to 24%. Changes in tax rates through VAT was passed, were the authorities' response to the negative effects of the crisis, the state only wanting to cover public spending and debt. However, this tax throughout the analysis period was a constant source of income for the state budget; being the *leader of indirect taxes* (Cristea L.A., 2017), because it represents, on average, more than 50% of their total.
On the basis of the statistical analysis, we can say that Romania concentrates its entire hope based on indirect taxation in order to collect the tax revenues to the state budget.

4. The correlation between fiscal revenues and gross domestic product

In order to highlight the correlation between fiscal revenues (VF) and gross domestic product (GDP), we have studied a year-to-year evolution of these two indicators with the help of the Eviews9 econometric program. The reference period is 2006-2017 and the graphic representation can be seen in Figure 5, below.

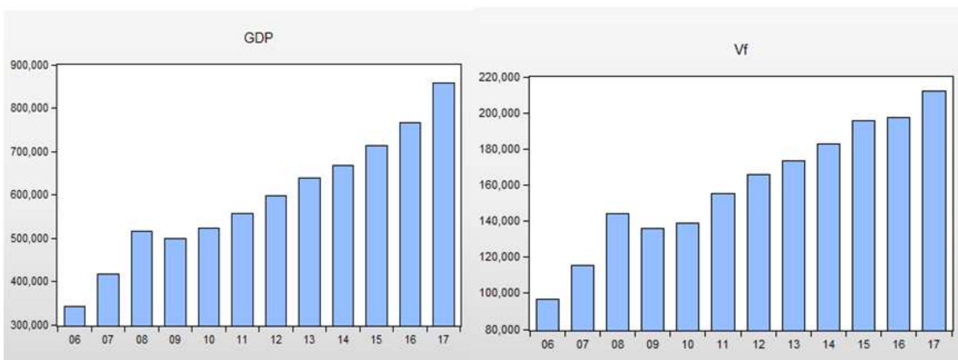


Figure 5: Comparative evolution of gross domestic product and fiscal revenues
Source: own processing based on data provided by the Ministry of Finance

It can be noticed that both indicators, the fiscal revenues and the GDP, after the year of Romania's accession to the European Union, namely 2007, have a significant growth, which unfortunately did not continue, given the sudden decline in 2008 caused by the economic and financial crisis. However, after this year, both indicators had an ascending trajectory over the period studied.

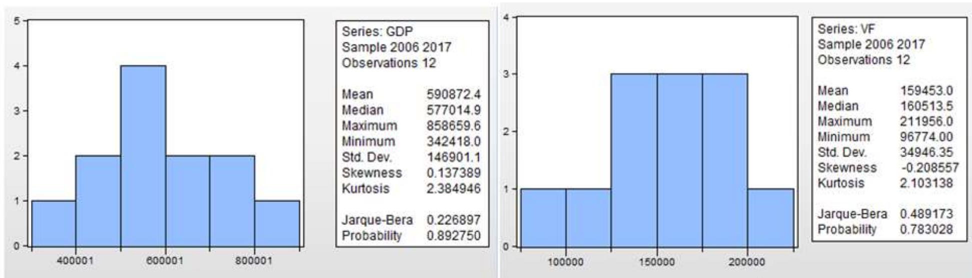


Figure 6: The main statistical tests performed on GDP and VF values
Source: own processing based on data provided by the Ministry of Finance

In order to have a clearer picture of these two indicators, we conducted a series of statistical tests on GDP and VF values over the period 2006-2017, using the Eviews data processing program.
It can be seen from Figure 6, that the average gross domestic product between 2006 and 2017 is 590872,4 mil. lei, an average value ranging from the minimum of 342418 million lei at the end of 2006 and the maximum of 858659,6 mil. lei reached after 11 years, respectively in 2017, which shows that the trajectory of the gross domestic product was an ascending one. As for the average value of the tax revenues, it was 160513.5 million lei, the value being between the minimum of 96774 million lei at the end of 2006 and the maximum of 211956 million lei in 2017, the same situation being encountered as in the case of gross domestic product.
Since ”skewness” is the measure of symmetry of the studied data, by observing the above figure and taking into account the displayed values, we can say that the distribution of GDP-related values in the studied period is not perfectly symmetrical (skewness ≠ 0), the value being 0,1373> 0, which shows a positive distribution, with a predominant inclination to the right. And in terms of the distribution fiscal revenue values, the skewness of -0.2085<0, shows a negative distribution, with a predominant inclination to the left. Following symmetry testing, we can say that these two indicators do not have a perfectly symmetrical distribution in the 12 years studied.
From the above observations, we can draw an interesting conclusion on the correlation between these indicators taken into account. As shown in Figure 5 and Figure 6, they have a similar trajectory, with ups and downs: significant increases have occurred between 2006 and 2008, followed by a sudden fall, highlighted at the end of 2009, and then the whole route had an upward path by 2017, reaching the full point in this year. Based on this observation, we can deduce that there is some interdependence between the values of the gross domestic product and the values related to the fiscal revenues. In order to confirm this, we have a graphical representation of the correlation between these indicators and as can be seen in Figure 7, their values correspond to a linear correlation.

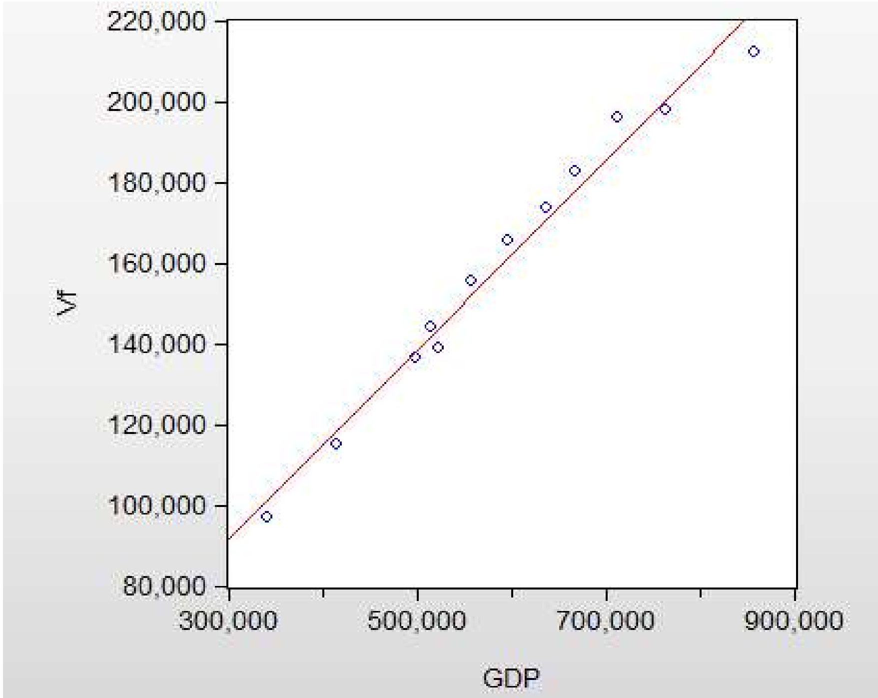


Figure 7: Dispersion diagram GDP-Vf (scatter plots)
Source: own processing based on data provided by the Ministry of Finance

Starting from the above representation, in order to highlight the impact of tax revenues on Romania's gross domestic product during 2006-2017, we will use the simple linear regression technique:

$$Y=\alpha+\beta*X \text{ where,}$$

- Y is the dependent variable;
- X represents the independent variable;
- α is the free term of the regression line (value for X = 0);
- β is the regression coefficient (the amount with which Y changes when X changes with one unit).

The regression equation, by which I will determine the correlation mentioned above, will have the Gross Domestic Product (GDP) as a dependent variable, and the independent variable will be fiscal revenues (Vf). Thus, the regression equation becomes:

$$GDP=c\ (1) + c\ (2)*Vf, \text{ where,}$$

- c (1) and c(2) represent the parameters of the equation.

Using the LS (Least Squares method) of the Eviews 9 program, the correlation between these two variables for the period 2006-2017 is shown in the figure below.

Dependent Variable: GDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 11/07/18 Time: 11:26
Sample: 2006 2017
Included observations: 12
GDP=C(1)+C(2)*VF

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-71611.49	32935.06	-2.174324	0.0548
C(2)	4.154729	0.202148	20.55291	0.0000

R-squared	0.976874	Mean dependent var	590872.4
Adjusted R-squared	0.974562	S.D. dependent var	146901.1
S.E. of regression	23429.74	Akaike info criterion	23.11241
Sum squared resid	5.49E+09	Schwarz criterion	23.19323
Log likelihood	-136.6745	Hannan-Quinn criter.	23.08249
F-statistic	422.4223	Durbin-Watson stat	1.015246
Prob(F-statistic)	0.000000		

Figure 9: The correlation between Gross Domestic Product and Fiscal Income, based on Eviews 9
Source: own processing based on data provided by the Ministry of Finance

The value of the coefficient of determination regression (R-squared) indicates that there is a probability of 97.7% that GDP variation is explained by the change in fiscal revenues, and based on the figures in Figure 9, the regression equation between tax revenue (Vf) and GDP is as follows:

$$GDP = -71611,49 + 4,1547*Vf$$

From this econometric relationship, we note that the correlation between tax revenues and GDP is directly proportional between 2006 and 2017. On the basis of this positive relationship, we can interpret the fact that an increase of one percentage point in the value of tax revenues will lead to an increase in gross domestic product of 4.1547 monetary units. This is plausible, given that over the period under study, tax revenues have had percentages of significance in GDP, and the state budget is mainly based on fiscal revenues.
Also based on the analysis of this regression equation, we can observe that the free term of the relationship, i.e. -71611,49, shows the negative influence of other factors, not included in the model, exert on the gross domestic product.
By synthesizing the information obtained, we can say that Romania's GDP, during the studied period, is influenced in a significant proportion by the changes in fiscal revenues.

5. Conclusions

In conclusion, we note that taxation is the only way to finance the public expenditures related to services and goods, which the entire population of Romania benefits from.

That is why the fiscal pressure exerted by each tax, as well as the taxes and duties, are to be optimized to facilitate a high degree of voluntary compliance with payment, without discouraging economic activity and making budget revenues without resorting to excessive borrowing. An optimal fiscal pressure will lead to a higher collection of tax revenues, respectively to a better cover public spending, but also it will encourage investment, which would inevitably lead to economic development and general welfare.
Regarding the influence of the fiscal revenues on Romania's gross domestic product, they exert a direct influence: at each increase of one percentage point of fiscal revenues, there are positive changes in GDP. Of course, as future directions in research, we intend to study the influence of the entire system of taxes and duties on the Romanian economy.
On the one hand, we believe that there must be an education of the Romanian taxpayer, regarding compliance with the payment of taxes. He needs to understand that the tax revenues of the state, that is taxes and duties he pays to the state, are in a closed and repetitive circuit. In other words, if there isn’t an efficient collection to the state budget, the state would not be able to provide services to the citizens, and it wouldn’t be able to cover its public expenditures. This fact would inevitably lead to degradation at socially, financially and economically level. On the other hand, we believe that in order to be a voluntary compliance of the citizen, the fiscal control body plays an important role; it has to be educated in such a way that the desire for compliance of the citizen is created, given the fact that most of the state revenue is formed from taxes.

Acknowledgements

Bio-note:
Loredana Andreea Cristea is a PhD. student in the Department of Doctoral Studies, Faculty of Economic Sciences, "Lucian Blaga" University of Sibiu, Romania. As a PhD. student she focuses on the study of public finances and economy field, as well as research of the impact of taxes on the Romanian economy. She currently carries out her professional activity at the University of Petrosani.
Alina Daniela Vodă is a PhD. student in the Department of Doctoral Studies, Faculty of Economic Sciences, "Lucian Blaga" University of Sibiu, Romania. Her research interests focus on finances and economy field, with specific emphasis on the interconnection between fiscal mechanism and applied fiscal policies in European countries. She currently serves as Inspector at General Regional Directorate for Public Finance from Brașov.

References
1. Abuselidze, G. (2012) *The influence of optimal tax burden on economic activity and production capacity*, Intellectual Economics, Vol. 6, No. 4(16), p. 493–503
2. Afonso, A., Blanco-Arana, M.C. (2018) *Financial development and economic growth: a study for OECD countries in the context of crisis*, Research in Economics and Mathematics, ISSN 2184-108X
3. Brasoveanu Obreja, L. (2007) *Impact of fiscal policies on economic growth*, ASE Publisher, Bucharest

4. Castro, G.A., Ramírez Camarillo D.B. (2014) *Determinants of tax revenue in OECD countries over the period 2001-2011*, Contaduría y Administración 59(3), p. 35-59
5. Cristea, L.A. (2017) *The share and evolution of indirect taxes in state revenues-the case of Romania*, Annals of the University of Petroşani, Economics, vol 17(1), p. 307-314
6. Law nr.227/2015 regarding the *Fiscal Code*, as subsequently amended and supplemented
7. Mahdavi, S. (2008) *The level and composition of tax revenue in developing countries: Evidence from unbalanced panel data*, International Review of Economics & Finance, vol. 17, issue 4, 607-617
8. Ministry of Finance, Consolidated General Budget, 2006-2017, [online] Available: www.mfinante.ro [25 October 2018]
9. National Statistics Institute, Statistical Bulletins, 2006-2017, [online] Available: www.insse.ro [25 October 2018]
10. Stoilova, D. (2017) *Tax structure and economic growth: Evidence from the European Union*, Contaduriay Administracion, 62(3), p. 1041-1057
11. Ungureanu, M.A. (2017) *Comparative Taxation and Tax Optimization Techniques*, Universitara Publisher, Bucharest