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Leibniz-Informationszentrum Wirtschaft Leibniz Information Centre for Economics



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

Rodica Pripoaie¹

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: $r_f = \text{tax rate or fiscal pressure;}$ $V_{\text{fiscal}} = \text{tax revenues;}$ 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:

	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													
contribution													
s (%)	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

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 and2016

Source: own calculations on the base the annually reports of the European Commission (<u>https://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en</u>), National Institute of

Statistics and the National Bank of Romania from 2004 to 2016

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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:

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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:

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	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	

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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 2	1.261142 0.738858	0.522285 	0.6306 0.3694	1.261142 2.000000	0.6306 1.0000
Eigenvectors (loadings	s):				
Variable	PC 1	PC 2			
FDI TAX_PRESSURE	-0.707107 0.707107	0.707107 0.707107			
Ordinary correlations:					
	FDI	TAX_PRES			
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 C	-4730.486 178249.6	5272.234 144764.1	-0.897245 1.231311	0.3888 0.2439
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.068195 -0.016514 16383.95 2.95E+09 -143.5131 0.805049 0.388804	Mean depend S.D. depende Akaike info cr Schwarz crite Hannan-Quin Durbin-Watsc	lent var ent var iterion rion n criter. on stat	48424.77 16250.31 22.38663 22.47354 22.36876 0.237695

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Vorkfile: BO + (c:) users\user\documents\ro.wf1) View Proc Object Print Name Freeze Estimate Forecast Stats Resids v Proc Object Save Snapshot Freeze Details+/- Show Fetch Store Delete Genr S Dependent Variable: FDI Method: Least Squares Date: 12/21/18 Time: 10:19 Range: 1 14 -- 14 obs Sample: 1 14 -- 14 obs Order: Na -c direct_taxes fdi group01 indirect_taxes resid social contribution Properties Std. Error t-Statistic Prob Equation Endogenous Add Factors 5272.234 144764.1 -0.897245 1.231311 0.3888 ation 1 Endogeonus: FDI -Link: None lean dependent var D. dependent var 48424.7 = -4730.48551366*tax_pressure_broadly + 178249.641898 16250.31 22.38663 22.47354 22.36876 0.237695 kaike info criterion chwarz criterion łannan-Quinn criter Jurbin-Watson stat vith S.D.: 16383.946 Edit Equation or Link Spec Ro New Page Ph. OK Cancel

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

Estimation Command:

LS FDI TAX_PRESSURE_BROADLY C

Substituted Coefficients:

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. 0.151	1505
Bias Proportion	0.000000
Variance Proportion	0.585864
Covariance Proportion	0.414136
Theil U2 Coefficient	2.268550
Symmetric MAPE	27.81710

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Forecast and actual FDI



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

obs	Actual	Fitted	Residual	Residual Plot
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	ı) ≢ ı
6	48827	54059.1	-5232.1	
7	51414	54530.9	-3116.9	
8	53723	45545.3	8177.65	• • •
9	57851	47153.0	10697.9	ı • ı
10	59958	49356.6	10601.3	ı • (ı
11	60198	48159.4	12038.5	ı • .
12	64433	45611.1	18821.8	ı Ìp
13	70113	55711.4	14401.5	I •I



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

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Correlogram of FDI

Sample: 1 14 Included observations: 13

Autocorrelation	Partial Correlation	AC PAC Q-Sta	t Prob
	Partial Correlation	AC PAC Q-Sta 1 0.688 0.688 7.684 2 0.395 -0.148 10.44 3 0.208 -0.003 11.29 4 0.075 -0.058 11.41 5 -0.015 -0.038 11.41 6 -0.114 -0.119 11.78 7 -0.202 -0.096 13.10 8 -0.274 -0.113 16.02 9 -0.329 -0.117 21.30	3 0.006 5 0.005 1 0.010 3 0.022 9 0.044 1 0.067 4 0.070 3 0.042 3 0.011
		10 -0.353 -0.098 29.41	7 0.001
		11 -0.350 -0.093 41.38 12 -0.228 0.116 51.56	1 0.000 2 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%	6 CI	95%	CI	99%	6 CI
Variable	Coefficient	Low	High	Low	High	Low	High
TAX_PRESSURE_B C	-4730.486 178249.6	-14198.81 -81730.03	4737.839 438229.3	-16334.59 -140374.0	6873.623 496873.3	-21105.02 -271359.7	11644.05 627859.0

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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 C	0.999017 1.000000	0.000983 1.73E-09

Eigenvectors

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

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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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