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Article

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The Analysis of the Relationship between the Tax Pressure Rate and the Level of Foreign Direct Investment

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Abstract: Generally speaking, this work presents the relationship between the tax pressure rate and the level of Foreign Direct Investment (FDI). It is known that FDI depend on many factors including the level of taxes in every country and we have studied how much tax pressure influences FDI in Romania in period 2004 – 2016 and how can this be quantified.

Keywords: Foreign Direct Investment (FDI); tax pressure broadly; tax pressure strictly; tax indirects; tax directs

JEL Classification: C10; C18; C19

1. Introduction

The taxation is a notion from ancient times because people paid taxes regardless of their nation, gender, religion, and social status, number of children or profession. The taxation has given rise to controversial reactions, public talks or even riots, strikes or wars over time.

In the current period, most states are trying to harmonize their tax legislation so that it is unitary at an international level. Most harmonization is achieved in indirect taxes as they affect all natural and legal persons, included in the selling price of goods and services.

Generally, in developed countries the tax rate is higher than in the less developed countries where it is lower. Worldwide, the rate of taxation varies between 30-40%, while countries such as USA, Japan and Switzerland are isolated because although developed countries have a tax burden below 30%, which is lower than the world average.

The tax rate also called fiscal pressure shows the share of tax revenue in the country's Gross Domestic Product at one year. This is determined using the following calculation relations:

$$r_f = \frac{V_{fiscal}}{\text{GDP}} \cdot 100,$$

where: r_f = tax rate or fiscal pressure;

V_{fiscal} = tax revenues;

GDP = Gross Domestic Product.

State Fiscal policy covers all the legislative measures adopted by it in connection with the collection and payment of taxes aimed at normal functioning of business processes and socio-economic relations.

If tax incomes are deemed to be made of Indirect taxes, Direct taxes and Social contributions, *the rate of tax pressure, broadly speaking*, is calculated as follows:

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$R_f = \frac{IT + DT + SC}{GDP} \times 100$, where: DT = Direct taxes;

IT = Indirect taxes;

SC = Social contributions;

GDP = Gross Domestic Product

The rate of tax pressure, strictly speaking, can also be calculated by excluding the Social contributions. This is determined using the following relations:

$R_f = \frac{IT+DT}{GDP} \times 100$, where: DT = Direct taxes;

IT = Indirect taxes;

GDP = Gross Domestic Product.

Foreign direct investment (FDI) represent the international investment made by a direct investor to acquire a lasting interest (at least 10 % of the equity capital of the enterprise) in an entity operating in an economy other than that of the investor. (http://ec.europa.eu/eurostat/web/products-datasets/-/tec00095). The FDI have a positive impact to national economy because they determine additional incomes for the state budget which consist of taxes and fees paid by new contributors.

2. The Evolution of the Main Indicators Monitored by the European Commission, National Institute of Statistics and National Bank of Romania during the period 2004 and 2016

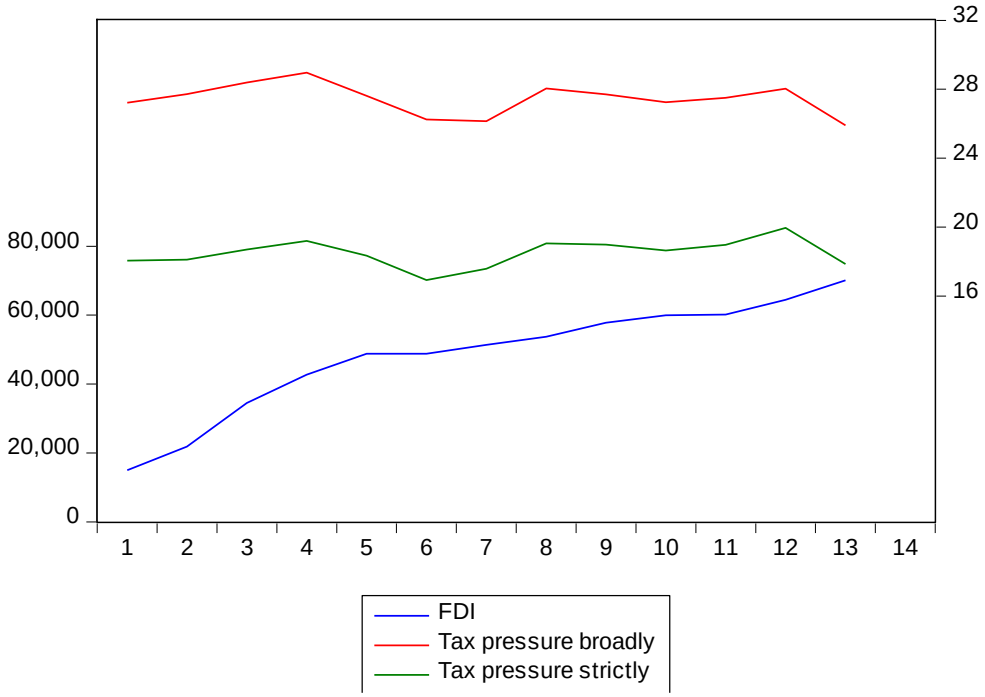
On the basis of the annually reports communicated by the European Commission (https://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en) and the National Bank of Romania from 2004 to 2016, we extracted a series of indicators that are presented in the following table:

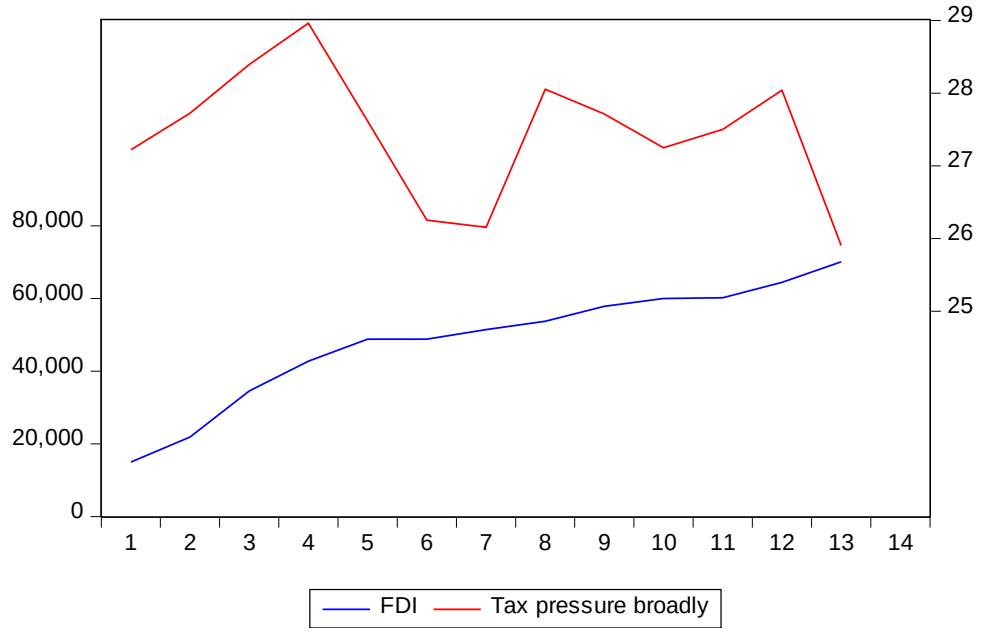
Table no. 1 The Evolution of the main indicators monitored by the European Commission, National Institute of Statistics and National Bank of Romania during the period 2004 and 2016

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Indirect taxes (%)	11.7	12.8	12.7	12.5	11.8	10.8	11.8	13.0	13.2	12.7	12.8	13.4	11.4
Direct taxes (%)	6.4	5.3	6.0	6.7	6.6	6.2	5.7	6.0	5.8	5.9	6.2	6.6	6.5
Social contributions (%)	9.2	9.6	9.7	9.8	9.3	9.3	8.6	9.0	8.7	8.6	8.5	8.1	8.0
Tax pressure broadly (%)	27.2	27.7	28.4	29.0	27.6	26.3	26.2	28.1	27.7	27.2	27.5	28.0	25.9
Tax pressure strictly (%)	18.1	18.1	18.7	19.2	18.3	16.9	17.6	19.1	19.0	18.6	19.0	20.0	17.9
FDI (millions Euro)	15040	21885	34512	42770	48798	48827	51414	53723	57851	59958	60198	64433	70113

Source: own calculations on the base the annually reports of the European Commission (https://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en), National Institute of Statistics and the National Bank of Romania from 2004 to 2016

The Analysis of Data Series for FDI and Tax Pressure with EViews 10 are used to determine descriptive indicators and statistical or graphical estimation of econometric models. Evolution of the variables analyzed in the period 2004-2016 is presented using EViews 10, as follows:





It appears that the FDI was in an indirect relationship depending on the tax pressure broadly or strictly speaking, during the period analyzed.

Descriptive indicators for FDI and tax pressure broadly or strictly speaking data series are those in the following table:

	FDI	TAX_PRES...	TAX_PRES...
Mean	48424.77	27.44430	18.49339
Median	51414.00	27.61483	18.64814
Maximum	70113.00	28.96245	19.95606
Minimum	15040.00	25.90393	16.93409
Std. Dev.	16250.31	0.897084	0.792114
Skewness	-0.814413	-0.321956	-0.180927
Kurtosis	2.730836	2.344479	2.722393
Jarque-Bera	1.476324	0.457345	0.112669
Probability	0.477992	0.795589	0.945223
Sum	629522.0	356.7759	240.4141
Sum Sq. Dev.	3.17E+09	9.657121	7.529336
Observations	13	13	13

	FDI	TAX PRES...
Mean	48424.77	27.44430
Median	51414.00	27.61483
Maximum	70113.00	28.96245
Minimum	15040.00	25.90393
Std. Dev.	16250.31	0.897084
Skewness	-0.814413	-0.321956
Kurtosis	2.730836	2.344479
Jarque-Bera	1.476324	0.457345
Probability	0.477992	0.795589
Sum	629522.0	356.7759
Sum Sq. Dev.	3.17E+09	9.657121
Observations	13	13

Ordinary covariance analysis between the series FDI and the Tax pressure is as follows and we can observe it appears that the variables are inverse correlated.

Sample: 1 13
Included observations: 13
Balanced sample (listwise missing value deletion)

Covariance Correlation	FDI	TAX PRES...
FDI	2.44E+08	
	1.000000	
TAX PRESSURE ...	-3514.067	0.742855
	-0.261142	1.000000

Sample (adjusted): 1 13
Included observations: 13 after adjustments
Balanced sample (listwise missing value deletion)
Computed using: Ordinary correlations
Extracting 2 of 2 possible components

Eigenvalues: (Sum = 2, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	1.261142	0.522285	0.6306	1.261142	0.6306
2	0.738858	---	0.3694	2.000000	1.0000

Eigenvectors (loadings):

Variable	PC 1	PC 2
FDI	-0.707107	0.707107
TAX_PRESSURE_...	0.707107	0.707107

Ordinary correlations:

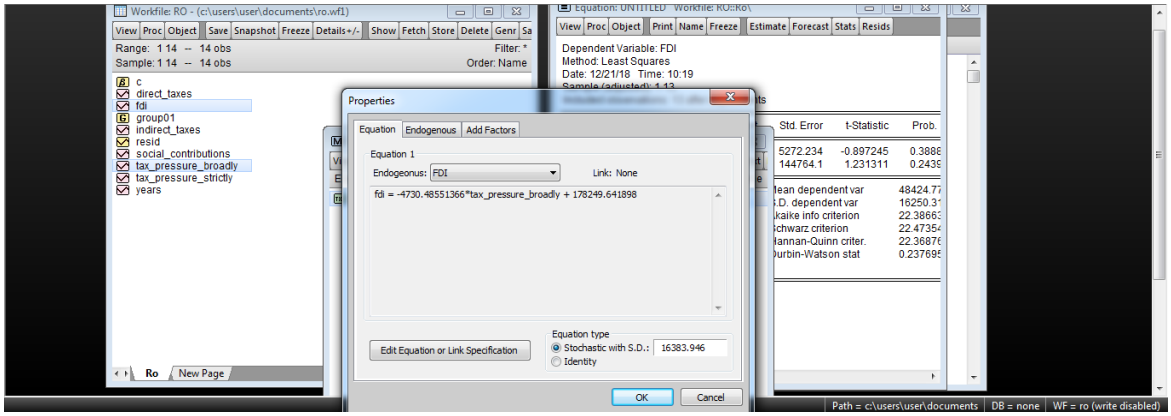
	FDI	TAX_PRES...
FDI	1.000000	
TAX_PRESSURE_...	-0.261142	1.000000

The previous conclusion is confirmed by the Least Squared Method on estimate the FDI by tax pressure broadly speaking shown in following table:

Sample (adjusted): 1 13
Included observations: 13 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TAX_PRESSURE_BROADLY	-4730.486	5272.234	-0.897245	0.3888
C	178249.6	144764.1	1.231311	0.2439

R-squared	0.068195	Mean dependent var	48424.77
Adjusted R-squared	-0.016514	S.D. dependent var	16250.31
S.E. of regression	16383.95	Akaike info criterion	22.38663
Sum squared resid	2.95E+09	Schwarz criterion	22.47354
Log likelihood	-143.5131	Hannan-Quinn criter.	22.36876
F-statistic	0.805049	Durbin-Watson stat	0.237695
Prob(F-statistic)	0.388804		



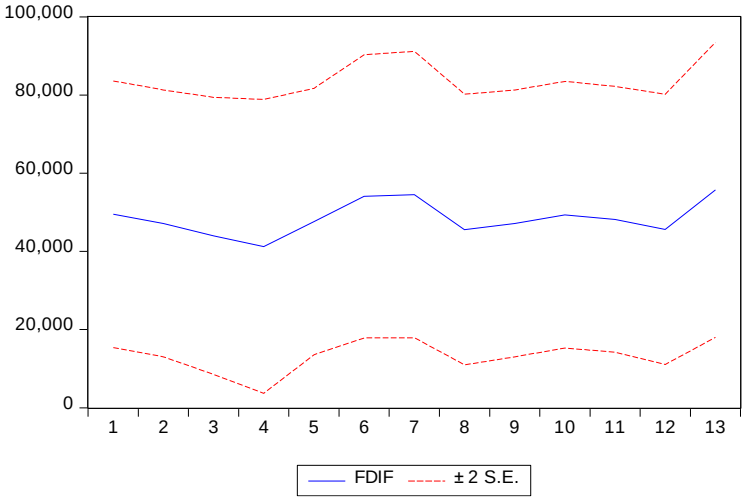
To determine the regression equation applies Least Squares Method. So, we obtain the following regression equation:

Estimation Command:
==========
LS FDI TAX_PRESSURE_BROADLY C

Estimation Equation:
==========
FDI = C(1)*TAX_PRESSURE_BROADLY + C(2)

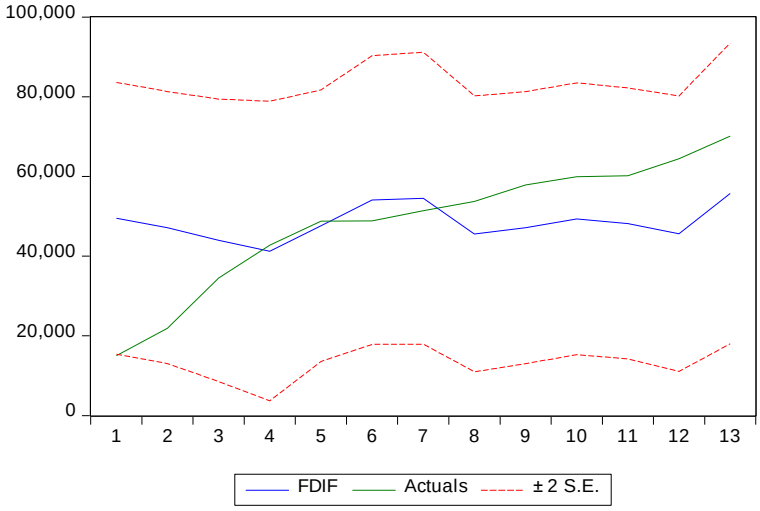
Substituted Coefficients:
==========
FDI = -4730.48551366*TAX_PRESSURE_BROADLY + 178249.641898

In the followings graphics are forecast FDI actual and estimated values of the feature analysis (Y) and the residual variable values and chart series.



Forecast: FDIF	
Actual: FDI	
Forecast sample: 1 14	
Adjusted sample: 1 13	
Included observations: 13	
Root Mean Squared Error	15071.04
Mean Absolute Error	11914.72
Mean Abs. Percent Error	39.65473
Theil Inequality Coef.	0.151505
Bias Proportion	0.000000
Variance Proportion	0.585864
Covariance Proportion	0.414136
Theil U2 Coefficient	2.268550
Symmetric MAPE	27.81710

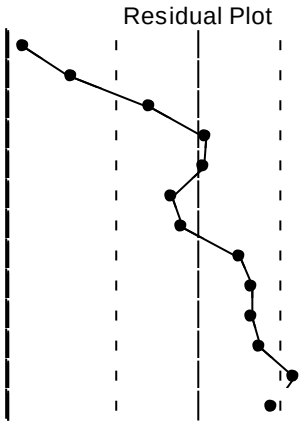
Forecast and actual FDI

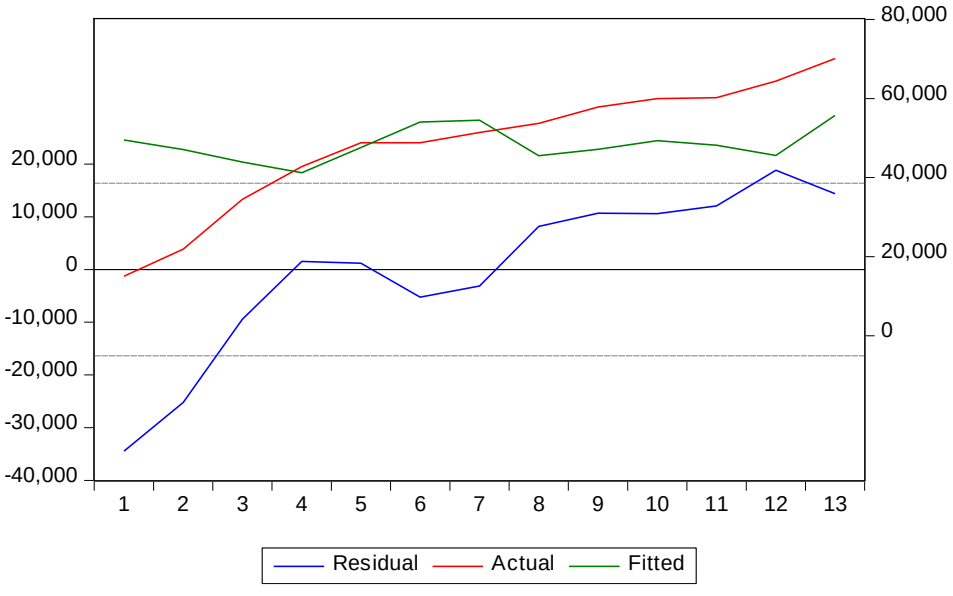


Forecast: FDIF	
Actual: FDI	
Forecast sample: 1 14	
Adjusted sample: 1 13	
Included observations: 13	
Root Mean Squared Error	15071.04
Mean Absolute Error	11914.72
Mean Abs. Percent Error	39.65473
Theil Inequality Coef.	0.151505
Bias Proportion	0.000000
Variance Proportion	0.585864
Covariance Proportion	0.414136
Theil U2 Coefficient	2.268550
Symmetric MAPE	27.81710

Another way of presenting the residual variable: Actual, Fitted, Residual Graphis presented in the following figure:

obs	Actual	Fitted	Residual
1	15040	49484.8...	-34444....
2	21885	47111.3...	-25226....
3	34512	43937.4...	-9425.4...
4	42770	41243.1...	1526.81...
5	48798	47618.0...	1179.92...
6	48827	54059.1...	-5232.1...
7	51414	54530.9...	-3116.9...
8	53723	45545.3...	8177.65...
9	57851	47153.0...	10697.9...
10	59958	49356.6...	10601.3...
11	60198	48159.4...	12038.5...
12	64433	45611.1...	18821.8...
13	70113	55711.4...	14401.5...

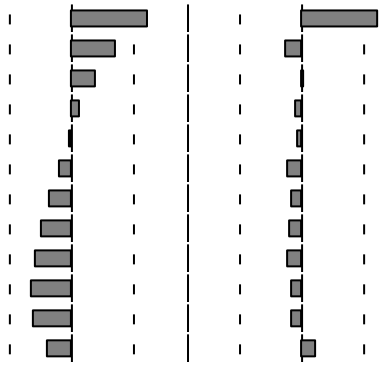




Correlogram of Residuals can be shows like in the following table:

Correlogram of FDI

Sample: 1 14
Included observations: 13

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.688	0.688	7.6843	0.006
		2	0.395	-0.148	10.445	0.005
		3	0.208	-0.003	11.291	0.010
		4	0.075	-0.058	11.413	0.022
		5	-0.015	-0.038	11.419	0.044
		6	-0.114	-0.119	11.781	0.067
		7	-0.202	-0.096	13.104	0.070
		8	-0.274	-0.113	16.023	0.042
		9	-0.329	-0.117	21.303	0.011
		10	-0.353	-0.098	29.417	0.001
		11	-0.350	-0.093	41.381	0.000
		12	-0.228	0.116	51.562	0.000

Scaled Coefficients
Date: 09/30/18 Time: 10:39
Sample: 1 14
Included observations: 13

Variable	Coefficient	Standardized Coefficient	Elasticity at Means
TAX PRESSURE B...	-4730.486	-0.261142	-2.680960
C	178249.6	NA	3.680960

Coefficient Confidence Intervals
Date: 09/30/18 Time: 10:40
Sample: 1 14
Included observations: 13

		90% CI		95% CI		99% CI	
Variable	Coefficient	Low	High	Low	High	Low	High
TAX PRESSURE B...	-4730.486	-14198.81	4737.839	-16334.59	6873.623	-21105.02	11644.05
C	178249.6	-81730.03	438229.3	-140374.0	496873.3	-271359.7	627859.0

Coefficient Variance Decomposition
Date: 09/30/18 Time: 10:40
Sample: 1 14
Included observations: 13

Eigenvalues	2.10E+10	27351.81
Condition	1.30E-06	1.000000

Variance Decomposition Proportions

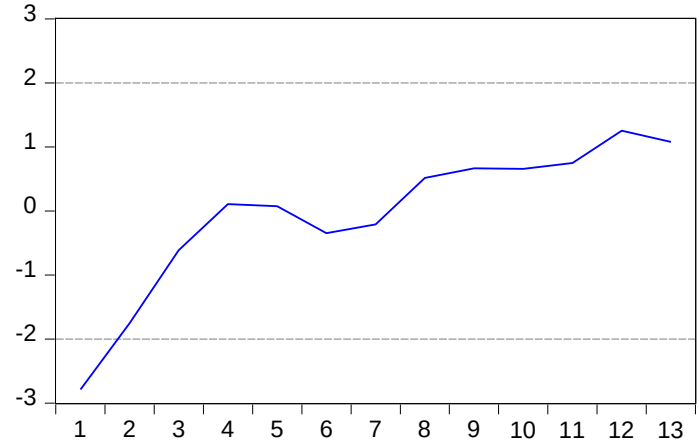
	Associated Eigenvalue	
Variable	1	2
TAX_PRESSURE_B...	0.999017	0.000983
C	1.000000	1.73E-09

Eigenvectors

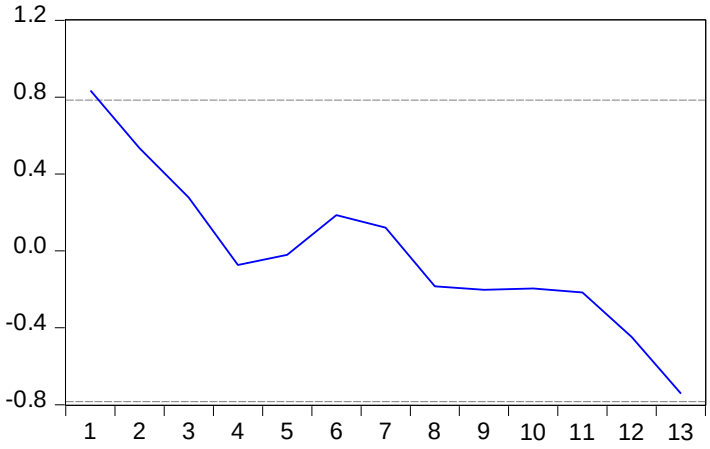
	Associated Eigenvalue	
Variable	1	2
TAX_PRESSURE_B...	-0.036377	-0.999338
C	0.999338	-0.036377

Influence Statistics

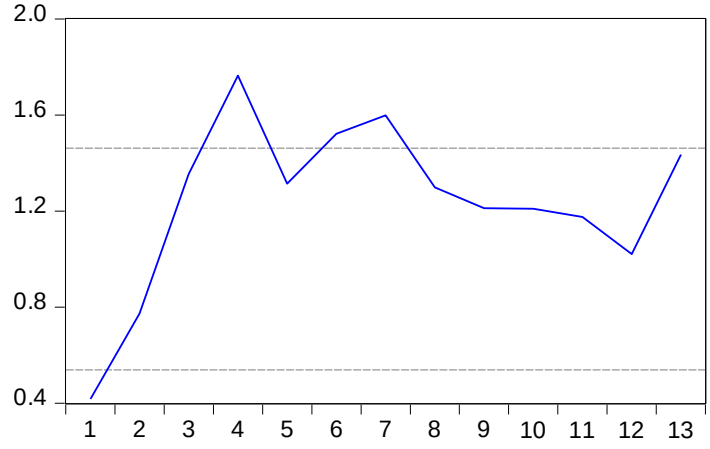
RStudent



DFFITS



COVRATIO



3. Conclusions

Generally speaking, it is known that FDI depend on many factors including the level of taxes in every country and we have studied how much tax pressure influences FDI in Romania in period 2004 – 2016 and how can this be quantified. In developed countries the tax rate is higher than in the less developed countries where it is lower. Worldwide, the rate of taxation varies between 30-40%, while countries such as USA, Japan and Switzerland are isolated because although developed countries have a tax burden below 30%, which is lower than the world average.

State Fiscal policy covers all the legislative measures adopted by it in connection with the collection and payment of taxes aimed at normal functioning of business processes and socio-economic relations.

The FDI have a positive impact to national economy because they determine additional incomes for the state budget which consist of taxes and fees paid by new contributors.

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