THE IMPACT OF EU FUNDS ON ROMANIAN ECONOMY

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Abstract

This study analyzes the influence of European funds on growth and multiplier of funds that bring added value in economy. We perform a quarterly database of European funds attracted during 2007-2014 detailed on agricultural and structural funds.

It is describe in detail: 1) Communitarian Budget, 2) National Budget, 3) European Funds, 4) The financial perspective, 5) Absorption of funds.

We present in detail budget and cash flow of European and national co-financing.

We apply econometric techniques to show the influence of European funds on GDP and their forecast for the next years. We will use quantitative forecasting methods, extrapolation methods, Box-Jenkins methods of control.

Keywords: European funds, macroeconomic, co-financing, econometric techniques

JEL classification: E1, E5, E6

Introduction

Macroeconomic effects of the Structural Funds are complex, depending on economic and political context and the Member State. Transfers from the EU budget are in most cases beneficial for growth in the Member States and can sometimes have negative effects.

The so-called "Dutch greenhouse" explains where an excess demand in a particular sector could lead to a strong impact on inflation and the decline may reflect other sectors. Therefore, it can seriously affect both the structure and the economic growth of the country.

When there is an important conflict of interest between authorities at different levels, decisions taken at national level could end up contradicting local preferences, thus causing significant side effects at the macro level.

Financial Perspective 2007-2013 brought Romania to around 25 billion euros 30.09.2014 European funds, and our country has contributed to the EU budget by about 10.5 billion euros, paid from the state budget.

Maximum absorption capacity share of GDP for allocating structural and cohesion funds established by the European Union is 4% of the GDP of the Member State.

In this paper we will try to detail the components of the absorption of structural and cohesion funds, and the agricultural funds.

The impact was positive but different for the Member States receiving funds due to its absorption of European funds and their distribution by destination, infrastructure development, human resources, agriculture and other economic activities.

Economic and mathematical models are used to analyze national macroeconomic system and the effects of structural funds.

Econometric models are used successfully when there is long time series calculated standard methodology for the variables involved.

General equilibrium models are used to pay off when sectorial breakdown and the number of variables of the system are high.

Short time series do not lead to some good estimates of the coefficients of behavioral equations. In such situations, many coefficients are calculated using simple theoretical estimates.

For testing stationarity of the variables used in the econometric estimates used in the equation co integration relationship between non stationary variables.

Structural and Cohesion Funds have an impact on economic growth both on the demand side and supply.

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Multiplicative effect of European funding components induces domestic consumption effects: investment, private consumption, import and the output of the internal and national income. Offer potential will increase.

Economic and social cohesion policy of the EU increases and improve infrastructure, representing an input for the private sector. Private sector can increase productivity by investing in human resources improvement. They also stimulate investment, research and development through financial assistance to firms.

The types of expenditure under operational programs that the model treats are investing in infrastructure, investment in human resource development, funds for investment in industry, agriculture and services market.

Sources of funding for this expenditure are the transfers from the EU budget and national co-financing is 2 ways, public and private.

Comparing the two scenarios, one "with" structural funds and the other "no", the difference between them can be regarded as the macroeconomic impact of structural and cohesion funds.

However the practice of EU Member States has shown that the prosperity of an economy is much higher absolute amount drawn from the EU budget through operational programs. European funds are in euros and for currency non-euro states; the effects are stronger domestic currency, to balance the balance of payments, forgetting any of these investment multiplier especially in infrastructure, which have high added value.

Decisive contribution to economic growth gap between the demand scenario involving EU funds and that no funds have investments, gross capital formation in particular, while private consumption has a lower intake.

On the supply side, the effects will influence the absorption of funds especially external trade, manufacturing, which have a higher output than ascending brought services.

European funds and create new jobs. Employment growth will lead to future economic growth.

Applying the model of macroeconomic impact assessment
EU structural funds for Romania

Structural Funds received from the EU represents percent to 4% of GDP and are used for investment in infrastructure, human resources, research and development, manufacturing, technical assistance. Model simulations show that the impact of these funds generally represents significant gains in production, both short term and long term.

We analyzed the payments made in the period 2007-2013 divided by economic sector for the new Member States (Romania, Bulgaria, Czech Republic, Poland, Hungary, Slovenia, Slovakia, Estonia, Latvia and Lithuania).

Table 1

Payments made in the period 2007-2013 divided by sectors (%)

	Bulgaria	Czech	Estonia	Latvia	Lithuania	Hungary	Poland	Romania	Slovenia	Slovakia	Average new Member States
Technical Assistance	5,6	6,2	2,1	2,4	4,2	4,6	4,7	5,5	4,6	4,6	4,5
Industry	3,8	3,1	2,2	1,2	4,3	7,8	4,3	6,2	5,0	4,4	4,2
Services	4,6	7,7	5,3	1,2	4,4	4,5	7,6	5,0	4,4	6,9	5,2
Research and Development	6,1	13,8	18,4	17,0	16,1	7,7	14,0	4,8	21,5	12,4	13,2
Infrastructure	58,4	53,8	59,0	65,0	57,0	60,0	55,4	60,0	49,2	58,5	57,6
Human Resources	21,5	15,4	13,0	13,2	14,0	15,4	14,0	18,5	15,3	13,2	15,4

Table own made of model data Varga-Veld

Calculating an average of Member States for dividing the percentage of payments made in the 2007-2013 economic sectors, we can say that 57.6% of the structural and cohesion funds are distributed infrastructure, human resources 15.3%, 13.1% research - development services 5.1%, industry 4.2%, 4.4% technical assistance.

The percentages allocated to Romania for Infrastructure, 60% and 18.5% than the average HR of the new Member States are well below average R & D only if 4.8% to 13.1%.

In the 2007-2013 financial perspective there were three financial instruments known as Structural Funds: European Regional Development Fund (ERDF); European Social Fund (ESF); Cohesion Fund (CF) and two complementary actions: European Agricultural Fund for Rural and Development (EAFRD) and European Fisheries Fund (EFF).

In 2007 -2013 financial perspective, the total amount of EU funds allocated to Romania was 38 billion, of which EUR 19.67 billion earmarked for FSC.

The new financial framework established for each of the years covered in the 2014-2020 period and for each chapter, the amounts of expenditure commitments.

The total expenses are denominated in global annual commitment and payment appropriations.

As in the national budget in the Community budget is the maximum loan commitment of expenditure that may be incurred or more simply, is the maximum that can be signed contracts during the financial year within the limits approved.

The loan payment is the amount approved in the budget, representing the maximum limit up to which you can order and make payments during the fiscal year for commitments made during the budget year and / or in previous years for the multi annual.

Table 2

The Indicative Financial Allocations by Operational Programs 2014 – 2020

Operational Programs (OP)	Type of Fund	Total allocation (billion Euro)
Large infrastructure OP	European Cohesion Fund (CF)	6,98
Human Capital OP	European Social Fund (ESF)	2,18
Administrative Capacity OP	ESF	0,96
Regional Operational Programs	European Regional Development Fund (ERDF)	6,99
Competitiveness OP	ERDF	1,35
Technical Assistance OP	ERDF	0,30
European Territorial Cooperation	ERDF	0,60
TOTAL Cohesion Policy	ERDF,ESF,CF	19,36
Rural Development OP	EARDF	6,60
Fishing OP	EFP	0,22
Direct payments	EFGA	10,39
TOTAL Agricultural and Fishing Policy	EARDF, EFP	17,23
TOTAL NET	ERDF, ESF, CF, EARDF, EFP	36,59
Connecting Europe	CF	1,00
Performance Reserve	ERDF, ESF, CF, EARDF, EFP	1,97
TOTAL BRUT	ERDF, ESF, CF, EARDF, EFP	39,56

Source: interactive database MFP

Although the 2007-2013 financial perspective ended, n + 2 rule allows the Member State allocations to be used in ceiling contracting and what not contracted to be considered "deployment" disengagement.

In the following tables we calculated estimate payments in the next 2 years based on management contracting by the authorities. The situation is for each operational program and by source of funding (2014 - 2016), and co, the amount will be provided by Romania of the state budget are 15% of the payments made by the European Union.

To see more clearly the impact of these amounts on the economy has transformed the amounts in lei into euros using the InforEuro used by the European Commission for Financial Programming and Budget.

Table 3

Forecast of payments on Operational Programs and source of financing 2014-2015

PO	2014			2015		
	EU Payments	Co financing State Budget	Total	EU Payments	Co financing State Budget	Total
POR	909115415	144411215	1297947528	589819091	69816818	767459773
POSM	1193170138	320841257	1913692512	982710000	161502727	1370218636
POSDRU	175266401	24771985	200038386	159090909	33636364	192727273
POSCCE	551844119	105435387	758495585	470000000	87000000	667000000
POST	1368089179	205313377	1950895169	1753977273	263096591	2501171591
POAT	36369778	405360	37045378	63181818	909091	64545455
PODCA	85350749	1756559	88998987	82021591	1090909	85157955
TOTAL	4319205779	802935140	6247113545	4100800682	617052500	5648280683

Source: interactive database MFP

Table 4

Forecast of payments on Operational Programs and source of financing 2016

	2016			2014 -2016	
	EU Payments	Co financing State Budget	Total	EU Payments	Co financing State Budget
POR	486009000	61438000	642332000	7118140000	1009890000
POSM		717033000	1751964000	9622196000	2852340600
POSDRU	638000000	146,000,000	784000000	2116270455	404000000
POSCCE	1864045550	344848427	2681893976	6382509361	1195834262
POST	4500000000	675000000	6417000000	18292500000	2743875000
POAT	100000000	8000000	108000000	539500000	13800000
PODCA	120000000	1500000	124500000	859895000	14100000
TOTAL	7708054550	1953819427	12509689976	44931010816	8233839862
				65102432678	

Source: interactive database MFP

Legend

POR: Regional Operational Program
POM: Environment Operational Program
POSDRU: Developing of Human Capital Sectorial Operational Program
POST: Transport Sectorial Operational Program
POAT: Tehnical Assistance Operational Programme
PODCA: Administrative Capacity Operational Programmer

Although estimates so far proved unrealistic over time, we can say that the payments made by the European Commission in Romania Structural and Cohesion Fund is an upward trend, and contractions were performed in 90%, by therefore there is every chance that during 2014 - 2016 to have a positive scenario. After analyzing the data calculated in the scenario above we can conclude that in the years 2014-2016 GDP will increase by 10 billion euros by structural and cohesion funds, representing more than 3% of annual GDP. Co-financing from the state budget will be in these three years, about 1.8 billion, which represents a considerable effort of the state.

In the table below we have tried to develop a database of operational programs financed economic sectors, but their share in GDP. Using Eviews and econometric functions we studied the impact of European funds allocated to the sectors concerned. For 2014 we used data forecasting.

Table 5

EU Funds on Economic Sectors, 2007 -2014

- Million lei, actual prices -

	Period		GDP	Agriculture, Forestry and Fishery	Industry	Services	Infra structure	Funds for Agriculture and Rural Development	Structural and Cohesion Funds	Tehnical Assistance	Industry	Services	R&D	Infra structure	Human Resources
1		Q1	74382,8	1955,7	13522,3	51183,0	1957,7	15,0	30,0	1,7	1,9	1,5	1,4	18,1	5,6
2	2007	Q2	93408,5	3720,1	13596,9	56351,4	2565,2	20,0	50,0	2,9	3,1	2,4	2,5	30,1	9,4
3		Q3	112290,9	10487,2	12950,9	54044,6	2610,0	23,3	1160,5	63,7	71,9	58,1	55,7	696,2	214,6
4		Q4	135924,6	7749,3	13173,2	60926,5	2560,2	51,1	263,8	14,5	16,5	13,2	12,6	158,3	48,7
5		Q1	93483,6	2127,7	14593,9	58505,6	1982,2	23,9	1940,4	106,6	121,3	97,1	93,1	1164,1	359,0
6	2008	Q2	117510,0	5123,6	18201,5	70598,8	3575,8	121,0	398,6	21,8	25,7	19,8	19,1	239,2	73,8
7		Q3	142259,8	14820,0	18748,8	77095,6	3540,3	3181,1	23,8	1,5	1,4	1,2	1,1	14,3	4,4
8		Q4	161446,6	12055,1	19173,7	94218,5	4910,6	244,3	20,0	1,1	1,3	1,0	1,0	12,1	3,7
9		Q1	93395,9	2334,1	10794,9	60516,9	2493,5	464,6	2440,5	134,4	151,4	122,1	116,1	1464,2	451,4
10	2009	Q2	115299,6	5348,3	13356,3	68210,3	3924,8	581,1	1053,1	57,7	65,2	52,6	51,6	631,9	194,9
11		Q3	134339,7	14502,7	13129,0	72997,7	3880,8	2374,2	11,7	0,8	0,8	0,7	0,6	7,1	2,2
12		Q4	158104,2	10112,7	14102,0	90945,1	5359,8	1190,1	186,6	10,5	11,5	9,3	9,0	112,0	34,5
13		Q1	101401,6	3347,6	10561,3	64079,2	1309,0	1568,0	62,7	3,5	3,8	3,2	3,1	37,5	11,7
14	2010	Q2	122651,8	4146,5	12692,2	67825,9	3205,5	741,8	98,4	5,4	6,2	4,8	4,6	59,1	18,1
15		Q3	143084,7	13787,6	12687,4	66229,7	2090,4	2037,1	1470,9	80,8	91,2	73,3	70,6	882,6	272,1
16		Q4	156555,2	8592,5	15038,8	72276,5	3639,3	1700,4	509,0	27,9	31,6	25,7	24,4	305,4	94,2
17		Q1	108434,0	1945,1	12270,7	61052,3	2247,7	1990,0	785,5	43,4	48,8	39,3	37,6	471,2	145,2
18	2011	Q2	129229,6	4715,7	12521,7	69132,2	2807,1	1542,2	448,8	24,7	27,7	22,3	21,5	269,4	83,1
19		Q3	154261,6	19987,2	13550,3	67516,3	2948,3	1013,3	270,9	14,8	16,8	13,6	13,1	162,5	50,1
20		Q4	165423,0	9693,6	15325,0	72082,5	2981,4	2480,7	1513,8	83,3	93,9	75,7	72,7	908,3	280,0
21		Q1	111661,5	2131,1	11682,5	64061,1	2636,1	2006,9	892,3	49,3	55,4	44,6	42,7	535,3	165,2
22	2012	Q2	138486,1	4327,6	12928,6	71131,3	2310,8	903,6	2191,2	120,5	135,8	109,6	105,3	1314,8	405,3
23		Q3	162225,7	14296,7	14459,9	72497,0	2943,6	909,9	463,2	25,5	28,7	23,2	22,2	277,9	85,7
24		Q4	174376,6	7882,7	16032,2	77746,8	3104,2	1010,8	1514,1	83,6	93,9	75,5	72,7	908,4	280,1
25		Q1	120142,3	2082,0	13115,7	67817,3	2455,2	654,6	1469,4	80,6	91,2	73,7	70,4	881,7	271,7
26	2013	Q2	146290,1	5177,2	14676,6	74528,2	1896,0	2017,6	1887,9	103,8	117,1	94,4	90,7	1132,7	349,4
27		Q3	171539,4	14609,2	16543,9	76967,7	2750,8	745,0	5156,7	283,2	319,6	257,8	247,5	3094,1	954,0
28		Q4	183158,3	13380,8	17642,6	84549,7	3383,0	2017,4	4654,7	256,4	288,6	232,7	223,4	2792,7	861,1
29		Q1	123746,6	2106,9	11996,8	5524,9	2285,6	680,8	1763,3	96,9	109,4	88,2	84,7	1058,0	326,3
30	2014	Q2	160678,8	5587,8	15502,4	7150,8	2967,8	2098,3	2265,5	124,7	140,5	113,4	108,8	1359,4	419,1
31		Q3	186685,6	14485,8	18023,1	8309,9	3448,2	874,8	6188,1	340,2	383,6	309,4	297,0	3712,7	1144,7

Source: own processing interactive data base of MFP

To smooth the data series and blur seasonality, cyclical influences, we went to annualized series and calibration coefficients.

<div align="right">**Table 6**</div>

Annualized Data – Level

Period		GDP	AGR_anualiz	GDP-Agriculture	EU Funds for Agriculture and Rural Development	Structural and Cohesion Funds	Fond_Agric_anualiz_7	Fond_Struc_anualiz_50
2008	Q3	489178,0	29820,6	459357,4	3377,1385462	2626,64214	23639,970	131332,110
	Q4	514700,0	34126,4	480573,6	3570,2885144	2382,86888	24992,020	119143,440
	Q1	514612,3	34332,8	480279,5	4011,0308988	2882,96526	28077,216	144148,260
2009	Q2	512401,9	34557,5	477844,4	4471,1060306	3537,48621	31297,742	176874,310
	Q3	504481,8	34240,2	470241,6	3664,2058146	3525,38529	25649,441	176269,260
	Q4	501139,4	32297,8	468841,6	4609,9668606	3692,02093	32269,768	184601,000
	Q1	509145,1	33311,3	475833,8	5713,3865492	1314,25375	39993,706	65712,688
2010	Q2	516497,3	32109,5	484387,8	5874,1521219	359,528487	41119,065	17976,424
	Q3	525242,3	31394,4	493847,9	5537,0219700	1818,71454	38759,154	90935,727
	Q4	523693,3	29874,2	493819,1	6047,3237694	2141,08989	42331,266	107054,490
	Q1	530725,7	28471,7	502254,0	6469,3100388	2863,86659	45285,170	143193,330
2011	Q2	537303,5	29040,9	508262,6	7269,6945621	3214,22492	50887,862	160711,250
	Q3	548480,4	35240,5	513239,9	6245,8748808	2014,17694	43721,124	100708,850
	Q4	557348,2	36341,6	521006,6	7026,2656475	3018,92236	49183,860	150946,120
	Q1	560575,7	36527,6	524048,1	7043,1058478	3125,67129	49301,741	156283,560
2012	Q2	569832,2	36139,5	533692,7	6404,5454513	4868,05397	44831,818	243402,700
	Q3	577796,3	30449,0	547347,3	6301,1968366	5060,39018	44108,378	253019,510
	Q4	586749,9	28638,1	558111,8	4831,2000542	5060,68489	33818,400	253034,240
	Q1	595230,7	28589,0	566641,7	3478,9056644	5637,79096	24352,340	281889,550
2013	Q2	603034,7	29438,6	573596,1	4592,8307578	5334,57066	32149,815	266728,530
	Q3	612348,4	29751,1	582597,3	4427,8774949	10028,07900	30995,142	501403,950
	Q4	621130,1	35249,2	585880,9	5434,4777769	13168,77680	38041,344	658438,840
	Q1	624734,4	35274,1	589460,2	5460,6608373	13462,65220	38224,626	673132,610
2014	Q2	639123,1	35684,8	603438,3	5541,3638263	13840,23900	38789,547	692011,950
	Q3	654269,3	35561,3	618708,0	5671,1628646	14871,58240	39698,140	743579,120
	Q4	660064,0	37364,2	622699,9	5661,8568880	15802,53220	39632,998	790126,610

Source: Data processing by annualized series econometric data and calibration coefficients

Enter the equation temp variable (time) to reduce the seasonality.

Calculated data stationarity and Unit Root test results from applied regression of Agriculture and European funds for agriculture, an R2 = 0.65 represents an important link between the two variables, and DW = 1.14, error autocorrelation poor.
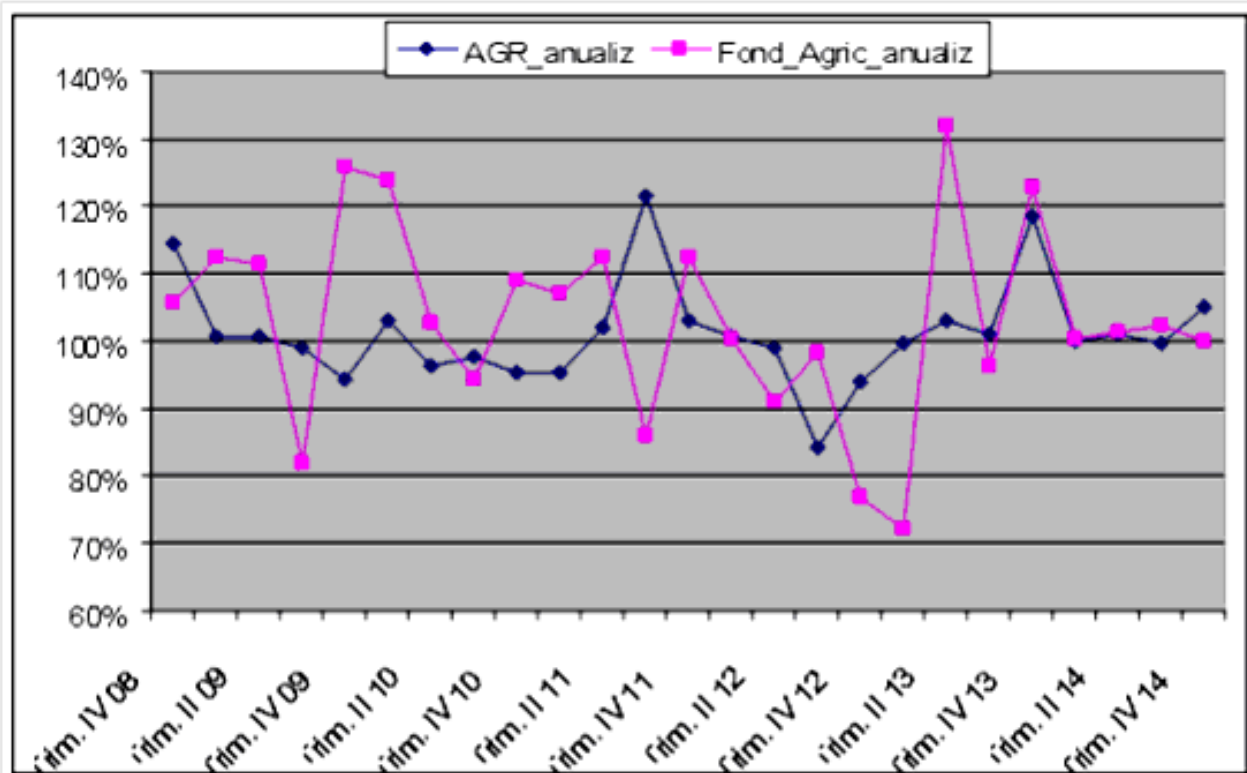

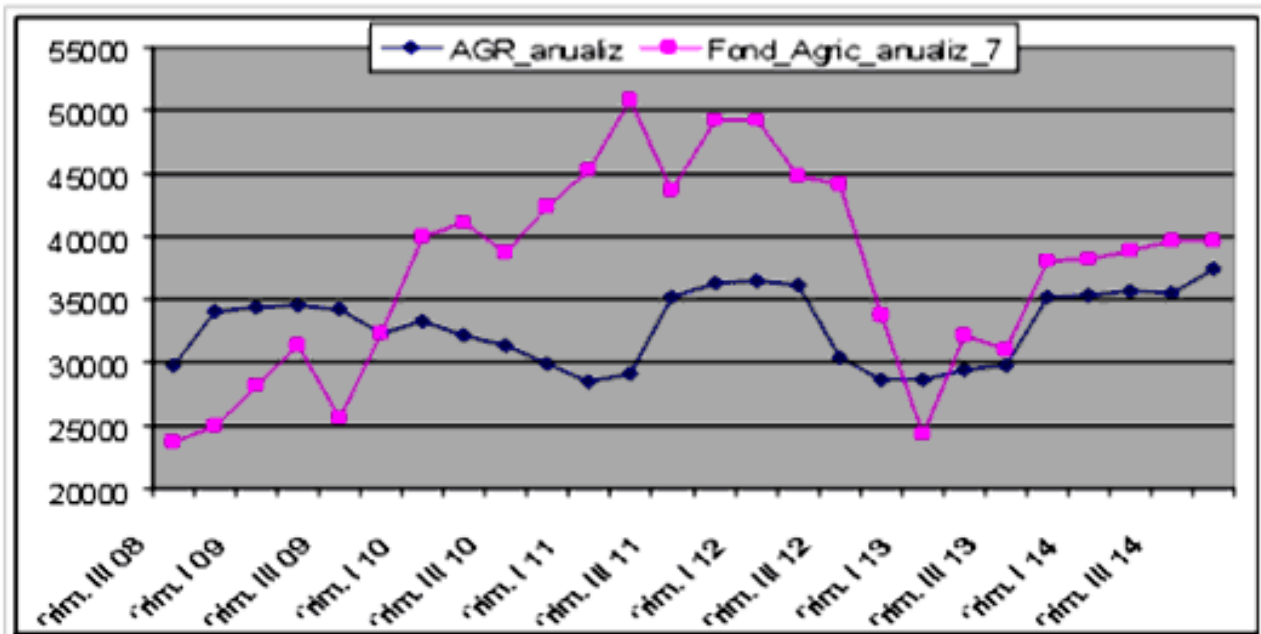**Figure 1. Agricultural Funds from EU and Value Added in Agriculture, Index of Growth**

Figure 2. Agricultural funds from EU and value added in agriculture, after calibration of the coefficients, quarterly annualized data
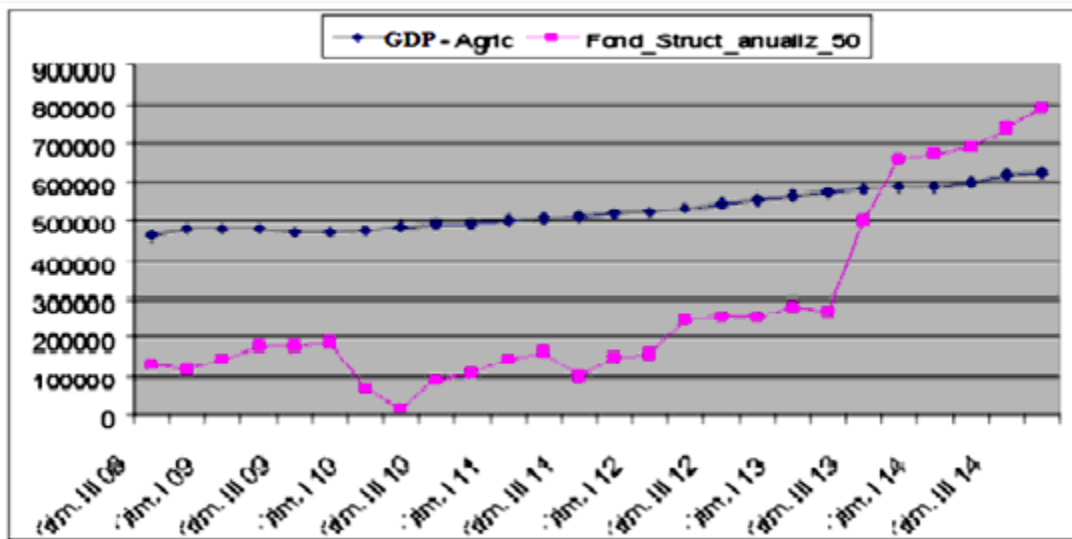
Figure 3. Structural funds from EU and the value GDP – value added of agriculture, after calibration of the coefficients, quarterly annualized data

Estimation Command:

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LS AGRIC_AN C FOND_AGRIC_AN TEMP

Estimation Equation:

$AGRIC\_AN = C(1) + C(2)*FOND\_AGRIC\_AN + C(3)*TEMP$

Substituted Coefficients:

$AGRIC\_AN = 26121.75389 + 1.372786524*FOND\_AGRIC\_AN - 92.38535166*TEMP$

Dependent Variable: AGRIC_AN
Method: Least Squares
Date: 10/28/14 Time: 14:43
Sample: 2007Q4 2013Q4
Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	26121.75	1471.783	17.74838	0.0000
FOND_AGRIC_AN	1.372787	0.361367	3.798870	0.0010
TEMP	-92.38535	101.3754	-0.911320	0.3720

R-squared	0.646976	Mean dependent var	31337.04
Adjusted R-squared	0.596701	S.D. dependent var	3697.844
S.E. of regression	2872.200	Akaike info criterion	18.87571
Sum squared resid	1.81E+08	Schwarz criterion	19.02198
Log likelihood	-232.9464	F-statistic	8.890648
Durbin-Watson stat	1.136005	Prob(F-statistic)	0.001480

We used the test Durbin - Watson (DW) for checking errors in linear regression autocorrelation value added in agriculture according to the agricultural funds and time variable.

The values of this test depends on the level of significance set, the number of observations in the sample and the number of variables influence of linear regression.

One of the reasons is the neglect of autocorrelation errors independent variables with significant influence on the dependent variable.

If the variables are close to DW 2 autocorrelation can be considered absent.

The coefficient of determination R^2 is calculated using the total variance decomposition of the scattering of the observed versus the theoretical and theoretical dispersion from the mean values.

This coefficient R 2 represents how much of the total variance can be explained by the variation of chosen factors and is calculated as the ratio between the total deviation of the calculated values and deviation.

Adjusted R2 coefficient is calculated by adjusting the corresponding degrees of freedom violations.

The link is particularly strong between the dependent variable and the explanatory variables of the model as the coefficient of determination approaches 100%.
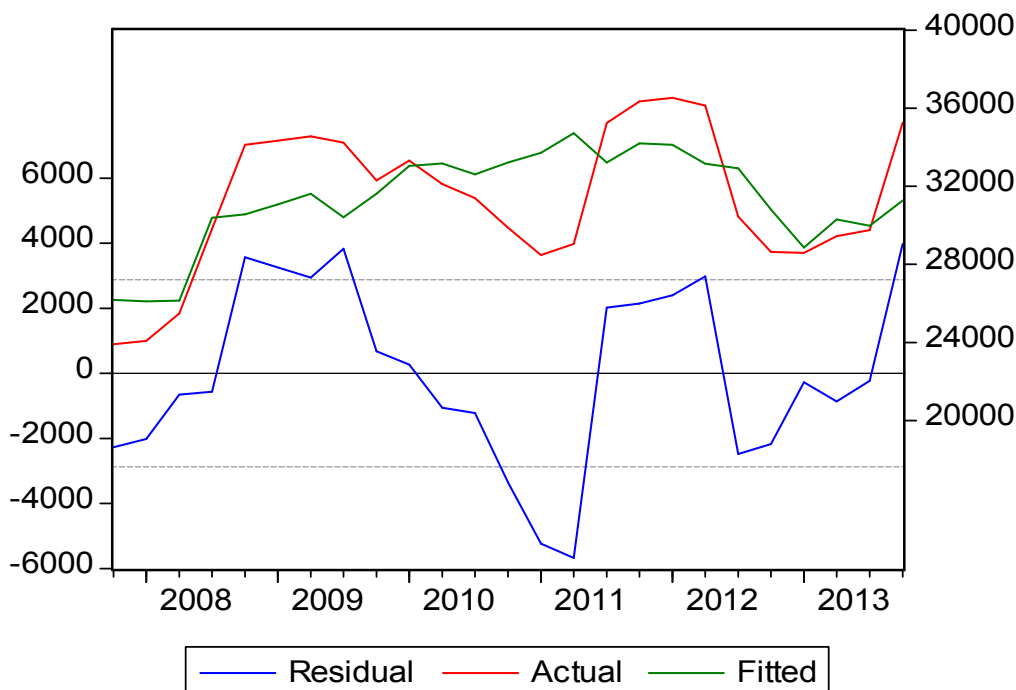
Figure 4. Diagram representing EVIEWS equation:
AGRIC_AN = C(1) + C(2)*FOND_AGRIC_AN + C(3)*TEMP

Estimation Command:

LS NONAGRIC_AN C FOND_NONAGRIC_AN TEMP

Estimation Equation:

NONAGRIC_AN = C(1) + C(2)*FOND_NONAGRIC_AN + C(3)*TEMP

Substituted Coefficients:

NONAGRIC_AN = 424680.4542 + 2.411361815*FOND_NONAGRIC_AN + 5426.34451*TEMP

Dependent Variable: NONAGRIC_AN
Method: Least Squares
Date: 10/28/14 Time: 14:41
Sample: 2008Q2 2013Q4
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	424680.5	4769.611	89.03881	0.0000
FOND_NONAGRIC_AN	2.411362	0.981904	2.455803	0.0233
TEMP	5426.345	402.9794	13.46556	0.0000
R-squared	0.951850	Mean dependent var		510236.0
Adjusted R-squared	0.947035	S.D. dependent var		42495.86
S.E. of regression	9780.027	Akaike info criterion		21.33518
Sum squared resid	1.91E+09	Schwarz criterion		21.48329
Log likelihood	-242.3546	F-statistic		197.6853
Durbin-Watson stat	1.205532	Prob(F-statistic)		0.000000

After the Unit Root test applied regression of GDP Non Agricultural and non agricultural European funds (structural) resulted in a R 2 = 0.95 and a DW = 1.20.
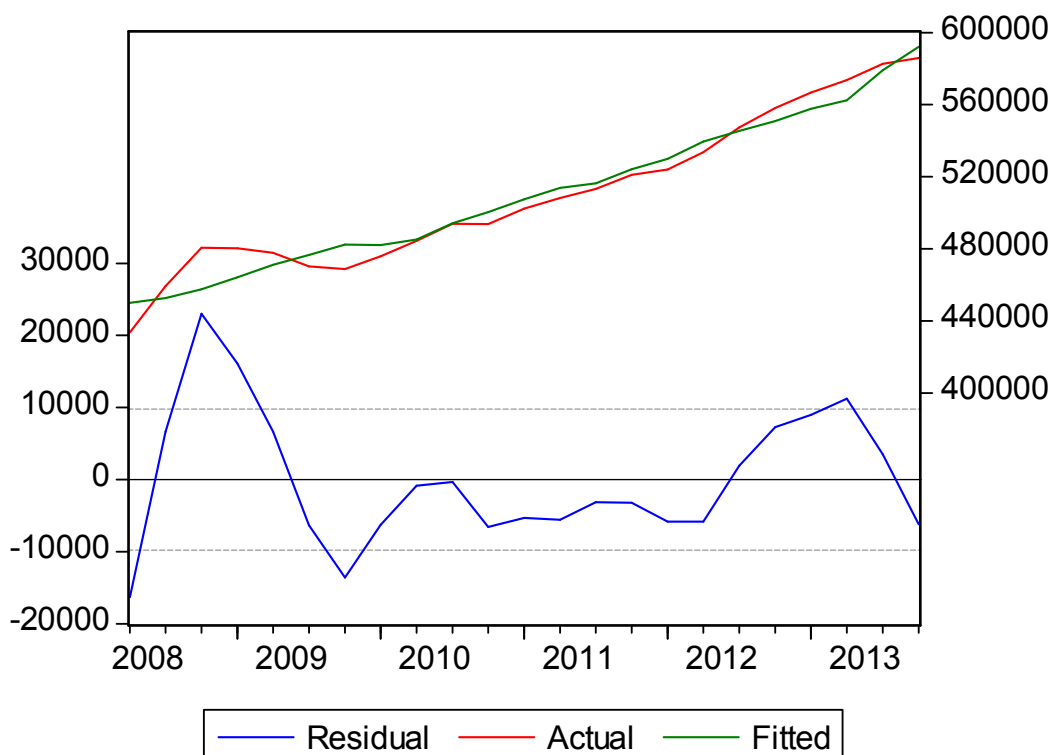
Figure 5. Diagram representing EVIEWS equation:
NONAGRIC_AN = C(1) + C(2)*FOND_NONAGRIC_AN + C(3)*TEMP

Acknowledgment

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