7. EUROPEAN STRUCTURAL FUNDS AND LABOR FORCE REQUIREMENT IN ROMANIA

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Abstract

The study focuses on the evaluation of the European Structural and Investment Funds (ESIF) and provides a tool for analyzing the direct and indirect effects of the Operational Programme Large Infrastructure with reference to the 2014-2020 Programming Period for Romania. This analysis requires the construction of an accounting scheme, the SAM, which comprehensively includes the circular flow of income and also that takes into account the labor demand, providing a picture of the workforce. The paper therefore makes use of a dynamic multisectoral extended model taking into account the exogenous shocks of the programmed policy, where the requirement of labor depends on the production changes. The short-term dynamic model will be used for assessing the labor force growth for the seven years of programming when examining two hypothetical scenarios. The two solutions will provide an overall assessment of the impact of Large Infrastructure OP on the domestic labor requirement and on the main aggregates.

Keywords: employment, European Structural and Investment Funds, Social Accounting Matrix, dynamic multisectoral model
JEL Classification: E16, F47, H23, O52

I. Introduction

More than one third of the total EU expenditure goes to the regional policy, the so-called Cohesion Policy, through the European Structural and Investment Funds (ESIF). Its main purpose is to harmonize and actively improve the living and working conditions of

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the European Union's citizens, by reducing the disparities between the levels of development of the various regions and by strengthening its "economic, social and territorial cohesion"[3].

ESIFs are meant to contribute to a smart, sustainable and inclusive growth while having in mainstream the Europe 2020 objectives. Romania, after joining the European Union, was determined to accomplish its own 2020 targets, implemented at a national level through the National Reform Program (NRP). Analyzing the current situation with regard to the advancement in reaching the 2020 national targets, the European Commission recognizes some urgently important areas, like spending on research and innovation, boosting employment rates and reducing poverty, which need specific attention in order to overcome the critical status.

During the 2001-2008 period, the Romanian economy expanded at an annual average of 6.3 percent per year, representing one of the fastest growth rates in the European Union. After two years of decline, by more than 7% in 2009 and 2010, growth resumed in 2011 due to a substantial increase in industrial output and an exceptional harvest that resulted in a 2.3% growth in the real GDP. In 2013, the country recorded a 3.5% growth rate, becoming the country with the highest GDP growth as compared to the other member states.

However, in 2011 “the employment rate remained low, at 62.8%, while the unemployment rate for the 15-74 age group remained high, at 7.4%”[4].

In the above context, the aim of this paper is to evaluate the direct and indirect effects of the ESIFs and their impact on the system's capacity of creating new investment, as well as new jobs, assessing in this way the employment impact. Furthermore, the ability of attracting labor force, when exogenously assuming to satisfy the domestic labor demand is analyzed.

The policy actions to be evaluated require an accounting scheme that comprehensively includes the circular flow of income and also takes into account the labor demand, providing a picture of the workforce. Our proposed analysis technique starts from a Social Accounting Matrix (SAM) and makes use, further, of a dynamic multisectoral extended model taking into account the exogenous shocks of the programmed policy, where the requirement of labor depends on the output changes. There is a strikingly expanding body of literature evaluating the impact of ESIFs on regional economic growth and convergence (see Becker *et al.*, 2010; Mohl and Hagen, 2010; Ramajo *et al.,* 2008). Rodriguez-Pose and Fratesi (2004); and Martin and Tyler (2006) concluded that only investments in education and the development of human capital has medium and long-term positive and significant results when assessing the level at which the ESIFs can fulfill their objective of triggering greater economic and social cohesion and lower disparities. The impact of the ESIFs and the regional cohesion policies have been evaluated by different tools and approaches. However, to our knowledge, there has not yet been any contribution making use of a multisectoral extended model. Keuning and

[3] *Articles 174 to 178 of the Consolidated version of the Treaty on the Functioning of the European Union. TITLE XVIII, Economic, Social and Territorial Cohesion (ex Article 158 TEC and ex Article 159 TEC).*

[4] *European Union, 2012. Position of the Commission Services on the development of Partnership Agreement and operational programs in Romania for the period 2014-2020.*

Verbruggen (2003) proposed a SAM framework in order to build reliable, comparable and meaningful indicators for the EU inter-regional policy making, Psaltopoulos *et al.* (2004) studied how the structural policies affected the lagging rural areas of Northern and Southern Europe, while Thorbecke and Jung (1996) used a SAM to analyze the poverty reduction caused by exogenous shocks. The multiplier approach was studied in a dynamic framework by Samuelson (1939) with a special interest combining it with the acceleration principle, and more recently, Puu and Sushko (2004). The paper proceeds as follows: Section two focuses on the construction of the 2011 SAM for Romania. Section three will describe the dynamic multisectoral extended model; Section four is dedicated to the ESIFs and Section five to the policy impact. Three scenarios are considered, depending on whether the cost of financing is laid on three institutional sectors. Concluding remarks are given in Section six.

II. The 2011 Social Accounting Matrix for Romania

In order to estimate the GDP and employment rate changes, it is necessary to clearly specify the framework used. For the Romanian case study, we developed a SAM based on the dataset provided by the National Institute of Statistics of Romania for the year 2011.

This accounting scheme comprises a basic structure including: output by industry, intermediate consumption by commodity, primary factors, domestic institutional sectors and capital formation and, finally, the rest of the world (Socci, 2004). This multisectoral scheme takes the opportunity of an inter-industry detail in order to connect the sphere of production with that of the institutional sectors. The economic aggregates are divided into accounts, chained by each amount, which describe the disaggregation of the circular flow of income into components. Presenting now in detail each block of the SAM we briefly start introducing the production account where the output and the goods and services for producing this output are recorded. Keeping distinguished Makes and Use tables with the maximum disaggregation level, the SAM comprises eighty-six industries and eighty-six commodities.

The generation of income is composed of the value added components (gross wages and salaries, social contributions, gross operating surplus, mixed income, other taxes on production and other subsidies on production) and the taxes on products less subsidies components (VAT, other taxes on products and customs duties), which are consequently allocated to the institutional sectors in the primary distribution phase.

Along these lines, the income flows are reconstructed in the secondary distribution phase. The domestic institutional sectors involved are Households, Non-profit Institutions serving households (NPISHs), Financial Corporations, Non Financial Corporations and Government. This aggregate explains the money flows among various holders in the form of taxes, for redistribution within the economy; the use of income account, including the final consumption goods of the institutional sectors. Finally, the loop is closed with the capital formation account, which includes investments and change in inventories, and the rest of the world account. Table 1 summarizes the 2011 SAM for Romania, with the respective amount of resources for each account.

Table 1

Macro-synthesis of the SAM for Romania (year 2011, in Millions of Euro)

	Commodities	Industries	Gross Value Added	Taxes on product less subsidies	Institutional sectors	Capital formation	Rest of the world	Total
Commodities	0	149886	0	0	103172	35296	52593	340946
Industries	264942	0	0	0	0	0	0	264942
Gross Value Added	0	115056	0	0	0	0	500	115555
Taxes on product less subsidies	16422	0	0	0	0	0	0	16422
Institutional sectors	0	0	116227	16181	50889	0	5691	188988
Capital formation	0	0	0	0	29409	1045	5887	36340
Rest of the world	59582	0	-672	241	5518	0	0	64670
Total	340946	264942	115555	16422	188988	36340	64670	

Table 1 provides a macro-synthesis of the main aggregates: output by commodity and industry, primary and secondary income by institutional sectors, final demand and capital formation. In this composite framework, it is possible to quantify each block by its amount. The first column records the following: the total amount of commodities produced by each industry (264,942 million of euro); the amount of taxes on products less subsidies deriving from the Supply or Make table (16,422 million of euro); the resources from the rest of the world (59,582 million of euro). The first row records the intermediate consumption flows required by industry (149,886 million of euro); the final demand consumption by the institutional sector (103,172 million of euro); the final demand part for the capital formation, including gross fix capital and change in inventories (35,296 million of euro) and finally the exports to the rest of the world (52,593 million of euro). The third row includes the aggregate value added (115,056 million of euro) that, together with the taxes on products less subsidies, represents the Gross Domestic Income (131,478 million of euro), and the compensation of employees (500 million of euro) generated by cross-border, seasonal, and other workers (residents in Romania), which jointly with the Gross Domestic Income forms the Gross National Income (131,978 million of euro).

The fifth row displays: the primary allocation of income where the value added and the taxes on products less subsidies are distributed to the institutional sectors representing the Gross National Product (132,408 million of euro); the secondary distribution where all the current and capital transfers between institutional sectors including the rest of the world are collected. The sixth row shows the gross saving for institutional sectors (29,409 million of euro) and the lending with the rest of the world. The remaining intersections with the rest of the world, in the third and forth column (-672 and 241 million

of euro, respectively), define, along with the Gross National Product, the Gross Domestic Product.

The SAM provides a disaggregation of the institutional sectors not only according to economic criteria, but social ones as well (Round, 1985), which could have different disaggregation depending on the purposes of the study. In this contribution, where the ESIFs impact in the main aggregate and for employment by industry is determined, at first analysis a disaggregation at institutional sectors level is not provided.

For the construction of the various accounting items, especially the reconstruction of transfer accounts among institutional sectors, it was necessary to resort to the information contained in the integrated economic accounts table provided by the National Institute of Statistics of Romania.

III. The Dynamic Multisectoral Extended Model

The analysis provides a dynamic multisectoral extended model inspired by the SAM, where the production block has been developed in order to differentiate commodities and industries considering a "commodity-industry" approach. In this framework, where Make and Use tables are kept separated, the matrix of fixed technical coefficients is defined in industry by industry terms under the Industry Technology Assumption (ITA)[5].

The aim of this contribution is to assess the GDP trend and the employment dynamics, per type of industry, induced by the ESIF national related policies from the 2014-2020. For this purpose, the evaluation is made with a multisectoral set of tools in the circular flow of income. Then, the main equation of the model can be introduced:

$$\mathbf{q_t} = \mathbf{b}(x_t) + \mathbf{f_t} \tag{1}$$

where the intermediate consumption vector is given by

$$\mathbf{b}(x_t) = \mathbf{B}\mathbf{x_t} \tag{2}$$

The technical coefficients are obtained from

$$\mathbf{B} = \mathbf{U}\hat{\mathbf{x}}_\mathbf{t}^{-1} \tag{3}$$

The industry output is given by

$$\mathbf{x_t} = \mathbf{D}\mathbf{q_t} \tag{4}$$

Pre-multiplying both sides of equation 1 with $\mathbf{D}$ and substituting the equation 4 in the main equation we obtain:

$$\mathbf{x_t} = \mathbf{DB}\mathbf{x_t} + \mathbf{Df_t} \tag{5}$$

[5]All commodities produced by an industry are assumed to have the same input structure (Miller & Blair, 2009).

Alternatively,

$$\mathbf{x_t} = [(\mathbf{I} - \mathbf{DB})^{-1} \cdot \mathbf{D}] \cdot \mathbf{f_t} \quad (6)$$

$$\mathbf{f_t} = \mathbf{f^c}(y_{t-1}) + \mathbf{f_t}^0 \quad (7)$$

Hence,

$$\mathbf{x_t} = \mathbf{b}(x_t) + \mathbf{f^c}(y_{t-1}) + \mathbf{f_t}^0 \quad (8)$$

The vector $\mathbf{b}(x_t)$ is equal to the intermediate consumption matrix $\mathbf{B}[m,m]$ pre-multiplied by the output vector $\mathbf{x_t}$. The $\mathbf{f^c}(y_{t-1})$ vector introduces the final demand formation and the disposable income distribution and the exogenous final demand $\mathbf{f_t}^0$. In defining the components that determine the generation and allocation of the value added, a diagonal matrix $\mathbf{L}[m,m]$ needs to be built, where the single coefficient of the matrix represents the industry's value added per unit of output.

$$\mathbf{v_t} = \mathbf{L} \cdot \mathbf{x_t} \quad (9)$$

In order to obtain the total value added by industry, matrix $\mathbf{L}$ needs to be further post-multiplied by the vector $\mathbf{x_t}$. Afterwards, the value added is disaggregated into components (primary factors) using a matrix of share factors $\mathbf{V}[f,m]$.

$$\mathbf{v_t}^c = \mathbf{V} \cdot \mathbf{L} \cdot \mathbf{x_t} \quad (10)$$

Finally, $\mathbf{P}[h,f]$ stands for the distribution of primary income where each component is attributed to the institutional sectors.

$$\mathbf{v_t}^s = \mathbf{P} \cdot \mathbf{v_t}^c \quad (11)$$

After this stage, we need to allocate the transfers among institutional sectors, usually defined as secondary distribution of income. Here the income tax and other intersectoral transfers are taken into consideration through the matrix $\mathbf{T}$. To complete the phase of the disposable income formation in the secondary distribution, the matrix $\mathbf{T}[h,h]$ represents the share of net transfers between institutional sectors.

$$\mathbf{y_t} = (\mathbf{I} + \mathbf{T}) \cdot \mathbf{v_t}^s \quad (12)$$

The final demand formation that determines the two components of the final demand consumption starting from disposable income is represented in matrix $\mathbf{N}$.

$$\mathbf{f^c} = \mathbf{N} \cdot \mathbf{y_{t-1}} \quad (13)$$

where the matrix $\mathbf{N}$ is

$$\mathbf{N} = \mathbf{F} \cdot \mathbf{C} \quad (14)$$

Equation 14 shows the matrix of the constant share for final demand formation and it is composed of the matrix $\mathbf{F}[m,h]$, that transforms the consumption expenditure per

institutional sectors in I-O consumption, multiplied by the matrix $\mathbf{C}[h,h]$, which presents the average propensity to consume of the institutional sectors.

$$\mathbf{y}_{t-1} = [(\mathbf{I}+\mathbf{T})\cdot\mathbf{P}\cdot\mathbf{V}\cdot\mathbf{L}]\cdot\mathbf{x}_{t-1} \quad (15)$$

Hence, referring to equation 5,

$$\mathbf{x}_t = \mathbf{DBx}_t + \mathbf{D}\cdot\{\mathbf{F}\cdot\mathbf{C}\cdot[(\mathbf{I}+\mathbf{T})\cdot\mathbf{P}\cdot\mathbf{V}\cdot\mathbf{L}]\cdot\mathbf{x}_{t-1} + \mathbf{f}_t^{\,0}\} \quad (16)$$

Finally, for closing the loop of the circular flow of income, the final demand by exogenous components is introduced. The exogenous investment is defined by vector $\mathbf{k}[m,1]$, the investment shares demanded in the SAM, multiplied by i_t, a scalar which represents the investment plus the European injection per year. The vector obtained from the difference between exports $\mathbf{f}^x$ and imports $\mathbf{f}^m$, generates the vector of net exports $\mathbf{f}_t^{\,0}$ that closes the exogenous part of the model.

$$\mathbf{f}_t^{\,0} = \mathbf{k}\cdot i_t + (\mathbf{f}^x - \mathbf{f}^m) \quad (17)$$

Now, equation 6 can also be expressed in its structural form:

$$\mathbf{x}_t = (\mathbf{I}-\mathbf{DB})^{-1}\cdot\mathbf{D}\cdot[\mathbf{F}\cdot\mathbf{C}\cdot(\mathbf{I}+\mathbf{T})\cdot\mathbf{P}\cdot\mathbf{V}\cdot\mathbf{L}]\cdot\mathbf{x}_{t-1} + (\mathbf{I}-\mathbf{DB})^{-1}\cdot\mathbf{D}\cdot[\mathbf{k}\cdot i_t + (\mathbf{f}^x - \mathbf{f}^m)] \quad (18)$$

Finally, the employment coefficients $\mathbf{E}_t$ can be obtained as a diagonal vector of employment-to-output ratios (Polenske and Jordan, 1988). In order to capture the employment impact we formalize the equation 19,

$$\mathbf{e}_t = \mathbf{E}_t\cdot\mathbf{x}_t \quad (19)$$

where: $\mathbf{e}_t$ is a vector and each element represents the total labor requirements by industry.

IV. The 2014-2020 Programming Period for Romania

In order to make the Romanian economy more sustainable and inclusive, the most pressing structural challenges that need to be addressed are employment, social cohesion and education.

In the 2007-2013 programming period, cohesion funding amounted to more than one third, 35.7%, of the total EU expenditure, a budget of approximately 347.4 billion of euro being allocated in this way to regional policy. The current funding for regional and cohesion policy for 2014-2020 adds up to 351.8 billions of euro, from which Romania's share equals 30.4 billion of euro (Table 2), as presented in the Romanian Partnership Agreement for the 2014-2020 programming period.

Table 2

Aggregated Scheme of the ESIF 2014-2020 for Romania, in Millions of Euro

Programme title	ESIF	2014	2015	2016	2017	2018	2019	2020	TOTAL
Large Infrastructure OP	ERDF	305	314	339	348	396	437	449	2590
	CF	825	885	950	1000	1047	1094	1135	6935
Human Capital OP	ESF	497	519	575	602	645	679	705	4221
Administrative Capacity OP	ESF	55	66	83	83	83	105	77	553
Competitiveness OP	ERDF	144	155	157	169	186	194	219	1223
Technical Assistance OP	ERDF	21	32	29	32	32	32	35	212
Regional OP	ERDF	824	891	937	997	997	997	1057	6700
National Rural Development Programme	EAFRD	1150	1148	1147	1145	1144	1142	1140	8016
TOTAL	-	3822	4010	4216	4376	4530	4679	4817	30451

Table 3

OP Large Infrastructure 2014-2020 per Priority Axis, in Millions of Euro and Investment Percentage

Priority Axis	ESIF	Total Investment (millions of euro)	Share from UE (in percentage)	Main Targets	Investment priorities
1	CF	3165	85.0	Transport:	TEN-T development in Romania
	ERDF	-	-		
2	CF	-	-		Increase regional accessibility by connecting the TEN-T
	ERDF	1842	80.0		
3	CF	-	-	Environment:	Development of a safe and environmentally friendly transport
	ERDF	461	20.0		
4	CF	2252	87.5		Protecting the environment and promoting resource efficiency
	ERDF	-	-		
5	CF	322	12.5		Protecting and restoring biodiversity, contaminated soil remediation and air quality monitoring
	ERDF	-	-		
6	CF	479	100.0		Promoting climate change adaptation, prevention and management risk
	ERDF	-	-		
7	CF	-	-	Clean Energy and Energy Efficiency:	Safe and clean energy for a low carbon economy dioxide carbon
	ERDF	245	85.2		
8	CF	-	-	Transport:	

Priority Axis	ESIF	Total Investment (millions of euro)	Share from UE (in percentage)	Main Targets	Investment priorities
	ERDF	43	14.8		Intelligent and sustainable transport systems for electricity and natural gas
9	CF	718	100.0		Urban Infrastructure Development for the region of Bucharest-Ilfov
	ERDF	-	-		
Total		9525			

We concentrate on the amount concerning the Large Infrastructure Operational Programme (OP) financed through two ESIFs, the Cohesion Fund (CF) and the European Regional Development Fund (ERDF). As shown in Table 2 the total resources addressed to the Large Infrastructure OP amounts to 9.5 billions of euro (7.2% of the GDP).

In the new programming period the level of support available for member states depends on the level of development and the financing fund. For the Cohesion Fund the maximum co-financing rates can reach 85% and 75%-85% for less developed regions depending on the relative wealth of the Member State; 60%-75% for transition regions; 50% for more developed regions and 75% for European Territorial Cooperation. Romania comprises seven regions considered as less developed and only one (Bucharest-Ilfov) that will receive transitional "phasing out" support.

The Large Infrastructure OP (see Table 3) is composed of nine priority axes divided by funds and percentage derived from the EU, including the amount of the investment priorities by main target.

Based on the percentage that each fund can receive for fulfilling the priority axis we computed an overall average percentage combining the two funds and considering the amount allocated from each fund to the axes. The overall co-financing rate assessed for all the programming period is 81% which means that the remaining percentage of the total amount has to be invested by the nation itself.

V. Policy Decision and Burden Scenarios for ESIFs

In order to provide a preliminary evaluation of the above mentioned OP, focused on the economic and employment variables, it is important to clearly specify the policies analyzed and the scenarios. According to Romanian Large Infrastructure OP, briefly summarized in Table 3, Romania will concentrate the investment on civil engineering projects. Additionally we choose to study alternative categories of investment directed to other two construction activities.

The three policies result from the possible investment options depending on where the total OP amount is allocated to the construction of buildings (NACE code Rev.2, F41) industry, the civil engineering (F42) industry or the other specialized construction activities (F43) industry. We assumed that in all the policies taken into consideration, all

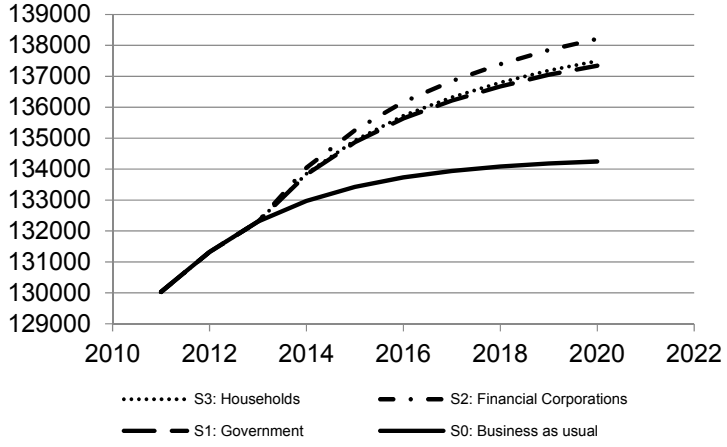
the amount addressed to Romania has been spent and that the three main institutional sectors, Government, Financial Corporations and Households, take the burden to finance 19% of the overall expenditure in three scenarios. Together with these main investment carriers a "business as usual" scenario will be also provided as a benchmark, showing the trend without any policy intervention. Note that the base year is 2011 while the policy has been activated from 2014 to 2020.

For each of the three scenarios we propose an institutional sector that takes the burden of 19%, starting with the Government, followed by Financial Corporations and Households. In all the cases, the national share allocated to each economic agent contemplates the percentage received by the OP Funds less the share that has to be carried on.

For the 2014-2020 programming period the three policies along with the three scenarios will be compared in terms of Gross Domestic Product (GDP) and employment rate, the latter being calculated as a percentage change from the benchmark year. The GDP results are obtained according to the equation 9, exploiting the impacts for each year proposed by the equation 18.

Figure 1

Construction of Buildings - GDP Changes per Scenario, in Millions of Euro



Source: Own elaboration.

In Figures 1, 2, 3, the three investment policies can be observed. The largest GDP growth is obtained when the entire investment is made in the specialized construction activities policy, the second largest impact being given by the civil engineering and the smallest by the construction of buildings.

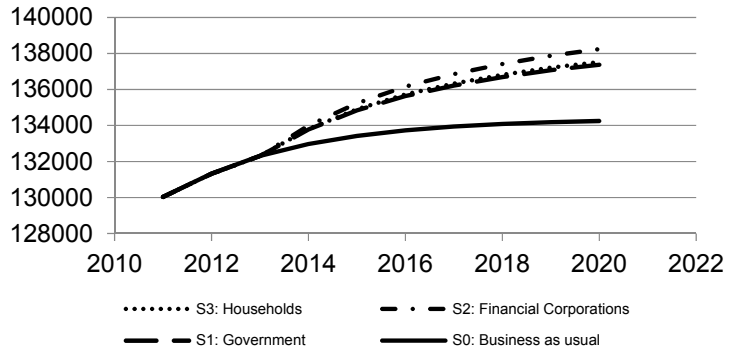
For all three investment policies each, the results in terms of GDP for each scenario can be reassumed separately:

- When the burden of the local share is carried by the Government, a moderate growth in terms of GDP is present. We observe that after the first three years, where the

policy is still not activated, the economic system responds overall with a smallest impact to all three policy investments;

Figure 2

Civil Engineering - GDP Changes per Scenario, in Millions of Euro

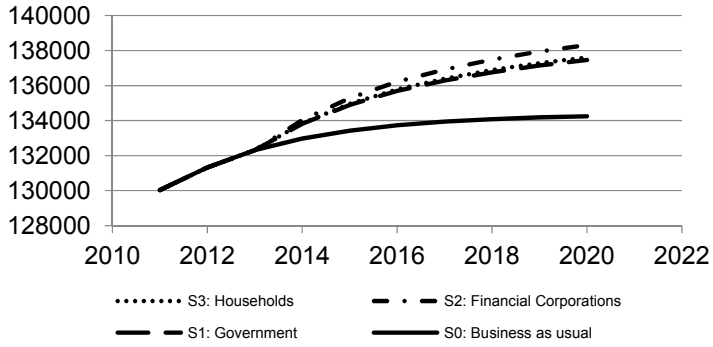


Source: Own elaboration.

- When the financing cost is brought by the Financial Corporation, the impact in terms of GDP growth is the strongest. In other words the capacity of the financial agents to carry that weight shows a better response of the economic system than the other considered sectors;
- When the reaction of Households is along the lines of the Government one.

Figure 3

Specialized Construction Activities - GDP Changes per Scenario, in Millions of Euro



Source: Own elaboration.

Table 4 shows the employment rate impact, as a difference from the benchmark, which each of the Large Infrastructure investment policies induces, under the different institutional burden scenarios and the trend without the ESIFs. It is evident that, similar to the GDP case, when the burden is carried by the Financial Corporations, the

employment rate trend increases significantly more than in the case of Households and Government scenarios, and this is observable in all three investment options.

Table 4

Employment Rate per Scenario, Differences from the Benchmark per Year

		2014	2015	2016	2017	2018	2019	2020
S0: Business as usual		2.56%	2.94%	3.19%	3.37%	3.48%	3.56%	3.62%
	F41	2.96%	3.81%	4.42%	4.88%	5.23%	5.52%	5.75%
S1: Government	F42	2.97%	3.85%	4.48%	4.96%	5.32%	5.62%	5.86%
	F43	3.14%	4.03%	4.69%	5.17%	5.55%	5.86%	6.11%
	F41	3.16%	4.15%	4.88%	5.42%	5.85%	6.21%	6.49%
S2: Financial Corporations	F42	3.17%	4.19%	4.94%	5.50%	5.94%	6.31%	6.60%
	F43	3.34%	4.37%	5.14%	5.71%	6.17%	6.55%	6.85%
	F41	3.00%	3.88%	4.52%	4.99%	5.36%	5.66%	5.90%
S3: Households	F42	3.02%	3.92%	4.58%	5.07%	5.45%	5.76%	6.01%
	F43	3.19%	4.10%	4.78%	5.28%	5.68%	6.01%	6.26%

The employment impacts are illustrated in percentage change with respect to the benchmark, referring to each scenario:

- "business as usual" shows the results without the intervention of the ESIF. The employment growth increase positively but slowly and from the 2014 to the 2020 the increment is 2-3 percentage points.
- the "Government" scenario represents the less appropriate reaction comparing with the others institutional sectors;
- the "Financial Corporation" scenario illustrates the most positive impact in terms of employment growth. In other words this institutional sector is the most suitable for carrying the investment burden, while being able to reach the best outcome;
- the "Households" scenario describes a moderate growth in terms of employment. We observe that it reacts negatively when compared with the "Financial Corporation" scenario, but with better outcomes in respect to the "Government" ones.

Table 4 highlights the economic and employment rate impact of the ESIFs in Romania, while underlying the significant role that the Financial Corporations may have in addressing the challenges that the country is facing.

VI. Conclusion

The evaluation of the policies aimed at assessing the ESIF set by the European policy makers provides an important development opportunity. Nevertheless, Romania is still lagging significantly behind the majority of the EU Member States in terms of economic development and among its core challenges we find employment, social cohesion and education. In what concerns the labor market, Romania is confronted with a complex

situation. The main issues that cause considerable concern are the low employment rate, generated by a gross deficiency in demand.

The SAM and the dynamic multisectoral extended model enable us, mainly through the three scenarios, to identify the three main actors that can bear the financing cost required by the European funding procedures. Furthermore, the analysis was conducted by a comparison between the non-intervention and the ESIF policy injection, in order to bring out the relevance of this important instrument. The dynamic multisectoral extended model is therefore used to specify the three scenarios, and the effects that each one can have in terms of GDP and employment by industries.

In aggregate terms, our results underline the importance of the ESIF for the less developed countries to achieve the European target and obtain a positive effect in terms of GDP and employment rate. Nonetheless it is important to consider the financing cost that has to be undertaken by the institutional sectors to receive the funds. A better effect can be obtained by selecting the best institutional sector able to bear the 19% of the total amount allocated. The results in terms of GDP and employment point out the significance of that particular detail in order to obtain the best outcomes. By adopting a predetermined structure, such as the one suggested by the exogenous final demand, the ESIFs injection takes the investment composition driven by the economic system itself, giving a real dimension of the implementation of the funds and its effects. The three scenarios that we proposed compared with the "business as usual" one clearly underline the difference between the European intervention and the absence of this policy instrument.

References

Becker, S.O. Egger, P.H. and Von Ehrlich, M., 2010. Going NUTS: The effect of EU Structural Funds on regional performance. *Journal of Public Economics,* 94(9), pp.578-590.

Ciaschini, M. Pretaroli, R. and Socci, C., 2009. A convenient multisectoral policy control for the ICT in the U.S.A. economy. *Metroeconomica*, 60(4), pp.660-685.

Ciaschini, M. and Socci, C., 2006. Income distribution and output change: Macro multiplier approach. In: N. Salvadori, eds. *Economic Growth and Distribution: On the Nature and Cause of the Wealth of Nations*. Cheltenham, Edward Elgar, pp. 247-270.

European Union, 2012. Position of the Commission Services on the development of Partnership Agreement and operational programs in Romania for the period 2014-2020. [online] Available at < http://www.cbcromaniabulgaria.eu/user/file/position_CE_2014-2020.pdf> [Accessed in October 2015].

European Union, 2012. *Consolidated version of the Treaty on the Functioning of the European Union*. [online] Available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012E/TXT&from=EN> [Accessed in October 2015].

Keuning, S. and Verbruggen, M., 2003. European structural indicators, a way forward. *Economic Systems Research*, 15(2), pp.185-196.

Martin, R. and Tyler, P., 2006. Evaluating the impact of the structural funds on Objective 1 regions: an exploratory discussion. *Regional Studies*, 40(2), pp. 201-210.

Miller, R. and Blair, P., 2009. *Input-Output Analysis: Foundations and Extensions*. Cambridge: Cambridge University Press.

Mohl, P. and Hagen, T., 2010. Do EU structural funds promote regional growth? New evidence from various panel data approaches. *Regional Science and Urban Economics*, 40(5), pp.353-365.

Polenske, K.R. and Jordan, P.G., 1988. Multiplier impacts of fishing activities in New England and Nova Scotia. In M. Ciaschini eds. *Input-Output Analysis Current Developments*: London: Chapman and Hall, pp.325-366.

Psaltopoulos, D. Thomson, K.J. Efstratoglou, S. Kola, J. and Daouli, A., 2004. Regional social accounting matrices for structural policy analysis in lagging EU. *European Review of Agricultural Economics*, 31(2), pp.149-178.

Puu, T. and Sushko, I., 2004. A business cycle model with cubic nonlinearity. *Chaos, Solitons and Fractals*, 19(3), pp.597-612.

Ramajo, J. Márquez, M.A. Hewings, G.J. and Salinas, M.M., 2008. Spatial heterogeneity and interregional spillovers in the European Union: Do cohesion policies encourage convergence across regions? *European Economic Review*, 52(3), pp.551- 567.

Rodriguez-Pose, A. and Fratesi, U., 2004. Between development and social policies: the impact of European Structural Funds in Objective 1 regions. *Regional Studies* 38(1), pp.97-113.

Round, J., 1985. Decomposing multipliers for the economic system involving regional and world trade. *Economic* Journal, 95(378), pp383-399.

Samuelson, P.A., 1939. Interactions between the Multiplier Analysis and the Principle of Acceleration. *The Review of Economic Statistics*, 21(2), pp.75-78.

Socci, C., 2004. *Distribuzione del reddito e analisi delle politiche economiche per la regione Marche*. Milano: Giuffré editore.

Thorbecke, E. and Jung, H., 1996. A multiplier decomposition method to analyze poverty alleviation. *Journal of Development Economics* 48(2), pp.279-300.

Appendix

Figure 4

Output Changes per Year and Industry (1-45), S2 - F41, in Millions of Euro

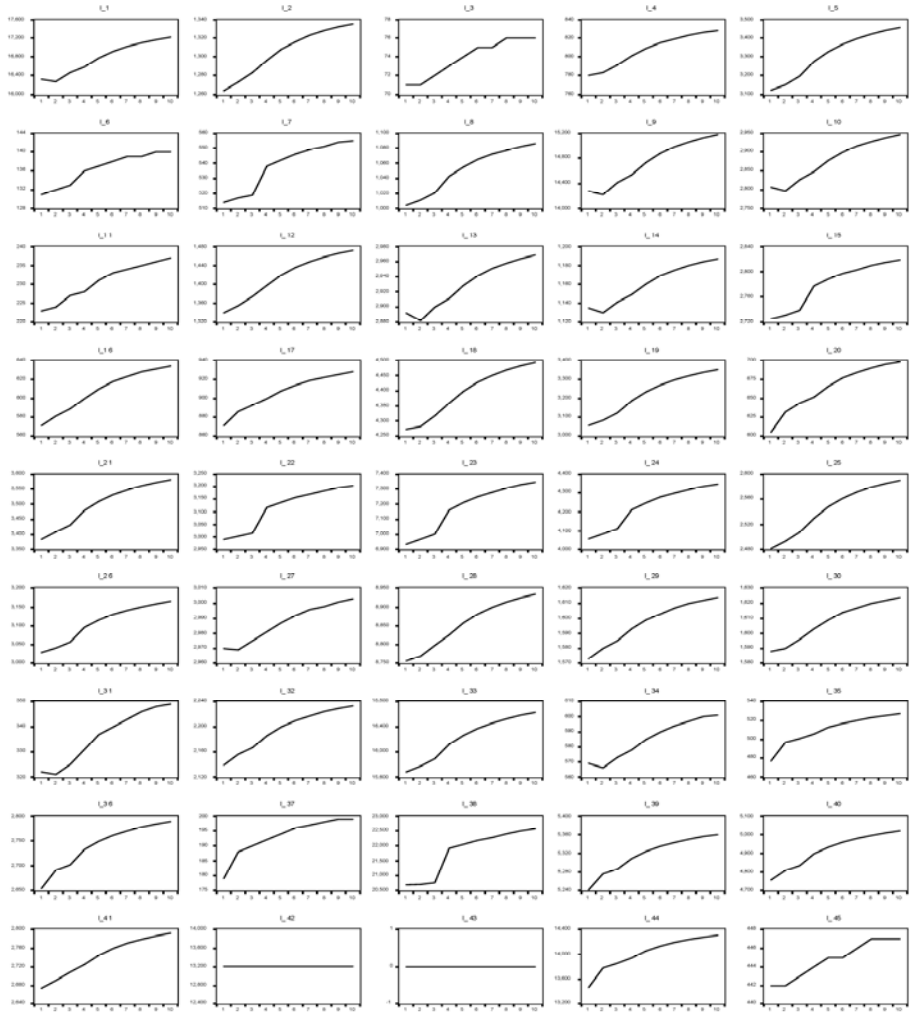


Figure 5

Output Changes per Year and Industry (46-86), S2 - F41, in Millions of Euro

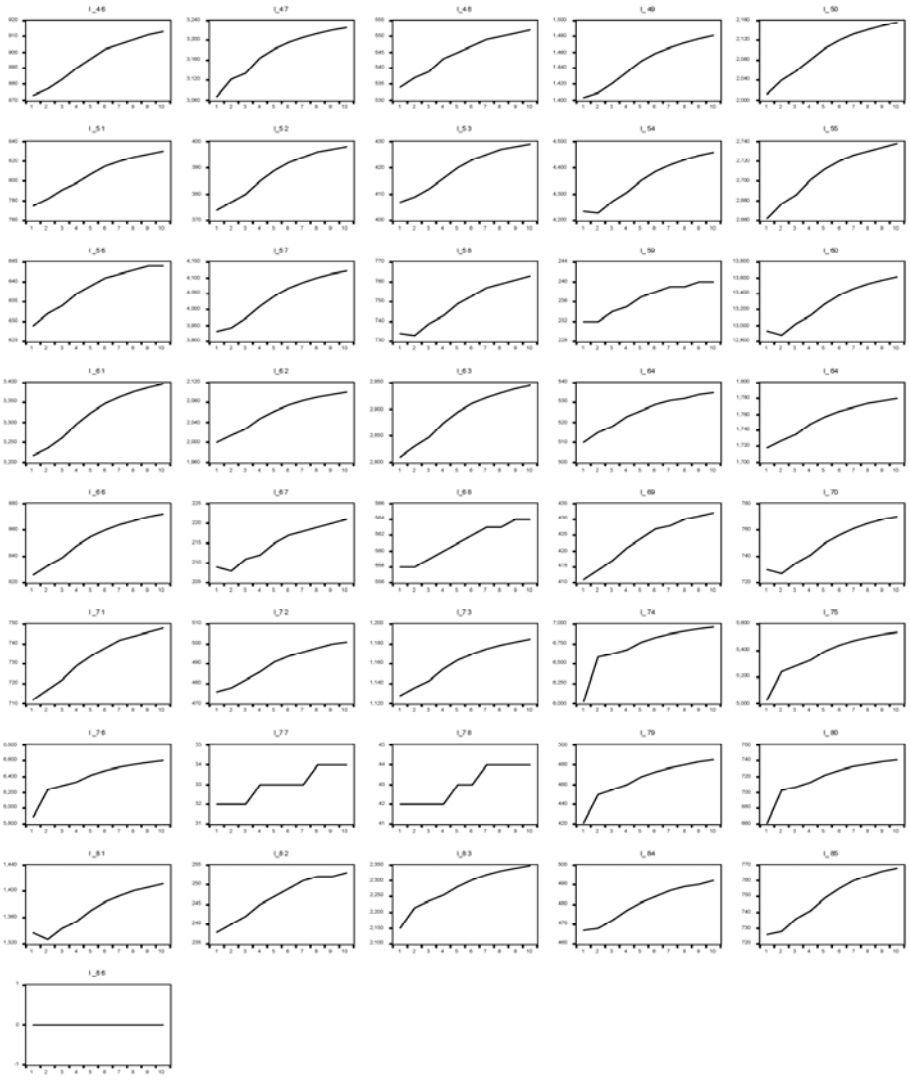


Figure 6

Output Changes per Year and Industry (1-45), S2 - F42, in Millions of Euro

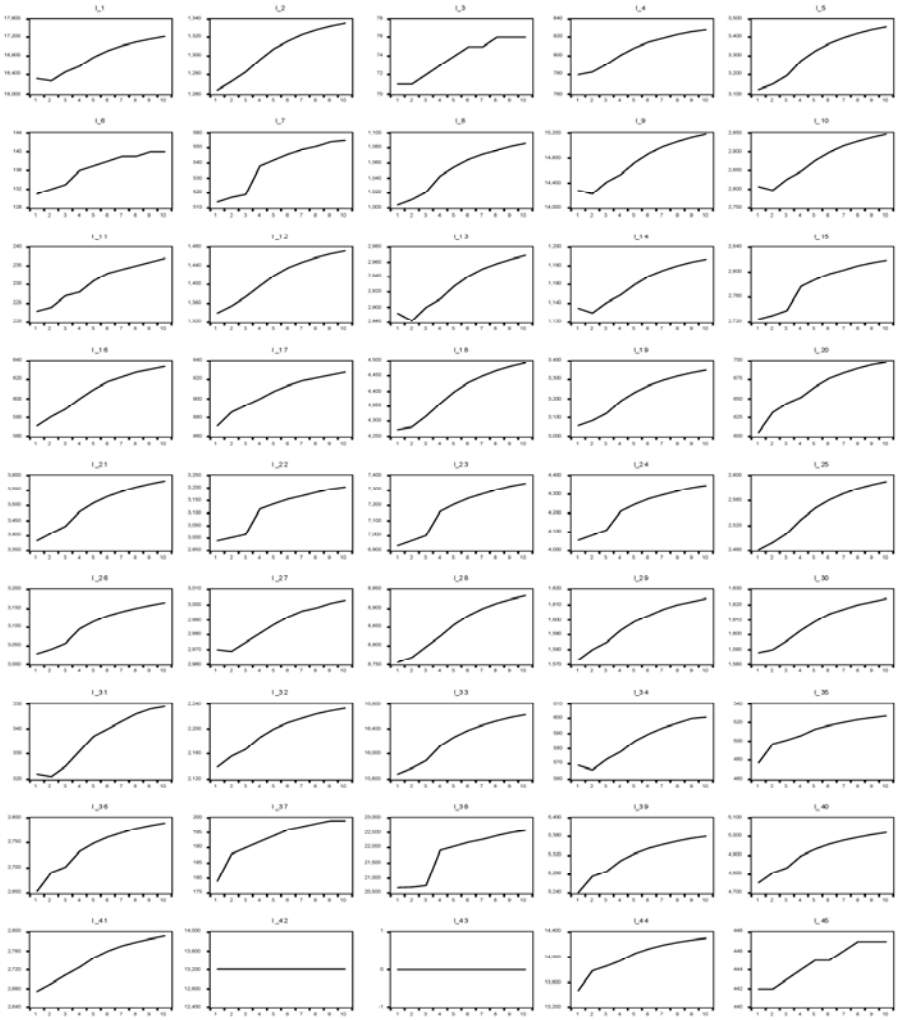


Figure 7

Output Changes per Year and Industry (46-86), S2 - F42, in Millions of Euro

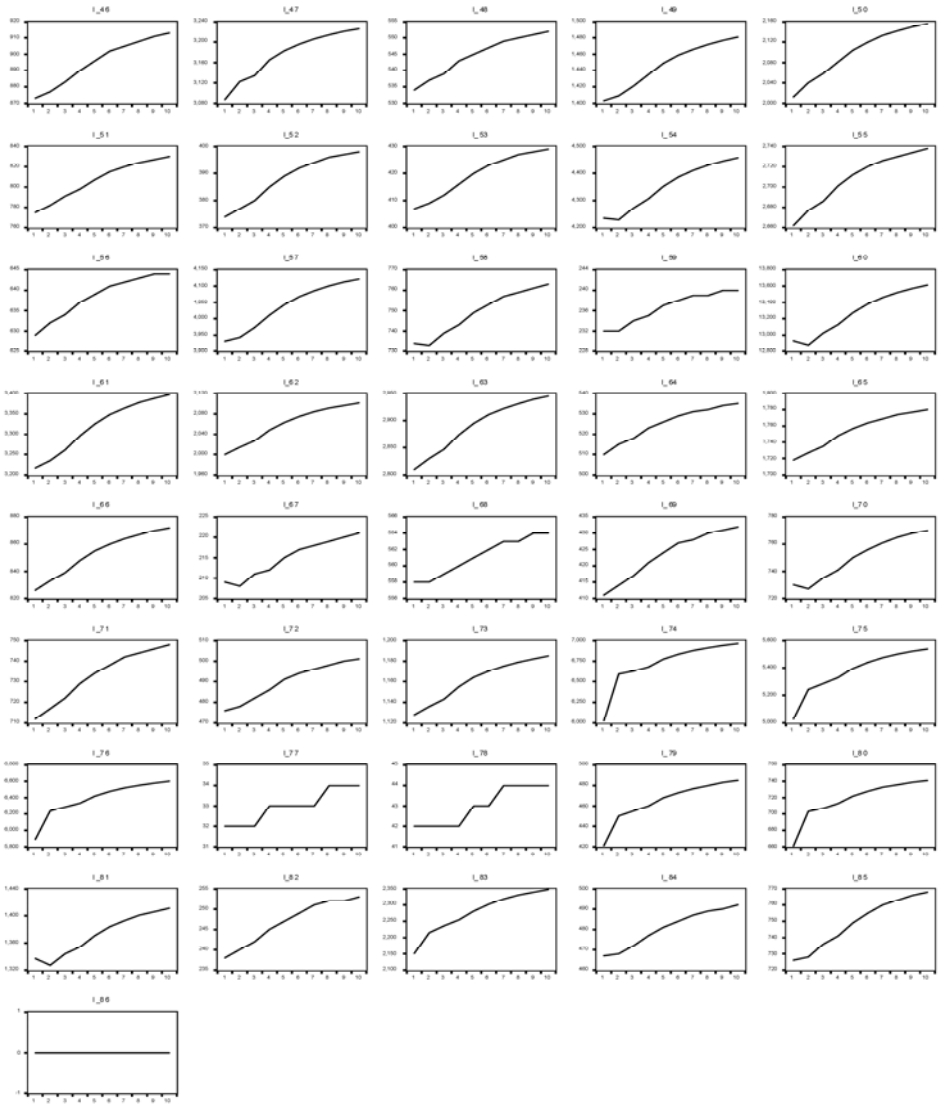


Figure 8

Output Changes per Year and Industry (1-45), S2 - F43, in Millions of Euro

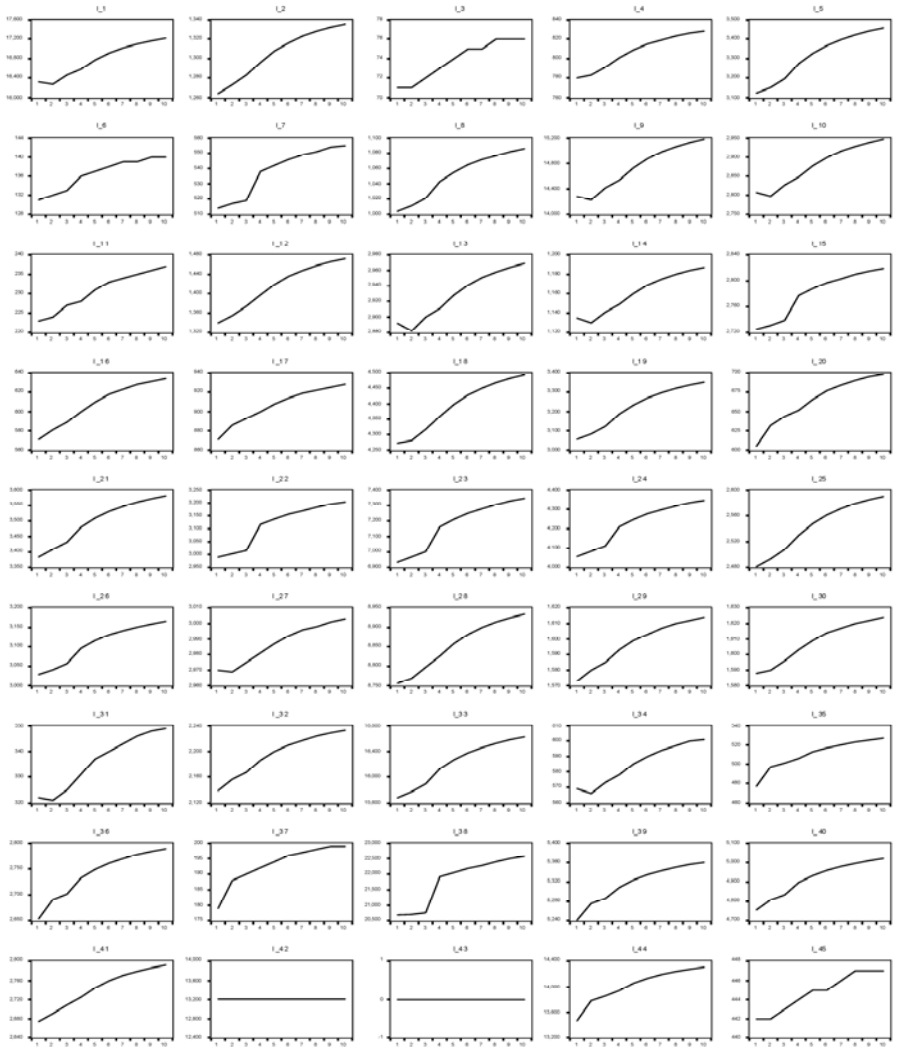


Figure 9

Output Changes per Year and Industry (46-86), S2 - F43, in Millions of Euro