

Business Administration and Business Economics

The Statistical Analysis of GDP, Tax Pressure and Tax Revenue with EViews 7 between 2000 – 2009

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Abstract: The general characteristic of modern economies is given by the rapid growth of the demand of financial resources as compared to the possibility of acquiring them. Fiscal pressure data series and tax revenues are used to determine descriptive indicators and to conduct statistical or graphical estimation of econometric models. Evolution of the two variables analyzed: the tax burden and tax revenue in the period 2001-2009 is presented using EViews 7.

Keywords: GDP; tax pressure broadly; tax pressure strictly; tax revenue

JEL Classification: C10; C18; C19

1. Tax Pressure Broadly and Tax Pressure Strictly

The obligation to pay taxes appeared along with the emergence of the State and of Law in the human society and the attempt to elude this system was more or less strong according to the increase or decrease of tax burden.

The *tax pressure* indicator (or tax rate) represents the ratio between inland revenues (of the State and of local communities) and GDP or NDP, expressed in percentages. This indicator measures the share of tax in the obtained wealth and thus allows determining the tax burden.

The change of the tax rate and / or of the share of budget resources categories in the total State revenue varies with the economic situation: when economy boost is wanted, in case of recession, the tax rate will be low, direct taxes will be less

burdening, etc, while in case of economic overheating, contrary measures shall be adopted.

In the analysis of the impact of State's fiscal policy on the economic growth, an important part is played by the phenomena of underground economy development and of tax evasion stimulation generated by the enforcement of much too high tax rates. Tanzi Vito¹ analyses the effects of a tax system with arbitrary exceptions and other distorter elements: the degree of corruption increases, production and, consequently, physical capital stock decreases; corruption reduces the rate of economic growth through the distortion caused on resource allocation, destroying the relationship between the social profitability and the financial profitability of an investment.²

The rate of tax pressure officially communicated by the Statistic Annual drawn up by the National Institute of Statistics is calculated as follows:

$$R = \frac{VF}{PIB} \cdot 100, \text{ where}$$

R – the rate of tax pressure,

VF – tax incomes,

PIB – the volume of gross domestic product

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

$$R = \frac{I + T + C}{PIB} \cdot 100, \text{ where}$$

¹ Vito Tanzi, *Corruption, Governmental Activities and Markets*, IMF working paper, 1995, p.15

² Laura Obreja Braşoveanu, *Impactul politicii fiscale asupra creşterii economice*, Editura ASE, Bucureşti, 2007, p. 117

I – the volume of collected taxes,

T – the total sum of collected duties,

C – State social security contributions;

The rate of tax pressure, strictly speaking, can also be calculated by excluding State social security contributions from the numerator:

$$R = \frac{I + T}{PIB} \cdot 100$$

2. The Evolution of Tax Pressure between 2000 and 2009

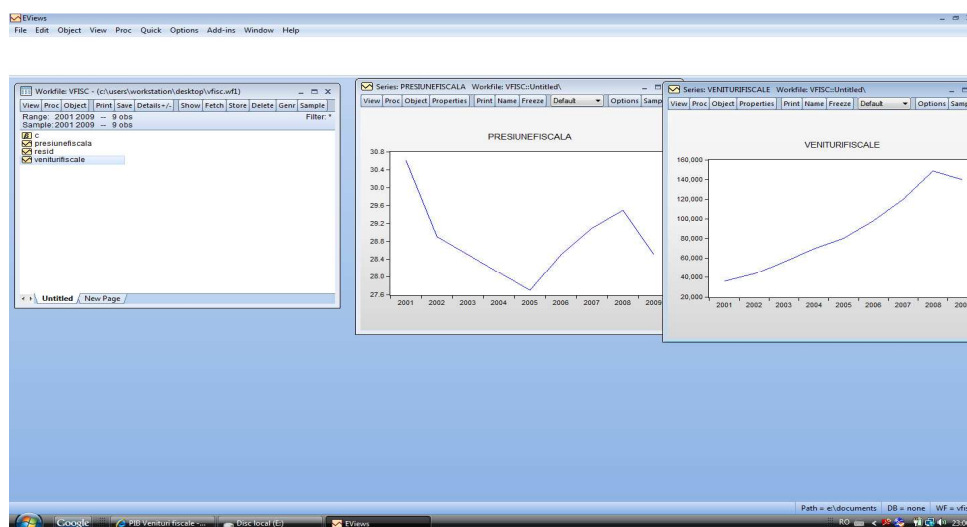
Given the data provided by the National Institute of Statistics and by the Tax Council, we proceeded to the calculation of the level of tax pressure for the period 2000 - 2009, the data obtained being centralised in the table below:

Year	GDP mil. Lei	Tax incomes % GDP	Direct taxes % GDP	Indirect taxes % GDP	Social contributions % GDP	Tax pressure broadly speaking	Tax pressure strictly speaking
2000	80984.6	30.6	7.0	12.2	11.4	30.6	19.2
2001	117945.8	28.9	6.4	11.3	11.2	28.9	17.7
2002	152017.0	28.5	5.8	11.6	11.1	28.5	17.4
2003	197427.6	28.1	6.0	12.2	9.9	28.1	18.2
2004	247368.0	27.7	6.4	11.6	9.7	27.7	18.0
2005	288954.6	28.5	5.3	12.9	10.3	28.5	18.2
2006	344650.6	29.1	6.0	12.8	10.3	29.1	18.8
2007	412761.5	29.5	6.7	12.3	10.5	29.5	19.0
2008	503958.7	28.5	6.7	11.7	10.1	28.5	18.4
2009	491273.7	28.0	6.6	11.0	10.4	28.0	17.6

3. The Analysis of Data Series with EViews 7

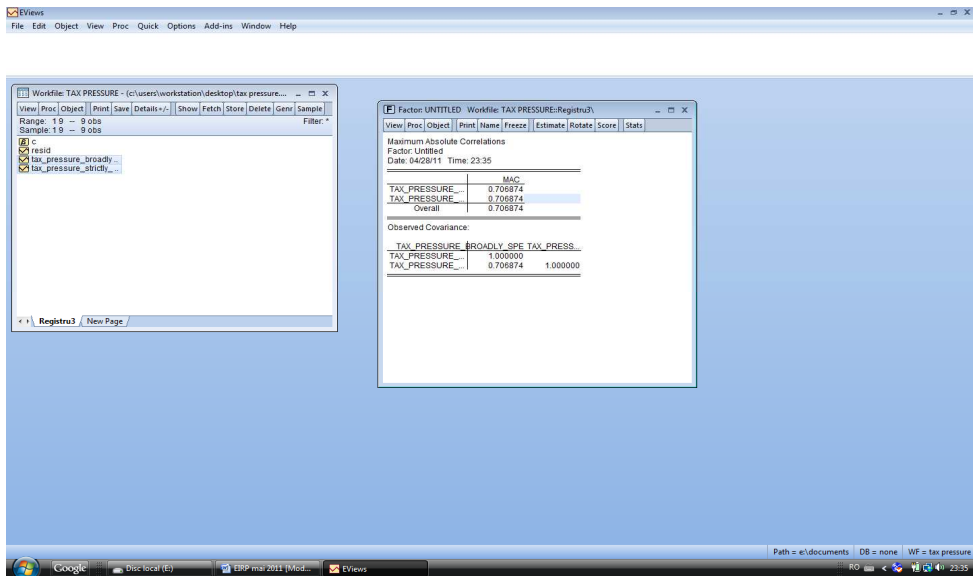
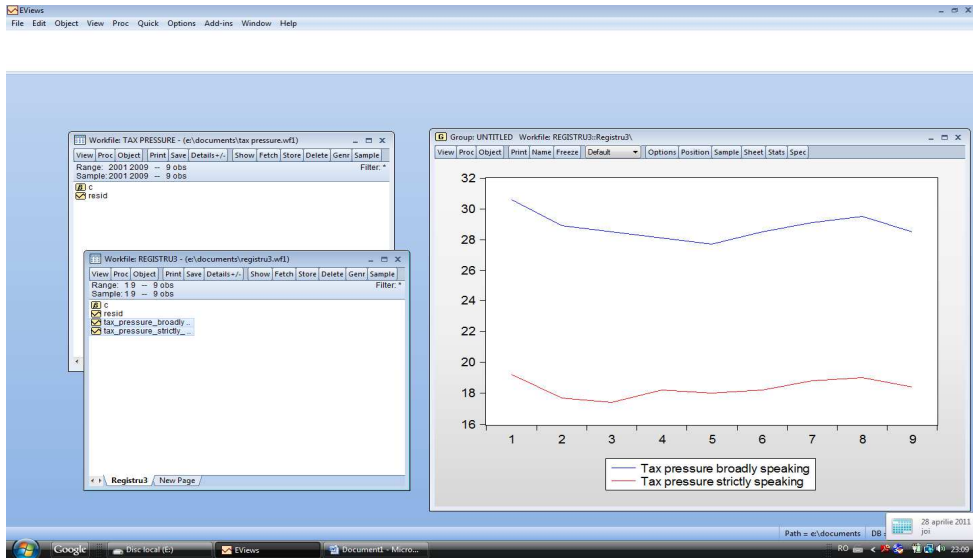
Fiscal pressure data series and tax revenues are used to determine descriptive indicators and to conduct statistical or graphical estimation of econometric models.

Evolution of the two variables analyzed: the tax burden and tax revenue in the period 2001-2009 is presented using EViews 7, as follows:

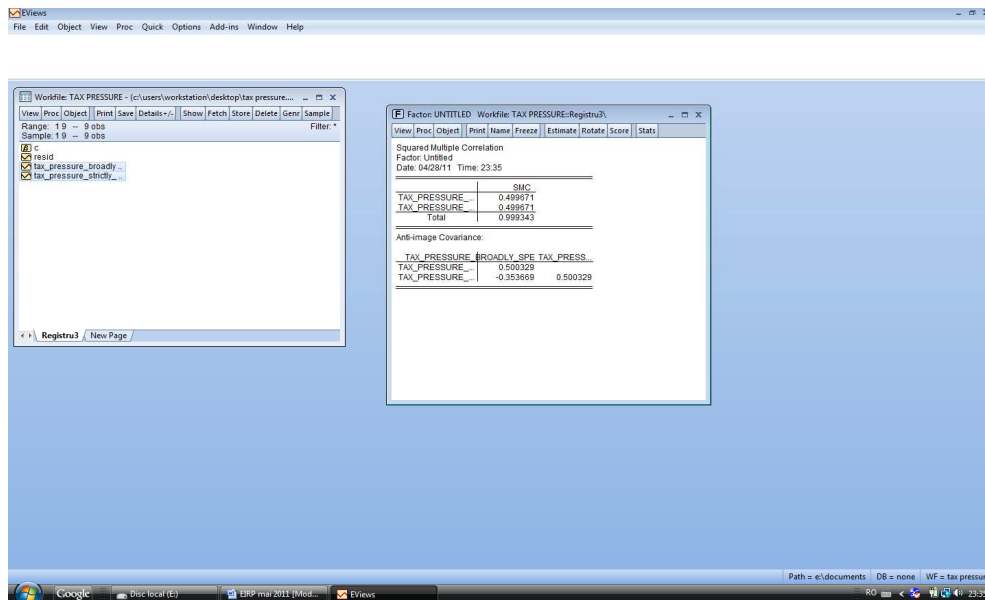


It appears that the tax burden was greatest in the early period, respectively in 2001 and then to decrease continuously and record a minimum in 2005, then began rising again in 2008 achieving a relative maximum. Throughout this period, tax revenues have increased continuously, achieving a relative maximum in 2008 also.

The following figure shows that tax pressure broadly have a relatively similar to that of tax pressure strictly during the nine years analyzed.

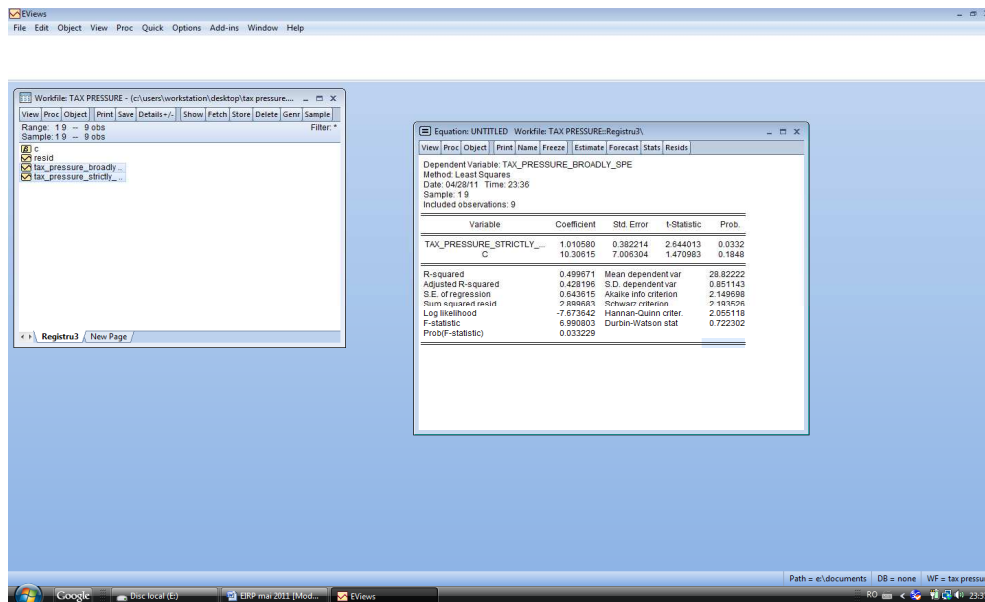


It appears that the two variables broadly tax pressure and strictly tax pressure is a direct correlation and very strong.

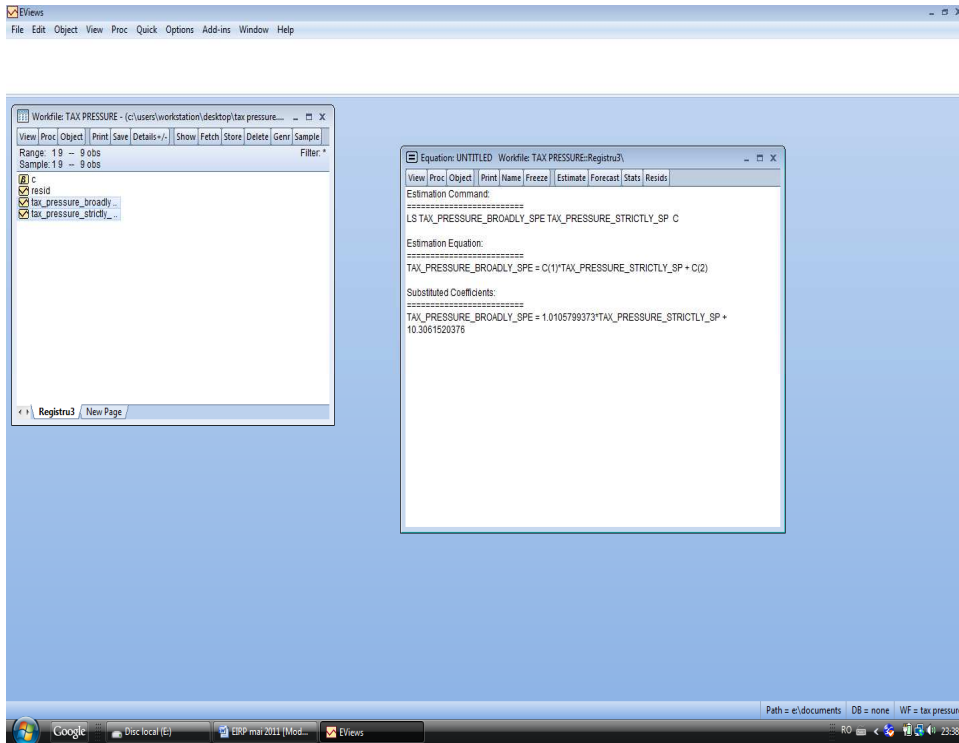


The previous conclusion is confirmed by the Squared Multiple Correlation shown in previous figure.

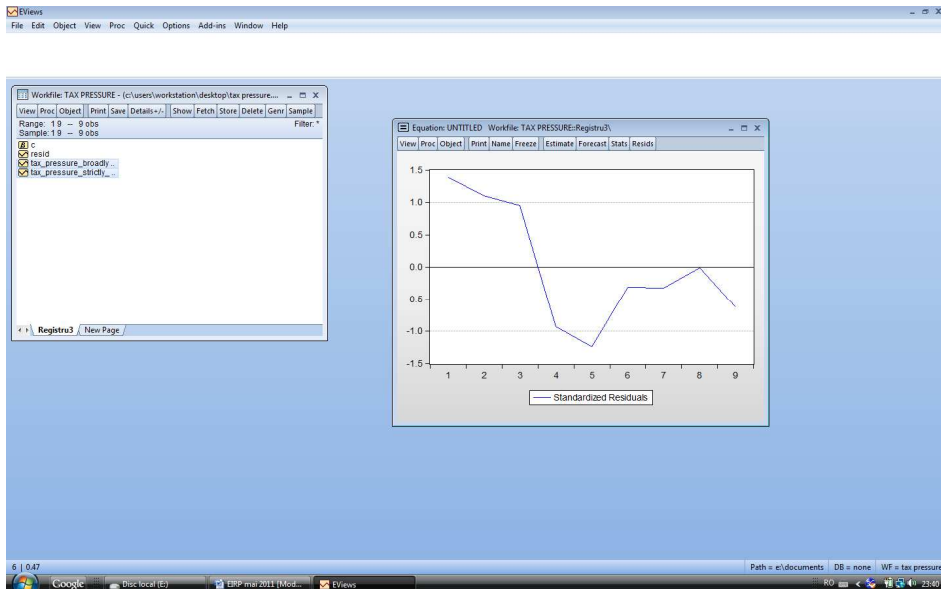
To determine the regression equation applies Least Squares Method.

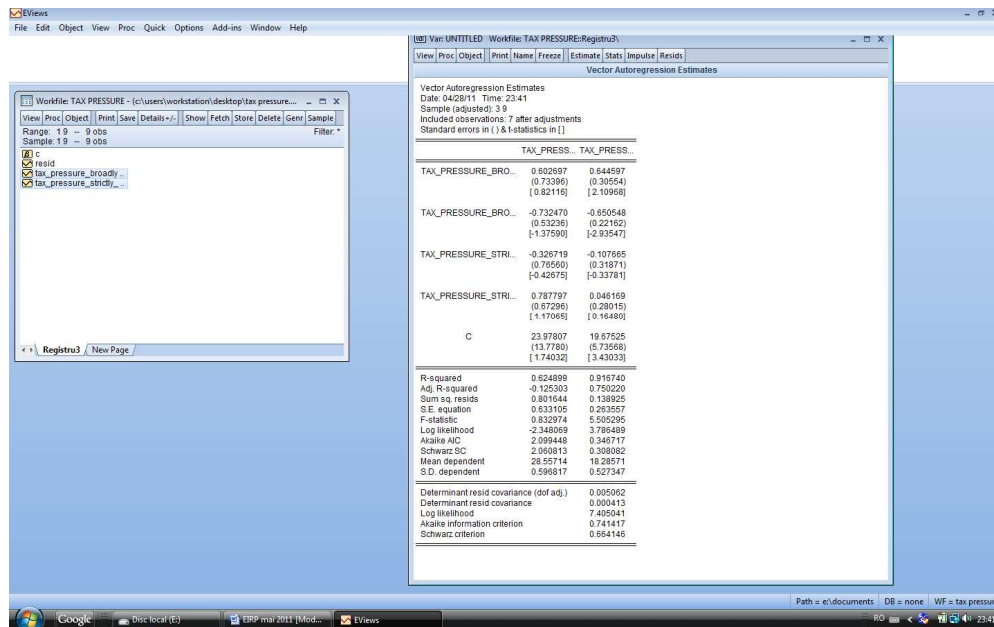


So, we obtain the following regression equation:



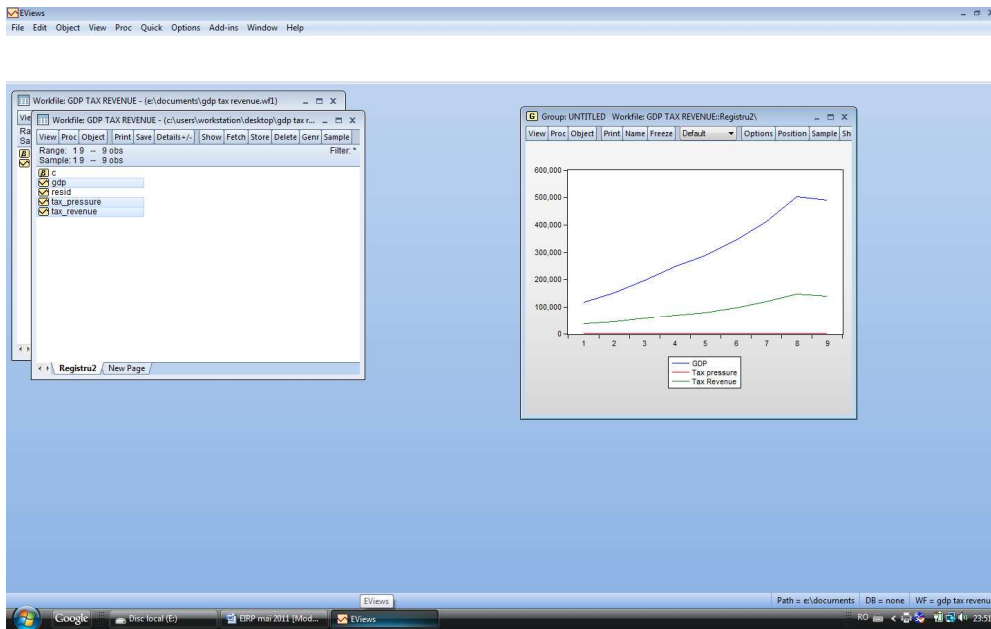
Standardized residuals are represented as follows:





The data series GDP, tax revenue and tax pressure are used to determine descriptive indicators and to conduct statistical or graphical estimation of econometric models.

Evolution of the variables analyzed: GDP, tax revenue and tax pressure in the period 2001-2009 is presented using EViews 7, as follows:

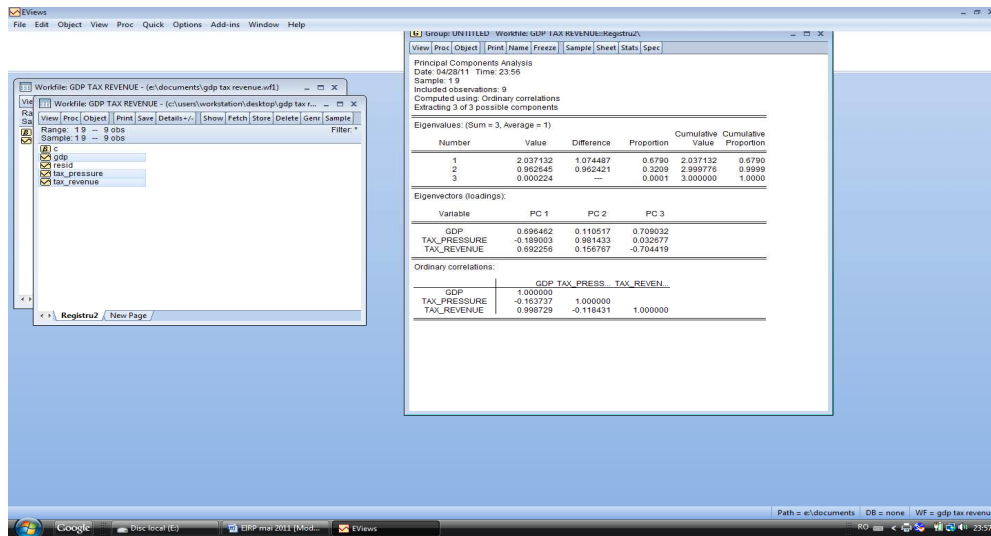


Descriptive indicators for GDP data series, tax pressure and tax revenue is as follows:

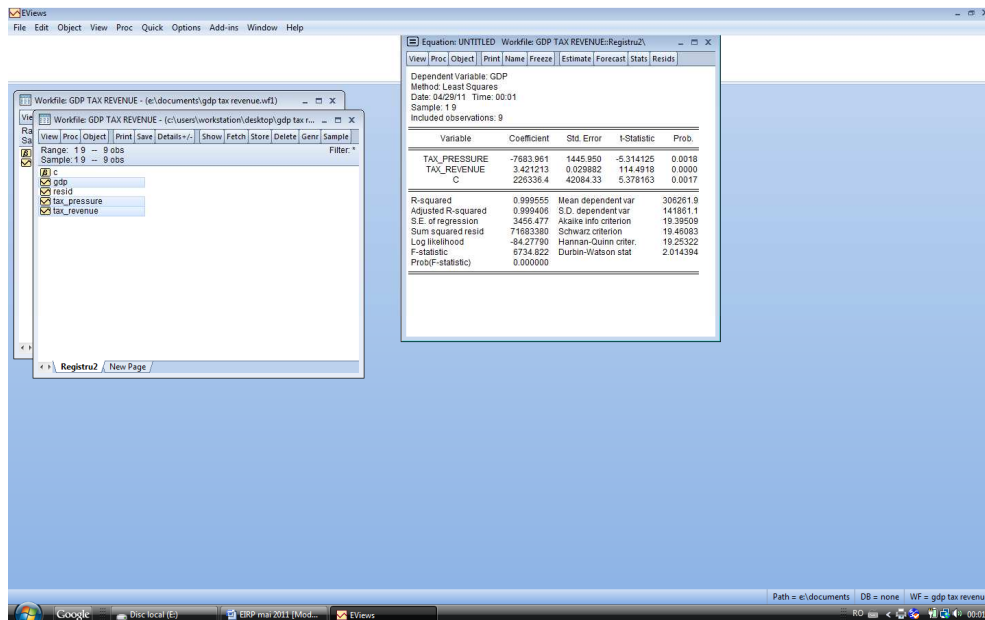
The screenshot shows the EViews software interface with a statistical summary table for the three data series. The table is titled 'Group: UNTITLED' and 'Workfile: GDP TAX REVENUE-Registru2'. It provides various statistical indicators for GDP, TAX_PRESSURE, and TAX_REVENUE.

	GDP	TAX_PRESSURE	TAX_REVENUE
Mean	306261.9	28.82222	89095.76
Median	288954.6	28.50000	80040.42
Maximum	503958.7	39.60000	149367.9
Minimum	117945.8	27.70000	36091.41
Std. Dev.	141891.1	0.851143	41188.04
Skewness	0.161499	0.872310	0.246845
Kurtosis	1.868792	3.241167	1.664384
Jarque-Bera	0.703666	1.165616	0.760369
Probability	0.703397	0.558273	0.683742
Sum	2750358	259.4080	792861.9
Sum Sq. Dev.	1.61E+11	5.795556	1.36E+10
Observations	9	9	9

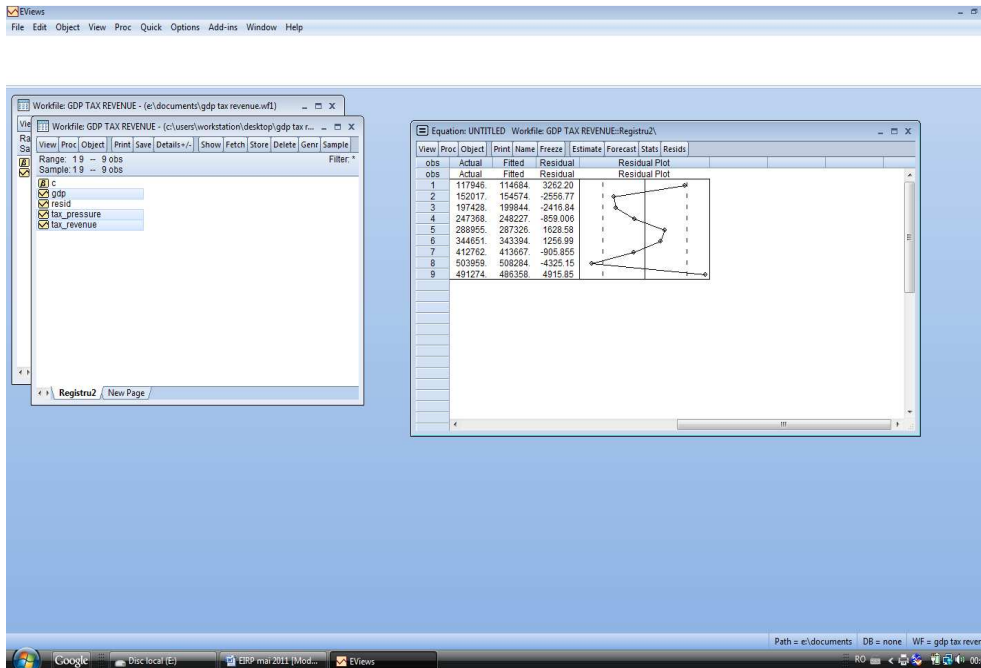
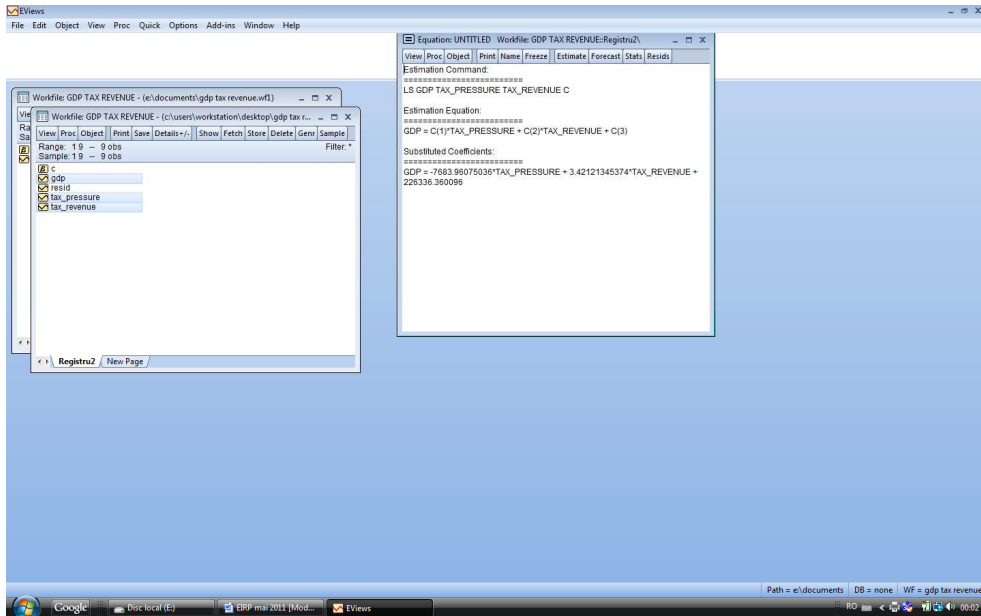
Ordinary correlation between the three series GDP, tax revenue and tax pressure is as follows:



To determine the regression equation applies Least Squares Method.

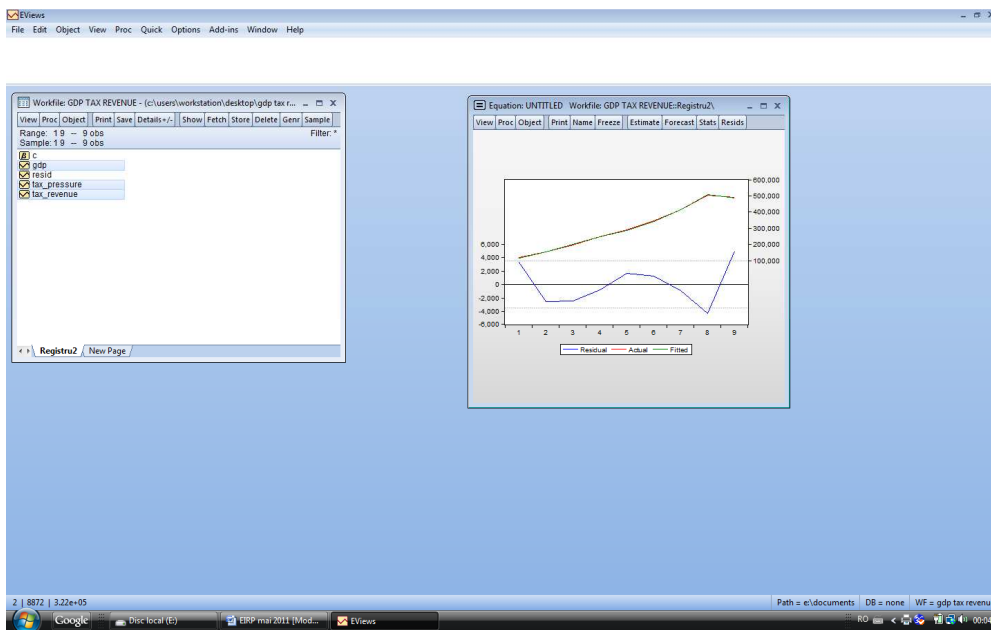


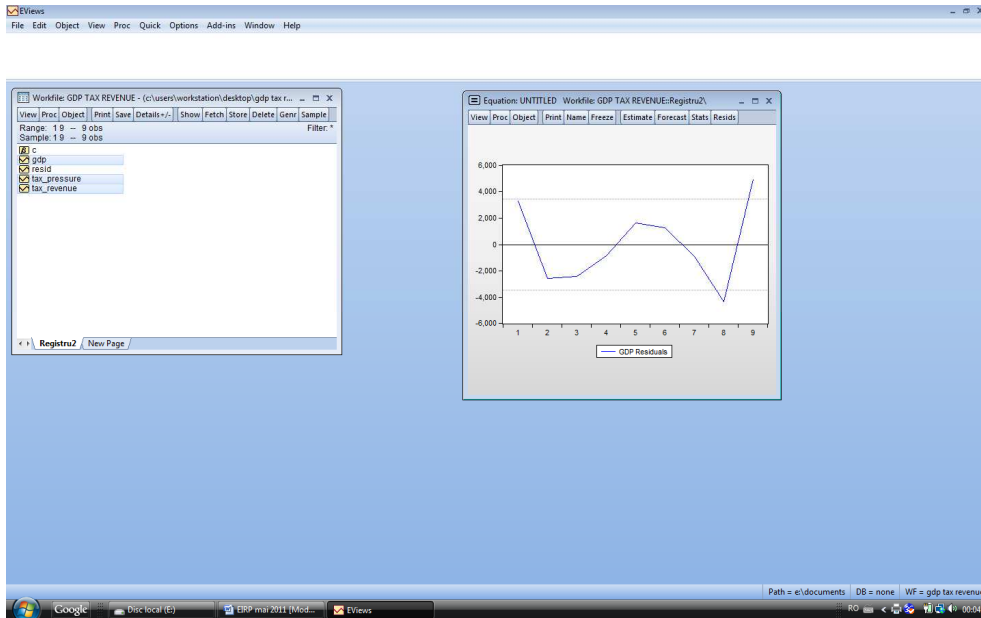
So, we obtain the following regression equation:



In the previous figure are actual and estimated values of the feature analysis (Y) and the residual variable values and chart series.

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





The screenshot shows the EViews software interface with the regression results window open. The window displays the following statistics:

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.953051	Prob. F(2,6)	0.2222
Obs*R-squared	3.548815	Prob. Chi-Square(2)	0.1696
Scaled explained SS	0.778798	Prob. Chi-Square(2)	0.6775

Test Equation:
 Dependent Variable: RESID^2
 Method: Least Squares
 Date: 04/20/11 Time: 00:06
 Sample: 1 9
 Included observations: 9

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.13E+08	91856423	-1.226566	0.2659
TAX_PRESSURE	3948714	3166040	1.249488	0.2684
TAX_REVENUE	110.1458	65.22214	1.688780	0.1422

R-squared: 0.394313 Mean dependent var: 7964820
 Adjusted R-squared: 0.192417 S.D. dependent var: 8395164
 S.E. of regression: 7544366 Akaike info criterion: 34.77170
 Sum squared resid: 3.42E+14 Schwarz criterion: 34.83744
 Log likelihood: -153.4727 Hannan-Quinn criter.: 34.62963
 F-statistic: 1.953051 Durbin-Watson stat: 1.114767
 Prob(F-statistic): 0.222201

4. Conclusions

To achieve an as accurate analysis as possible, we must study the following:

- the level of real economy, meaning that it must be calculated after the deduction of the official GDP of the percentages representing hidden economy, given that these incomes are characterised by tax avoidance,
- the existence of a significant amount of activities exempt from certain categories of taxes - the favourable tax regime applicable to free zones, duty-frees, disfavoured areas, etc,
- parafiscality, respectively the existence of an impressive number of taxes and duties which are not to be found in the State budget but in the budgets of certain agencies;
- the analysis of the level and of the structure of tax pressure must be correlated with the **intensity of tax regulations**, that is, with the large number of normative documents, frequent amendments, bureaucratic formulations, legal overlapping, etc. The most eloquent example is that of Law no. 571/ 2003 on the Tax Code which between December 2003 and August 2010 was modified by no less than 75 amending documents and Decision no. 92 / 2003 on the Fiscal Procedure Code was amended 15 times during the same period.

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