CONTENTS

1. INTRODUCTION

Franco Sotte

The REAPBALK project (Rural Employment and Agricultural Perspective in the Balkan Applicant Countries) is an European research (Contract no. QLK5-CT-2001-01608) financed by the EU Fifth Framework Research Programme: "Quality of Life and Management of Living Resources" (Key Action 1.1.1.-5.5: "New tools and models for the integrated development of rural and other relevant areas"). The research had a duration of 36 months. It officially started on 1st October 2001 and ended on 30 September 2004. The research has been co-ordinated by Franco Sotte, Department of Economics of the Polytechnic University of Marche – Ancona, Italy. It involved 6 further research teams from different countries: Bulgaria (Sofia), Croatia (Split)[1], Greece (Thessaloniki), Romania (Cluj-Napoca), Slovenia (Ljubljana), UK (Wye)[2].

Despite the wide scientific and political debate and the resources dedicated to the subject, still a contradiction persists in the definition of rural development (RD). As a consequence still ambiguity persists on the objectives and consequent design of a rural development policy (RDP). The contradiction concerns the prevalent sectoral (agricultural) approach

[1] As Croatia had not the status of applicant Country at the time when the research project was approved, the participation of the Croatian team was assured in the form of a sub-contract with the Polytechnic University of Marche and under the responsibility of the co-ordinator.

[2] The teams involved in the research project have been under the responsibility of Plamen Mishev (Department of Agribusiness, University of National and World Economy in Sofia, BG), Željko Mrnjavac (Faculty of Economics, University of Split, HR), Konstadinos Mattas (School of Agriculture, Department of Agricultural Economics, Aristotle University of Thessaloniki, GR), Maria Vincze (Faculty of Economics, Department of Statistics, Analysis & Forecasting, Babes - Bolyai University of Cluj – Napoca, ROM), Emil Erjavec (Zootechnical Department, Biotechnical Faculty, University of Ljubljana, SLO), Sophia Davidova (Department of Agricultural Science, Agricultural Economics & Business Management, Imperial College at WYE, London, UK).

of RDP in Europe, opposed to the assumption that RD should be the result of a territorial strategy encompassing the whole rural economy and the whole set of policies designed to foster local development. The contradiction remains even after the formalization of a specific cluster of measures for RD within the 2nd pillar into Agenda 2000 as well as after the recent CAP reform of June 2003. In terms of European Policy this implies that, in a given region, a comprehensive evaluation of RDP has to take into consideration not only the 2nd pillar, but the whole agricultural policy (1st and 2nd pillar) together with the Structural and Cohesion Policies as well as the Community Initiatives such as LEADER and INTERREG, and to link together those policies to the internal policies adopted by the MSs at national, regional and local level.

The June 2003 CAP reform and the following Salzburg Conference (November 2003) have both made a significant step forward in the direction of a more consistent and intersectoral RDP. The first has reinforced the 2nd pillar through the modulation and the introduction of a wider set of measures, but still the 1st pillar is by large prevalent (80% and more of the funds) and the 2nd pillar maintains its prevalently sectoral character. One can observe also that it is characterized by a weak integration with the other structural policies of the EU. The Salzburg conference has created the conditions for simplifying the RDP and making it more finalized (one fund, one program, one control system, mainstreaming the LEADER approach, evaluation extended to all stages, etc.). These objectives have substantially inspired the still ongoing process of renewal of the EU RDP for the years from 2007 to 2013. It started with the first proposal, presented by the Commission on 14th June 2004, and was concluded, from the legislative point of view, with the approuval of the Reg. 1698/05 setting up the new European Agricultural Fund for Rural Development (EAFRD). But still a gap remains between the CAP reform process and the contemporary re-design of the overall EU strategy and policies for cohesion and convergence. A process that, after the enlargement, is going to be reinforced and will constitute the guideline of the EU intervention at a territorial level (as is clear after the publication in February 2004 of the Financial and political outlook for the enlarged Union 2007-2013 and the 3rd Report on Economic and Social Cohesion). The strategy there depicted has been confirmed in June 2004 when the Commission has adopted the new package of legislative proposals on cohesion for the years 2007-2013. A strategy that has been confirmed with the December 17th, 2005 European Council compromise on the Financial Perspectives 2007-13, which allocates euro 307.6 billion (35.7% of the total) to Cohesion Policy.

Due to the still relatively small amount of money dedicated to the RDP and the overwhelming importance of the market support policy, the bulk of the quantitative analysis made so far by the research in evaluating the effects of policy change has been mainly dedicated to measure the reaction of farms and market to the fall of price support and its compensation with direct payments (full or partial, coupled or not). On the opposite, a more limited attention has been dedicated to the evaluation of the policies that have been addressed to foster RD in the broader sense as now defined. And the evaluation effort on RD has concentrated on the measure of the capacity of Member States to use the funds or remained partial, i.e. dedicated to specific measures of the 2nd pillar: the instalment of young farmers, the agro-environmental measures and so on; it focuses on the measures, not on the territory as a whole. More attention has been dedicated to the territory in the evaluation of the Local Action Pprograms under the LEADER Initiative (because of its experimental and demonstrative character). But even in this case, the analysis has been mainly descriptive, focusing on the selection of good practices.

With the REAPBALK reseach project we try to fill the gap especially of *ex-ante* and overall evaluation of the RDPs. The level of abstraction and aggregation is thus higher than usual within quantitative analyses. In REAPBALK research we use the whole territory as the unit of analysis and concentrate on the combined effect that the mix of RDP (1st and 2nd pillar) and all the other structural and cohesion policies produces on the whole economy forcing on the intersectoral and inter-territorial links. Here is the originality of REAPBALK. These peculiarities determine also the limits of this research. Its cannot provide any knowledge on the effects of a specific measure into a sectoral policy (a change in a Common Market Organisation), and its capacity to give an answer to the intersectoral linkages is limited by the quality of data used in building the I-O tables.

The project aim is to focus on the development perspectives within rural regions of five Balkan countries, Bulgaria, Croatia, Greece, Romania and Slovenia. At the beginning of the research, three of the case study Countries were applying for accession to the EU. Slovenia has entered the EU in the meanwhile, while Bulgaria and Romania are presently expected to enter in 2007. Croatia as obtained in June 2004 the status of Candidate Country and even if not still decided, its entrance to the EU appears to be possible in a relatively near future. The main objective of the project is to assess the implications for inter-sectoral rural employment patterns of policy changes at the domestic and EU level. The inclusion of the Greek case within the study has been decided to provide grounds for suggesting the likely path of employment development post-accession. The study concentrates on the analysis of three main aspects within a medium-term perspective: a) rurality, b) employment, c) agriculture. Different scenarios with respect to the political and economic evolution in the area, specifically related to the EU accession and adoption of the EU policies, are developed. The impacts of the possible scenarios on intra-sectoral employment are assessed in each selected rural region.

The common feature of the countries studied is their geographic location in an area which is crucial for the future stability of Europe and the EU, the Balkans. The countries present an interesting and diverse environment for rural economic research. The first step of the analysis has been the selection of rural regions for use as case studies. One region has been selected in each country between those having three common characteristics: being rural according to the OECD definition of rurality, showing significant growth in employment in other sectors and having a relevant share of agricultural employment. A first phase of the research is dedicated to a detailed descriptive analysis of the economic development, employment patterns, and the relevant policies conducted in each region. On this basis a comparative study of the five selected regions is produced.

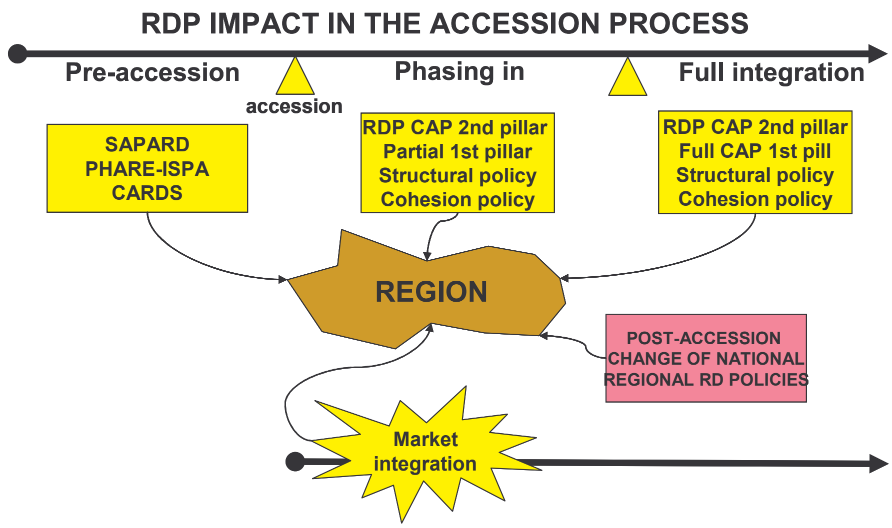
In a second phase, Input-Output (I-O) analysis is carried out on the specified regions to study the structure of rural employment in more detail. I-O tables are constructed for each region. They are derived from the national ones by GRIT methodology. Scenarios are defined according to the specific development patterns in the study regions, the rate of national economic growth, EU accession and other specific regional policies. The impact of the different scenarios on regional non-agricultural and agricultural output, employment and income are then assessed by a traditional I-O model and policy recommendations formulated. The scenarios are adjusted for taking in account the specific situation of each Country about accession: ranging from Greece, which is already a MS, to Croatia, whose process towards the accession has only recently started. Table 1 shows a visual summary of the main alternatives analysed:

Tab. 1 – The REAPBALK scenarios

Baseline	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Current Situation (2003)	Current Situation	Current Situation	Current situation	Current Situation
	+ Pre-Accession Funds	+ Pre-Accession Funds	+ Pre-Accession funds	+ Pre-Accession Funds
		+ Integration Effects	+ Integration effects	+ Integration Effects
			+ EU policies partial integration	+ EU policies full integration

Schematically, the REAPBALK approach in analyzing the RDP evolution during the accession process and its impact on the region of our study is presented in Figure 1.

Figure 1 – Visual summary of the REAPBALK scenarios



The accession time can be split into three different periods: the pre-accession, the phasing in period after the accession in which some EU policies are partially and gradually entered, and finally the full integration of the new Member States into all the EU policy regimes. Before the accession the EU provide support through pre-accession policies, the accession create a first shock on rural regions depending on the market integration, the EU policies are at the same time entered into the new Member States following a phasing in process (in particular the 1st pillar of the CAP is going to be adopted on the basis of a gradual scheme, which could be more or less rapid, depending on the decision of each Member States on the top-up option). The analysis in this case takes into consideration not only the two pillars of the CAP but also the structural and the cohesion policies. Finally the accession will be completed when the phasing-in process will be concluded and the Member States receive the same treatment as the old Member States. The accession could suggest the Member States to modify its internal policies addressed to rural regions and this can as well be considered in our models. Different hypothesis can be tested concerning the capacity of the government and governance institutions of the Member States to adapt rapidly its own structures and to absorb fully or only partially the new policies.

The medium-term perspectives of the five case study regions on the basis of the results of the impact analysis under the different policy scenarios can be summarised in the following points:

- The pre-accession funds have a higher effect at national level than at regional level in Croatia and Romania, for all the variables namely output, income and employment, and in Slovenia in output terms. The post-accession funds have higher impact on the region than at national level in Croatia, Greece and Slovenia.
- Across the five regions, results do not considerably differ when the different variables, output, income and employment, are analysed.
- The sectoral ranking, across scenarios, does not differ substantially between the national and regional levels. Percentages of variation in output, income and employment are often different but the same sectors are generally identified as the main drivers of the change in the economy at the two geographic levels.
- The highest impact of the simulated policy transfers is observed for those sectors linked to the potential infrastructural development in the five case study regions. This is a direct consequence of the fact that different policy schemes are generally targeted at infrastructure in rural areas and, therefore, result in positive effects for the related sectors.
- The different regional and national economies react differently to the two forms of agricultural direct payments, coupled and decoupled. Treating direct payments as decoupled generally results in lower impact percentages for the agricultural sector and in higher impact

percentages for those sectors supplying the consumption of goods and services to agricultural households. This effect is especially important in the case study regions (with the exception of Peripheral Slovenia) where the agricultural population represents an important proportion of the total population.
- Even though some of the considered policy programmes are directly aimed at the development of the agricultural sector, the positive effects of the incoming funds seem not to be effectively captured by the agricultural sector alone but are themselves distributed across the entire regional economy. This can be seen as an evidence of the achievements towards the implementation of a broader concept of rural development, which is taken into account in the different policy programmes' objectives.

The last two points are particularly important in consideration of the conclusions drawn from the comparative analysis. The report identifies generally a lack of proper infrastructure as one of the main obstacles to the development. In addition, the analysis of the agricultural sector in the five regions showed a need for a deep restructuring with the aim of targeting the entire complexity of rural economies and societies. A mixed picture has emerged from this comparison as a consequence of the differences among the regions as well as the limitations of the methodology applied. Therefore the results should be interpreted with caution.

The impact analysis has been integrated with a dynamic analysis in which the assumption of invariant technology is relaxed. This analysis is carried out using a time-varying coefficient I-O model and applied to the cases of Romania and Bulgaria. The main results are the following:

- Policy is more effective in generating output, income and employment at a national level than at a regional (rural) level. Moreover, policy effectiveness is bigger in Romania in terms of output and income and in Bulgaria in terms of employment.
- The accession alone, without application of EU policies, with the exception of Bulgaria, would generally produce negative effects due to an increase in deficit of the balance of payment.
- As expected, the acceptance of a gradual transfer of payments, instead of a full transfer, will produce in the areas under study a loss of benefits in terms of output, income and employment. Losses vary according to areas, impact variables and hypotheses on links to production (decoupling or coupling) considered.

- Finally, decoupling tends to produce bigger positive effects than coupling but only in terms of output and income. However, as far as employment is concerned, whatever area is considered, coupling yields higher impacts than decoupling. Moreover, it emerges that full application in comparison with partial integration would tend to emphasise these differences.

Further research is evidently necessary to confirm these evidences and conclusions. The specific area analysed as well as the quality of data used have strongly conditioned the results obtained. They can hardly be used for predictive scopes. The research anyway demonstrates how crucial are the intersectoral relationships in measurement and evaluation of the outcomes and final effects of policy. This is especially true as far as RDP is concerned, for the contradiction in the EU between the still sectoral approach of RDP and the assumption that RD is the result of a territorial strategy.

2. DEVELOPMENT OF RURAL REGIONS IN THE EU AND IN THE BALKANS

Roberto Esposti

1. Introduction

The REAPBALK research project focuses on the development perspectives of rural regions in 5 Balkan countries: Bulgaria, Croatia, Greece, Romania and Slovenia. The main objective of the project is to assess the implications for inter-sectoral rural employment patterns of policy changes at the domestic and EU level. The study concentrates the analysis on three main aspects: rurality, employment and agriculture within a medium-term perspective. The project identifies five regions (one for each country) as case studies. The main common feature of these cases is their geographic location in a crucial area for the future stability of Europe and the EU, the Balkans. The five countries present different conditions in terms of rural environment, economic development and EU accession status (members, candidates or other).

This chapter deals with the contribution REAPBALK aims to provide to the general and wide topic concerning the development of rural areas in the enlarged EU. Thus, it summarizes the major empirical evidence, as well as open issues, on this topic and describes how this research project tries to give an original contribution in this respect.

2. State of the art and the REAPBALK approach

2.1 Regional development in the EU: the convergence debate

There is a long-lasting and well-developed economic and social research tradition on the major characters of the regional development patterns across the EU. This research tradition has received a further impulse by the EU enlargement process, already when it concerned three Mediterranean countries (Greece, Portugal and Spain)[1] in early eighties, but with major emphasis with respect to the recent accession of the Central Eastern European Countries (CEECs). This last enlargement further puzzles the research objective of finding general interpretations of how different regional development and growth patterns are distributed over the EU space and are linked among them.

In fact, even excluding the new members' regions from the analysis, there are serious doubts whether a convergence process actually occurs, that is a progressive reduction of the growth gap (in terms of *per capita* GDP, or p.c.GDP) among regions due to higher growth rates occurring in poorer regions (the so called β-convergence). Though it may be particularly difficult to summarize the huge amount of studies in this field (Bussoletti and Esposti, 2005), a general conclusion might be that there is neither clear evidence of a reducing growth gap across regions in absolute terms, nor a general agreement on the reduction of the disparities in relative terms, though this idea is supported by the Third EU Report on Socio-Economic Cohesion (European Commission, 2004). A widely accepted view in the political debate acknowledges that some degree of growth convergence have been observed in the last decades in the EU. However, it is on average a quite slow process not involving all lagging behind regions in the same way. One possible interpretation is that this overall result is indeed the combined effect of a country-convergence and a regional-divergence process (Sapir, 2004; European Commission, 2004). Nonetheless, beside any possible slight convergence process, the gap in terms of p.c. GDP remains remarkable both across the European Union and within many member states, and it also increased, on average, in absolute nominal terms.

An increasing number of recent panel-data studies does not show any clear evidence of unconditional convergence across EU countries and, above all, regions (Boldrin and Canova, 2001), while conditional convergence is strongly supported by some empirical works (Fagerberg and Verspagen, 1996; Neven and Gouyette, 1995; De Freitas *et al.*, 2003), but contested by others. Moreover, several recent empirical studies are increasingly corroborating the so-called club-convergence, that is convergence observed within subgroups of countries or regions (Chatterji, 1993; Canova, 2004; Quah, 1996); however, even this evidence is contrasted by other recent and qualified studies (Brasili and Gutierrez, 2004). Evidence in favour of conditional and, even more, club-

[1] Though Portugal is not strictly Mediterranean, it still shows many Mediterranean characters.

convergence[2] would support the idea of an European space actually divided in one (or few) core area(s) and several peripheral macro-regions (Mediterranean regions, remote Scandinavian and Baltic regions, the CEECs, the Western Balkans, etc.).

The regional convergence issue within the EU significantly increases its political relevance with the accession of new member states for two basic reasons (Bussoletti and Esposti, 2005; Faiña and Lopez-Rodriguez, 2004): firstly, these countries are on average significantly poorer than most of the former EU-15 regions; secondly, they are more heterogeneous within and among them, as their regions vary on a wider range of p.c. GDP, as shown by the higher CV (Coefficient of Variation) than the EU-15 (Bussoletti and Esposti, 2005). It is also more difficult to carry out convergence analysis for these regions due to limited availability and reliability of data, especially concerning the first phase of the transition period (indicatively, 1989-1994), when regional decline rather than faster growth was frequently observed (Grando, 2004).

The average income level of CEEC regions is often close to the poorest EU-15 Objective 1 regions, but they have not been yet included in the Objective 1 "treatment". During the second half of the nineties, the dispersion of regional p.c. GDP remained stable in the EU-15 while increased in CEECs regions (Bussoletti and Esposti, 2005), and this could provide a rough support in favour of a positive effect of Objective 1 programme in reducing (or stabilizing) the gap of the "club" of Objective 1 regions.

However, the role of structural fund payments for Objective 1 regions in accelerating or activating the convergence process remains strongly doubtful (Bussoletti and Esposti 2005; Faiña and Lopez-Rodriguez, 2004; Esposti and Bussoletti, 2006). The EU spends about 25% of its annual budget on Objective 1 structural funds; this budget is expected to increase in the next programming period (2007-2013) with the accession of the new member states (Sapir Report, 2003, European Commission, 2004). Nevertheless, the size of the gap seems so relevant in absolute terms to motivate serious doubts about the actual capacity of this financial effort to significantly affect it.

Despite the mentioned huge amount of empirical literature on convergence, there is far less abundance of empirical analyses about regional convergence conditional on Objective 1 payments and, even less,

[2] Distinguishing between conditional and club convergence may be indeed difficult (Islam, 2003). Club convergence is, in fact, a particular case of conditional convergence. The latter implies an individual regional-specific steady-state level, whereas club convergence implies multiple steady-state equilibria, one for any group (club) of regions.

about convergence in the CEECs regions. Recently, the EU Commission (European Commission, 2004) reported an unconditional convergence rate over all EU-15 regions of 0.5% for the 1980-1988 period; this rate increases to 0.7% and 0.9% in periods 1989-1993 and 1994-2000, respectively. During these two structural fund programming periods, convergence rate observed across Objective 1 regions has been 3.1% and 1.6%. Unfortunately, none of this evidence is sufficient to demonstrate a positive conditioning impact of structural funds in this convergence process. Moreover, no mention is made to the convergence process possibly observed in the accessioning regions in the recent years.

With respect to this general debate about convergence, the analysis of the territorial or regional impact of the Common Agricultural Policy (CAP) has become itself a relevant research topic in the last decade (Sotte 1995; Laurent and Bowler 1997; Shucksmith, Thomson and Roberts 2005; Esposti, 2006). A general and largely shared view is that, in aggregate terms, the 1st pillar of the CAP works against a balanced territorial development across the EU, mainly because its regional distribution is not consistent with the economic and social cohesion objectives of the EU.

Most previous studies on the alleged inconsistency of the CAP with respect to the cohesion objectives provide only descriptive evidence. The main reported evidence is the positive, or at least not significantly negative, statistical correlation between CAP expenditure per unit of agricultural land (or labor) and regional p.c. GDP (Shucksmith, Thomson and Roberts 2005). This distributional concern would support the idea of inconsistency of the CAP just because it demonstrates that CAP expenditure tends to concentrate more on richer regions than on lagging ones. But this is not necessarily an evidence that the CAP offsets, even partially, Objective 1 policies, thus acting as a counter-treatment. In fact, if this latter hypothesis were accepted, the distributional concern would become irrelevant. More recent and sophisticated works on the topic, would suggest a substantial irrelevance of the CAP expenditure at the regional level with respect to the convergence patterns (Esposti, 2006).

According to the abovementioned debate on the convergence hypothesis and the mixed and puzzling empirical evidence, the so called Core-Periphery interpretation of the EU space remains still applicable and valid (European Commission - DG Regional policy, 2004; ESPON, 2003 and 2004). Within this general interpretation, the issue of the EU rural space development and the relation between urban and rural areas become critical. On the one hand, rural areas or regions belonging to the EU-core context may be positively affected by the connection with the strongest economic areas of the Union and may experience a progressive catch-up process. On the other hand, remote rural areas belonging to peripheral macro-regions may even more intensively suffer from this marginality and lose resources (population, human and physical capital) in favour of urban areas acting as attractors for this peripheral geographical context. The EU Rural Development policies themselves may positively activate growth in the rural context in the former case, while may be irrelevant and may even displace resources and efforts in the case of remote or non-integrated areas (European Commission - DG Regional policy, 2004; ESPON, 2003 and 2004).

In this vision of the EU space, the new territories (that is, the new members' regions) apparently form a wide peripheral area, with the exception of some capital-town regions closer to the core area of the EU (for instance, the Prague and Bratislava regions). However, considering this large number of regions as a new peripheral "block", though may be helpful in analysing the EU spatial development and in designing appropriate policies, may also imply a major risk. In particular, this homogenising vision may understimate a major character of the CEECs, that is the relevant disparities among their regions and, above all, the specific problems and lags affecting rural areas, especially the remote ones. The Eastern European space is itself largely heterogeneous. Part of it, the Balkans, suffers from specific problems and even shows large disparities. In addition, portion of this area (the so-called Western Balkans) is currently neither member nor accessing the EU, therefore may be further affected by progressive exclusion and marginalization processes, after having experienced a dramatic and extremely turbulent transition. Nonetheless, Western Balkans' regions are often strongly linked, both in historical and socio-economic terms, to some EU accessioning regions, so their development pattern will probably remain at least partially common.

The nature of this Balkan specificity within the general wider European space and the specific problems concerning the Western Balkans' rural regions deserve major attention, even because they have been often disregarded in most of the research work spent so far on the EU rural space and the enlargement process. The REAPBALK project aims to contribute in this relatively novel direction.

2.2 Evidence about rural development in the EU

Despite this general (and somehow simplistic) view of the EU spatial development patterns, the specific development features of rural regions have become a major research field in the European context (and in different disciplines) in the last fifteen years (Dwyer *et al.*, 2003). This increasing research interest can be explained by two converging aspects: on the one hand, there is evidence of a positive development and growth performance of several rural regions across Europe; on the other hand, the EU spends a significant amount of money on Rural Development (RD) policies. Thus, there is a major interest in Europe to assess to what extent cases of "rural success" may be actually detected across the EU space, to understand the main characters of this success, and the role played by RD policies in generating it.

Rural economies are often considered weak due to the joint effect of remoteness and small scale. The former increases production and transaction costs, the latter prevents high returns to scale (Esposti and Sotte, 2002). According to this argument, both features should generate permanent competitive disadvantages for rural areas in their competition with urban ones, and a progressive decline in population and employment should be expected. However, this "law" of rural decline is largely contradicted by the empirical evidence. Many recent studies have shown that some rural areas may experience more intense growth than urban ones. In the USA (Henry and Drabenstott, 1996; Bernat, 1997), in the European Union (Esposti *et al.*, 2000), and in many other OECD countries (Bollman and Bryden, 1997; OECD, 1994 and 1996), many rural regions display population and employment increase due to their specific capacity to turn alleged disadvantages into competitive advantages.

In this respect, evidence about the EU has been provided by a consistent body of research work., In particular: some EU funded research projects (RUREMPLO and DORA projects, for instance; see Terluin and Post, 2000 and Bryden and Hart, 2001); the ESPON programme funded by the EU INTERREG initiative (Bengs and Schimdt-Tomè, 2002); the IIASA European Rural Development initiative and network (Heiling, 2001); several recent OECD initiatives and studies, such as the OECD "Territorial Reviews" (OECD, 2002 and 2003); other projects on rural areas carried out by several research teams all over Europe (an interesting and original example is the EURURALIS project commissioned by the Dutch Ministry of Agriculture, Nature and Food Quality; see Working Group Sustainable Development and System Innovation, 2004).

Despite significant differences in these approaches and works, some common results emerge. First of all, several cases of "rural success" actually exist across the EU. It is probably not enough to talk of a "rural renaissance", but still reveals that rural regions may be more dynamic and outperform urban ones according to several indicators. Secondly, this success is often somehow linked to those urban areas with which the rural context is geographically and economically integrated. In other words, this dynamism concerns not just the rural context, but the rural area within a more generally positive performance of a wider space including both the urban and rural dimension. In this respect, the urban-rural linkage becomes the critical issue trying to explain this performance. Thirdly, this success is not due mainly to agriculture, although the agricultural sector may play a significant part in it. The key-sectors are more often manufacturing sectors and those services that can make the rural context particularly attractive and convenient (for instance, tourism) (Roberts, 2005). Beside the sector balance within the local economy, even more important is the quality and capacity of local institutions, the social capital and the network of relations among heterogeneous actors, both private and public ones (Esposti and Sotte, 2002).

This common evidence has increasingly favoured a relatively new approach to the RD issues, the so-called "territorial approach" or "local economy approach", in which rural regions are viewed as single territorial entities, and the focus is on the regional economy as a whole, with all activities (agricultural, industrial and tertiary), and on the whole set of relevant institutions and local social networks (Leon, 1999; Saraceno, 1994; Terluin and Post, 2000; Ward *et al.*, 2003). Within the "territorial approach" the role itself of RD policies assumes a different and more complex interpretation. A significnt research effort has been spent in the recent years also on this aspect, mainly to understand the role of the EU RD polices in connection with the dominant CAP measures and with the rest of national, regional and local policies delivered in these territories and economies.

A further EU funded research project may be mentioned in this respect. The IMPACT project on RD policies and practices in Europe not only gathered some of the major European research institutes and scholars in the field, but also largely adopted this "territorial approach" (van der Ploeg *et al.*, 2000). To grasp the richness, diversity and complexity of current RD patterns and polices in Europe, the project adopted a mixture of quantitative and qualitative research methods. Interesting results emerged from the "policy-practice interface analysis" that revealed great variations in the form and level of support to RD activities across the EU (Arzeni *et al.*, 2002). Nonetheless, the success of this support again depends on the degree of integration of different measures and levels of intervention on the same local context, and the quality of institutions and of the local social capital and network.

With respect to the state of the art of the analysis of RD patterns across EU, far less evidence and much more complexity emerge in studying rural development in the CEECs, either the new members states or the nonmember countries (especially those for which a clear “road to accession” has not been yet established, as most Western Balkans). Though some general remarks with respect to these regions may be drawn, it is particularly hard to identify common RD patterns and the role of policies in such heterogeneous, highly transitional and still uncertain dynamics.

The main result concerns, as already mentioned, the lack of a significant convergence process of both the CEEC’s regions toward the EU average and the CEEC’s regions among them. Though long comparable time-series are hardly available at regional level for these countries, at least in the last fifteen years disparities evidently did not decrease (Bussoletti and Esposti, 2005; Grando, 2004; European Commission, 2004; Baum and Weingarten, 2004). Moreover, among the lagging regions we often find rural regions as the worst cases. In other words, unlike most EU-15 countries, here is difficult to detect cases of rural success and cases of rural regions functionally integrated with the urban space in an wider geographical dimension. As mentioned, in these countries rural regions seem to suffer, as in most peripheral contexts, the competition of urban areas, rather then taking advantage of being functionally integrated and complementary to them.

A significant amount of studies have been carried out in the last decade on regional development and disparities in the CEECs, and some of them also put specific emphasis on the rural space. Nevertheless, this significant stream of research maintains a gap with respect to the prevalent research orientations followed when EU-15 rural regions are under study. First of all, often due to the lack of longer data, the attention is mainly limited to the so-called transition period. Thus, on a relatively short period, when long-term growth patterns, therefore possible convergence processes, can be largely confused and hidden by the dramatic changes determined by the political and economic transition (Garonna and Buchacz, 2004; Nuti, 2004). Some differences emerging between urban and rural space, and even among rural areas, are actually interpreted as major consequences of the transition process, whereas long-term structural differences are often left in the background (Csaki and Lerman, 2001).

Secondly, the definition itself of “rural region” may cause significant difficulties in the research work. On the one hand, the definition of “region” may be problematic when consistency with the current EU-15 NUTS classification is pursued (a clear example of this is the specific case of “Peripheral Slovenia” that will be dealt with in the following chapters of this book). On the other hand, while a wider definition of “rurality” is accepted across the EU-15 with less emphasis on the role of agriculture and main focus on population density, as well as on the forms of agglomeration and of integration among sectors (Leon, 1999; Esposti and Sotte, 2002), this seems more problematic in regions where the role of agriculture remains crucial and a significant presence of other dynamic activities and sectors is indeed under question. In fact, this confusion between "agricultural" and "rural" should be definitively avoided within the "territorial approach", but it is still present in those valuable works specifically focusing on CEECs' rural regions (Baum and Weingarten, 2004; Baum *et al.*, 2004; IAMO, 2004).

These relevant methodological problems in applying the "territorial approach" to the evaluation of RD patterns in the CEECs also strongly affect the RD policy analysis. As mentioned, the "territorial approach" implies that kind of policy-practice impact analysis well clarified in the IMPACT research project. However, the set of policies, practices, institutions and networks that should be considered in this respect are strongly heterogeneous across the CEECs and also dramatically changed during the transition period. For this major reason, in some research work the main ambition in analysing RD policy has been the evaluation of the impact of pre-accession funds (PHARE, ISPA, SAPARD) in rural regions (Csaki and Lerman, 2001; European Commission, 2004). This work is still particularly difficult, as these policies are originally designed for and at the state level, and then allocated among regions only in a second stage. Moreover, it is largely acknowledged that most effects of these funds have been rather on an institutional and political ground, helping those countries to achieve the "acquis communautaire" and aiming to capacity and institution building according to the common EU principles and practices (European Commission, 2004). SAPARD funds thus represent, in many cases, the only policy for which a regional specific impact evaluation can be attempted. However, this policy has been introduced few years ago and very few data and information exist about its implementation and its integration with national, regional and local measures.

These challenging research problems are remarkably amplified when the area under study is the Balkan area and the respective regions. The Balkan specificity makes the analysis of rural region development so complex, on several grounds, that trying to do research in this direction is, by itself, somehow original.

3. The Balkan specificity

Why Balkans are so different to make their regional disparities and RD patterns an interesting field of research? The major specificity lays on the apparent contradiction between some key common aspects of the Balkan area as a whole and the large disparities observed within this area. Looking at the Balkan area as a whole seems appropriate for the socio-economic analyst if the common historical patterns and the consequent geo-political context have to be emphasized. In the European perspective, this area shows strong enough common features in this respect, at least as other large (and heterogeneous) macro-areas such as the Mediterranean space or the Scandinavian and Baltic area.

In fact, countries and regions in this geographical context may show strong interdependencies both in terms of trade and economic relationship and in terms of political and cultural connection. These linkages may also explain why the area as a whole may be indeed identified as a large lagging behind and peripheral macro-region with respect of the EU space, also in comparison with the mid-European CEECs (Tomic and Umicevic, 2006). Some studies have emphasized these aspects just paying attention to the aggregate features of the different Balkan countries, but disregarding the internal regional disparities (Petrakos and Totev, 2000; World Bank, 2002; Grando, 2004). However, the strong heterogeneity within the Balkan space may emerge also looking at the country comparison especially considering their recent growth and transitional patterns.

Here we define the Balkan space according to Petrakos and Totev (2000). It is a macro-region including Slovenia as North-Western border, Greece as Southern border, Romania and Bulgaria as North-Eastern border and the so called “Western Balkans” as the Central-Western part (see Map 7, next chapter). Western Balkans thus include all the countries of the Former Yugoslavia (excluding Slovenia) and Albania. This wide definition of the “Balkans” also implies large differences with respect to the EU accession status. The North-South extremes (Slovenia and Greece) are already EU members; the Eastern part contains accessioning countries that will probably become members in 2007. The rest, i.e. the Western Balkans, thus represents a wide area currently excluded from the EU membership and enlargement process (with the only exception of Croatia). This wide definition of the area reinforces its strategic relevance for the future of the EU from a political and economic point of view, since it represents a sort of “black spot” surrounded by EU members in the heart of Europe, and of major importance for the connection and relation with the Near and Middle-East and the whole Mediterranean space.

Within this complex framework, regional disparities play a crucial role though they are also largely unknown and, consequently, often not sufficiently stressed. Few studies focus on the regional dimension within the whole Balkan area. There are several recent studies on *the Balkan macro-region* (Petrakos and Totev, 2000; von Hagen and Traistaru, 2003), but very few on *the Balkan regions*. Specific attention to regional differences is paid in studies analysing and comparing the EU member states or accessioning countries, but they inevitably consider only Slovenia, Greece, Romania and Bulgaria, and exclude Western Balkans. The lack of consistent and comparable data is actually a major reason of this incomplete coverage. Moreover, these studies are essentially aimed to analyse policy issues upon enlargement. Thus, on the one hand they tend to exclude those territories for which the “road to accession” is largely undefined (European Commission, 2003); on the other hand, they look at the Balkan regions within the enlarged EU context (European Commission, 2004). Unfortunately, when the EU dimension is used as the key reference, the major disparities observed in these Balkan countries, mainly Romania and Bulgaria, are systematically underestimated: with respect to the hypothetical EU average region, all these Balkan regions seem quite similar in economic structure and performance (Baum and Weingarten, 2004; Baum *et al.*, 2004; ESPON, 2003 and 2004; IAMO, 2004).

This is especially true when rural regions are expressly considered. Once their usually large difference with respect to urban regions is disentangled, they seem to form a wide homogenous and undifferentiated rural space. Their specific characters and different dynamics are consequently disregarded. On the contrary, when comparison is made among them, neither using the EU average as reference nor including the national driving urban regions (often including the capital town) in the comparison, these disparities, as well as the possible similarities, are much more evident, meaningful and of major research interest. Moreover, they can be significantly detected both within the same country and across different countries, thus showing how proximity may be a major force designing development patterns even when it acts across, and despite, national borders.

A detailed research work on the specific regional disparities within the Balkans, therefore, is novel in the wide literature about regional and rural development in the European space. Those rare, and valuable, studies emphasizing differences among Balkan regions necessarily still show difficulties in finding consistent and comparable data, in the definition of rurality and, above all, in analysing the regional development patterns and the role of RD measures according to a well-established “territorial approach” (Baum and Weingarten, 2004; Baum *et al.*, 2004). Taking a step forward in these directions in the analysis of “rural Balkans”, is thus the major purpose of the REAPBALK research project and partnership.

References

Arzeni, A., Esposti, R., Sotte, F. (eds) (2002): European policy experiences with rural development. Kiel: Wissenschaftsverlag Vauk.

Baum, S., Trapp, C., Weingarten, P. (2004): Typology of rural areas in the Central and Eastern European EU new member states. Discussion Paper n. 72, Institute of Agricultural Development in Central and Eastern Europe (IAMO).

Baum, S., Weingarten, P. (2004): Interregionale disparitäten und entwicklung ländlicher räume als regionalpolitische herausforderung fur die neuen EU-Mitgliedstaaten. Discussion Paper n. 61, Institute of Agricultural Development in Central and Eastern Europe (IAMO).

Bengs, C., Schimdt-Tomè, K. (2002): Urban-rural relations in Europe. ESPON 1.1.2 Final Report, Centre for Urban and Regional Studies, Helsinki University of Technology.

Bernat, G.A. (1997): Manufacturing and the Midwest Rural Economy. Recent trends and implications for the future. Rural Development Perspectives, Vol. 12, n.2, 2-12.

Boldrin M., Canova, F. (2001): Europe's Regions. Income disparities and regional policies, Economic Policy, April, pp. 207-253.

Bollman, R.D., Bryden, J.M. (1997): Rural Employment. An International Perspective. New York: CAB International.

Brasili, C., Gutierrez, L. (2004): Regional convegence across European Union. Economics Working Paper Archive at WUSTL, http://econwpa.wustl.edu/

Bryden, J., Hart, K. (2001): The International comparison. "Dynamic of rural areas (DORA)" FAIR project, The Arkleton Centre for Rural Development Research.

Bussoletti, S., Esposti, R. (2005): Structural funds, regional convergence and the role of agriculture in the enlarged EU. A panel-data approach. In: Ortner, K. (ed.), Assessing rural development policies of the Common Agricultural Policy. Selection of papers from the LXXXVII EAAE Seminar – Vienna. Kiel: Wissenschaftsverlag Vauk, 125-145.

Canova, F. (2004): Testing for convergence clubs in income per capita: a predictive density approach. International Economic Review, Vol. 45 (1), 49-77.

Chatterji, M. (1993): Convergence Clubs and Endogenous Growth, Oxford Review of Economic Policy, Vol. 8, n. 4, pp. 57-69.

Csaki, C., Lerman, Z. (2001). The challenge of rural development in the EU accession process. Washington: The World Bank.

De Freitas, M.L., Pereira, F., Torres, F. (2003): Convergence among EU regions, 1900-2001. Intereconomics - Review of European Economic Policy, 38 (5), 270-275.
Dwyer, J., Baldock, D., Beaufoy, G., Bennett, H., Lowe, P., Ward, N. (2003): Europe's rural futures – The nature of rural development II: Rural development in an enlarging European Union. Report for WWF Europe and the Land Use Policy Group. London: Insitute for European Environmental Policy (http://www.lupg.org.uk/pubs/).
ESPON (2003): Diversity within the European territory. A selection of new European maps. Epson Briefing 1, The ESPON 2006 Programme, http://www.espon.lu/.
ESPON (2004): ESPON in progress. Preliminary results by autumn 2003. The ESPON 2006 Programme, http://www.espon.lu/.
Esposti, R. (2006): Regional growth and policies in the European Union: Does the Common Agricultural Policy have a counter-treatment effect? American Journal of Agricultural Economics, Vol. 88 (in press).
Esposti, R., Bussoletti, S. (2006): The impact of Objective 1 funds on regional growth convergence in the EU. A panel-data approach. XVIII Villa Mondragone International Economic Seminar, "Europe: A New Economic Agenda", CEIS-Roma, 26-27 Giugno.
Esposti, R., Godeshalk, F.E., Kuhmonen, T., Post, J.H., Sotte, F., Terluin, I.J. (2000): Statistical Analysis of Employment Growth in Rural Regions of the EU, 1980-1995. In: Terluin I.J., Post, J.H. (eds.), Employment Dynamics in Rural Europe, New York: CAB International, 30-58.
Esposti, R., Sotte, F. (2002): Territorial Heterogeneity, Institutional Structure and Rural Development. An Evolutionary Interpretation of the Italian Experience. Growth and Change, 33 (1), 3-41.
European Commission - DG Regional policy (2004): Interim territorial cohesion report. Brussels: Preliminary results of ESPON and EU Commission studies.
European Commission (2003): The EU's relations with South Eastern Europe. Brussels: External Relations – European Commission.
European Commission (2004): A new partnership for cohesion. Convergence, Competitiveness, Cooperation. Brussels: Third Report on Economic and Social Cohesion – European Commission.
Fagerberg, J., Verspagen, B. (1996): Heading for Divergence? Regional Growth in Europe Reconsidered. Journal of Common Market Studies, Vol. 34 n. 3.

Faiña, J.A., Lopez-Rodriguez, J. (2004): European regional policy and backward regions: implications towards EU enlargement. European Journal of Law and Economics, 18 (1), 5-32.
Garonna, P., Buchacz, A. (2004): Sicurezza e conflitto nelle economie in-transizione o post-transizione: dalla "pace fredda" ai nuovi rischi per la sicurezza globale. In: Quadrio Curzio, A. (ed.): La globalizzazione ed i rapporti nord-est-sud, Bologna: Il Mulino, 99-131.
Grando, S. (2004): Crescita e convergenza regional nei paesi dell'Europa Centro-Orientale. Paper presented at the 41st SIDEA Conference – Rome, September 16-18.
Heiling, G.K. (2001): Dimensions of rural development in Europe. A synthesis of research perspectives. Open speech given at the Workshop on European Rural Development, Problems, Chances, Research Needs – Warsaw, May 7th-9th.
Henry, M., Drabenstott, M. (1996): A New Micro-View of the U.S. Rural Economy. Economic Review, n. 2, 53-70.
IAMO (2004): The future of rural areas in the CEE new member states. Network of Independent Agricultural Experts in the CEE Candidate Countries – IAMO.
Islam, N. (2003): What Have We Learnt from the Convergence Debate?, Journal of Economic Surveys, 3, Vol. 17, pp. 309-362.
Laurent, C., and I. Bowler (eds.) (1997): CAP and the Regions: Building a Multidisciplinary Framework for the Analysis of EU Agricultural Space. Paris: INRA Editions.
Leon, Y. (1999): L'analisi economica dello sviluppo rurale. In Esposti R., Sotte F. (eds.), Sviluppo rurale e occupazione. Milano: Franco Angeli, pp. 11-28.
Neven, D., Gouyette, C. (1995): Regional Convergence in the European Community, Journal of Common Market Studies, 33 (1), pp. 47-65.
Nuti, D.M. (2004): I sistemi economici post-comunisti, ovvero 2001 odissea nella transizione. In. Jossa B. (ed.): Il futuro del capitalismo, Bologna: Il Mulino, 173-213.
OECD (1994): Creating Rural Indicators for Shaping Territorial Policy. Paris.
OECD (1996): Territorial Indicators of Employment. Focusing on Rural Development. Paris.
OECD (2002): Siena, Italy. OECD Territorial Reviews. Paris.
OECD (2003): The future of rural policy: from sectoral to place-based policies in rural areas. Paris.
Petrakos, G., Totev, S. (2000): Economic structure and change in the Balkan region: implications for integration, transition and economic

cooperation. International Journal of urban and Regional Research, Vol. 24 (1), 96-113.
Quah, D. (1996): Empirics for economic growth and convergence, European Economic Review, Vol. 40, 1353-1375.
Roberts, D. (2005): The role of households in sustaining rural economies: a structural path analysis, European Review of Agricultural Economics, Vol. 32 (3), 393-420.
Sapir, A. (2004): Europa. Un'agenda per la crescita. Rapporto Sapir. Bologna: Il Mulino.
Saraceno, E. (1994): Alternative readings of spatial differentiation: the rural versus the local economy approach in Italy, European Review of Agricultural Economics, 21 (3-4), 451-474.
Shucksmith, M., Thomson, K. and Roberts, D. (eds.) (2005): CAP and the Regions: Territorial Impact of Common Agricultural Policy. Wallingford: CAB International.
Sotte, F., (ed.) (1995): The regional dimension in agricultural economics and policies. Proceedings of the 40th EAAE Seminar - Ancona, CNR-RAISA.
Terluin, I.J. and Post, J.H. (eds.) (2000): Employment Dynamics in Rural Europe, New York: CAB International.
Tomic, D., Umicevic, B. (2006): Development of the Balkan countries: where does the European responsibility lie? *Eurochoices*, 5 (1), 38-41.
van der Ploeg, J.D., Renting, H. and Minderhoud-Jones, M. (2000): The socio-economic impact of rural development: realities and potentials. Sociologia Ruralis, Special Issue, Vol. 40 (4).
von Hagen, J. and Traistaru, I. (2003): The South-Eat Europe review, 2002-2003. Geneva: World Economic Forum.
Ward, N., Lowe, P., Bridges, T. (2003): Rural and regional development: the role of the Regional Development Agencies in England. Regional Studies 37, 201-214.
World Bank (2002): Transition. The first ten years. Analysis and lessons for Eastern Europe and the Former Soviet Union. Washington: The World Bank.
Working Group Sustainable Development and System Innovation (2004): *EURURALIS 1.0. A scenario study on Europe's rural areas to support policy discussion*. Wageningen University and Research Centre, The Netherlands.

3. SELECTION OF THE REGIONAL CASE STUDIES

Roberto Esposti

1. The REAPBALK approach: key choices, methodological issues and original contribution

This chapter analyses in details the criteria adopted to select the rural regions to be studied. These criteria are applied to the five mentioned Balkan countries. For any country, all relevant details about the selection process are here provided. The outcome of this selection process is then summarized in the final section where also some general conclusions and remarks are drawn.

The selection criteria follow the key research guidelines of the REAPBALK approach; they are:

1. focusing on rural Balkan regions to stress the differences among them, thus emphasizing the heterogeneity within the rural space in the Balkans, and adopting the "wide" definition of the Balkan geographic area mentioned in the previous chapter;
2. adopting the "territorial approach", that is regions are analysed and compared considering all the relevant activities and sectors (not only agriculture), all the relevant local/regional institutions and social capabilities, but also emphasizing the regional specificities, on those aspects, with respect to the national context. As will be explained in next section, this implies selecting regions with enough economic complexity and dynamism to make this approach fruitful;
3. analysing the development of these rural regions and the impact and role of policies in a mid-term perspective, thus admitting that the regional economic structure may actually change but only as a major effect of changes on the demand side, the technology remaining constant. This choice is not only implied by the adopted methodology (the I-O approach), but also aims to reduce the number

of external or internal factors that could eventually affect the policy evaluation in a longer run, where also major technological changes and adaptations may occur.

According to these basic research guidelines, the adopted methodology is the Input-Output (I-O) approach applied at the regional level. That is, any selected rural region is analysed and compared constructing consistent regional I-O tables, and simulating the impact of alternative policy scenarios through sectoral multipliers and linkages provided by the regional I-O tables themselves. Upon an appropriate construction of tables and definition of scenarios, this approach is quite powerful in terms of amount of information it can provide. Moreover, it seems appropriate to emphasize differences among regions with respect to specific economic structure and consequent growth pattern, specific combination of national, regional and local RD policies and institutions and, finally, specific EU status and timing of the accession process, with the consequent different implementation of the relevant EU RD policies.

The application of the I-O approach to regional context is not novel at all (Jensen *et al.*, 1979; Hoen, 2002). However, a limited number of applications refer to the specific context of rural regions, and even less frequently to the analysis of policy measures and to a number of rural regions in a comparable way (Ciobanu *et al.*, 2004). In fact, extending the approach to several regions still maintaining comparability and introducing policy measures is a major challenge within this kind of approach in terms both of data availability and of theoretical and methodological consistency (see the methodological chapters for more details).

This approach is also quite demanding and costly in terms of data requirement and research effort. For this major reason, and also to facilitate comparison among regions, the approach is not extended to all rural Balkan regions, but only to a limited number of selected regional cases, acting as "case studies".

In addition, this research approach involves several important methodological issues; they are dealt with in detail in the following chapters of this book. We can summarize them in four categories:

1. *The selection of case studies*: this very basic problem concerns the definition of "region" and of "rurality". The driving rule is to follow the definition of regions accepted at the EU level (the NUTS levels) and the definition of rurality accepted at the international level (the OECD definition). Moreover, once the set of candidate rural regions has been defined for any of the five countries, specific selection

criteria are followed to make case studies consistent with the "territorial approach" here adopted. These criteria actually adopt solutions already proposed in previous similar research projects, though concerning the EU-15 rural space (in particular, the RUEMPLO and DORA projects).

2. *The construction of comparable regional I-O tables*: once the regions are selected, the main research issue becomes the construction of the regional I-O tables. To make them comparable, a common structure of these tables must be established. Then, the regional tables have to be computed, on this common ground, regionalizing the national tables. Thus, a common and consistent regionalization method has to be settled and followed. Finally, since regional tables thus obtained may refer to different years, comparability also requires an appropriate method for updating the regional tables when needed.
3. *The definition of the policy scenarios*: to enter policy measures into regional I-O tables, a general agreed methodology on the construction of comparable policy scenarios must be defined. Then, region-specific policy scenarios for the 5 cases are derived accordingly. Comparability and, at the same time, regional specificity of the policy scenarios have to be achieved by maintaining for all the studied regions the same basic exogenous variables, though the "value" of these variables may obviously differ across regions. These variables may be grouped in three different exogenous driving forces: national/regional economic growth, EU accession/membership status, EU and national agricultural and rural policies.
4. *Policy impact analysis*: if both regional I-O tables and policy scenarios are constructed in an appropriate and consistent way, the calculation of the policy impact has no particular methodological difficulties, as it can be obtained by including the abovementioned regional scenarios into the regional I-O tables. However, this impact analysis generates several and sometimes conflicting policy effects in terms of employment and output/income absolute and relative changes, either in the whole regional economy or in any relevant sector (agriculture, in particular). Therefore, the main challenge in this respect is to consistently compare and summarize the results of the policy impact analysis in terms of differences among the selected regions and between regional and national performances, and to emphasise the different effects generated by alternative policy designs. To reinforce this evidence about policy impact, a further relevant research objective concerns the application of the same

policy scenarios but adopting a more advanced and sophisticated technique aimed to continuously update the regional tables themselves, thus allowing for a dynamic analysis of the policy impact (see chapter 12 of this book).

Eventually, these research objectives provide the two original contributions of this research project. First of all, it focuses on the rural space of a specific area of Europe, the Balkans, for which there are no systematic studies at the regional level. Moreover, the focus is not on economic transition, but on the persistent economic structure of these regions, and differences within countries as well as among countries in this respect. Secondly, it applies the "territorial approach" according to its deepest motivations: all the sectors are considered and all the relevant policies are included in policy impact analysis. In fact, at the regional level the policy impact is always a combined and inseparable effect of several policies, pre-accession funds, EU structural funds, EU sectoral policies (CAP) and other policies (national, regional, local). The territorial approach, and the methodology adopted accordingly (the I-O model), also implies that policy effects are analysed along with their distribution over all sectors. On the one hand, not only agricultural is considered; on the other hand, however, agriculture is always considered even when non-agricultural polices are under evaluation.

As mentioned, the REAPBALK research project focuses on 5 rural regions, one for any of the following countries: Bulgaria, Croatia, Greece, Romania and Slovenia. A deeper insight into Western Balkans would be indeed appropriate. Unfortunately, the lack of consistent and comparable data (mainly I-O tables), an unclear and incomparable definition of regions and difficulties in finding research partners in other countries of Western Balkans, limited the attention only to the Croatian case as representative of that area.

2. Criteria for the process of regional selection

This section analyses the selection process of the regional case studies. Since one region has to be selected in each country, the main objective is selecting regions that can be representative of the current conditions in countries under study with respect to their rural areas and rural policy. Rural regions in which agricultural employment matters, but where we may observe, at the same time, a significant employment growth in other sectors.

The main focus of the REAPBALK project is, in fact, on the mid-term development and agricultural perspectives of rural regions showing a positive employment dynamic in the transition period. For this reason, attention is paid to those rural regions that have experienced *in loco* some industrial and service dynamism in the recent years; thus, those cases showing greater adaptive capacity within the geographical area (the Balkans) and within each of the countries under study. Conditioned on this, the role of agriculture is then considered. This kind of approach has also been adopted in previous studies on EU rural areas (Esposti *et al.*, 2000).

Therefore, these case studies have to be selected among NUTS 2 or 3 regions in the abovementioned countries according to: degree of rurality, employment dynamics and role of agriculture in the area. Consequently, firstly these criteria have to be clearly identified and then applied to regional data within each country. On the base of these selection criteria, a group of candidate regions is proposed. The final choice within this group is eventually taken arbitrarily, emphasising those regions that would best represent country-specific features and simultaneously highlight the diversity of rural development patterns within the studied countries[1].

2.1 Selection criteria

The selection criteria identify a sequence of logical steps aimed at answering this sequence of general questions:

A. what do we mean by region?
B. what is a rural region?
C. what do we mean by "positive dynamic employment" during the transition period?

According to these issues, any selected region must satisfy the following three criteria:

A. NUTS 2 level: A decision was taken to focus on NUTS 2 cases. This seems more appropriate, in particular, for the Input-Output analysis that implies the construction of regional I-O Tables requiring many disaggregated and updated data; this condition

[1] It is worth reminding that this overall selection process required a relevant and accurate data collection work. These data have been stored in the REAPBALK REGIONAL DATABANK. A reserved access to the databank is available upon request at the Reapbalk web-site: http://www.reapbalk.unian.it/.

could not be fully satisfied in all 5 countries at the NUTS 3 level. Moreover, the identification and application of different regional scenarios could be less meaningful for the NUTS 3 rural regions, which are, in general, of smaller population and geographical scale. In this respect, also, policy scenarios implying EU accession should more appropriately refer to the NUTS 2 level, since it often represents the basic territorial level for programming the Structural Funds' actions. However, working at the NUTS 2 level is not always possible in these countries. In Slovenia and Croatia the correspondence between the administrative units and the NUTS levels was still not fully and clearly established at time the research project started. Consequently, though we maintain the general principle of working at the NUTS 2 level, a specific regional size criterion has to be followed in the two mentioned cases.

B. Rural according to the OECD definition: the OECD definition (OECD, 1994; 1996) is based on the concept of population density and distinguishes two geographical levels : regions and local communities. If population density in a community is lower than 150 inhabitants per square kilometre then it is classified "rural"; otherwise it is "urban". Then, if a region has more than 50% of population living in rural communities it is classified "predominantly rural"; if this share is between 50% and 15% it is classified "significantly rural"; if lower than 15% it is "predominantly urban". In addition, if a region includes a city of 200,000 inhabitants or more it is in any case classified at least "significantly rural"; if it includes a city of 500,000 inhabitants or more it is classified "predominantly urban". For the REAPBALK project, we define local communities as NUTS 5 areas. Therefore, the following stages are adopted, in order to define a rural region:

- For each NUTS 2 region, identify those NUTS 5 areas within the region that can be defined rural communities according to the OECD definition.
- Calculate regional population living in these rural communities.
- Calculate the ratio between this population living in rural communities and the total regional population.

Thus, the region fits the criteria of rurality if this rural/urban population ratio is such that the region can be defined "predominantly rural" or, also, "significantly rural" but with a share of rural population close to 50%[2].

C. A positive employment dynamics in the last decade (1991-2001). If not otherwise specified, by positive employment dynamics we mean a positive employment growth relative to the country (regional employment growth rate > national employment growth rate) in industry and service sectors. The employment growth rate is:

$$g = \frac{E_{2001} - E_{1991}}{E_{1991}} \tag{1}$$

where E indicates the number of employees in industry and service sectors. Therefore, this third criteria imposes $g_R > g_N$, where R indicates the region, N the whole country. This general criterion can be slightly adapted to the specific cases according to the respective data availability. In particular, data coverage of the whole 1991-2001 period is quite problematic at the regional level. So the criterion has to refer to the longest period (still in the nineties) covered by the available official statistics.

With respect to these sequence of criteria, three different cases can occur during the selection process in each of the 5 countries:

1. *IF*: Only one region fits all criteria
THEN: The process of regional selection is completed.
2. *IF*: More regions fit all criteria
THEN: The selection of the region can be finalised using some additional criteria, such as the highest share of agricultural employment and the lowest unemployement rate, still with respect to the national or "rural regions" average, or also on the base of *ad hoc* considerations such as *ex-ante* specific knowledge of the region.
3. *IF*: No region fits the three criteria
THEN: The criteria must be relaxed. In this case, the problematic criterion is usually the "positive employment dynamics". It can be relaxed by considering "positive" the regional employment growth which is greater than the country average now only limited to rural regions.

[2] We therefore disregard the size of the largest town.

3. Regional selection process by country

To apply the above selection criteria, an overview of the available statistical data at regional/local level in each country must be carried out. On this base, clusters are created for each criteria, so that the candidate regions can be identified and, then, the final selection achieved. This process is here reported country-by-country.

3.1 Bulgaria

A.

According to the adopted NUTS nomenclature, Bulgaria consists of six planning regions: North-West, North Central, North-East, South-East, South Central, South-West, which are all classified as NUTS 2 level. This latest division of Bulgaria into six NUTS 2 regions came into effect in 1999. The former division of the country was somewhat different (there were 9 regions), and the statistical data at regional level for the period 1991-1998 are not quite comparable with data for the following years. In particular, comparability of data on sectoral employment for North Central and North-East regions may be problematic.

B.

The abovementioned steps have been followed to determine whether these regions can be defined "rural" (Table 1). According to the definition, all regions with the exception of the South-West region (which can be defined significantly rural) satisfy the criteria of prevalent rurality, though the North-East region, whose capital city is Varna with 300,000 residents, should be more appropriately considered significantly rural according to the OECD criteria.

Tab. 1 - Regional population living in rural communities (%)

Region	% of population living in rural communities
North-West	86.0%
North Central	68.3%
North-East	61.0%
South-East	63.5%
South Central	65.9%
South-West	35.6%

Source: National Statistical Institute, Population and Demographic Processes, 2000

C.

In this stage we ranked the five prevalently rural regions, by awarding them points from 5 (for the best performer) to 1 (for the worst performer) on the base of employment growth performance. The data needed to calculate the overall employment dynamics are available from 1994 onwards. As evident from Table 2, no region experienced positive employment dynamics in the period 1994-2001. However, the criterion imposes positive employment dynamics relative to the country (regional employment growth rate > national employment growth rate) in industry and service sectors. According to Table 2, the regions showing positive employment growth with respect to the national figures are North-East and South Central.

Tab. 2 - Employment dynamics for the period 1994-2001

Region	Employment growth rate (1994-2001)	Points
Bulgaria	-3.3%	
North-West	-9.8%	2
North Central	-7.4%	3
North-East	-2.1%	5
South-East	-10.5%	1
South Central	-2.9%	4

Source: National Statistical Institute, Employment and Unemployment, 1994-2001

Tab. 3 - Regional employment dynamics in industry and service sectors

Region	Employment growth rate			
	Industry sector (1991-1999)	Points	Service sector (1991-1999)	Points
North-West	-51.5%	1	-23.5%	1
North Central	-40.5%	5	-22.4%	2
North-East	-41.3%	3	-15.3%	5
South-East	-50.2%	2	-16.6%	4
South Central	-41.1%	4	-17.8%	3

Source: National Statistical Institute, Statistical Yearbook, 1992-2000

Table 3 shows that none of the regions has positive employment dynamics in industry and service sectors in absolute terms. Thus, we can follow 3 hypotesis:

a) Hypothesis 1: ranking the regions only by overall employment dynamics (Table 2):

If we use this method for regional ranking, we must select the North-East region as case study.

b) Hypothesis 2: If we combine Table 2 and Table 3, we can make the regional ranking reported in Table 4.

According to this hypotesis, we must again select the North-East region for our case study.

c) Hypothesis 3: We can consider regional employment growth rate > average employment growth rates only of rural regions (i.e., -4.1%).

Therefore, again, the regions satisfying this criterion are North-East and South Central.

Then, we can also classify the regions by the agricultural employment share (Table 5): the region with the highest share of agricultural employment is the North-East region.

Tab. 4 - Regional ranking by employment dynamics

Region	Employment dynamics						Total points
	Overall (1994-2001)	Points	Industry sector (1991-1999)	Points	Service sector (1991-1999)	Points	
North-East	-2.1%	5	-41.3%	3	-15.3%	5	13
South Central	-2.9%	4	-41.1%	4	-17.8%	3	11
North Central	-7.4%	3	-40.5%	5	-22.4%	2	10
South-East	-10.5%	1	-50.2%	2	-16.6%	4	7
North-West	-9.8%	2	-51.5%	1	-23.5%	1	4

Source: National Statistical Institute, Statistical Yearbook 1992-2000, Employment and Unemployment, 1994-2001

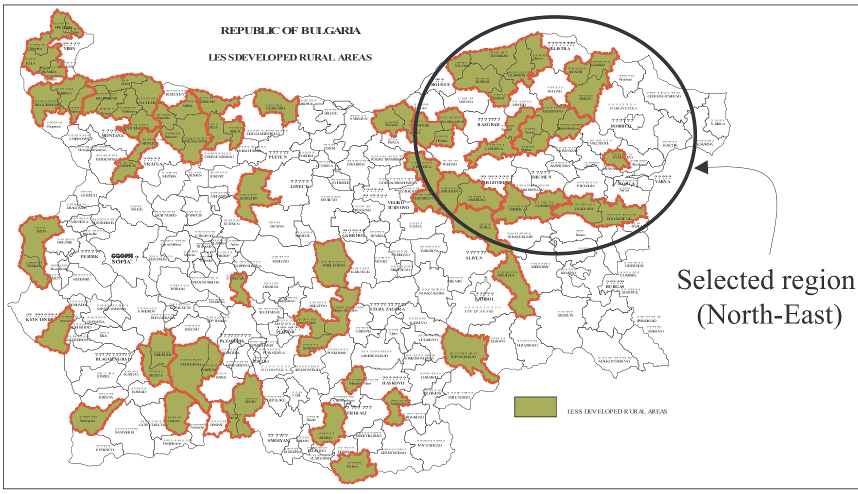
Tab. 5 - Share of agricultural employment (1999)

Region	Share of employed in the agricultural sector
North-West	6.8%
North Central	7.1%
North-East	8.6%
South-East	7.9%
South Central	4.7%

Source: National Statistical Institute, Statistical Yearbook 2000

The North-East region, therefore, corresponds on several grounds to the abovementioned selection criteria and is consequently selected as the Bulgarian case study (Map 1).

Map 1 – Map of Bulgaria with less developed rural areas (in grey) and the selected region



3.2 *Croatia*

In the Croatian case there are some specific difficulties in applying all the criteria:

A.

There is no applicable administrative or statistical division of Croatia corresponding to the NUTS 2 level. The Croatia was excluded from PHARE program in times of war so that, when Eurostat proposed a breakdown for other applicant countries, Croatia was not included. Present administrative breakdown into Counties largely satisfies criteria for NUTS 3 level. By grouping data of neighbouring counties, a simulation of one possible NUTS 2 division has been carried out (Table 6).

B.

Although not all details on the density at community (NUTS 5) level are available, data at country and county level reveal that: country as a whole has a low density (85 inhabitants/km^2); only the administrative area of Zagreb is predominantly urban, the surrounding counties, strongly characterised by its metropolitan influence, can be defined as predominantly rural. On the other hand, however, only counties of the North-Eastern area of the country have not such strong urban agglomeration that eventually jeopardizes the predominant rural character of the larger region as a whole (Table 6). Apparently, in particular, the Eastern (NUTS 2) region is the most rural.

Tab. 6 – *Proposed regional structure for Croatia*

COUNTRIES	Total population 31.03.1991	No of inhabitants in towns	%	No of inhabitants in villages	%	area km^2	density population per km^2
Croatia (total)	**4,784,265**	**2,597,205**	**54.3**	**2,187,060**	**45.7**	**56,542**	**85**
Northern NUTS 2	**1,908,514**	**1,091,931**	**57.2**	**816,583**	**42.8**	**13,120**	**145**
Town Zagreb	867,717	789,399	91.0	78,318	9.0	640	1,356
Zagreb	167,145	32,742	19.6	134,403	80.4	3,078	54
Krapina and Zagorje	149,534	23,967	16.0	125,567	84.0	1,230	122
Sisak and Moslavina	287,002	118,117	41.2	168,885	58.8	4,448	65
Varazdin	187,343	58,204	31.1	129,139	68.9	1,260	149
Medjimurje	119,866	27,183	22.7	92,683	77.3	730	164
Koprivnica and Krizevci	129,907	42,319	32.6	87,588	67.4	1,734	75
Western NUTS 2	**701,581**	**427,252**	**60.9**	**274,329**	**39.1**	**10,025**	**70**
Karlovac	174,105	83,850	48.2	90,255	51.8	3,622	48
Rijeka	323,130	224,180	69.4	98,950	30.6	3,590	90
Istria	204,346	119,222	58.3	85,124	41.7	2,813	73
Eastern NUTS 2	**1,121,433**	**479,023**	**42.7**	**642,410**	**57.3**	**15,104**	**74**
Virovitica and Podravina	104,625	31,897	30.5	72,728	69.5	2,021	52
Pozega and Slavonia	134,548	53,540	39.8	81,008	60.2	1,821	74
Slavonski Brod and Posavina	174,998	76,434	43.7	98,564	56.3	2,027	86
Osijek and Baranja	331,979	164,734	49.6	167,245	50.4	4,149	80
Bjelovar and Bilogora	144,042	47,268	32.8	96,774	67.2	2,638	55
Vukovar and Srijem	231,241	105,150	45.5	126,091	54.5	2,448	94
Southern NUTS 2	**1,038,817**	**598,999**	**57.7**	**439,818**	**42.3**	**18,293**	**57**
Sibenik and Knin	152,477	75,817	49.7	76,660	50.3	2,994	51
Split and Dalmatia	474,019	317,471	67.0	156,548	33.0	4,524	105
Zadar	214,777	90,312	42.0	124,465	58.0	3,643	59
Lika and Senj	71,215	27,516	38.6	43,699	61.4	5,350	13
Dubrovnik and Neretva	126,329	87,883	69.6	38,446	30.4	1,782	71

Source: Croatian Statistical Yearbook 2000

C.

There is an important statistical problem that makes the analysis of employment dynamics in Croatia at national and, especially, regional level difficult. Official statistics, in concordance with the former socio-economic system, once collected data about employment in enterprises and institutions owned by state. In this way, almost all industrial workers and majority of service workers were included, while data on employment in agriculture (that are mostly individually owned firms) were available only from censuses.

In any case, official statistical data (Table 7) underestimate the number of workers in private sector. In the period from 1990-1995, employment shows a steady downward trend, which started in the second half of the eighties, but was accelerated by the war (Mrnjavac, 1998). However, the employment has decreased unevenly in different sectors. Non-productive sectors have preserved employment (because they represent the preservation of the achieved social standard), while on the other hand, employment in productive sectors has decreased by one fourth in the period from 1991-1995. Not surprisingly, in all the counties the greatest absolute reduction is observed in the industrial sector, though other sectors contributed considerably depending on economic structure of the single county.

Croatian regions were unevenly influenced by the war. While some regions suffered very strongly from damages and outflow of population, others had only indirect costs. This makes the analysis of regional employment dynamics even more complex since changes and migrations were not influenced only by economic factors. This is also the reason for which we eventually choose, as Croatian case study, a NUTS 3 region. All hypothetic NUTS 2 regions contain areas that were, for several years, outside of economic, legal and statistical system of Croatia. These areas are now under special program for reconstruction and enjoy treatment as "Areas of special state care". So, NUTS 2 regions still represent “unstable” (also in terms of data availability) references for studying the rural space in Croatia.

In most transition countries, capital cities strongly attract economic activities and have best performance in terms of employment dynamics. As almost a quarter of Croatian population lives in Zagreb, its dynamics determines national dynamics. But when compared with the rest of the country without Zagreb, rural counties of North-Eastern Croatia show positive dynamics. In this way, and considering overall employment growth with the exclusion of private agriculture and with respect to the whole country with the exclusion of Zagreb, Bjelovar-Bilogora county is the most appropriate choice as case study. In fact, given its population size (about 135,000 inhabitants)[3], it can be regarded as a NUTS 3 region (Map 2).

[3] It almost fits the minimum size of 150,000 inhabitants, established by the Eurostat for NUTS 3 regions.

Tab. 7 - Official data on employment (number of workers and index, 1990=100)
(private agriculture not included in 1991 and 1996; in 1999 only partially included)

	1990	1996	1999	1990	1996	1999
Croatia (total)	**1,513,579**	**1,027,720**	**1,066,360**	**100**	**67.90**	**70.45**
Croatia withouth Zagreb	1,132,171	760,450	709,800	100	67.17	62.69
Northern NUT2	649,384	458,831	478,152	100	70.66	73.63
Town Zagreb	380,234	267,270	283,405	100	70.29	74.53
Zagreb	27,990	36,720	41,376	100	131.19	147.82
Krapina and Zagorje	38,217	27,306	25,553	100	71.45	66.86
Sisak and Moslavina	83,055	34,131	34,528	100	41.09	41.57
Varazdin	56,869	42,262	41,895	100	74.31	73.67
Medjimurje	29,102	24,065	26,214	100	82.69	90.08
Koprivnica and Krizevci	33,917	27,077	25,181	100	79.83	74.24
Western NUT2	**260,633**	**164,928**	**164,131**	**100**	**63.28**	**62.97**
Karlovac	49,986	27,769	26,292	100	55.55	52.6
Rijeka	132,305	83,481	82,617	100	63.10	62.44
Istria	78,342	53,678	55,222	100	68.52	70.49
Eastern NUT2	**298,777**	**183,048**	**175,409**	**100**	**61.27**	**58.71**
Virovitica and Podravina	23,956	17,716	16,896	100	73.95	70.53
Pozega and Slavonia	33,307	14,511	15,069	100	43.57	45.24
Slavonski Brod and Posavina	44,089	26,338	25,956	100	59.74	58.87
Osijek and Baranja	102,211	69,407	67,311	100	67.91	65.85
Bjelovar and Bilogora	**35,210**	**25,033**	**23,922**	**100**	**71.10**	**67.94**
Vukovar and Srijem	60,004	30,043	26,255	100	50.07	43.76
Southern NUT2	**303,611**	**171,582**	**175,513**	**100**	**56.51**	**57.81**
Sibenik and Knin	30,017	19,040	19,052	100	63.43	63.47
Split and Dalmatia	142,600	88,847	92,880	100	62.31	65.13
Zadar	67,382	26,479	27,129	100	39.30	40.26
Lika and Senj	16,772	8,673	8,326	100	51.71	49.64
Dubrovnik and Neretva	46,840	28,543	28,126	100	60.94	60.05

Source: Croatian Statistical Yearbook 2000

Map 2 – Administrative map of Croatia with the selected county

3.3 Greece

Greece being a member of the European Union since long time, the selection of the region is in many respects easier in this case, as NUTS-regional structure already exists and data availability and consistency cover a longer period.

A.

Greece is divided in 4 NUTS 1 areas, 13 adminstrative regions (NUTS 2 level), of which region of Kentriki Makedonia is the largest one in terms of area, and 54 prefectures (NUTS 3 level) (Map 3). Nearly 40% (over 3 million) of the country's population resides in the grater Athens area. The

North-East part of the country borders with Bulgaria and FYROM, therefore geographically has a strong Balkan character. It consists of 4 NUTS 2 regions: Anatoliki Makedonia and Thraki (Eastern Macedonia and Thrace), Kentriki Mekedonia (Central Macedonia), Dytikh Makedonia (Western Macedonia) and Thessalia.

B.

Most of the 13 Greek NUTS 2 regions can be selected as a study region for Greece. Actually, with the exclusion of the regions of Attiki and Kentriki Makedonia, due to the presence of the biggest Greek cities Athens and Thessaloniki, all the NUTS 2 regions can be considered prevalently or significantly rural. The final decision is to select the region of Thessalia. As shown in Table 8, it fully fits the OECD definition of a prevalently rural region. However, it is not a marginal-mountainous region since the flat area is prevalent (largely beyond the national average) and it still contains the fifth city of the country (Larissa). Moreover, agriculture plays a major role in this region.

In the region of Thessalia, there are 93 towns and 11 villages. Of these towns and villages, 38.8% are in mountainous areas, 14.8% in semi-mountainous areas and 46.3% in flat areas. In the region there are 8 communities with a population density over 150 inhabitants per square kilometer and 96 communities with a population density below 150 inhabitants per square kilometer. Moreover 56.8% of the total population of the region lives in rural communities with population density below 150 inhabitants per square kilometer. So, the region of Thessalia has been identified as predominantly rural according to OECD definition but, furthermore, the cultural identity of the population in the region both in urban centres and in rural communities has a traditional agricultural character.

Tab. 8 - Criteria for rural region: the case of Thessalia

CRITERIA	*< 150 inhabitants/km^2*	*> 150 inhabitants/km^2*
Number of communities	96	8
Population (%)	56.8% (Rural)	43.2% (urban)
		Main Town: Larissa with 114,334 inhabitants

Source: REAPBALK Database

C.

Data on sectoral employment are not available for all NUTS 2 regions, while for Thessalia they are available from 1991 to 1999. Therefore, it is not possible to calculate the relative employment growth in industry and service for Thessalia. Moreover, the national figures are strongly affected by the urban regions of Thessaloniki and Athens, that also shows a different pattern with respect to the rural NUTS 2 regions. Therefore, the appropriate comparison is carried out with the remaining rural regions (the “rural Greece”). As shown in Table 9, looking at these figures it clearly emerges that the total employment growth rate in Thessalia more than doubles the growth of the other rural regions. Though agriculture plays a relevant role, its employment figures seem quite stable and do not affect very much the general pattern.

Thessalia can be described as a leading region in the national economy not only for the importance of the agricultural sector but also because the industrial and services sectors are acquiring a great importance. According to available data of the National Institution of Labour, unemployment in the region of Thessalia has increased in the last decade from 6.8% to 12.3% and has overcome the average unemployment rate in Greece. This sets the region of Thessalia at the third place after the region of West Macedonia (14.9%) and the region of Central Greece (13.9%). The total number of workers in region of Thessalia has increased through the last decade but at a smaller rate than work force. This has led to the growth of the unemployment rate in the region.

Especially, the distribution of workers across sectors shows that the agricultural sector covers 38.3%. This fact, combined with the GDP in agricultural sectors, explains the importance of agriculture in the economy of Thessalia. Service sector covers a significant percentage of the total workers and is the upcoming sector of the regional economy.

On this base we can accept this region fits the general criteria of being a dynamic rural region from the point of view of non-agricultural employment (Map 3).

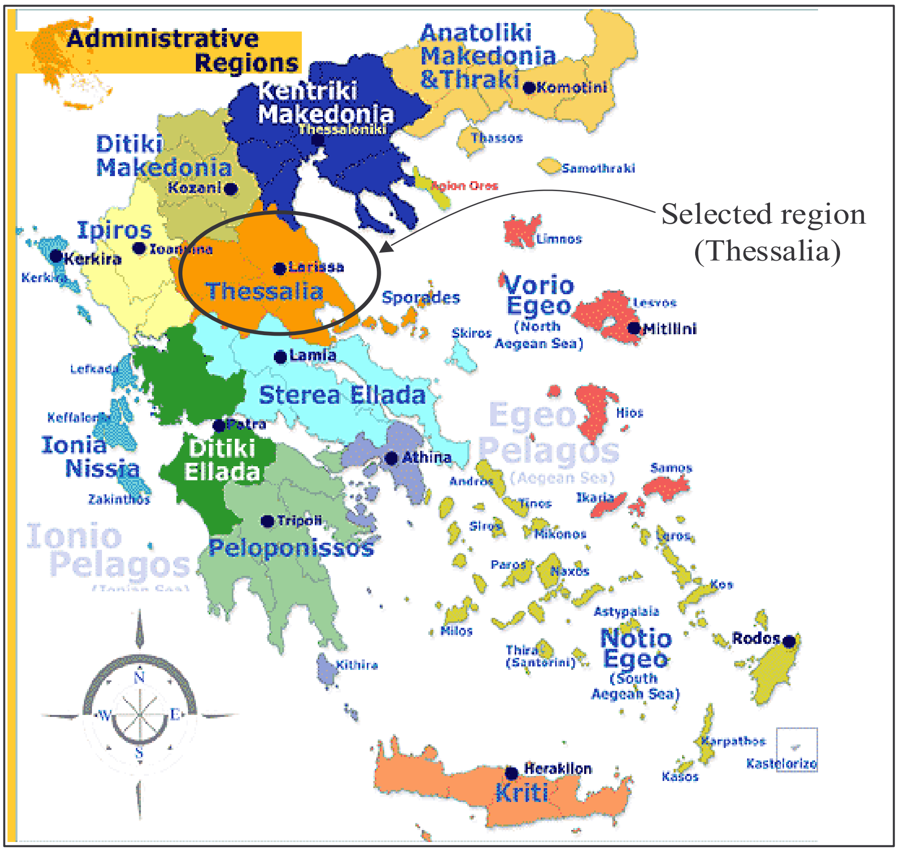
Tab. 9 - Employment dynamics in period 1991-1999 in Thessalia
(number of workers)

	1991	1999	Growth rate %
Agriculture	97,129	97,305	+0.2%
Industry	53,179	46,774	-12.0%
Service	93,855	109,765	+17.0%
Total Employment	244,164	253,844	+4.0%
Total Employment in Rural Greece*	1,698,200	1,726,724	+1.7%

* Total Greece with the exclusion of Attiki and Kendriki Makedonia NUTS 2

Source: Elaboration on data from National Statistical Service of Greece (NSSG)

Map 3 – NUTS 2 (Administrative) regions in Greece and the selected region



3.4 Romania

A.

The basic administrative regions in Romania are represented by the "judet" (counties). In Romania there are 42 counties (NUTS 3 regions), and 2688 communes (NUTS 5). At this county level all the central public administrations have their decentralised services. This explains why programming and financing documents produced by the central public administration have as local units of reference counties (NUTS 3) and communes (NUTS 5).

NUTS 2 regional structure appeared rather late, in year 1998. According to the legislation in force, the NUTS 2 regions were made through "voluntary" co-operation of counties, without legal status, and they are not administrative units. This new regional structure, at the moment, has only an advisory role in the process of programming and decision making (the first regional programmes started in 1999).

Although these NUTS 2 regions have, so far, no administrative relevance, it is still possible to work at the NUTS 2 level according to the current subdivision of the whole national territory reported in Table 10 (8 NUTS 2, and 42 NUTS 3 regions).

Tab. 10 - Current regional structure at the NUTS 2 and NUTS 3 level

NUTS 2	NUTS 3
North – East	Bacau, Botosani, Iasi, Neamt, Suceava, Vaslui
South – East	Braila, Buzau, Constanta, Galati, Tulcea, Vrancea
South	Arges, Calarasi, Dambovita, Giurgiu, Ialomita, Prahova, Teleorman
South – West	Dolj, Gorj, Mehedinti, Olt, Valcea
West	Arad, Caras – Severin, Hunedoara, Timis
North – West	Bihor, Bistrita Nasaud, Cluj, Maramures, Satu Mare, Salaj
Centre	Alba, Brasov, Covasna, Harghita, Mures, Sibiu
Bucharest	Ilfov, Bucharest Municipality

Source: REAPBALK Database

B.

With the exception of the region of Bucharest, all the NUTS 2 regions show a low population density. By applying the mentioned OECD definition at the NUTS 5 (municipality) level for each region, it is possible to calculate the percentage of rural population (Table 11). On this base, three regions can be classified prevalently rural (North-East, South, South-West), four significantly rural (South-East, West, North-West, Centre), though one of them (North-West) is very close to the limit of 50%, and one prevalently urban (Bucharest).

Tab. 11 - Selection criteria of the case-study region: rurality

NUTS 2	Population Density, 1999 (inhab./km^2)	Rural population/Total population (%)
1. North – East	103.5	56.1
2. South – East	82.1	42.9
3. South	100.8	58.2
4. South – West	82.3	54.5
5. West	63.9	37.7
6. North – West	83.4	47.3
7. Centre	77,6	39.5
8. Bucharest	1,255,40	11.2
Country average	***94.2***	***45.2***

Source: REAPBALK Database

C.

Sectoral employment figures at regional level cover the period between 1993 and 1999. The consequent employment growth is reported in Table 12.

Four rural regions (North-East, South-West, North-West and Centre) show a positive employment growth relative to the country average in total employment and both non-agricultural sectors. It can be noticed that the two predominantly rural regions have a lower share in agricultural employment and also a higher unemployment rate (North-East, South-West). Particularly, the North-East region presents the best employment dynamic but it also presents the highest unemployment ratio (15.4% in 1999). On the other hand, the North-West region presents the lowest (10.3% at the same date) unemployment rate with an employment dynamic that is still better than the country average and a relevant share of agricultural employment.

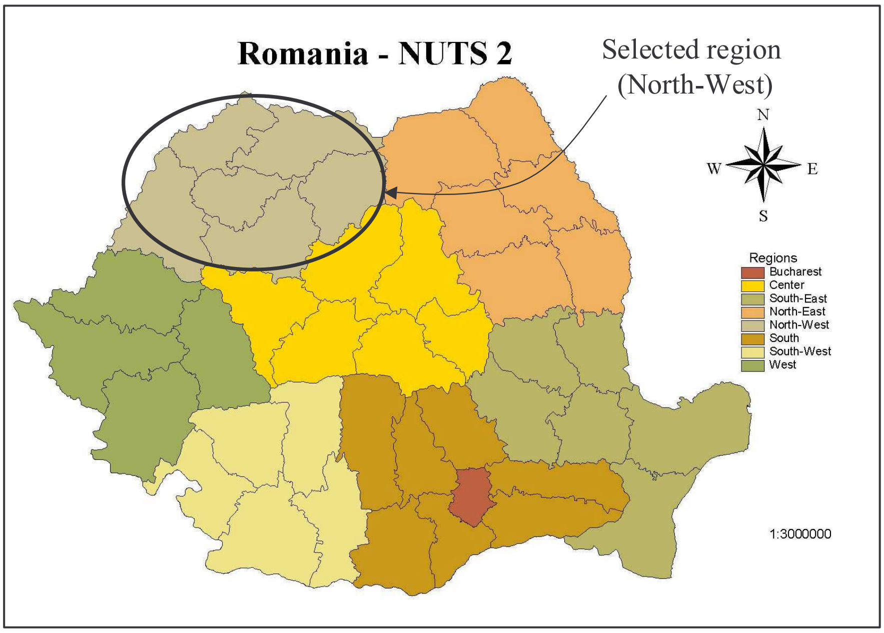
Therefore, the selected case study is the North-West NUTS 2 region (Map 4); it is a border region, as it is next to both Hungary and Ukraine. The region is located in the North-Western part of Romania and has a population of 2,850,000 inhabitants. The capital town is Cluj-Napoca, a town with nearly 350,000 inhabitants.

Tab. 12 - Selection criteria of the case-study region: employment dynamics

NUTS 2 Region	Employment dynamics (%) $\frac{E_{1999} - E_{1993}}{E_{1993}} \cdot 100$	Employment dynamics in industry (%)	Employment dynamics in services (%)	Unemployment ratio, 1999 (%)	The share of employment in agriculture of total employment in rural areas (%)
1. North – East	-10.38	-30.47	-4.94	14.9	55.9
2. South – East	-16.3	-32.32	-14.24	13.2	68.7
3. South	-17.84	-33.85	-19.46	11.8	56.8
4. South – West	-11.2	-29.71	-4.8	11.8	57.2
5. West	-17.17	-33.04	-13.57	12.6	65.7
6. North – West	-14.17	-31.08	-11.96	10	72.7
7. Centre	-12.03	-26.22	-5.03	11	70.7
8. Bucharest	-34.17	-42.13	-32.19	6.9	44.5
Country avg.	*-16.32*	*-32.23*	*-15.14*	*11.8*	*61.7*

Source: REAPBALK Database

Map 4 – Administrative Structure of Romania (NUTS 2 and NUTS 3 regions) and the selected region



3.5 Slovenia

A.

Slovenia is a small country in geographic terms, but at the same time a country with extreme natural and cultural diversity. The regions differ significantly also in terms of socio-economic development level.

Regionalisation in administrative sense at NUTS 2 level does not exist in Slovenia. Furthermore, Slovenia is governed as a central state, with no intermediate level of governance between the national and local level. The administrative organisation in Slovenia consists of structures at two levels: (i) national or state level, and (ii) municipal level (NUTS 5); there are altogether almost 200 municipalities in the country. The gap between these two administrative levels is in close association with the calls for greater regional autonomy aimed at a new division of competences and political power, as well as at a more appropriate allocation of resources. The need of regionalisation, i.e. the creation of an intermediate administrative structure (regions or provinces), has been most clearly expressed by some large regional centres, in particular Maribor.

The EU accession process has somewhat overtaken the abovementioned discussion on regionalisation in Slovenia. Particularly with regard to the future implementation of the structural and cohesion policies in Slovenia, the issue of regionalisation was high on the negotiation agenda, especially for the NUTS 2 regions, since it represents the basic programming level of the Structural Funds' actions.

By introducing the Standard Classification of Territorial Units in 2000, which is comparable to the EU NUTS Classification, Slovenia divided its territory and submitted the following proposal to the Commission: (i) NUTS level 0 (Slovenia), (ii) NUTS level 1 (Slovenia), (iii) NUTS level 2 (two regions, "Ljubljana Urban Region" and "Rest of Slovenia"), and (iv) NUTS 3 level (12 regions) (Map 6). The Commission has refused Slovenia's proposal for NUTS 2 level division of the country. It has argued that division of the country into two regions was an "artificial one" and not supported by administrative structures.

In order to address the Commission's concerns, Slovenia has prepared – for discussion purposes only – a revised working proposal for NUTS 2 level classification whereby the country would be divided into three regions, "Central Slovenia", "Western Slovenia" and "Eastern Slovenia". The division has been proposed on the basis of objective statistical data and taking into account the borders at the NUTS 3 level already agreed upon with the Eurostat. Nevertheless, the EU Commission did not accept the Slovenia's proposal to divide its territory into three NUTS level 2 regions and proposed to organise the whole country as a single NUTS level 2 region, similarly to some other EU new members or candidates (Estonia, Lithuania, Latvia, Cyprus, Malta, etc.). It must be noticed, however, that at time the REAPBALK research project started, a final agreement on the NUTS 2 classification of the country had still to be reached.

B.

Since a general agreement has been achieved about the Slovenian NUTS 3 structure, we can firstly apply the OECD classification at the NUTS 3 level (Table 13). Slovenia is a low density country with few urbanised areas. At NUTS 3 level, all the 12 regions are rural: 8 are predominantly rural, 4 significantly rural. The lowest level of rural population can be observed in the region of Osrednje-slovenska where the capital city of Ljubljana is located. It is the largest city of Slovenia inhabited by approximately 350,000 people, followed by Maribor with around 150,000 inhabitants (located in the region of Podravska). The city of Ljubljana and its suburbs (that is the NUTS 5 of Ljubljana) (Map 5) has a higher density of 192 inhabitants/km^2 which identifies it as an urban area.

Therefore, selecting the whole country as a NUTS 2 region would imply to consider also the urban part including Ljubljana and its surroundings.

Tab. 13 - Selection criteria at NUTS 3 level: rurality

NUTS 3	Density (1999)	% rural population (1999)
Pomurska	93.5	75%
Podravska	147.2	50%
Koroška	71.1	78%
Savinjska	107.6	56%
Zasavska	176.3	37%
Spodnje-posavska	79.2	100%
Jugovzhodna Slovenija	81.6	100%
Osrednje-slovenska	137.2	33%
Gorenjska	91.9	35%
Notranjsko-kraška	34.7	100%
Goriška	51.6	95%
Obalno-kraška	98.9	23%
SLOVENIA	97.9	55%

Source: REAPBALK Database

C.

Sectoral regional employment data are available at NUTS 3 level from 1995 to 1999. Table 14 reports the employment growth rate for the 12 NUTS 3 regions. It must be emphasised that the region containing Ljubljana has the greatest decline in agricultural employment and, above all, a greater decline in industrial employment compared to the national growth and a lower increase in service employment. If we consider the NUTS 2-type region represented by the whole country with the exclusion of Osrednje-slovenska (Map 6), its non-agricultural employment dynamic can be considered positive if compared to the national growth rate.

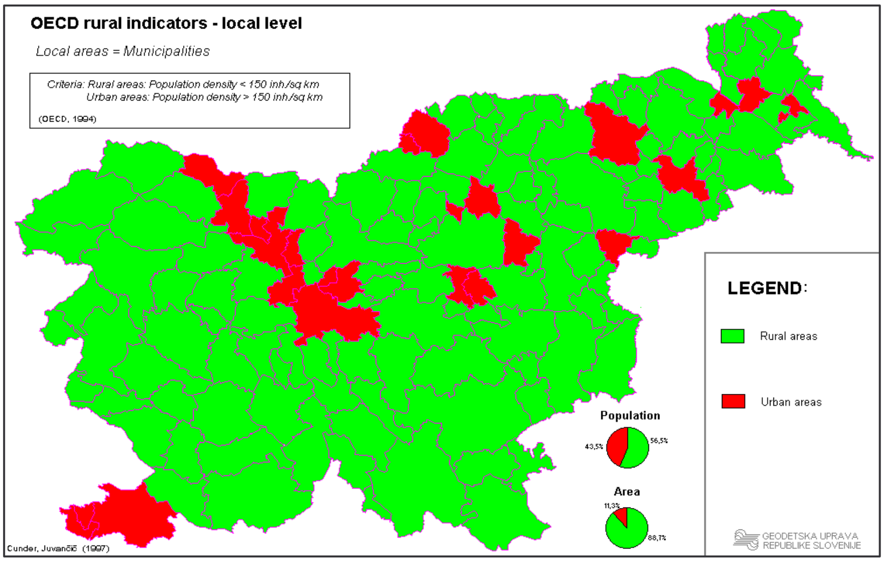
Considering the mentioned criteria, the current situation of the Slovenian regionalisation process but also the requirements of the REAPBALK research project, the final selection for Slovenia is to work on a NUTS 2-type region represented by the whole country except the Osrednje-slovenska NUTS 3 region (containing the capital Ljubljana) (Map 6). This selected region has NUTS 2 size, excludes the most urban parts of the country (Map 5) and experienced positive non-agricultural employment dynamics in relative terms. We call this region "Peripheral Slovenia".

Tab. 14 - Selection criteria, NUTS 3 level: employment dynamics (1995-1999)

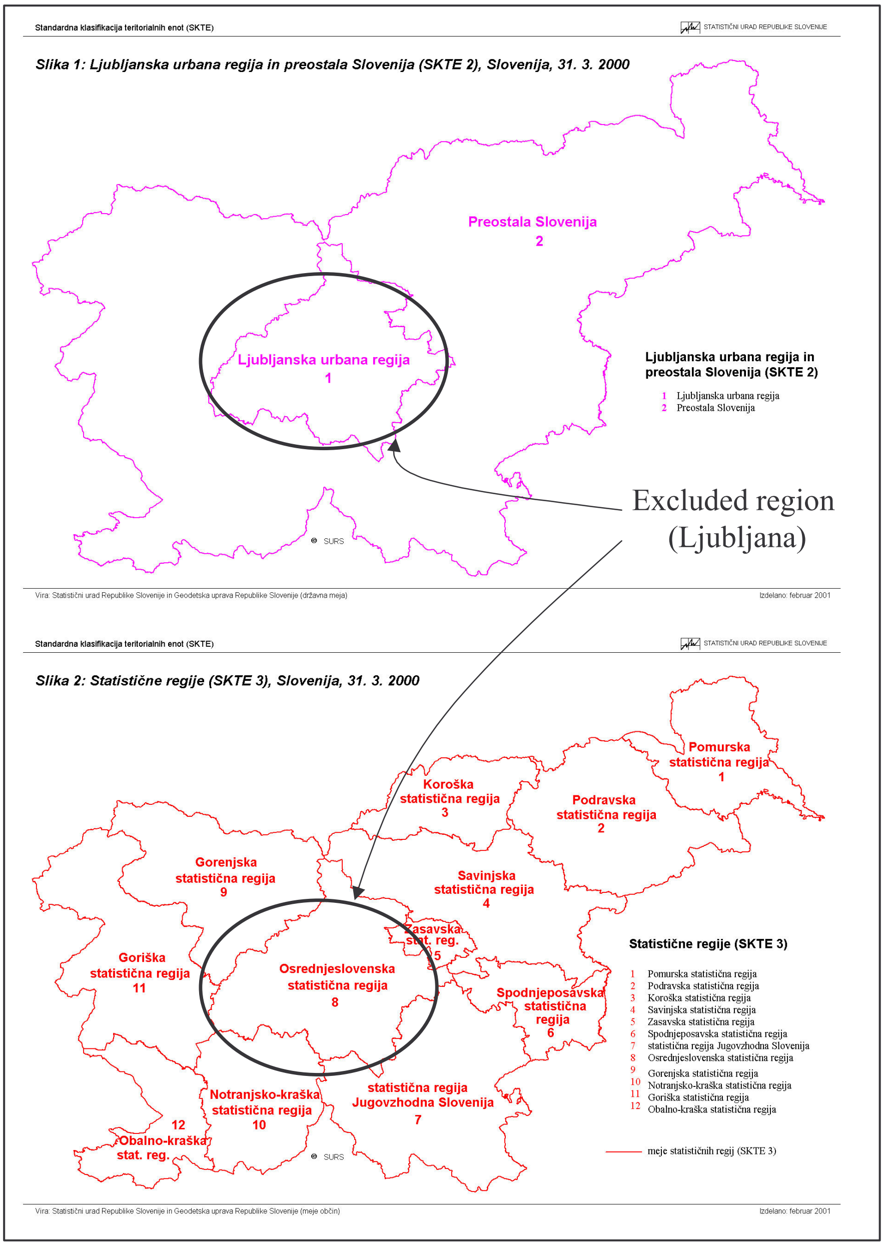
NUTS 3	Agriculture	Industry	Services
Pomurska	-27.2%	-1.3%	10.8%
Podravska	-27.6%	-5.2%	10.7%
Koroška	-27.0%	-4.3%	12.9%
Savinjska	-25.0%	-8.0%	10.1%
Zasavska	-33.3%	-8.5%	13.2%
Spodnje-posavska	-28.9%	-0.2%	11.1%
Jugovzhodna Slovenija	-14.4%	2.8%	9.5%
Osrednje-slovenska	-29.2%	-6.0%	8.6%
Gorenjska	-4.3%	-9.1%	13.6%
Notranjsko-kraška	-32.8%	0.9%	9.9%
Goriška	-22.2%	-3.7%	11.5%
Obalno-kraška	-26.7%	-2.3%	8.4%
SLOVENIA	-24.9%	-5.0%	10.1%

Source: REAPBALK Database

Map 5 - Designation of rural areas in Slovenia according to OECD indicators - local (NUTS 5) level



Map 6 – Proposed regional structure of Slovenia (NUTS 2 and NUTS 3 regions) and the selected "Peripheral Slovenia" region



4. Final remarks

Table 15 summarizes the final result of the selection process described above. This process firstly aimed at respecting the basic criteria motivated in detail in section 2 of this chapter. As clearly emerges from the table, the criteria are generally respected. With the exception of the Croatian case, for which neither an administrative nor a provisional NUTS 2 regionalisation exists, all selected regions have a NUTS 2-type size. Moreover, they are all rural according to the OECD definition and also show a positive employment dynamics (in the sense clarified above) during the transition period (according to the available years from 1991 onward).

Tab. 15 - Synthetic report on regional selection

Country	Selected Region	NUTS level	Rural Classification	Employment dynamics
Bulgaria	North-East	NUTS 2	Significantly rural	Positive with respect to the country in industry and service
Croatia	Bjelovar-Bilogora County	NUTS 3-type	Predominantly rural	Positive with respect to the country (Zagreb excluded) in all sectors (private agriculture excluded)
Greece	Thessalia	NUTS 2	Predominantly rural	Positive with respect to the "rural" Greece in all sectors
Romania	North-West	NUTS 2	Significantly rural	Positive with respect to the country in industry and service
Slovenia	"Peripheral" Slovenia	NUTS 2-type	Predominantly rural	Positive with respect to the country in industry and service

Source: REAPBALK Database

The selected regions constitute a relevant part of the Balkan area covered by the 5 countries (Table 16). They cover almost 90,000 km^2 and 6.5 million of inhabitants, that is about 16% and 14%, respectively, of the area under study. As explained, Slovenia and Croatia represent an exception with respect to this average coverage, though for opposite reasons. In particular, the selected case for Croatia represents only 3% of the total national population. It can also be noticed that the selected regions represent a good geographical coverage of the Balkan area under study (Map 7). From North to South and from East to West, the different types of rural region and development pattern are somehow represented by the five selected cases, though, as already emphasized, part of the Balkans (Western Balkans) remains significantly uncovered. This latter issue and the extension of the regional coverage can thus represent a major further research effort in the future.

Tab. 16 - Area and population coverage (on national totals) of the selected regions

Country	Selected Region	Area	Area coverage %	Population	Population coverage %
Bulgaria	North-East	19,967	18.0%	1,343,382	16.4%
Croatia	Bjelovar-Bilogora	2,638	4.7%	134,864	3.0%
Greece	Thessalia	14,037	10.6%	742,947	7.1%
Romania	North-West	34,159	14.3%	2,849,876	12.7%
Slovenia	"Rural" Slovenia	16,733	82.5%	1,499,859	75.5%
Total (5 countries)		87,533	15.7%	6,570,928	13.8%

Source: REAPBALK Database

Map 7 – Geographical coverage of the selected regions ("case studies") within the Balkan area

References

Ciobanu, C., Mattas, K. and Psaltopoulos, D. (2004): Structural changes in less developed areas: an Input-Output framework. Regional Studies, Vol. 38 (6), 603-614.

Esposti, R., Godeshalk, F.E., Kuhmonen, T., Post, J.H., Sotte, F., Terluin, I.J. (2000): Statistical Analysis of Employment Growth in Rural Regions of the EU, 1980-1995. In: Terluin I.J., Post, J.H. (eds.), Employment Dynamics in Rural Europe, New York: CAB International, 30-58.

Hoen, A.R. (2002): An Input-Output analysis of European integration. Amsterdam: North-Holland.

Jensen, R. C., Mandeville, T. D. and Karunaratne, N. D. (1979): Regional Economic Planning: Generation of Regional Input-Output Analysis. London: Croom Helm.

Mrnjavac, Ž. (1998): Regional Aspects of Unemployment in Croatia: Can We Neglect History?, Ekonomski pregled, No. 11-12, 1292-1307.

OECD (1994): Creating Rural Indicators for Shaping Territorial Policy. Paris.

OECD (1996): Territorial Indicators of Employment. Focusing on Rural Development. Paris.

4. A COMMON INPUT-OUTPUT MODEL

Konstatinos Mattas, Stratos Loizou, Vangelis Tzouvelekas and Tsakiri Meropi

1. Introduction

Purpose of the current chapter is to present the basics of the methodology adopted for the project's empirical analysis. The theoretical part of the methodology is divided into three parts: the first deals with the adopted common Input-Output model used in the project; the second presents the methodology to derive the regional I-O tables and the third is about the computation of the I-O linkages-multipliers.

The project was formed to examine employment and agricultural perspectives in five Balkan regional economies; four of them were candidates for EU accession (Bulgaria, Croatia, Romania and Slovenia) and one was EU member (Greece). In order to examine the regional economies and to assess possible impacts from pre-accession policies at regional level, Input-Output analysis was selected. For this, regional tables were decided to be constructed for the five regions and then, through impact analysis, used to identify the possible impacts.

Input-Output analysis is an analytical tool which is recognised to be as one of the most significant contributions in economic theory and applications. Since its foundation, it is being extensively used in empirical studies in its original form and alternative extensions. Wide application of Input-Output analysis, at national and regional level, mainly depends on its ability to depict a complete picture of the general equilibrium situation of an economy as well as to provide a detailed presentation of the economic interrelations among different sectors. Moreover, Input-Output models can be used as a policy tool in order to estimate and predict, with relative accuracy, anticipated changes in income, employment and output levels from policy measures, for all sectors of an economy.

Undoubtedly, I-O analysis is a very useful tool for regional studies aiming to assess integrated policy's impacts and it proves itself to be a very good analytical tool. This is the reason why it was selected as an analytical tool in the REAPBALK project. The aim of this chapter is to describe the fundamentals of the Input-Output methodology and then the basic features that all partners' I-O tables should have, in order to define a *common* I-O model to be used for deriving regional tables, estimating I-O linkages and assessing impact analysis.

The analysis below is directly related to the steps of the project dealing with I-O analysis, in terms of both theory and its application to the project. The analysis is as follows. In the first part (I-O analysis basics), a short historical review on the foundation of I-O analysis is presented. Moreover, a symmetric I-O table in schematic form is portrayed and each quadrant is explained. Next, the three basic matrices of I-O analysis are shown along with explanations on how they can be derived within a system of linear equations for the *n* sectors of an economy. The transactions matrix, the direct requirements matrix and the total requirements matrix or Leontief inverse are explained. Finally, in the second part, the features of the REAPBALK *common* I-O model, separated in technical and non-technical, are presented. In particular, the technical features refer to characteristics such as the number of sectors, the impact analysis base year, the technology assumption, etc.. On the contrary, the non-technical features refer to characteristics which depend on: the objectives of the study, policy scenarios, impacts analysis form and so forth.

2. Input – Output Foundations and Theoretical Base

2.1 Introduction

Input-Output analysis framework was originally developed in the late 1930s, by Wassily Leontief. The term interindustry analysis is also used, since the fundamental purpose of the input-output framework is to analyze the interdependence of industries in an economy. The original idea of developing a detailed accounting of interindustry activity is much older than Leontief's model. In fact, input-output can be thought as a formalization of concepts set forth many years earlier by the French economists François Quesnay and Léon Walras.

In 1758, Quesnay published the "Tableu Economique", which was a diagrammatic representation of how expenditures can be traced through an economy in a systematic way. More than a century after Quesnay, Leon Walras developed his theory on general equilibrium. In this work Walras utilized a set of production coefficients that related the quantities of factors required to produce a unit of a particular product to levels of total production of that product.

Input-output analysis is an adaptation of the neoclassical theory of general equilibrium to the empirical study of the quantitative interdependence between interrelated economic activities (Leontief, 1986). It was originally developed for the examination of the structure of national economies by analysing and measuring the interconnections between various producing and consuming sectors within an economy. In its most basic form an input-output model consists of a system of linear equations; each one describes the distribution of a sector's product throughout the economy. Its specific structural characteristics are thus reflected in the numerical magnitude of the coefficients of these equations.

The basic Leontief Input-Output model is a systematic method that quantifies and records the productive relationships among the different sectors of economic activity, in a framework of a complicated economy. The economic system can be large, including the whole economic activities of a country, but it can also refer to smaller regional or urban economies (regional models). Apart from the relative size of the economic system, the methodological approach remains the same. The productive activity of every economic sector is expounded by the use of a vector that contains productive coefficients which describes the relationship between inputs used by the sector and the final product.

Input-output analysis offered a quantitative tool to analysts, which could contribute substantially to the understanding of the nature of a national or regional economy. Moreover, the comparison of input-output tables can provide a valuable basis for studies of regional economic development. The flexibility of the Input-Output model made it ideally suited to projections of economic activity, impact analysis or structural and technical change trace.

Developments of the original form extended I-O analysis to topics such as energy and resource use, environmental economics and pollution impacts, etc.. Applications can be found even at firm's level. Its extensive ability of application drew the attention of academics, research and policy design institutes and became a very useful analytical tool widely applied throughout the world, since effective planning requires knowledge and information on structural interdependence, which input-output analysis can provide.

In order the empirical application of Leontief's model to be feasible, there are some basic assumptions[1] that rule Input-Output models. These assumptions include:

- homogeneous products;
- absence of externalities;
- no constrains in the capacity of production factors, especially capital;
- fixed coefficients of production;

Because of the abovementioned assumptions, which in certain cases are quite restrictive, the Leontief's model was criticized. Despite the criticism, the model is unique at its type and is widely used by most countries in the world and international organizations as an analytical tool.

The whole Input-Output system[2] is based on three matrices, from which most information are exported, after the appropriate manipulations. A typical input-output table is shown in Table 1. The system's base is the transaction matrix that leads to the other two matrices: the direct requirements matrix (or technical coefficient matrix) and the total requirements matrix (or the interdependence coefficients matrix).

2.2 Transactions matrix

The Input-Output analysis is based on the Symmetric Input-Output table that is constructed from observed data for a particular economic area and period. This table includes an intersectoral transaction matrix and its rows describe the distribution of products meaning the sales of every sector to itself and to the other economic sectors, the intermediate demand and final demand. While its columns describe the number of inputs that are required for the production of the final product of every sector, or rather the purchases of every sector from itself and from the other sectors.

---

[1] Analysis concerning the basic assumptions can be found in Leontief (1941, pp. 20), Stone (1963), Miernyk, (1965), Miyazawa, (1976) and, with specification to agricultural sector and rural areas, in Midmore (1991 and 1993) and Bailey (1996).

[2] Detailed presentation of the I-O system basic matrices and relations can be found, among others, at Richardson (1972); Miller and Blair (1985) and Leontief (1986).

Tab. 1 - Input-Output Table Framework

To		Intermediate Demand (Purchasing Sectors)						Final Demand (Y)				Total Output
From		**1**	**2**	**…**	***j***	**…**	**N**					**(X)**
Intermediate Inputs (Selling-Sectors)	1	X_{11}	X_{12}	…	X_{1j}	…	X_{1n}	C_1	I_1	G_1	E_1	X_1
	2	X_{21}	X_{22}	…	X_{2j}	…	X_{2n}	C_2	I_2	G_2	E_2	X_2
	…	…	…	…	…	…	…	…	…	…	…	…
	i	X_{i1}	X_{i2}	…	X_{ij}	…	X_{in}	C_i	I_i	G_i	E_i	X_i
	…	…	…	…	…	…	…	…		…	…	…
	n	X_{n1}	X_{n2}	…	X_{nj}	…	X_{nn}	C_n	I_n	G_n	E_n	X_n
Primary Inputs		L_1	L_2	…	L_j	…	L_n	L_C	L_I	L_G	L_E	L
		V_1	V_2	…	V_j	…	V_n	V_C	V_I	V_G	V_E	V
		M_1	M_2	…	M_j	…	M_n	M_C	M_I	M_G	M_E	M
Total inputs		X_1	X_2	…	X_j		X_n	C	I	G	E	X

The matrix which is called as the transactions matrix of the analysis is in the upper left quarter of the Input-Output table, where the intermediate transactions are presented. While the final demand lays in the upper right quarter (meaning consumption, investments, government expenditures and exports) and the primary inputs lay in the lower left (meaning wages and salaries, imports and other value added components).

The general form of the row transactions presented in Table 1, for *n* sectors, can be presented in equation (1)

$$X_i = \sum_{j}^{n} X_{ij} + C_i + I_i + G_i + E_i \tag{1}$$

where:

X_i is the total gross output of each sector i;

$\sum_{j}^{n} X_{ij} = X_{i1} + X_{i2} + \ldots + X_{ij} + \ldots + X_{in}$ is the sum of each sector's intermediate transactions;

$Y_i = C_i + I_i + G_i + E_i$ is the final demand, C_i is consumption, I_i are investments, G_i are government expenditures and E_i are exports.

Respectively, the column transactions, for n sectors, are shown in equation (2).

$$X_j = \sum_i^n X_{ij} + L_j + V_j + M_j \qquad (2)$$

where:

X_j is the total inputs of sector j;

$\sum_i^n X_{ij} = X_{1j} + X_{2j} ... + X_{ij} + ... + X_{nj}$ is the sum of sector j intermediate inputs;

$L_j + V_j + M_j$ is the sum of primary inputs, L_j are sector j payments for wages and salaries, V_j are sector j other value added components and M_j are sector j imports.

2.3 Direct Requirements Matrix

The transactions matrix is the core matrix of an Input-Output table. However, the information presented by the transactions table, although very significant, cannot be used for further economic analysis alone. From it, through specific transformations, the direct requirements matrix (or technical coefficients matrix, or direct I-O coefficients matrix) and the total requirements matrix can be derived.

Technical coefficients in each column of the technical coefficients matrix represent the structure of the production process of the respective sector, that is, the production function. Each technical coefficient illustrates the input requirements for the production of a unit of final product, or in monetary terms, the value of inputs needed, by each sector, to produce a monetary unit worth of product. Technical coefficients (a_{ij}) are computed by dividing the X_{ij} amount of inputs sector j purchases from the selling sector *i,* by the total output X of sector j, i.e.:

$$a_{ij} = \frac{X_{ij}}{X_j} \qquad (3)$$

That is, in order sector j to produce one unit of product a quantity a_{ij} of sector i's product is necessary. In the case of n sectors, the technical coefficients matrix, in matrix form, is defined as follows:

$$\mathbf{A} = \begin{bmatrix} a_{11} & a_{12}\ldots & a_{1j}\ldots & a_{1n} \\ a_{21} & a_{22}\ldots & a_{2j}\cdots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{i1} & a_{i2}\ldots & a_{ij}\ldots & a_{in} \\ \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2}\ldots & a_{nj}\ldots & a_{nn} \end{bmatrix} = \begin{bmatrix} X_{11}/X_1 & X_{12}/X_2\ldots & X_{1j}/X_j\ldots & X_{1n}/X_n \\ X_{21}/X_1 & X_{22}/X_2\ldots & X_{2j}/X_j\ldots & X_{2n}/X_n \\ \vdots & \vdots & \vdots & \vdots \\ X_{i1}/X_1 & X_{i2}/X_2\ldots & X_{ij}/X_j\ldots & X_{in}/X_n \\ \vdots & \vdots & \vdots & \vdots \\ X_{n1}/X_1 & X_{n2}/X_2\ldots & X_{nj}/X_j\ldots & X_{nn}/X_n \end{bmatrix} \tag{4}$$

So, each element of the $\mathbf{A}$ matrix shows the direct requirements of the respective sector in order to produce a unit of its product. It also becomes clear that technical coefficients are non-negative, $a_{ij} \geq 0$, $\forall$ *i,j* and the sum of a column j coefficients must be less than unit, $a_{1j} + a_{2j} + ... + a_{nj} = \sum_{j=1}^{n} a_{ij} < 1$. If $\sum_{i=1}^{n} a_{ij} > 1$, it means that the value of inputs required are greater than the value of the product produced.

2.4 Total Requirements Matrix

Only the direct effects on the economy due to a unit change in the output of a sector and not the total effects caused by exogenous changes are represented in the Direct Requirements Matrix. But the interest in the analysis is in the estimation of the total effects, both direct and indirect. These can be derived from the total requirements matrix. Each coefficient of the total requirements matrix indicates the total (direct and indirect) needs of a sector in order to deliver a unit of its product to the final demand.

The interaction and interdependence among sectors and final demand of a particular economy, as presented above in the I-O table, can be described by a system of linear equations as below:

$$
\begin{aligned}
X_1 &= X_{11} + X_{12} + \cdots + X_{1j} + \cdots + X_{1n} + Y_1 \\
X_2 &= X_{21} + X_{22} + \cdots + X_{2j} + \cdots + X_{2n} + Y_2 \\
&\vdots \\
X_i &= X_{i1} + X_{i2} + \cdots + X_{ij} + \cdots + X_{in} + Y_i \\
&\vdots \\
X_n &= X_{n1} + X_{n2} + \cdots + X_{nj} + \cdots + X_{nn} + Y_n
\end{aligned}
\tag{5}
$$

where Y_i is the final demand of sector *i*. Substituting all X_{ij} variables with equation (3), the system (5) produces:

$$
\begin{aligned}
X_1 &= a_{11}X_1 + a_{12}X_2 + \cdots + a_{1j}X_j + \cdots + a_{1n}X_n + Y_1 \\
X_2 &= a_{21}X_1 + a_{22}X_2 + \cdots + a_{2j}X_j + \cdots + a_{2n}X_n + Y_2 \\
&\vdots \\
X_i &= a_{i1}X_1 + a_{i2}X_2 + \cdots + a_{ij}X_j + \cdots + a_{in}X_n + Y_i \\
&\vdots \\
X_n &= a_{n1}X_1 + a_{n2}X_2 + \cdots + a_{nj}X_j + \cdots + a_{nn}X_n + Y_n
\end{aligned}
\tag{6}
$$

Every equation of the above system represents the relationship of interdependence between every sector and the other sectors of the economy. It shows that the production level for every sector depends on the production level of all the other economic sectors and on the level of final demand. Since final demand Y_i is considered exogenous to the system, system 6, after solving for Y_i derives:

$$
\begin{aligned}
&(1 - a_{11})X_1 - a_{12}X_2 - \cdots - a_{1j}X_j - \cdots - a_{1n}X_n = Y_1 \\
&-a_{21}X_1 + (1 - a_{22})X_2 - \cdots - a_{2j}X_j - \cdots - a_{2n}X_n = Y_2 \\
&\vdots \\
&-a_{i1}X_1 - a_{i2}X_2 - \cdots + (1 - a_{ij})X_j - \cdots - a_{in}X_n = Y_i \\
&\vdots \\
&-a_{n1}X_1 - a_{n2}X_2 - \cdots - a_{nj}X_j - \cdots + (1 - a_{nn})X_n = Y_n
\end{aligned}
\tag{7}
$$

In matrix form the above systems of equations can be written as follows:

$$\mathbf{x} = \mathbf{A}\mathbf{x} + \mathbf{y} \tag{8}$$

Solving for final demand **y** we get:

$$\mathbf{x} - \mathbf{A}\mathbf{x} = \mathbf{y} \Rightarrow (\mathbf{I} - \mathbf{A})\mathbf{x} = \mathbf{y} \tag{9}$$

or
$$\begin{bmatrix} (1-a_{11}) & -a_{12}\cdots & -a_{1j}\cdots & -a_{1n} \\ -a_{21} & (1-a_{22})\cdots & -a_{2j}\cdots & -a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ -a_{i1} & -a_{i2}\cdots & (1-a_{ij})\cdots & -a_{in} \\ \vdots & \vdots & \vdots & \vdots \\ -a_{n1} & -a_{n2}\cdots & -a_{nj}\cdots & (1-a_{nn}) \end{bmatrix} \cdot \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_j \\ \vdots \\ x_n \end{bmatrix} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_j \\ \vdots \\ y_n \end{bmatrix} \tag{10}$$

where system (10) is an *n*x*n* system of linear equations with *n* unknowns. After solving system (9) for total output **x** it comes to:

$$\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{y} \tag{11}$$

where $\mathbf{I}$ is an indentity matrix, $\mathbf{A}$ the matrix of technical coefficients, $\mathbf{x}$ the vector of sectoral output and $\mathbf{y}$ the vector of final demand components. The solution of the system (11) constitutes the basic solution of the Leontief's Input-Output system[3]. So, it represents the quantity of the total output **x** of the economy that will be increased due to an exogenous change in the final demand of a sector.

Matrix $(\mathbf{I} - \mathbf{A})^{-1}$ is the so-called matrix of interdependence coefficients or the Leontief inverse. It is the most important of all the abovementioned matrices for the derivation of the final estimations of the analysis or the total impact on the whole economy from exogenous changes, such as in the final demand. Each element of that matrix indicates the total (direct

[3] This model, the standard I-O model, is often referred to as the demand driven-model since it relates gross sectoral output with final demand changes (for any new sectoral final demand the new total output can be estimated). Contrary to the demand-driven model, the supply-driven one relates sectoral gross output to primary inputs, with which, instead of estimating direct input-coefficients, we estimate direct-output coefficients. With the use of the supply-driven model one can estimate forward (such as those of Augustinovics, 1970) instead of backward linkages.

and indirect[4]) requirements of sector i per unit of final demand for the output of sector j. Moreover, a coefficient in the Leontief inverse matrix indicates by how much the output of a sector i must change if the final demand of a sector j changes by one unit.

2.5 Secondary Products and I-O Tables

The construction of an I-O table is based on the I-O hypotheses. Starting from these hypotheses, the initial transactions matrix is constructed by performing survey methods to collect the transactions data. The economic units that provide the data are classified in sectors-industries according to their primary product, that is, the product that has the highest share in its total output. This classification is often very difficult to be done, because most companies produce more than one product and some products are produced by more than one company. All those secondary products make very difficult the classification of the economic units in sectors, and thus the homogeneity hypothesis is violated.

Stone (1961) was among the first who deal with the problem of secondary production. In order to face the problem it was proposed to collect the data and to classify the economic units on the basis of both the industries and the products. The initial classification framework based on the economic units, and not on the products, was called industry-by-industry. With Stone proposals the data collected at industry level form the industry accounts while the data collected at product level form the product accounts.

Based on the above framework, in order to face the secondary production problem, the I-O tables are constructed with the creation of two matrices the *Make* and *Use* matrices. Make matrix records all the products produced by all economic units in the economy; its rows represent the sectors and the columns are the products. The principal diagonal of the Make matrix shows the primary products while the other elements show the secondary

[4] The model described above is the so-called open model, which includes only the sectoral relationships and thus by estimating the Leontief matrix only the direct and indirect effects are identified. In the case where one needs to identify induced effects the so-called closed model should be built. A closed model incorporates portions of the final demand into the intersectoral section of the model. Input-output models are frequently closed with respect to households. In this case households are incorporated in the transactions table as an endogenous sector. Its inputs are various consumption goods and services, and its output is labour. Households' income is spent within the system generating therefore further economic activity (induced effects). Hence, the column of consumer expenditure indicates the structure of the households' consumption distributed among sectors while the row of wages and salaries indicates their inflow. A closed model will have augmented transactions, direct requirements and total requirements matrices, respectively, with n+1 entries.

products. Use matrix shows the sources and the destination of the production, either to the intermediate or to the final demand. The rows of Use matrix record the products and their disposal to the other sectors, while its columns record the sectors and the source of each sector product inputs.

This new framework[5] is presented diagrammatically in Table 2, which shows the make (**V**) and use (**U**) matrices as well as the final demand (**f**) and primary inputs (**w**) vectors. The use matrix, as is shown, is a *product-by-industry* matrix while make matrix is an *industry-by-product*.

Tab. 2 - I-O Framework Based on Make and Use Matrices

	Products	Industries (sectors)	Final Demand	Total Output
Products		USE **U**	**F**	**q**
Industries (sectors)	MAKE **V**			**x**
Primary Inputs		**w**		
Total Inputs	**q'**	**x'**		

Source: Miller and Blair (1985)

Considering that there are n sectors and m products in the economy, the above terms are as follows:

$\mathbf{V}=[v_{ij}]$ is the nxm industry-by-product make matrix, each v_{ij} element represents the amount of product j produced by industry i;
$\mathbf{U}=[u_{ij}]$ is the mxn product-by-industry use matrix, each u_{ij} element represents the amount of product i used by industry sector j;
$\mathbf{f}=[f_i]$ is the mx1 vector indicating each product sales to final demand
$\mathbf{q}=[q_i]$ is the mx1 vector showing each commodity total gross output;
$\mathbf{w}=[w_j]$ is the nx1 vector indicating each industry's primary inputs
$\mathbf{x}=[x_j]$ is the nx1 vector indicating each sector total output.

After some computations, we can derive the direct and total requirements matrices following either the industry-based technology[6] or the product-based technology[7] assumption. In order to compute the product-by-product

[5] For a detailed analysis about the problem of secondary products and the make and use matrices see among the others Mattas *et al.* (1984), Miller and Blair (1985) and Polenske (1989).
[6] In the case of Industry-based technology assumption it is assumed that an industry's total output is made up of commodities in fixed proportions.
[7] In the case of Product-based technology assumption it is assumed that the total output of a product is provided by industries in fixed proportions.

total requirements matrix by employing the industry technology assumption, we proceed as follows[8]. Initially the product-by-industry matrix of direct requirements is specified:

$$\mathbf{B} = \mathbf{U}\hat{\mathbf{x}}^{-1} \tag{12}$$

where $\mathbf{B}$ is the product-by-industry direct requirements matrix, $\hat{\mathbf{x}}^{-1}$ the inverse of the diagonal matrix of $\mathbf{x}$ vector and $\mathbf{U}$ the use matrix.

Continuing, the industry-by-product direct requirements matrix is computed as:

$$\mathbf{D} = \mathbf{V}\hat{\mathbf{q}}^{-1} \tag{13}$$

where $\mathbf{D}$ the industry-by-product direct requirements matrix and $\hat{\mathbf{q}}^{-1}$ the inverse of the diagonal matrix of $\mathbf{q}$ vector and $\mathbf{V}$ the make matrix.

After the computation of the above two matrices (12) (13), the product-by-product direct requirements matrix can be computed as:

$$\mathbf{A} = \mathbf{BD} \tag{14}$$

where **A** is the matrix of direct technical coefficients and $\mathbf{B}$ and $\mathbf{D}$ are as defined above. Substituting (12) and (13) in (14) we can get analytically the way **A** is computed.

$$\mathbf{A} = (\hat{\mathbf{x}}^{\mathbf{-1}})(\mathbf{V}\hat{\mathbf{q}}^{\mathbf{-1}}) \tag{15}$$

where $\mathbf{A}$ is the product-by-product matrix of direct technical coefficients and all other terms are as defined above. As soon as the direct requirements matrix is computed, the transactions and the total requirements matrices can be computed applying the formulae defined in the above section. Specifically the product-by-product total requirements matrix is estimated by the following formula:

[8] The presented methodology is described in Mattas (1994). Miller and Blair (1985) present all the alternative ways to compute the direct and total requirements matrices following either the industry-based technology or the product-based technology.

$$(\mathbf{I}-\mathbf{BD})^{-1} \qquad (16)$$

with all terms as defined above.

3. REAPBALK Common I-O model

In order to make the results of the REAPBALK project (arising from the I-O analysis) more meaningful and to assess a *comparable* impact analysis among the five Balkan countries, construction of a *common* I-O model is one of the tasks of the REAPBALK project.

In literature, there is no distinct definition of the common I-O model since several factors (objectives of the study, size of the regions, available information, etc.) influence the final decision about what can be called as a "common" table. For this reason, it was necessary to indentify some principles of building such a table. In this sense, it was decided that a common I-O model must embody the following common technical and non-technical features:

1. The number of sectors, which must be identified according to the same Statistical Industrial codes (SIC)[9]. This implies that each sector of the table must comprise the same type of industries or products.
2. The impact analysis base year; all tables should refer to a common year. In this case, if inconsistency exists among them, updating of the tables might be necessary.
3. The technology assumption followed by the tables' compilers: industry, commodity or mixed technology. If data are in Make and Use format, it is necessary to identify the methodology which has to be followed in order to construct the symmetric I-O table, the structure of the resultant table (commodity-by-commodity, etc.) and the way transactions are valued.
4. The regionalization methodology to be employed.
5. The way of treating international trade, that is, if I-O tables have to contain total flows (domestic and imported flows) or only domestic flows.
6. The treatment of households, that is, if a closed or an open model has to be adopted.

[9] Standard Industrial Classification (SIC, Rev.3) is published by the United Nations and NACE Rev. 1 from EUROSTAT. The two system adopt the same classification of economic activities.

7. The type of linkages to be estimated in order to identify the key sectors and the impact analysis.
8. Non-technical features (objectives of the study, policy scenarios and methodology for impact analysis).

In next paragraphs, the above features are analyzed in more detail and, finally, the characteristics of the REAPBALK common I-O model are illustrated. The basic characteristics of the partners' available I-O tables can be seen in Table 3.

Tab. 3 - Summary characteristics of available national I-O tables and data

Characteristics	Bulgaria	Croatia	Greece	Romania	Slovenia
No. of sectors	Symmetric 53X53	Symmetric 60X60	Symmetric 29X29	Symmetric 28X28	Symmetric 58X58
Technology Assumption	Industry technology assumption Industry-by-Industry	Industry technology assumption Product-by-Product	Industry technology assumption product-by product	Industry technology assumption product-by product	Industry technology assumption product-by-product
Valuation	Basic values, current prices	Basic values, current prices	Basic values, current prices	Basic values, current prices	Basic values, current prices
Year	1997	1997	1998	1999	2000
Intermediate flows	Domestic	Domestic	Domestic	Domestic	Domestic
Employment data	1997 (28 sectors)	1997 (60 sectors)	2000 (60 sectors)	1999 (28 sectors)	2000 (58 sectors)

3.1 *Common technical features of the I-O model*

a) *REAPBALK classification scheme*
   Since the project is oriented mainly to study rural areas[10] of the Balkan countries, a primary target is to identify those sectors that are closely related to rural activities. These sectors must remain distinguished in the regional tables and their identity must be preserved. Since the study areas meet the OECD rurality criteria, it is obvious that sectors related with rural activities might have important contribution to the economy of the areas. Probably, these sectors are those with a high share in region's employment and output and also sectors highly interrelated with those. In the case where the national

[10] Jensen *et al.* (1979), in order to produce regional tables for the regions of Queensland, classified the State into three main categories: Metropolitan, Provincial and Rural. They classify the metropolitan regions into 36 sectors, the provincial into 19 and rural into 11; and finally a uniform classification for all regions into 11 sectors. At the 1995 EU common I-O tables compiled by Eurostat for the EU member states, from the 44 sectors (aggregation level R25) that are consisted of, agricultural activities are represented by only one sector.

tables are highly aggregated and do not separate sectors related to rural activities it might be needed to dis-aggregate them. The latter case (dis-aggregation) should be followed for agricultural activities and manufacturing industries related to agriculture. While the former case (aggregation) has to be performed for sectors with non-significant contribution in manufacturing and services.

Agriculture, livestock, fishing and forestry are the industries being very close to rural activities from the primary sector. From manufacturing, sectors such as food, beverages, tobacco and textile industries are directly related to agriculture. Whereas in tertiary sector few industries are related to rural activities. Both aggregation and dis-aggregation have to be done following the NACE/SIC classification system and according to the aggregation rules of I-O analysis. That is, leading sectors of the economy should be treated as separate; while miscellaneous sectors with non-significant contribution should be aggregated with the closely related ones, in order the common technology assumption not to be violated. In addition, sectors of special interest in the study should treat as separate in order to evaluate their contribution and impacts.

b) *Impact analysis base year*

The available national tables refer to different past years. Hence, in order to make the outcomes of the analysis more comparable, tables might need to be updated. The year that will be agreed to serve as base year also depends on the updating methodology and on data availability. If an index updating methodology is adopted, then price and production indices specific to each sector will be needed. In the occasion where the RAS procedure is selected, adequate regional data (eg. regional sectoral gross output) are required.

c) *Technology assumption and valuation of transactions of the symmetric I-O tables*

It is preferable that all data are compiled following the same technology assumption and presented in the same form in the symmetric final I-O table. For example, the Slovenian and the Greek I-O tables are common in this sense. They are compiled according to the industry technology assumption and presented in a product-by-product symmetric table. The transactions in both tables are valued in current prices and basic values. This should be the reference format for all the tables.

d) *The regionalization methodology*

All regional tables should be derived following identical regionalization technique. For REAPBALK, it was decided to follow the GRIT technique. Although regional tables can be derived without performing any surveys, it might be needed to perform some small-scale surveys. The important sectors are among those about which collection of external superior data is needed, in order to improve the reliability of resulting tables. Superior data can come from statistical services or other official sources and not only from surveys.

e) *Treatment of international trade*
All I-O tables should treat international trade in the same way. This means that all should have either domestic flows or total flows. Moreover, if all tables are with domestic flows, it has to be decided if they have to be used in this form or if trade has to be reallocated to the sectors and the way this has to be done.

f) *The model and linkages*
Finally, it must be decided whether the model has to be closed (considering households as endogenous) or open (or both) as well as the type of linkages to be estimated in order to identify the key sectors and to assess the impacts of the alternative scenarios.

3.2 Non-technical features of the Common I-O model

The fulfillment of the above technical features of the REAPBALK I-O tables does not assure that we constructed a common I-O model as the objective is not to build "identical" I-O tables, but to make the I-O model a powerful and helpful analytical tool facilitating the comparative analysis. In this respect, except for the technical features, other determinants, assigned externally, have to be discussed. The objectives and the focus of the project as well as policy scenarios and the methodology for impact analysis to be followed after constructing I-O tables are among these determinants.

A primary assessment of the policy scenarios should be necessary. This is because the different scenarios can refer to specific sectors of the regional economies, in order to estimate their impacts. Consequently, all sectors affected by the potential scenarios should be treated separately in the regional tables.

Moreover, before defining the regional classification scheme, it is advisable to define the important sectors of each region, precisely. These sectors must remain un-touched or should be dis-aggregated, because the expected impacts on the regional economy can be significant. The abovementioned determinants might cause problem in defining a common classification scheme for all regions. Significant sectors for a region might have minimal importance for the others as well as policy support initiatives might have different targets in each country.

3.3 Proposed Common I-O model

Considering the abovementioned technical and non-technical features as well as the outcomes of discussions at the project's meetings, it was suggested that the common REAPBALK I-O model had to own the following characteristics.

a) *REAPBALK classification scheme*
   It was proposed that it is not necessary to have a strictly identical classification scheme. That is, sectoral presentation in the I-O tables of the partners could have differences, depending on the national I-O tables and needful data (mainly sectoral employment) for regionalization and on the characteristics of the regional economies (significant and non-significant sectors for the region).
   After reviewing the available I-O tables, it can be seen that the followed classification scheme is almost the same; hence there is not a problem in this respect. The number of sectors was proposed to be 15-25, according to the characteristics of national tables and the need to keep sectors disaggregate. Sectors such as agriculture, fishing and forestry as well as manufacturing sectors related to agriculture and rural activities must keep their identity and must be examined as separate sectors. Also the important sectors from manufacturing and services must keep their identity in order to see their impacts in the regional economies.
b) *Impact analysis base year*
   Since the available national tables of all partners were recent enough and were closed to each other (there are no significant publication date differences), it was agreed to skip the updating procedure. This should not create problems in terms of results, since, as is referred in literature, structure of production (technical coefficients) is assumed to be constant for a few years.
c) *Technology assumption and valuation of transactions*
   It was agreed to have a Product-by-Product symmetric I-O table based on the industry technology assumption, in current prices and in basic values.
d) *The regionalization methodology*
   The regionalization methodology adopted was the GRIT technique, which is analytically presented in chapter 5.

e) *Treatment of international trade*
It was decided that a national I-O table with domestic flows should be employed. For this, national imports at c.i.f. cost should be reallocated only within the secondary sectors by applying the formula (slightly revised) suggested by Jensen (1979). Another solution proposed to reallocate imports was the use of an imports matrix (even of a previous year); this was not feaible since an imports matrix was not available in many cases. The decision of using a formula to reallocate imports (even for those who had imports matrix) was taken in order to preserve the common characteristics of the I-O model.

f) *The model and linkages*
An open I-O model was chosen. For identifying the key sectors and carrying out impact analysis, estimation of I-O multipliers (output, income and employment multipliers) and other linkages, like the Mattas and Shrestha (1991) elasticities, were suggested.

g) *Non-technical determinants of the Common I-O model*
Mainly, it was decided to construct similar vectors of final demand injections (steamming from common scenarios) in order to guarantee comparison possibilities.

4. Final Remark

The aim of this chapter is twofold: presenting some of the basics of I-O analysis (assumptions, schematic approach of the symmetric table, the three basic matrices and issues related to secondary products) and dealing with the definition a common I-O model for the five Balkan countries of the project by specifying its technical and non-technical features.

Some of the most important decisions taken about the common characteristics are: it is not important that all the countries have exactly identical number of sectors since the structure of the regional economies might be different with non-identical significant sectors. Tables compiled using the industry technology assumption and presented in product-by-product form in basic values should be used. Also, national tables with only domestic flows should be employed and imports should be reallocated to the secondary sectors. The GRIT technique is to be used as a regionalisation methodology. This technique will be presented in detail in chapter 5 along with the constructed regional tables. Superior data have to be collected for the important sectors and whenever it is necessary to improve the reliability of regional tables derived mechanically.

References

Augustinovics, M. (1970): Methods of International and Intertemporal Measures of Structures, in A. P. Carter and A. Brody (eds.). Contributions to Input-Output Analysis Amsterdam: North-Holland Publishing Co.

Bailey, A. (1996): Problems with Leontief Technology and Agriculture: the Case of Producing commodities with More Than One Input. In: Midmore P. and Harrison-Mayfield, L. (ed). Rural Economic Modeling: An Input-Output Approach. CAB International, UK, pp 85-99.

Jensen, R. C., Mandeville, T. D. and Karunaratne, N. D. (1979): Regional Economic Planning: Generation of Regional Input-Output Analysis. London: Croom Helm.

Leontief, W. (1941): The Structure of the American Economy, 119-1929. New York: Oxford University Press. Second ed. 1951. White Plains: International Arts and Science Press.

Leontief, W. (1986): Input-Output Economics. New York: Oxford University Press, Second Edition.

Mattas, K. and Shrestha, C. (1991): A New Approach to Determining Sectoral Priorities in an Economy: Input-Output Elasticities. Applied Economics, 23: 247-254.

Mattas, K., Pagoulatos, A. and Debertin, D. L. (1984): Building Input-Output Models Using Non-Survey Techniques. Southern Rural Development Centre, Mississippi Series, No. 72.

Midmore, P. (1991): Input-Output and Agriculture: a review. In: Midmore P. (eds). Input-Output Models in the Agricultural Sector, Aldershot: Gower, pp 1-20.

Midmore, P. (1993): Input-Output Forecasting of Regional Agricultural Policy Impacts. Journal of Agricultural Economics, 44, pp 284-300.

Miernyk, W. H. (1965): The Elements of Input-Output Analysis. New York: Random House.

Miller, R. E. and Blair, P. D. (1985): Input-Output Analysis: Foundations and Extensions. Prentice Hall, Englewood Cliffs, New Jersey.

Miyazawa, K. (1976): Input-Output Analysis: Foundations and Extensions. Berlin: Springer-Verlag.

Polenske, K. (1989): Historical and New International Perspectives on Input-Output Accounts. In Miller, R. E., K. R. Polenske and A. Z. Rose (eds): Frontiers of Input-Output Analysis. Oxford University Press, New York.

Richardson, H. (1972): Input-Output and Regional Economics. New York: Jhon Wiley & Sons Inc., Halsted Press.

Stone, R. (1961): Input-Output and National Accounts. Paris: Organization for European Economic Cooperation Publications.

Stone, R. (1963): Input-Output Relationships. 1954-66. University of Cambridge.

5. DERIVING REGIONAL I-O TABLES AND MULTIPLIERS

Konstatinos Mattas, Stratos Loizou, Vangelis Tzouvelekas, Tsakiri Meropi and Andrea Bonfiglio

1. Regional Input – Output Models and Theoretical Base

1.1 Introduction

First applications of the Leontief Input-Output (I-O) model concerned national economies, which sought via the I-O model an analytical tool to present an economy in detail and to study the impacts of various development and structural measures of economic policy. Indeed the input-output model can appear particularly useful in the configuration of suitable plans for economic growth as well as in the choice of suitable measures for the structural intervention in an economy's intersectoral relationships. However, on the other hand, the effectiveness of the model is limited considerably if a national model is used for the configuration of development or structural policies at regional level. As Miller and Blair (1985) stressed, this is due to two basic reasons.

The economic activity, as is reflected in the national input-output tables, constitutes a medium approximation of intersectoral relationships in the individual regional economies. It is reasonable to assume that the productive activity of the same sectors is differentiated considerably between different regions. Factors, such as the availability of raw material and the geographic position of a region, alter the structure, the productive process and consequently the economic transactions among the sectors of the model. Moreover, apart from the differences in the relationships among sectors of a regional economy that cause differences in terms of productive structure of sectors among regions, important changes also create the supply of their final products.

Therefore, it is obvious that for the formation of a satisfactory regional policy plan or for the analysis of macroeconomic impacts of a development plan in a region, the national input-output model should be adapted suitably so as to capture the regional particularities correctly. So empiric specification of a regional input-output model is essential.

The first effort of deriving a regional model is due to Isard (1951) who constructed a regional input-output model for the American economy. Two years afterwards, Leontief (1953) proposed a method of disaggregating the national model into the corresponding regions of an economy (*the balanced regional input-output model)*. Some empiric studies followed, of which the most important ones were those of Isard and Kuene (1953), Moore and Petersen (1955), Giarratani *et al*. (1976). Polenske (1980) and Miernyk (1982) provide a short bibliographic presentation of the most important studies dealing with construction and specification of regional input-output models.

Empirical specification and construction of regional Input-Output models can be done either by using primary data for intersectoral transactions or by applying various techniques of regionalizing a national model. The first applications of a regional model were based on primary survey methods for the construction of the basic transactions matrix. However, at the end of the 50's, various secondary techniques, *non-survey methods,* began to be applied widely. These were based both on the national tables and on other secondary sources of statistical data. Specifically, these techniques are applied for estimating regional technological coefficients (or regional direct requirements matrix) by using the corresponding coefficients of the national model.

Finally, from the beginning of the 70's, many experts tried to combine these two methodological approaches, proposing the use of hybrid or mixed techniques, which combine primary (survey) information and secondary (non-survey) techniques, the so-called partial-survey or hybrid methods. Below the abovementioned categories of regionalization techniques are presented analytically.

1.2 Survey and Non-Survey Regional I-O Models

In survey-based regional I-O models, transactions among sectors of a model, which are used for the construction of the transactions matrix, are collected from alternative surveys, following various field research techniques. The most important advantage of this methodological approach is that it does not need to assume a common productive technology between the region and the country. On the contrary, the productive structure of the region is determined by the productive structure of the representative regional units from which the primary data are collected. However, the method has great disadvantages such as an enormous number of data, high cost and long duration required and possible methodological errors. These drawbacks dispute the supposed superiority of survey-based technical coefficients in regional models.

Thus, the construction of I-O tables at a regional level by using the survey-based approach demands many primary data, however there is usually a lack of data. For this reason and in combination with the fact that for individual researchers and small institutions it is very difficult to conduct a primary research, non-survey techniques for the construction of regional tables were developed.

These methods contrary to the survey-based ones try to estimate intersectoral relationships in a region using the national table. More specifically, they are focused on the calculation of the regional matrix of technical coefficients (or direct requirements matrix) using the corresponding national matrix. Next, some of the most important and known non-survey methods appearing in literature are presented.

1.2.1 Simple Location Quotient (SLQ)

The simple location quotient (SLQ) is a statistical indicator that shows the degree with which two quantitative characteristics (gross production) are distributed between the region and the country (Hoover, 1975). This technique is based on the hypothesis that the regional technical coefficients differ from the national ones only by the size of the regional imports coefficients. Specifically,

$$a_{ij}^{N} = a_{ij}^{R} + m_{ij}^{R} \qquad (1)$$

where a_{ij}^{N} and a_{ij}^{R} are the national and regional coefficients respectively, indicating the direct requirements for inputs of sector j from sector i and m_{ij}^{R} is the regional imports coefficient of the product of sector i that is required by sector j .

The simple location quotient (SLQ) is a relative measure of the size (importance) of the sector at regional level compared to the size (importance) of the same sector at national level. SLQ can be calculated by the use of several measures, such as employment, output, value added.

Employment[1] is usually used due to availability of data. In terms of output, SLQ is computed as follows:

$$SLQ_i = \frac{X_i^R \Big/ \sum_{i=1}^{n} X_i^R}{X_i^N \Big/ \sum_{i=1}^{n} X_i^N} \tag{2}$$

where SLQ_i is the simple location quotient of sector i; X_i^R, X_i^N are total gross output of sector i in the region and the country, respectively, and i= 1, 2, …, n are the sectors of the model.

SLQs are applied to the selling sectors (all the elements across a row). The national direct coefficients are adjusted for regional level, according to the value of the SLQ, as follows: if the simple location quotient is greater or equal to one ($SLQ_i \geq 1$) then the regional direct coefficients of sector i are considered the same with those of the national model $\left(a_{ij}^R = a_{ij}^N\right)$. This assumes that sector i is large enough in the region, compared to the country, it can supply all purchasing sectors and hence that there is no need for imports. On the other hand if the simple location quotient is less than one (SLQ_i<1), this means that the regional output of the selling sector is not enough to satisfy the required local intermediate demand and imports are needed. Consequently, the direct coefficients of sector i in the region are multiplied (row-wise), in order to be reduced, by the quotient which is smaller than one. They are calculated as follows:

$$a_{ij}^R = SLQ_i \cdot a_{ij}^N \tag{3}$$

Given the hypothesis of common productive technology between the region and the country, the import coefficients of the sector are calculated as follows:

$$m_{ij}^R = a_{ij}^n \left(1 - SLQ_i\right) \tag{4}$$

As is known, the technique of location quotients allows the adjustment of regional direct requirements coefficients only downwards, or rather, only

[1] By using employment in the calculation of the SLQs, it is assumed that labour productivity is the same in the region and nation.

in the cases where the sector in the region is under-represented compared to the country. This fact represents an important shortcoming of the method.

1.2.2 Purchases Only Location Quotient

According to the purchases only location quotient, the calculation of the location quotient of a sector is based on the total output of those sectors that buy inputs from it and not on the total output of the model. The calculation of the purchases only location quotient is done in the following way:

$$PLQ_i = \frac{X_i^R \Big/ \sum_{i=1}^{n-p} X_i^R}{X_i^N \Big/ \sum_{i=1}^{n-k} X_i^N} \tag{5}$$

where PLQ_i is the purchases only location quotient of sector i and $\sum_{i=1}^{n-p} X_i^R$, $\sum_{i=1}^{n-k} X_i^N$ are the total output of the sectors to which the intermediary demand of sector i is directed, in the region and in the country, respectively (where p can be equal or different from k). As can be noted from equation (5), the input requirements for the products of sector i are in constant proportions among sectors j. The calculation of the regional technical coefficients, as well as the imports coefficients of sector i, is done following the same way as with the SLQ (equations (3) and (4)). As mentioned above, for the calculation of PLQ_i, also employment, income or value added of each sector, in addition to total output, can be used.

1.2.3 Cross - Industry Location Quotient

An important disadvantage of the application of the SLQ is that it assumes that the national and the regional demand patterns are similar. However, this assumption is not realistic. As Flegg *et al.* (1995) argue, by using the SLQ (and multiplying the whole row of a sector by the same SLQ), it is presupposed that the discrepancy between the national and regional coefficients is the same regardless of the sectors to which producing (selling) sectors sell their output. The above assumption does not take into account the relative size of the selling sector, providing inputs, and the sector purchasing them.

The cross-industry location quotient (CILQ) takes into account the abovementioned lack and also the relative importance of each sector intermediate sales. In other words, the output (employment) share of a selling sector is compared to the output (employment) share of a purchasing sector. The $CILQ_{ij}$ is calculated as follows[2]:

$$CILQ_{ij} = \frac{X_i^R / X_i^N}{X_j^R / X_j^N} = \frac{SLQ_i}{SLQ_j} \tag{6}$$

where $CILQ_{ij}$ is the cross-industry location quotient between sectors i and j. The way of adjusting (or regionalizing) the national coefficients works in the same way as for the SLQ. A CILQ greater to unity ($CILQ_{ij}$>1) means that the regional selling sector can supply all the requirements of the regional purchasing sector. The selling sector has a greater share in sectoral national output (or employment) than the purchasing sector. Hence, the regional technical coefficient and the regional imports coefficient are identical $\left(a_{ij}^R = a_{ij}^N\right)$ with the national ones. Therefore, no adjustment is needed. No adjustment is also needed when $CILQ_{ij}$=1, indicating that regional employment in both sectors has the same share as each sector's national employment. If CILQ is less than one ($CILQ_{ij}$ <1) then the regional technical coefficient is replaced (adjusted downward) with the product of the national coefficient and the computed CILQ $\left(a_{ij}^R = CILQ_{ij} \cdot a_{ij}^N\right)$, while the remaining quantity ($a_{ij} \cdot (1 - CILQ_{ij})$) is added to the imports coefficients. In this case, it is assumed that regional production is insufficient to meet regional demand and imports are

---

[2] By simple transformations, it can be easily proved that $CILQ_{ij} = \frac{SLQ_i}{SLQ_J}$ and when i=j then $CILQ_{ij} = 1$. The latter case was criticised (Morrison and Smith, 1974) since it does not take into account the size of the local industry. In this connection, they suggest using the SLQ in the main diagonal. If this does not happen then it is assumed that all intra-sectoral trade at the national level is also intra-sectoral at regional level, which is not true because a substantial share of this trade is actually inter-sectoral. In the case where a net table is used such a problem does not exist because all elements in the main diagonal (intra-sectoral trade) are set to zero. In their study, Morrison and Smith (1974), after evaluating a number of alternative LQ, they conclude that SLQ is superior to CILQ. On the other hand, Johns and Leat (1987), after comparing the results from the application of the two LQs, they suggest that CILQ gives better results.

required. That is, the supplying sector is relatively small regionally, compared to the purchasing sector. A significant disadvantage of CILQ, in contrast to SLQ, is that it does not take into account the relative size of the region.

1.2.4 The Method of Flegg et al., (FLQ)

One of the most important disadvantages of all the purely secondary techniques, according to Flegg *et al.* (1995) is that they do not take into consideration the relative size of the region under examination and they underestimate the regional imports. This leads to biased estimations of sectoral transactions and linkages. To face these problems, Flegg *et al.* (1995) proposed the adaptation of a location quotient based on the relative size of the region in terms of employment. In this way, they tried to link the size of imports of the region to its size in the national economy.

The SLQ and CILQ provide an alternative way of estimating the relevant trading coefficients (Flegg *et al.*, 1995). Trading coefficients measure the proportion of any given commodity supplied from the region (measuring the degree of self-sufficiency of a region). Those trading coefficients depend on three variables, which are the relative size of the supplying sector, the relative size of the purchasing sector and the relative size of the region. The SLQ takes into account only the first and the third, the CILQ takes into account only the first two, while the FLQ considers all the three.

The FLQ is applied as the other LQs for the regionalization of the national coefficients and is calculated as follows[3]:

$$FLQ_{ij} = CILQ_{ij} \cdot \lambda \tag{7}$$

where FLQ_{ij} is the location quotient between the sector i and j of Flegg and Webber (2000)[4], $CILQ_{ij}$ is the cross-industry location quotient as it was defined in equation (6) and λ is the weighting measure of the regions' relative size. It is calculated as follows:

[3] The method of Flegg et.al. (1995) can be applied in any distributive quotient (SLQ_i, PLQ_i or $CILQ_{ij}$).

[4] The original proposal of FLQ by Flegg *et al.* was introduced in 1995. Afterwards, a debate was opened in literature (Flegg and Webber, 1996a, 1996b, 1997, 2000; Brand S., 1997 and McCann and Dewahurst, 1998). Following to this discussion, the original version was improved obtaining the version contained in Flegg and Webber (1998 and 2000).

$$\lambda = \log_2 \left[1 + \left(\sum_{i=1}^{n} E_i^R \Big/ \sum_{i=1}^{n} E_i^N \right) \right]^{\delta} \tag{8}$$

with $0 \leq \delta < 1;\ 0 \leq \lambda \leq 1$

where E_i^R and E_i^N is the employment of sector i in the region and in the country respectively and δ is the weighting parameter which is determined empirically based on the size of the region. It results that the smaller the assumed value of δ, the greater the degree of upward convexity of the function and the larger the λ. In the case where δ=0, then λ=1 and FLQ_{ij} = $CILQ_{ij}$. The problem[5] with the specific formula is the value of δ, which has to be set empirically.

If the FLQ between any two purchasing and selling sectors is greater than zero but less than one $\left(0 < FLQ_{ij} < 1\right)$, it is assumed that regional production is insufficient to cover local demand and imports will be required to make up the deficiency. In this case, the respective technical coefficient of the national direct requirements matrix will over-estimate the regional inter-industry transactions and will have to be reduced. Multiplying the national coefficient with the relevant FLQ_{ij} does this. The residual is added to the relevant national import coefficient to yield an enhanced regional import coefficient.

However, if the FLQ_{ij} is greater than one $\left(FLQ_{ij} > 1\right)$, it is assumed that regional sector's i supply is sufficient to cover the purchasing sector's j demand and the national coefficient is accepted as the regional coefficient. In fact the resulting regional technical coefficients will lie between their national value and zero. The coefficients in the regional imports row will be either the same as, or greater than, the respective entries in the national imports row.

1.3 Partial-Survey or Hybrid I-O Models

Partial-survey or hybrid regional input-output models were proposed for improving and facing the problems of both the survey and the non-survey techniques. Survey techniques are quite time-consuming and costly, while non-survey techniques are based on quite restrictive hypotheses regarding the differentiation of the productive technology of the regions.

[5] For this, they have been mainly criticised by Brand (1997) and McCann and Dewhurst (1998) and Flegg and Webber (1998 and 2000) replied improving their formula.

These techniques try to combine the two first categories and to estimate the regional technical coefficients by using a non-survey technique, along with the use of specific exogenous data and information from small-scale surveys. These surveys concern usually the most important economic sectors in the region as well as those which are in the interest of the empirical analysis. Consequently, the smaller the region, the more feasible the application of a hybrid technique. Even Jensen *et al.* (1979) supported that the discriminatory estimation of technical coefficients of relatively less important regional sectors has small effect to the intersectoral transactions and sectoral linkages.

So the use of hybrid techniques for the construction of a regional model aimed at evaluating sectoral linkages and assessing impacts from policy measures, gives relatively reliable results compared to the cost and the time of constructing the model. Some of the most important and widely used are presented below shortly.

1.3.1 The RAS Method

The RAS method was initially used for updating the direct requirements matrix by Stone (1961, 1963) and Stone and Brown (1962). More specifically, this method constitutes a technique of marginal statistical information requirements. Having the direct requirements matrix of year t and data for total output, final demand and the primary inputs for each sector at year t+1, the direct requirements matrix of year t+1 can be generated.

The important advantage of RAS method lies in the fact that during the procedure both the relative price changes between products as well as the degree and the intensity of substitution and fabrication effects between the products are taken into account. Miller and Blair (1985, p. 276-294) present a detail description of the RAS method for the estimation of regional I-O models.

1.3.2 The Imports or Exports Only Method

In most non-survey techniques presented in the previous section, the import coefficients of each region are calculated residually after the adjustment of the corresponding national direct coefficients. However, for small regions, imports represent the most important part of their sectoral inputs purchases and consequently their calculation should be as much reliable as possible. This particular method is aimed at estimating import coefficients through small-scale surveys.

This method was initially used by Su (1970), who proposed the construction of an imports requirements matrix, using survey data from the regional sectors. This is a much simpler survey than an extensive survey at a regional level, because the collection of data is easier for the researcher as well as for the enterprises. Moreover, by this method, the potential differences between the national and regional productive technology are recorded by estimated technical coefficients.

1.3.3 The GRIT Method

The GRIT technique was initially proposed by Jensen *et al.* (1979). It is a hybrid method which is based on non-survey techniques of location quotients giving, however, simultaneously the possibility to the user of inserting external data from surveys or other secondary sources that are considered superior; mainly for the important sectors in the region. By the use of GRIT, there was an attempt, according to Jensen *et al.* (1979), to shape, as much as possible, a functional method. This technique should be simple, precise and reliable, free from important errors and it can be applied in a relatively short time. So its results and conclusions can be used readily in decision-making process regarding a given region.

By the term precision, they mean the exemption from significant errors and not the accounting precision of each coefficient. If the fundamental aim is to construct a table that has to portray the intersectoral transactions by an accounting precision, then there is no better method than a survey one. On the other side, if the primary aim is the use of the derived regional model for the analysis of intersectoral transactions and for the assessment of impacts of policies on the regional economy, then the possible resulting errors will be insignificant with minor influence on the final results.

The ability to import superior external data, either from surveys or from secondary sources, at the various stages of the procedure is its basic advantage; one of the characteristics that separated it from the other hybrid methods. The advantage of importing external data and the possibility of intervening during its application ensures that the derived tables are clear of significant errors.

Johns and Leat (1987) used the GRIT method after specific modification, for the construction of a regional I-O model for the Grampian region in Scotland. Among their basic modifications, there was the use of CILQ in the place of SLQ. This was done in order to avoid the strong assumption of identical national and regional demand, which is supposed by the use of SLQ. Johns and Leat concluded that the use of CILQ instead of SLQ gives more reliable results, contrary to the outcomes of the study of Morrison and Smith (1974). Below, the GRIT technique is presented in detail since it was selected to be used in the REAPBALK project.

1.4 Comparative Studies Between Survey and Non-survey Methods

The superiority, in terms of accuracy, of a survey regional input-output model in comparison with the non-survey-based one is generally admissible. According to Richardson (1972), there is no non-survey method that could substitute a survey table completely. There is no case where non-survey models can better represent the real productive structure of a region and consequently non-survey models provide an insufficient estimate of the real situation. Most times regional imports are underestimated and the sectoral linkages appear larger than they actually are.

However, what influences the choice of the method are the conditions and the objectives for which is a regional model is constructed. If the objective is the construction of a detailed, accurate regional model so as to reflect in every detail sectoral transactions in the region, then a survey-based model will be the best solution. As was mentioned above, survey techniques were popular in the 60's. Miernyk (1976, 1965) was the first that expressed doubts about the reliability of non-survey techniques, while Schaffer and Chu (1969) stated that there is no perfect substitute for a survey model.

On the other hand, the defenders of non-survey methods present important arguments for their appropriateness and their advantages in contrast with the survey methods. The construction of a regional model requires a large scale survey for the collection of the required data from all regional sectors, something that is costly and time consuming. These two reasons constitute the basic obstacles for non-constructing survey regional I-O models. Moreover, as was mentioned, survey tables are vulnerable to the followed sampling methods as well as to the reliability of the collected data. The questionnaires are addressed to regional enterprises and households, which are usually extensive enough. Therefore, it is quite likely that in many cases the collected data are not true. For this reason, GRIT method is considered quite attractive since it limits the volume of the collected information, because the survey is concentrated on sectors of special interest. Hence the presence of unreal information is limited.

Boster and Martin (1972) supported the non-survey techniques vigorously, stressing that there is no choice between survey and non-survey since in most cases the construction of a primary model is not feasible. They calculated that the cost of constructing a survey model is about 20 times more expensive than a respective non-survey. The same opinion also was supported by Jensen and MacDonald (1982). Even Miernyk (1987), although he recognized the problems and difficulties of constructing a survey model, supported that in many cases survey models are unfeasible.

The number of empirical studies, comparing survey with non-survey models in literature, is limited, mainly because of the absence of regional survey-based models. The first who tried empirically to evaluate the ability of no-survey techniques to portray with reliability a regional economy were Hewings (1969) and Schaffer and Chu (1969 and 1970). Firstly, Hewings (1969), even though he did not have a survey regional model, tried to compare the ability of various non-survey techniques to predict the total output of each sector in the region of West Midlands in UK, having real output from census data. None of the non-survey techniques managed to forecast industrial output rightly, though the results were rather encouraging since he observed that in the most important sectors of the region the divergence was smaller than in the less important ones.

On the other hand, Schaffer and Chu used various non-survey techniques to construct an input-output model for the Washington state in 1963, which was then compared to the existing survey model provided by Bourque *et al.* (1967). They used the simple location quotient (SLQ), the cross industry location quotient (CILQ), the supply demand pool (SDP) technique and a combination of the latter with the RAS method. They concluded that all techniques give a model closed to the corresponding regional survey one. Specifically, the cross industry location quotient (CILQ) forecasted better the imports and exports of the region, while all the other techniques provided better estimates for the imports vector than for exports. The regional technical coefficients generated by all the techniques were highly correlated with the ones of the survey model (they used Chi-square statistic). Finally, they concluded that sectoral multipliers (output, income and the employment) were generally higher than those of the survey model but considerably different from the national ones.

The same year, Chamanski and Malizia (1969), by applying the RAS method for the Washington State, concluded that the most significant errors affected the primary sectors of the regional economy as well as the most important ones in which the region is specialised. Few years later, Morrison and Smith (1974) used all the known location quotients (SLQ, PLQ, CILQ) as well as the RAS and the SDP technique, to construct a regional model for a small region in central England (Peterborough). Their comparative empirical findings showed that sectoral multipliers were overestimated (greater than those of the survey table). Their results also indicated that the RAS method outperforms all the LQ techniques and gives the most accurate results. The conclusions of Morrison and Smith (1974) were also confirmed by the Harrigan *et al.* (1980) comparative study.

Cartwright *et al.* (1981) also used various forms of location quotients to construct regional tables for the States of Texas, Washington and West Virginia, which were compared to survey-based tables. They used both income and employment for the calculation of the location quotients. Their results indicated that all the LQ techniques provide estimates of regional intersectoral transactions, which are as much better as the model is disaggregated. Moreover, the use of employment for the calculation of the location quotients provided better results. On average, the overestimation of sectoral multipliers reached 9%.

Finally, Flegg *et al.* (1995), using the studies of Morrison and Smith (1974) and Harrigan *et al.* (1980), related the errors in sectoral multipliers to the size of the region. They found that the smaller the region is the greater the tendency for imports is and hence the higher the upward bias of multipliers is the smaller the region is.

1.5 Empirical Specification of the Regionalization methodology (GRIT)[6]

A detailed study of the economic structure of the five regions of the countries participating in the REAPBALK project (Bulgaria, Croatia, Greece, Romania, Slovenia) is based on the construction of a regional I-O model for each region. The construction of regional I-O tables (like the national ones) provides a detailed picture of the regions. The regional economies are portrayed by the quadrants of the regional symmetric I-O table: the transactions matrix which presents all intersectoral relationships, as well as the relationships of each regional sector with final demand and primary inputs categories. The regional I-O tables, by themselves, provide a detailed description of the regional economies and constitute the basic information for the construction of the regional I-O models. The national I-O tables are used for the specification of the regional I-O models in order to calculate the sectoral linkages and to perform the impact analysis, (assessment of impacts from exogenous changes affecting regional economies).

[6] The regionalization procedure (GRIT) presented is based on the original version of Jensen *et al.* (1979).

As was presented in the previous section, there are many methods, in literature, to construct regional I-O tables; among them, the GRIT technique was selected for the REAPBALK project. GRIT was introduced above and some of its advantages were presented, though in the next section is presented in detail, step by step, with specification to the project's regions. In order to present the empirical specification of the I-O model for the five regions, the GRIT technique is described in detail.

For deriving the regional input-output tables of the selected regions under study, we have chosen the variable interference hybrid GRIT (*Generation of Regional Input-Output Tables*) technique developed by R. C. Jensen and others in the Department of Economics at the University of Queensland in Australia (Jensen *et.al.*, 1979). In summary, GRIT technique is a formalized non-survey method of compilation with facility for the user to insert survey data at any stage of the compilation procedure. Like any other non-survey technique, GRIT is based primarily on a mechanical procedure (mainly on cross-industry location quotient - CILQ) for the regionalization of the national direct requirements matrix, which is at the core of any input-output table. At the same time, the analyst can determine the extent to which he/she should interfere by the insertion of superior data from survey or other secondary sources either in the elements of the regional direct requirement matrix or in the elements of other final payments and demand.

For the purposes of the present research project, the GRIT technique was incorporated in the *GAUSS* (ver 3.2.26) mathematical computer package, which allows easy data handling and matrix manipulation and can be monitored step by step. For the regionalization of the national direct requirements, we have applied the modification of the cross-industry location quotients recently suggested by Flegg *et al.* (1995), which takes into consideration the relative size of the region.

In order to construct a complete regional Input-Output table, we need, first of all, the most recent disaggregated national Input-Output table (including of course final demand and payments elements) in current prices with total flows measured at basic values. Basic values refer to the fact that interindustry transaction flows are net of commodity taxes, which are paid by the buyer of the commodities on which the taxes are levied. Commodity taxes appear in a separate row in the final payments section of the table.

The final demand and final payments matrices were aggregated prior to the application of the regionalization methodology in order to render it possible to make comparisons among countries. Specifically, the national final demand matrix was composed of sectoral private consumption, exports and other final demand elements (gross capital fixed formation, investments, public consumption, etc.) while the final payments matrix was composed of sectoral imports, household payments (wages and salaries, social insurance payments) and other final payments (taxes, subsidies, etc.).

Concerning the underlying production technology of the table, the GRIT technique can be equally applied using either an industry-based technology or a commodity-based technology. However, complete national accounts matrices in a USE and MAKE format were not available for the Balkan applicant countries. In fact, that kind of information was only available for the Greek economy. For the Balkan applicant countries only a symmetric transactions table was available from the respective National Statistical Services, which was constructed under the assumption of industry-based technology.

In addition to the National Input-Output tables, also employment data at both regional and national level are also required for the regionalization methodology. These data must be at the highest level of sectoral disaggregation and can be otained from either the Census or other official and reliable national or regional sources. Employment data should be as much accurate as possible since they are used for the computation of the cross industry location quotients necessary for the regionalization of the national direct requirements matrix.

Finally, superior data coming from field survey or other national or regional sources can be optionally used during the regionalization procedure. Superior data can considerably improve the precision of the regional direct and total requirement matrices, which are the basis for the computation of the respective linkage coefficients necessary for the policy impact analysis.

Below, all the steps are described, one by one, in order to derive a regional non-survey I-O table, according to the GRIT technique.

1.5.1 Sectoral Aggregation

Usually, sectoral aggregation is done after the regionalization of the direct requirements matrix in order to avoid unnecessary biases that may arise (Jensen *et al.*, 1979). However, sectoral aggregation at this stage may be necessary in the cases where the aggregation scheme of the available employment data is less than that of the national Input-Output tables. This was the case of Bulgaria where the sectors, about which employment data were available, were less than those represented in the Input-Output table of the Bulgarian economy. In this case the national transactions matrix was aggregated into the same scheme along with the regional and national employment data.

The aggregation of the national transactions matrix as well as of the sectoral output, final demand and payments vectors is done as follows:

$$\underset{(sxs)}{\mathbf{Z}_N} = \underset{(sxn)}{\mathbf{S}}\ \underset{(nxn)}{\mathbf{Z}_N}\ \underset{(nxs)}{\mathbf{S}'} \tag{9}$$

and

$$\underset{(sxk)}{\mathbf{FD}_N} = \underset{(sxn)}{\mathbf{S}} \cdot \underset{(nxk)}{\mathbf{FD}_N} \tag{10}$$

$$\underset{(sxk)}{\mathbf{FP}_N} = \underset{(sxn)}{\mathbf{S}} \cdot \underset{(nxk)}{\mathbf{FP}_N} \tag{11}$$

$$\underset{(sx1)}{\mathbf{x}_N} = \underset{(sxn)}{\mathbf{S}} \cdot \underset{(nx1)}{\mathbf{x}_N} \tag{12}$$

where n is the original sectoral classification in the national Input-Output tables, $s<k$ is the sectoral classification after aggregation, $k=3$ are the categories included in the final demand (household consumption, exports and other final demand elements) and payments (household income, imports and other primary inputs) matrices, $\mathbf{Z}_N$ is the national transactions matrix, $\mathbf{FD}_N$ and $\mathbf{FP}_N$ are the national final demand and payments matrices and, $\mathbf{S}$ is the aggregation matrix, the elements of which in each row are zeros for sectors that are not aggregated and ones for those that are aggregated.

If, for instance, the national transactions matrix includes 5 sectors and we want to aggregate sector 2 and 3 because there is no employment data for each one of them separately, then the aggregation matrix has the following form:

$$\mathbf{S} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \tag{13}$$

1.5.2 Reallocation of International Trade

If the national transactions table includes total flows then this step is not necessary. However, when the national transactions are expressed in domestic flows, the imports row must be reallocated proportionally within the relevant rows of the secondary sectors in the national table. For doing so we have followed Jensen *et al.* (1979) approach which proceeds as follows:

$$\mathbf{d}_1 = \underset{(1\text{x}m)}{\mathbf{i}} \cdot \underset{(m\text{x}m)}{\mathbf{Z}_N^{(0)}} \tag{14}$$

where m is the number of the secondary sectors in the national transactions matrix, $\mathbf{d}_1$ are the total intermediate purchases of the secondary sectors, $\mathbf{Z}_N^{(0)}$ is a sub-matrix of the national transactions matrix which includes only the secondary sectors and $\mathbf{i}$ is a unit row vector. Since imports are generally made up of secondary products, the reallocation of them is done within these sectors.

Then we add to the imports of the secondary sectors their total intermediate purchases obtained from (14) as follows:

$$\underset{(1\text{x}m)}{\mathbf{d}_2} = \underset{(1\text{x}m)}{\mathbf{d}_1} + \underset{(1\text{x}m)}{\mathbf{m}_N^S} \tag{15}$$

where $\mathbf{m}_N^S$ are the national imports of the secondary sectors extracted from (11).

Finally, we redistribute the total sectoral purchases (intermediate purchases and imports) of the secondary sectors as follows:

$$\underset{(m\text{x}m)}{\mathbf{Z}_N^{(1)}} = \underset{(m\text{x}m)}{\mathbf{Z}_N^{(0)}} \cdot \underset{(m\text{x}m)}{\hat{\mathbf{d}}_2} \cdot \underset{(m\text{x}m)}{\hat{\mathbf{d}}_1^{-1}} \tag{16}$$

where $\mathbf{Z}_N^{(1)}$ is the sub-matrix of the national transactions matrix which includes only the secondary sectors corrected for the international trade, $\hat{\mathbf{d}}_2$ is a diagonal matrix of both the intermediate purchases and imports of the secondary sectors and $\hat{\mathbf{d}}_1^{-1}$ is a diagonal matrix of the total intermediate purchases of the secondary sectors.

1.5.3 Derivation of the National Direct Requirements Matrix

The application of the location quotients during the regionalization process is done to the direct requirements matrix and not to the transaction flows. The direct requirement matrix is the matrix of the technical coefficients of production for every sector in the Input-Output table. The technical coefficient represents the share of the product of sector *i* that is used as an input for sector *j*. Under the basic assumption of the Input-Output models, these technical coefficients remain stable implying the absence of economies or diseconomies of scale.

Assuming that sectoral aggregation is not necessary (see previous step), then the direct requirements matrix is computed from the following:

$$\underset{(n\text{x}n)}{\mathbf{A}_N} = \underset{(n\text{x}n)}{\mathbf{Z}_N} \cdot \underset{(n\text{x}n)}{\hat{\mathbf{x}}_N^{-1}} \tag{17}$$

where *n* is the number of sectors in the national direct requirements matrix, $\mathbf{A}_N$ is the national direct requirements matrix, $\mathbf{Z}_N$ is the national transactions matrix and $\hat{\mathbf{x}}_N$ is the diagonal matrix of the national total sectoral output. If sectoral aggregation is necessary, then one must use the aggregated national transaction matrix and sectoral output vector from (9).

It should be noted that the national transactions matrix in (17) includes the sub-matrix of the secondary sectors from the (16) in which the trade of goods has been reallocated.

Finally, before the computation of the national direct requirements matrix, the intrasectoral flows in the main diagonal of the national transactions matrix should be deleted. This is necessary as the intrasectoral flows include interregional trade. So, by maintaining these flows within the table, when deriving the regional table, the regional intermediate purchases would be overestimated.

1.5.4 Computation of the Regional Direct Requirement Matrix

Like many other non-survey methods of regionalization, GRIT technique is based on the application of location quotient coefficients (for a review of the various location quotient coefficients proposed in literature see Miller and Blair, 1985) to separate the national technical coefficients into regional purchases and import coefficients. In the published GRIT computer programme simple location quotients are used for this adjustment of the national direct requirements matrix. A location quotient measures the relative importance of an industry in a region compared with its importance nationally. Although location quotients can be based theoretically on a number of economic activity indicators[7] (output, employment, purchases and expenditures), the greatest availability of employment data had led to a frequent use of employment based location quotients. Since this was true also in the case of the areas under study, we have used employment data for the computation of the location quotients.

However, the simple location quotients used initially by Jensen *et al.* (1979) assume similar national and regional sectoral demand patterns, which is rather unrealistic (Johns and Leat, 1987; Tzouvelekas and Mattas, 1999). On the other hand, regional demand for industry *i'*s products is better reflected by the relative regional presence of those industries which purchase industry *i'*s output. This aspect is incorporated into the concept of the *Cross Industry Location Quotient* (CILQ) as the latter allows to modify each element of any given row of the national direct requirements matrix. In other terms, it allows for cell-by-cell adjustments within the direct requirements matrix rather than for uniform adjustments along each row.

Although the use of the CILQ overcomes the problem of similar national and regional demand patterns inherent to *Simple Location Quotients* (SLQ), CILQ does not take into account the relative size of the region for which an Input-Output Table is to be constructed. Recently, Flegg *et al.* (1995) and Flegg and Webber (1996a, 1996b, 1997, 2000) based on Round (1978) suggestions, proposed a modified version of the CILQ which takes into account the relative size of the region and, at the same time, it allows for different modifications to be made across every row in the national direct requirements matrix.

The Flegg and Webber (2000) location quotient (which is a modified version of the formula proposed in Flegg *et al.*, 1995) denoted with FLQ is estimated as:

$$FLQ_{ij} = \frac{E_i^R / E_j^R}{E_i^N / E_j^N} \cdot \lambda = CILQ_{ij} \cdot \lambda \tag{18}$$

and

$$\lambda = \log_2 \left(1 + \frac{\sum_i E_i^R}{\sum_i E_i^N} \right)^{\delta} \tag{19}$$

[7] See Richardson (1972).

where i,j=1, 2, …, n is the number of sectors in the national Input-Output tables, E^R and E^N are the regional and national employment levels, $0 \le \delta \le 1$ is the weighting parameter reflecting the relative size of the region which needs to be determined empirically according to knowledge of the relative importance of the economic activity in the region.

If the FLQ between any two purchasing and selling sectors is greater than zero but less than one $\left(0 < FLQ_{ij} < 1\right)$, it is assumed that regional production is insufficient to meet local demand and imports will be required to make up the deficiency. In this case the respective technical coefficient of the national direct requirements matrix will over-estimate the regional inter-industry transactions and will have to be reduced. This is done by multiplying the national coefficient by FLQ_{ij}. The residual is added to the relevant national import coefficient to yield an enhanced regional import coefficient.

If, however, the FLQ_{ij} is greater than one $\left(FLQ_{ij} > 1\right)$, it is assumed that regional sector i's supply is sufficient to meet the purchasing sector j's demand and the national coefficient is accepted as the regional coefficient. In fact the resulting regional technical coefficients will lie between their national value and zero. The coefficients in the regional imports row will be either the same as, or greater than, the respective entries in the national imports row.

Empirically, this is done as follows. First, we need to eliminate from the national direct requirements matrix the non-existing sectors in the region, which are the sectors with zero employment. The respective rows of the national direct requirements matrix are added to the national imports coefficients row, while the columns are added to the national export coefficients column as follows:

$$\underset{(1\text{x}\, n-j)}{\bar{\mathbf{m}}_N} = \underset{(1\text{x}\, n-j)}{\mathbf{m}_N} + \underset{(1\text{x}j)}{\mathbf{i}} \cdot \underset{(j\text{x}\, n-j)}{\mathbf{A}_N} \tag{20}$$

and

$$\underset{(n-j\,\text{x}1)}{\bar{\mathbf{e}}_N} = \underset{(n-j\,\text{x}1)}{\mathbf{e}_N} + \underset{(n-j\,\text{x}j)}{\mathbf{A}_N} \cdot \underset{(j\text{x}1)}{\mathbf{i}} \tag{21}$$

where n is the number of sectors in the national Input-Output tables, j=1, 2, …, J are the non-existing sectors in the region, $\bar{\mathbf{m}}_N$ is the national coefficients import row vector augmented with the technical coefficients of the non-existing sectors as sellers in the national economy, $\mathbf{A}_N$ is the national direct requirements matrix, $\overline{\mathbf{e}}_N$ is the national export coefficients column vector augmented with the technical coefficients of the non-existing sectors in the region as buyers in the national economy, $\mathbf{i}$ is a unit vector and $\mathbf{m}_N$ and $\mathbf{e}_N$ are the original national imports and exports coefficients vectors, respectively.

In the next step, we replace in the **FLQ** matrix the values that are greater than one with one. Assuming again that sectoral aggregation is not necessary (we skip the first stage) and that there are not non-existing sectors in the region, then the regional direct requirements matrix is obtained as:

$$\underset{(n\mathrm{x}n)}{\mathbf{A}_R} = \underset{(n\mathrm{x}n)}{\mathbf{FLQ}} \cdot \underset{(n\mathrm{x}n)}{\mathbf{A}_N} \tag{22}$$

and

$$\underset{(1\mathrm{x}n)}{\overline{\mathbf{m}}_R} = \mathbf{i} \cdot \left(\underset{(n\mathrm{x}n)}{\mathbf{A}_N} - \underset{(n\mathrm{x}n)}{\mathbf{A}_R} \right) \tag{23}$$

where n is the number of sectors in the national Input-Output tables, $\mathbf{A}_R$ is the regional direct requirements matrix, **FLQ** is the matrix of Flegg *et al.* (1995) cross industry location quotients and $\overline{\mathbf{m}}_R$ is a first approximation of the regional import coefficients vector. Then in (23) we add the vector of the national imports coefficients as follows:

$$\underset{(1\mathrm{x}n)}{\mathbf{m}_R} = \underset{(1\mathrm{x}n)}{\mathbf{m}_N} + \underset{(1\mathrm{x}n)}{\overline{\mathbf{m}}_R} \tag{24}$$

where n is the number of sectors in the national Input-Output Tables, $\mathbf{m}_N$ is the national import coefficient vector and $\mathbf{m}_R$ is the final regional imports coefficient vector. If there are indeed non-existing sectors in the region then the national direct requirements matrix in (22) and (23) should be replaced with the reduced one, while the national imports coefficient vector in (24) should be replaced with that in (20).

1.5.5 *Sectoral Aggregation*

Until now, we have assumed that the economic structure is the same in the region and in the country. However, although this may be true for large regions, it is unlikely that this happens in small regions with low economic activity. Therefore the dimensions of the regional Input-Output tables should be adjusted so as to reflect the economic conditions in the region adequately. Towards this aim, small and un-important sectors with very low economic activity (low employment or output levels) must be aggregated with sectors having a similar technological conditions. The aggregation procedure is the same as in the first step of the regionalization methodology. However, before that it is necessary to modify the regional direct requirements matrix as well as the regional import coefficient vector.

This is done as follows:

$$\underset{(nxn)}{\breve{\mathbf{A}}_R} = \underset{(nxn)}{\mathbf{A}_R} \cdot \underset{(nxn)}{\hat{\mathbf{w}}} \tag{25}$$

and

$$\underset{(1xn)}{\breve{\mathbf{m}}_R} = \underset{(1xn)}{\mathbf{m}_R} \cdot \underset{(nxn)}{\hat{\mathbf{w}}} \tag{26}$$

where $\breve{\mathbf{A}}_R$ and $\breve{\mathbf{m}}_R$ are the weighted regional direct requirements matrix and imports coefficient vectors, $\mathbf{A}_R$ and $\mathbf{m}_R$ are the original regional direct requirements matrix and imports coefficient vectors defined in (22) and (24) and $\hat{\mathbf{w}}$ is a diagonal matrix of the regional employment weights.

The vector of regional employment weights takes the value of 1 $(w_i = 1)$ for the sectors that are not aggregated in the regional classification scheme, while for the sectors that are to be aggregated it takes the value of their employment shares. The employment shares are computed as:

$$w_i = \frac{E_i^R}{\sum_{i=1}^{r} E_i^R} \tag{27}$$

where i=1, 2, …, r are the sectors that are to be aggregated and E^R is the regional sectoral employment. These regional employment weights are calculated for any group of sectors in the national classification scheme, which must be aggregated at the regional level.

Then, both the regional direct requirements matrix and the import coefficient vectors can be aggregated using an adequate aggregation matrix and following the procedure outlined in par. 1.5.1. Specifically,

$$\underset{(p\mathrm{x}p)}{\tilde{\mathbf{A}}_R} = \underset{(p\mathrm{x}n)}{\mathbf{S}} \cdot \underset{(n\mathrm{x}n)}{\breve{\mathbf{A}}_R} \cdot \underset{(p\mathrm{x}n)}{\mathbf{S}'} \tag{28}$$

and

$$\underset{(1\mathrm{x}p)}{\tilde{\mathbf{m}}_R} = \underset{(1\mathrm{x}n)}{\breve{\mathbf{m}}_R} \cdot \underset{(n\mathrm{x}p)}{\mathbf{S}'} \tag{29}$$

with p is the number of sectors included in the final regional classification scheme after aggregation, $\breve{\mathbf{A}}_R$ and $\breve{\mathbf{m}}_R$ are the weighted regional direct requirements matrix and imports coefficient vectors defined in (25) and (26), $\mathbf{S}$ is the aggregation matrix and $\tilde{\mathbf{A}}_R$ and $\tilde{\mathbf{m}}_R$ are the final regional direct requirements matrix and import coefficients vector, respectively.

1.5.6 Computation of the Complete Regional Input-Output Tables

In order to derive the complete regional Input-Output tables, we need to transform, first of all, the direct requirements matrix and the imports coefficients vector into monetary flows. For doing so we need the vector of regional sectoral output. This can be approximated by using the employment ratios as well as an employment-based Simple Location Quotient.

First we need to compute the employment shares in the region and in the nation for the sectors included in the final aggregation scheme:

$$\underset{(p\mathrm{x}1)}{\mathbf{e}_R^s} = \left(\underset{(p\mathrm{x}n)}{\mathbf{S}} \underset{(n\mathrm{x}1)}{\mathbf{e}_R} \right) \left[\underset{(1\mathrm{x}n)}{\mathbf{i}} \left(\underset{(p\mathrm{x}n)}{\mathbf{S}} \underset{(n\mathrm{x}1)}{\mathbf{e}_R} \right) \right]^{-1} \tag{30}$$

and

$$\underset{(p\mathrm{x}1)}{\mathbf{e}_N^s} = \left(\underset{(p\mathrm{x}n)}{\mathbf{S}} \cdot \underset{(n\mathrm{x}1)}{\mathbf{e}_N} \right) \cdot \left[\underset{(1\mathrm{x}n)}{\mathbf{i}} \cdot \left(\underset{(p\mathrm{x}n)}{\mathbf{S}} \cdot \underset{(n\mathrm{x}1)}{\mathbf{e}_N} \right) \right]^{-1} \tag{31}$$

where $\mathbf{e}_N^s$ and $\mathbf{e}_R^s$ are the sectoral employment shares and $\mathbf{e}_N$ and $\mathbf{e}_R$ are the employment levels in the nation and the region, respectively.

Then, using the sectoral employment shares we compute the simple location quotient vector as:

$$\underset{(p\text{x}1)}{\mathbf{SLQ}} = \underset{(p\text{x}p)}{\hat{\mathbf{e}}_R^s} \cdot \underset{(p\text{x}p)}{\hat{\mathbf{e}}_N^{s\,-1}} \cdot \underset{(p\text{x}1)}{\mathbf{i}} \tag{32}$$

where **SLQ** is the vector of the employment based simple location quotients and $\hat{\mathbf{e}}_N^s$ and $\hat{\mathbf{e}}_R^s$ are the diagonal matrices of the national and regional sectoral employment shares, respectively. If the computed **SLQ** for any given sector is higher than one, then we can assume that that sector is well represented in the region and thus we can use the sectoral employment ratios to approximate regional sectoral output. Otherwise, if the computed SLQ is less than one for any given sector, then the economic activity of that sector in the region is very low and thus its sectoral output should be adjusted.

After replacing in the **SLQ** vector the values that are greater from one with one, we can compute regional sectoral output vector as:

$$\underset{(p\text{x}1)}{\mathbf{x}_R} = \left(\underset{(p\text{x}p)}{\hat{\mathbf{e}}_R} \cdot \underset{(p\text{x}p)}{\hat{\mathbf{e}}_N^{-1}} \right) \cdot \underset{(p\text{x}p)}{\hat{\mathbf{SLQ}}} \cdot \left(\underset{(p\text{x}n)}{\mathbf{S}} \cdot \underset{(n\text{x}1)}{\mathbf{x}_N} \right) \tag{33}$$

where $\mathbf{x}_N$ and $\mathbf{x}_R$ are the national and regional sectoral output, respectively, $\hat{\mathbf{e}}_N$ and $\hat{\mathbf{e}}_R$ are the diagonal matrices of the national and regional sectoral employment, respectively and $\hat{\mathbf{SLQ}}$ is the diagonal matrix of the simple location quotients.

Once the regional sectoral output has been computed we can proceed to the estimation of the regional transactions matrix and imports vector as follows:

$$\underset{(p\text{x}p)}{\mathbf{Z}_R} = \underset{(p\text{x}p)}{\tilde{\mathbf{A}}_R} \cdot \underset{(p\text{x}p)}{\hat{\mathbf{x}}_R} \tag{34}$$

and

$$\underset{(1\text{x}p)}{\ddot{\mathbf{m}}_R} = \underset{(1\text{x}p)}{\tilde{\mathbf{m}}_R} \cdot \underset{(p\text{x}p)}{\hat{\mathbf{x}}_R} \tag{35}$$

where $\mathbf{Z}_R$ is the regional transactions matrix, $\ddot{\mathbf{m}}_R$ is the regional import flows vector and $\hat{\mathbf{x}}_R$ is a diagonal matrix of the regional sectoral output computed in (33).

For the estimation of the sectoral final demand elements (household consumption, exports and other final demand) we proceed as follows. First, we estimate the total final demand as the difference between total sectoral regional output and total sectoral intermediate sales as follows:

$$\underset{(p\text{x}1)}{\mathbf{fd}_R} = \underset{(p\text{x}1)}{\mathbf{x}_R} - \underset{(p\text{x}p)}{\mathbf{Z}_R} \cdot \underset{(p\text{x}1)}{\mathbf{i}} \tag{36}$$

Two options are possible: either the final demand computed from (36) is positive or it is negative (in the extreme case it should be also null). However, an adequate choice for the parameter δ in (6) would ensure that the difference in (36) is indeed positive. Then we estimate all elements of the regional final demand using the regional to national employment ratio as well as an employment-based simple location quotient as we have done with regional sectoral output. Specifically,

$$\underset{(p\text{x}1)}{\mathbf{c}_R} = \left(\underset{(p\text{x}p)}{\hat{\mathbf{e}}_R} \cdot \underset{(p\text{x}p)}{\hat{\mathbf{e}}_N^{-1}} \right) \cdot \underset{(p\text{x}p)}{\mathbf{S\hat{L}Q}} \cdot \left(\underset{(p\text{x}n)}{\mathbf{S}} \cdot \underset{(n\text{x}1)}{\mathbf{c}_N} \right) \tag{37}$$

where $\mathbf{c}_N$ and $\mathbf{c}_R$ are the national and regional sectoral household consumption, respectively, and:

$$\underset{(p\text{x}1)}{\mathbf{exp}_R} = \left[\underset{(p\text{x}p)}{\hat{\mathbf{e}}_R} \cdot \underset{(p\text{x}p)}{\hat{\mathbf{e}}_N^{-1}} \right] \cdot \underset{(p\text{x}p)}{\mathbf{S\hat{L}Q}} \cdot \left[\underset{(p\text{x}n)}{\mathbf{S}} \cdot \underset{(n\text{x}1)}{\mathbf{exp}_N} \right] \tag{38}$$

where $\mathbf{exp}_N$ and $\mathbf{exp}_R$ are the national and regional sectoral exports, respectively.

If at the beginning of the regionalization process we have eliminated the non-existing sectors then the national exports vector will be adjusted accordingly using the export coefficients from (21).

Then the other final components of the sectoral final demand ($\mathbf{f}_R$) are calculated residually as:

$$\underset{(p\text{x}1)}{\mathbf{f}_R} = \underset{(p\text{x}1)}{\mathbf{fd}_R} - \underset{(p\text{x}1)}{\mathbf{c}_R} - \underset{(p\text{x}1)}{\mathbf{exp}_R} \tag{39}$$

For the estimation of the final payments elements we follow the same approach. Regional sectoral imports have been calculated from (35). Regional sectoral household income is computed as:

$$\underset{(1\text{x}p)}{\mathbf{h}_R} = \left[\underset{(1\text{x}n)}{\mathbf{h}_N}\ \underset{(n\text{x}p)}{\mathbf{S}'}\right] \cdot \left[\underset{(p\text{x}p)}{\hat{\mathbf{e}}_R} \cdot \underset{(p\text{x}p)}{\hat{\mathbf{e}}_N^{-1}}\right] \cdot \underset{(p\text{x}p)}{\mathbf{S\hat{L}Q}} \tag{40}$$

where $\mathbf{h}_N$ and $\mathbf{h}_R$ are the national and regional sectoral household income, respectively.

Finally, the other final components are also computed residually as:

$$\underset{(1\text{x}p)}{\mathbf{p}_R} = \underset{(1\text{x}p)}{\mathbf{x}'_R} - \underset{(1\text{x}p)}{\ddot{\mathbf{m}}_R} - \underset{(1\text{x}p)}{\mathbf{h}_R} - \underset{(1\text{x}p)}{\mathbf{i}} \cdot \underset{(p\text{x}p)}{\mathbf{Z}_R} \tag{41}$$

1.6 Available Data and Regional Classification Scheme

Since there is no availability of survey regional I-O tables, for any of the five regions, the national I-O tables were used as a basis for the construction of the regional ones'. The basic data source for all five countries was their official statistical offices, which have departments responsible for the construction of I-O tables. National I-O tables for all the five countries are constructed following the guidelines of Eurostat, the official statistical office of the European Union, according to the European System of Accounts 1995 (ESA 1995). Consequently the industrial classification rules are also the same for all countries, which is compatible with industrial classification proposed by the United Nations National Accounts department, the well known SIC (Standard Industrial Classification).

In order to construct the regional I-O tables it was decided that the partners for the five Balkan countries had to deliver the following data: the most recent and disaggregated national I-O table (that is, a commodity-by-commodity symmetric I-O table, in current prices, with domestic flows valued in basic values, following industry technology assumption); employment data at the same as or higher classification level of the I-O table and superior data, if available, coming from small-scale surveys or official sources.

Table 1 shows, in summary, the basic characteristics of the available national I-O tables of each country. It can be noted that all the tables meet the *common I-O model* characteristics. Moreover, the final scheme (number of sectors) of the derived regional tables for each region is shown at the last row of the table.

Tab. 1 - Summary characteristics of the national I-O tables and the regional scheme

Characteristics	Bulgaria	Croatia	Greece	Romania	Slovenia
No. of sectors	Symmetric 53x53	Symmetric 60x60	Symmetric 29x29	Symmetric 28x28	Symmetric 58x58
Technology Assumption	Industry technology assumption Industry-by-Industry	Industry technology assumption Product-by-Product	Industry technology assumption product-by product	Industry technology assumption product-by product	Industry technology assumption product-by-product
Valuation	Basic values, current prices	Basic values, current prices	Basic values, current prices	Basic values, current prices	Basic values, current prices
Year	1997	1997	1998	1999	2000
Intermediate flows	Domestic	Domestic	Domestic	Domestic	Domestic
Employment data	1997 (28 sectors)	1997 (60 sectors)	2000 (60 sectors)	1999 (28 sectors)	2000 (58 sectors)
DERIVED REGIONAL I-O TABLES SCHEME					
No. of sectors	**18**	**14**	**18**	**17**	**29**

2. Sectoral Linkage Coefficients and Theoretical Base

2.1 Introduction

The Input–Output model can offer not only an accurate picture of the intersectoral relationships of an economy but also, it can estimate and predict the impacts caused by different changes on a national or regional economy. So, by the use of the input-output model, both the evaluation of the relative importance of any given sector and the quantitative evaluation of expected impacts in the production, income or employment of the regional or national economy initiated from any exogenous change can be accomplished. The estimation of the economic impacts of the productive sectors is done with the help of the sectoral linkages, the calculation of which is usually based on the elements of the total requirements matrix (Leontief inverse).

By the input-output model, any change in the productive capacity of any given sector provides two distinct results. First, the increase in the total production of sector *j* at the same time increases sector *j*'s demand for inputs from the rest of economic sectors in the model. In this occasion, the term backward linkage of sector *j* is used to represent this kind of internal transactions. On the other hand, the increase of the total production of sector *j* increases its total supply to the rest of the economic sectors in the model that use sector *j*'s product as an input in their production process. In this case the term forward linkage is used to represent these intersectoral transactions.

It is important to point out that the analysis of the economic impacts within input-output model concerns a mid-term period. If the aim of the analysis has long-term prospects, then the adaptation of the total and direct requirements matrices will be essential so as to take into consideration the technological changes in the productive structure of the system. According to several authors, any input-output model can be reliable used for impact analysis for a period of five years (Miller and Blair, 1985; Livas, 1994).

Traditionally, the impact analysis within input-output models is done by the use of the backward and forward linkages proposed by Rasmussen (1956) and Hirschman (1958). These linkages show the size of structural interdependence in an economy as well as the degree to which the enlargement of a sector can contribute directly or indirectly to the enlargement of other sectors in the model. Because of their property, backward linkages are also reported in the bibliography as multipliers of output, income or employment depending on their empirical specification. However, in spite of their wide application, some empirical works raise important doubts for the way in which the Hirschmanian linkages evaluate sectoral interdependence (e.g., Sraffa, 1960; Pasineti, 1973; Skolka, 1986; Heimler, 1991).

Improving the methodological framework and using the conclusions of Sraffa (1960) and Pasinetti (1973), Mattas and Shrestha (1991) proposed the use of input-output elasticities as a linkage indicator for the evaluation of sectoral interdependence. The calculation of input-output elasticities takes into consideration the relative size of each sector measured as its share in the total final demand. The evaluation of backward linkages by input-output elasticities is essentially the same as the approach suggested by Sraffa (1960) and Pasinetti (1973). Theoretically, however, they are different since input-output elasticities are based on classical hypotheses of the micro-economic theory.

The same year Heimler (1991) using the methodological framework developed by Schultz (1976) and Milana (1985), proposed an index of vertical integration which takes into consideration the relative size of the sector concerning not only the final demand as Mattas and Shrestha (1991) proposed, but also the total production of the economy. The index of vertical integration is calculated using the net intermediate transactions and the relative size of each sector to the total gross production of the economy.

Finally, relatively recently, Dietzenbacher and Van der Linden (1997), starting from Strassert's (1968) hypothetical extraction method, proposed an indicator of sectoral interdependence which is theoretically more consistent than those of Rasmussen and Hirschman. In contrast with Strassert's approach, the Dietzenbacher and Van der Linden (1997) indicators allow for the differentiation between backward and forward linkages.

It is obvious that each one of the abovementioned linkage coefficients is based on a different methodological framework. This does not mean that any one of them is superior to the others. Each linkage coefficient has certain advantages and disadvantages, the importance of which depends exclusively on the needs and the priorities of each empirical application. Below the way of calculating and interpreting some of the most important linkages appeared in literature is analyzed. Special attention is paid to those of Rasmussen (1956) and Hirschman (1958) which are used in the project for impact analysis.

2.2 Chenery and Watanabe (1956) Backward Linkages

The first empirical attempt to identify the most important economic sectors within the input-output models belongs to Chenery and Watanabe (1956). Specifically, they proposed that the degree of backward linkages of each sector should be evaluated on the basis of sector's direct input requirements. They proposed the following backward linkage coefficients for the evaluation of sectoral interdependence based on the direct requirements matrix:

$$BL_j^{CW} = \sum_{i=1}^{n} a_{ij} \quad \text{or} \quad \mathbf{bl}^{CW} = \mathbf{e} \cdot \mathbf{A} \tag{42}$$

where $\mathbf{bl}^{CW}$ is the (nx1) vector of backward linkage coefficients which reveals the direct dependence of each sector upon its intermediate inputs; **A** is (nxn) matrix of direct requirements and **e** is the (1xn) unitary vector. As is obvious from (42), the computed linkages ignore completely the indirect effects from an exogenous change in the economy. For this reason, they are often referred also as direct backward linkage coefficients.

2.3 *Rasmussen (1956) and Hirschman (1958) Backward Linkages*

Recognizing the abovementioned deficiencies, Rasmussen (1956) and Hirschman (1958) proposed the use of the total requirements matrix and not the direct one for the calculation of backward linkages provides more reliable results regarding the backward linkages of the sectors within the model. The calculation of the Rasmussen (1956) and Hirschman (1958) backward linkages is based on the difference between direct and total result that is created by an exogenous change in the final demand of the economic system. This result can concern total production, income or employment.

Each element of the total requirements matrix gives the total (direct and indirect) increase in the total output of the supplier sector, which is required in order to satisfy the increase of one unit in the final demand of the products of the purchaser sector. Moreover, Rasmussen's (1956) and Hirschman's (1958) proposal provides an indication of the total multiplicative results in the economy from an exogenous change in the system. Specifically they suggested the following linkage indicators:

$$BL_j^{RH} = \sum_{i=1}^{n} \beta_{ij} \quad \text{or} \quad \mathbf{bl}^{RH} = \mathbf{e} \cdot \mathbf{B} \tag{43}$$

where $\mathbf{bl}^{RH}$ is the (nx1) vector of backward linkages each element of which shows the total increase of gross output in the economy which is required for the satisfaction of one unit of increase in the final demand of sector j and β_{ij} is the corresponding element of the total requirements matrix **B**.

So, the Hirschmanian linkages analyse the impact that is produced in the system through the increased demand for inputs and provide an indication of the degree of interdependence of any given sector within the economy. Because of their multiplicative property, the backward linkages are often reported in the bibliography as output multipliers. It must be stressed that the above indicators do not satisfy the additivity property with respect to the changes in the final demand of the model. That is to say, the increase of final demand of sector alters *ex post* the size of the backward linkages and consequently it cannot be used to interpret any new change in the final demand.

Apart from the output backward linkages, it is also possible within input-output model to determine also the backward linkage coefficients with respect to the household income and the employment of the regional or national economy. These linkage coefficients show the changes in household income or in employment that are initiated by any change in the final demand of each individual sector.

Specifically, the income backward linkages are calculated as follows:

$$IBL_j^{RH} = \sum_{i=1}^{n} L_i \beta_{ij} \quad \text{or} \quad \mathbf{ibl}^{RH} = \mathbf{l}' \cdot \mathbf{B} \tag{44}$$

and

$$L_i = \overline{L}_i / X_i \quad \text{or} \quad \mathbf{l} = \overline{\mathbf{l}}\,'./\,\mathbf{x} \tag{45}$$

where $\mathbf{ibl}^{RH}$ is the (1xn) vector of sectoral income backward linkages, each element of which reveals the change in the total (direct and indirect) household income of the economy initiated by any change in the final demand of each sector separately; $\mathbf{l}$ is the (nx1) vector of income technical coefficients, each element of which shows the direct change in the income of each sector of the economy initiated from any change in its total production and $\overline{\mathbf{l}}$ it is the (1xn) vector of household income.

Accordingly, the employment backward linkages can be calculated as follows:

$$EBL_j^{RH} = \sum_{i=1}^{n} W_i \beta_{ij} \quad \text{or} \quad \mathbf{ebl}^{RH} = \mathbf{w}' \cdot \mathbf{B} \tag{46}$$

and

$$W_i = \overline{W}_i / X_i \quad \text{or} \quad \mathbf{w} = \overline{\mathbf{w}}\,'./\,\mathbf{x} \tag{47}$$

where $\mathbf{ebl}^{RH}$ is the (1xn) vector of sectoral employment backward linkages each element of which, reveals the change in total employment, which is initiated by any change in the final demand of every given sector, $\mathbf{w}$ is the (nx1) vector of employment technical coefficients, each element of which shows the direct change in the employment of each sector in the economy produced by a change in its total gross output and $\overline{\mathbf{w}}$ is the (1xn) vector of sectoral employment.

The above income and employment backward linkages are also called as *simple multipliers* in literature. As already mentioned, they measure the total changes in an economy due to exogenous changes in the final demand of one specific sector of the economy. In order to measure total changes in an economy due to a unit change in household income or employment of a sector the well known *Type I multipliers* are used. Type I multiplier of a sector can be calculated by dividing its simple multiplier with its direct effect (direct income or employment coefficient). Specifically, it is calculated as follows:

$$IM_j^{RH} = \sum_{i=1}^{n} L_i \beta_{ij} \Big/ L_j \quad \text{or} \quad \mathbf{im}^{RH} = \mathbf{ibl}^{RH} ./ \mathbf{l} \tag{48}$$

and

$$EM_j^{RH} = \sum_{i=1}^{n} W_i \beta_{ij} \Big/ W_j \quad \text{or} \quad \mathbf{em}^{RH} = \mathbf{ebl}^{RH} ./ \mathbf{w} \tag{49}$$

where $\mathbf{im}^{RH}$ and $\mathbf{em}^{RH}$ are (1xn) vectors of Type I income and employment multipliers, each element of which shows the change in total income or employment in the economy initiated by a change in income or in employment of each individual sector.

2.4 Augustinovics (1970) Forward Linkage Coefficients

An important disadvantage of Hirschmanian forward linkage coefficients concerns their underlying hypothesis regarding the change in the final demand of every sector in the model. It is obvious that in real terms it is difficult to alter the final demand of every sector in the same way. In addition, if a great part of the total production of any sector is sold to another sector with low production level relative to the rest of the economy, or a small part of the total production of any sector is sold to another sector with relatively high production level, then the traditional forward linkage coefficients will provide us with misleading results (Jones, 1976).

To overcome that problem, Augustinovics (1970) suggested the use of the transposed matrix of intermediate sales to compute forward linkage coefficients that reveals the intermediate consumption as a percentage of total sectoral sales including final demand. Specifically, the basic input-output identity can be written in terms of total product supply as (supply-driven model):

$$\mathbf{x}' = \mathbf{x}'\mathbf{F} + \mathbf{va} \tag{50}$$

and

$$\mathbf{F} = \hat{\mathbf{x}}^{-1}\mathbf{Z} \tag{51}$$

where $\mathbf{F}$ is a (nxn) matrix of intermediate sales, $\mathbf{Z}$ is the (nxn) transactions matrix and $\mathbf{va}$ is the (1xn) vector of final payments.

Solving (50) with respect to output vector we get:

$$\mathbf{x}' = \mathbf{va}\left(\mathbf{I} - \mathbf{F}\right)^{-1} \Rightarrow \mathbf{x}' = \mathbf{va} \cdot \mathbf{B}^{*} \tag{52}$$

where $\mathbf{B}^{*}$ is the (nxn) transposed matrix of tot al requirements. According to Augustinovics (1970), the forward linkage coefficients should be computed as:

$$FL_i^{AG} = \sum_{j=1}^{n} \beta_{ij}^{*} \text{ or } \mathbf{fl}^{AG} = \mathbf{B}^{*} \cdot \mathbf{e}' \tag{53}$$

where $\mathbf{fl}^{AG}$ is the (nx1) vector of forward linkage coefficients that shows the total (direct and indirect) change in the total output of the economy that is initiated by a unit change in sector final payments. Using the same analytical approach, we can calculate the income and employment forward linkage coefficients as:

$$IFL_i^{AG} = \sum_{j=1}^{n} L_i \beta_{ij}^{*} \text{ or } \mathbf{ifl}^{AG} = \mathbf{B}^{*} \cdot \mathbf{l} \tag{54}$$

and

$$EFL_i^{AG} = \sum_{j=1}^{n} W_i \beta_{ij}^{*} \text{ or } \mathbf{efl}^{AG} = \mathbf{B}^{*} \cdot \mathbf{w} \tag{55}$$

where $\mathbf{ifl}^{AG}$ and $\mathbf{efl}^{AG}$ are the (nx1) vectors of forward linkage coefficients with respect to household income and employment that show the total change in household income or employment in the economy due to a unit change in the final payments of any given sector.

2.5 Mattas and Shrestha (1991) Input-Output Elasticities

An important disadvantage of the above linkage coefficients concerns their inability to incorporate the relative size of each sector in the economy (Sraffa, 1960; Pasinetti, 1973; Milana, 1985; Mattas and Shrestha, 1991; Heimler, 1991). This means that the traditional sectoral linkages do not impress satisfactorily the relative importance of each sector and consequently it is likely that they disorientate policy makers in the formulation of regional or national development plans as for the ability of each sector to stimulate domestic production, income or employment.

Recognizing this deficiency, Mattas and Shrestha (1991) proposed the use of input-output elasticities of final demand, as a alternative and theoretically more reliable way for the measurement of sectoral interconnections within input-output model. Specifically, they proposed the following indicators:

$$OE_j^{MS} = \sum_{i=1}^{n} \beta_{ij} Y_j^* \text{ or } \mathbf{oe}^{MS} = \mathbf{B} \cdot \mathbf{y}^* \tag{56}$$

and

$$Y_j^* = Y_j \Big/ \sum_{i=1}^{n} X_i \text{ or } \mathbf{y}^* = \mathbf{y} / (\mathbf{e} \cdot \mathbf{x}) \tag{57}$$

where $\mathbf{oe}^{MS}$ is the (nx1) vector of elasticities of demand, each element of which gives the percentage change in the total output of economy caused by a percentage change in final demand and $\mathbf{y}^*$ is an (nx1) vector of direct factors of demand, each element of which gives the direct change in the final demand of each sector caused by a change in the total output of the economy.

As can be noted, input-output elasticities take into consideration both sectoral interdependence and their relative importance in the national or regional economy. Consequently, they provide more reliable results on the potentials for stimulating growth within the economy. If the aim of developmental policy is the increase in final demand, the input-output elasticities will provide more accurate conclusions as they take into consideration the relative size of sector.

In addition with output elasticities, we can calculate also income and employment elasticities as:

$$IE_j^{MS} = \left\{ \sum_{i=1}^{n} \left[\left(L_i / X_j \right) \beta_{ij} \right] \Big/ \left(L_j / X_j \right) \right\} \cdot Y_j^* \tag{58}$$

and

$$EE_j^{MS} = \left\{ \sum_{i=1}^{n} \left[\left(W_i / X_j \right) \beta_{ij} \right] \Big/ \left(W_j / X_j \right) \right\} \cdot Y_j^* \tag{59}$$

where IE^{MS} and EE^{MS} are income and employment elasticities that show the percentage change in income and the employment of an economy respectively, which is caused by a percentage change in the final demand of each sector.

2.6 *Heimler (1991) Index of Vertical Integration*

Several years before Mattas and Shrestha (1991), Sraffa (1960) and Pasinetti (1973) tried to find an alternative way for the measurement of sectoral linkages taking into consideration also the relative size of each sector within the economy. In contrast with Mattas and Shrestha (1991), their methodological approach was based on the notion of vertical integration sector. In summary, the notion of vertical integration presupposes that, for each sector of an economy, there is a vertically integrated sector, which is constituted of intermediate inputs that actually are occupied by other sectors and contributes indirectly to the total gross production of this sector (Pasinetti, 1973).

Based on this assumption, the total output of the vertical integrated sector is defined as the vector of production that is required to produce its total final demand. The basic identity of the model can be written as follows:

$$\bar{\mathbf{X}} = \left(\mathbf{I} - \mathbf{A} \right)^{-1} \hat{\mathbf{y}} \tag{60}$$

where $\hat{\mathbf{y}}$ is the (nxn) diagonal matrix of sectoral final demand, $\mathbf{A}$ is the direct requirements matrix and $\bar{\mathbf{X}}$ is the (nxn) matrix of total output for the vertically integrated sectors, each column of which shows the vector of production from each sector of the model which is required for the direct and indirect production of the final demand of that sector. Each column in $\bar{\mathbf{X}}$ is independent of the others and it can be considered as an independent economy, which produces exclusively for the final demand of one only sector. It provides similar information to that of the backward linkages but to a different extent.

However, in the calculation of the matrix of total output of vertically integrated sectors (this is also true in the calculation of Hirschmanian linkage coefficients) using the total requirements matrix, the intermediate demand of each sector is counted twice. Specifically, the sales from sector *i* to sector *j* that correspond to sector *j*'s backward linkage are at the same time sector *i*'s forward linkage. From a practical point of view one direction of intersectoral transactions should only be incorporated in the calculation of indicator[8].

Consequently, the computed linkage coefficients are very likely to provide inaccurate information concerning the potential of each sector to stimulate growth domestically. In order to overcome the problem of double-counting, Sraffa and Pasinetti proposed to multiply the matrix of vertically integrated sectors' total output by the vector of value added coefficients as follows:

$$VIS_j^{SP} = \sum_{i=1}^{n} \overline{VA}_i \overline{X}_{ij} \text{ or } \mathbf{vis}^{SP} = \overline{\mathbf{va}} \cdot \overline{\mathbf{X}} \tag{61}$$

and

$$\overline{VA}_j = \sum_{i=1}^{n} Z_{ij} \Big/ X_j \text{ or } \overline{\mathbf{va}} = (\mathbf{e} \cdot \mathbf{Z})./\mathbf{X} \tag{62}$$

where $\mathbf{vis}^{SP}$ is the (1x*n*) vector of intermediate consumption of vertical integrated sectors which is required directly or indirectly for the production of total final demand of economy and $\overline{\mathbf{va}}$ is the (1x*n*) vector of value added coefficients.

In this way, Sraffa (1960) and Pasinetti (1973) tried to incorporate in the calculation of linkage coefficients, the relative size of each sector based on its share of total final demand. Even though they did not propose any specific quantitative indicator they took into consideration the problem of double measurement of intermediate transactions, which was ignored in Hirschmanian linkages.

[8] The problem of double counting of intermediary consumption does not take place in the exceptional case where a sector either produces exclusively for the final demand (consumption, investments and exports) or does not use intermediary inputs.

However, each sector of the model does not only produce final demand but also intermediate inputs for the remaining sectors in the economy. Thus, by simply defining the relative size of each sector based on its share of final demand, it is likely that we are led to mistaken conclusions as for growth potentials. Based on the theoretical contributions of Schultz (1976) and Milana (1985), Heimler (1991) proposed an indicator of sectoral evaluation that takes into consideration both the intermediate and final requirements of each sector.

Let us suppose that the economic system is constituted by two groups of sectors, manufacturing and agriculture and we want to calculate the multiplicative result in total output of one group of sectors that results from an increase in total production of the others. The basic system of equations of the model can be separated in two subsystems as follows:

$$\mathbf{x}_a = \mathbf{A}_{aa}\mathbf{x}_a + \mathbf{A}_{am}\mathbf{x}_m + \mathbf{y}_a \tag{63}$$

and

$$\mathbf{x}_m = \mathbf{A}_{ma}\mathbf{x}_a + \mathbf{A}_{mm}\mathbf{x}_m + \mathbf{y}_m \tag{64}$$

where $\mathbf{x}_a$ and $\mathbf{x}_m$ are the (ax1) and (mx1) vectors of total output of the agricultural and manufacturing sectors respectively, $\mathbf{y}_a$ and $\mathbf{y}_m$ are the (ax1) and (mx1) vectors of the total final demand of the agricultural and manufacturing sectors, respectively, $\mathbf{A}_{aa}$ is the (axa) matrix of technical coefficients of the self consumption for the agricultural sectors, $\mathbf{A}_{mm}$ is the (mxm) matrix of technical coefficients of the self-consumption for the manufacturing sectors, $\mathbf{A}_{am}$ is the (axm) matrix of technical coefficients of demand of agricultural output from the manufacturing sectors, $\mathbf{A}_{ma}$ is the (mxa) matrix of technical coefficients of the demand of manufacturing products from agricultural sectors, a=1, 2, …, A and m=1, 2, …, M are the number of the agricultural and industrial sectors, respectively.

Solving the above system for $\mathbf{x}_m$ and supposing that $\mathbf{x}_a$ is exogenous, we derive the following formula from which it is possible to calculate the direct and indirect effect in the total output of industrial sectors, which is induced by a change in total output of agricultural sectors:

$$\mathbf{x}_m = \left(\mathbf{I} - \mathbf{A}_{mm}\right)^{-1}\mathbf{A}_{ma}\mathbf{x}_a + \left(\mathbf{I} - \mathbf{A}_{mm}\right)^{-1}\mathbf{y}_m \tag{65}$$

Milana (1985) proved that the first term in the right side of equation (65) corresponds to the total output of the vertical integrated sector, which derives from a change in gross production of agricultural sectors. Also in this case, the problem of double counting of total intermediate sales remains and it can be eventually solved using the approach suggested by Sraffa (1960) and Pasinetti (1973). That is:

$$\mathbf{ic}_{ma} = \overline{\mathbf{v}}\overline{\mathbf{a}}\left[\left(\mathbf{I} - \mathbf{A}_{mm}\right)^{-1} \mathbf{A}_{ma} \mathbf{x}_{a}\right] \tag{66}$$

where $\mathbf{ic}_{ma}$ is the (1xm) vector of intermediate sales of the vertical integrated sector which is required directly or indirectly by the manufacturing sectors for the production of total output of agricultural sectors. If intermediate sales are added to $\mathbf{ic}_{ma}$ and one compares the result with the total intermediary consumption of economy, the evaluation of importance of agricultural sectors of economy will be possible.

Based on the above theoretical contributions, Heimler (1991) proposed the following index of vertical integration that can be used to evaluate sectoral potentials to generate impacts within the economy:

$$VI_j^H = \sum_{i=1}^{n} IC_{ij} \Big/ IC_j \tag{67}$$

where VI^H is the *index of vertical integration* of sector j and constitute a quantitative measurement of indirect results of a change in the gross product of this sector in the intermediary consumption and in the final demand of the remaining sectors in the economy. Since this indicator does not depend on the relative size of sector j, it can be compared to the others among the sectors of system.

2.7 The Method of Hypothetical Extraction and Dietzenbacher and Van der Linden (1997) Backward and Forward Linkages

The idea of the hypothetical extraction method of a sector from the input-output model for the measurement of its sectoral linkages is due to Strassert (1968). The basic idea of this approach lies in the analysis of the direct and indirect impacts in the system from the hypothetical extraction of one sector from the model. This quantitative measurement of impacts can give us an explicit and complete picture of the sectoral linkages of each sector. This approach takes into consideration, for the calculation of the sectoral linkages, both the relative size of each sector and the problem of double counting of the intersectoral transactions.

Among several empirical studies, carried out the last years, the most promising one is the method of Dietzenbacher and Van der Linden (1997), since it gives the possibility of calculation and discrimination between the backward and forward sectoral linkage coefficients in accordance to the traditional indicators of Rasmussen and Hirschman. The basic idea about the evaluation of both backward and forward linkages of every sector is simple theoretically and methodologically. Specifically, this sector should be extracted hypothetically from the model and then one should analyze the direct and indirect impact that this elimination has in the total output of the economy. If we assume that the sector *k* of the model is extracted from the system, then the corresponding column and row *k* of the direct and the total requirements matrix of model will be deleted. So the basic identity of the model takes the following form:

$$\tilde{\mathbf{x}}^{(k)} = \left[\mathbf{I}^{(k)} - \tilde{\mathbf{A}}^{(k)}\right]^{-1} \tilde{\mathbf{y}}^{(k)} \tag{68}$$

where $\tilde{\mathbf{A}}^{(k)}$ is a (n-1)x(n-1) direct requirements matrix and $\tilde{\mathbf{x}}^{(k)}$, $\tilde{\mathbf{y}}^{(k)}$ are the vectors of total sectoral output and final demand of the n-1 sectors of the model, respectively. Given the theoretical hypotheses of the model, the total produced product of each sector in the system n-1 will be smaller than the corresponding product of the complete model, since the extracted sector does not purchase or sell products in the remaining sectors of the system. That is, it will be $\tilde{x}_i^{(k)} < x_i \quad \forall i = 1,\ 2,\ ...,\ n$. According to Strassert (1968), the sum of the differences of the gross product of each sector provides us with a quantitative measurement of both backward and forward linkages of the kth sector. That is:

$$BL_k^S = \sum_{i=1, i \neq k}^{n-1} \left(X_i - \tilde{X}_i^{(k)}\right) \tag{69}$$

where BL_k^S is the backward and forward linkage coefficient of sector *k*, which shows the total reduction in the gross product of the economy from the elimination of this sector from the model.

An obvious disadvantage of the above linkage coefficient concerns its weakness to distinguish between the backward and forward interdependencies. Moreover, the hypothesis that the sector is completely eliminated from the system is rather restrictive (Meller and Marfan, 1981; Cella, 1984; Clements, 1990). Recognizing these disadvantages, Cella

(1984) and Sonis *et al.* (1995), based on the method of hypothetical extraction, proposed a different way for the calculation of the backward and forward linkage coefficients. Despite the important methodological and theoretical improvement that they brought, the proposed linkages are not symmetric and consequently comparable with the traditional linkages of Rasmussen and Hirschman.

Recently, Dietzenbacher and Van der Linden (1997) extended further the theoretical framework of their method suggesting an alternative way for the measurement of sectoral interdependence that overcomes the problem of symmetry between the backward and forward linkages. According to Dietzenbacher and Van der Linden (1997) the measurement of the backward linkages of each sector must reflect the dependence of this sector concerning its input requirements from the remaining ones in the model. Consequently for the calculation of backward linkages they proposed the elimination only of this type of transactions. So, the essential inputs of each sector do not emanate any more from the remainder sectors of the model but from imports from other countries or regions.

In order to understand the Dietzenbacher and Van der Linden approach, we suppose that we want to calculate the degree of backward linkage of the sector k of the model. In such a case, the sector k does not buy inputs from the remainder sectors of the system but it imports. Consequently, the system in (63) will have the form:

$$\begin{bmatrix} \tilde{X}_k \\ \tilde{\mathbf{x}}_m \end{bmatrix} = \begin{bmatrix} \mathbf{0} & \mathbf{a}_{km} \\ \mathbf{0} & \mathbf{A}_{mm} \end{bmatrix} \begin{bmatrix} \tilde{X}_k \\ \tilde{\mathbf{x}}_m \end{bmatrix} + \begin{bmatrix} Y_k \\ \mathbf{y}_m \end{bmatrix} \tag{70}$$

where $\tilde{X}_k$ is the total output of sector k , $\tilde{\mathbf{x}}_m$ is the (mx1) vector of the m remaining sectors in the model (m = 1, 2, …, n-1), $\mathbf{a}_{km}$ is the (1xm) vector of direct requirements of the remainder sectors of the model for the products of sector k , $\mathbf{A}_{mm}$ is the (mxm) direct requirements matrix between the remainder sectors of the model, Y_k is the final demand of the products of the sector k and $\mathbf{y}_m$ is the (mx1) vector of final demand of the remainder sectors of the system. Solving the above system with respect to the output vectors $\tilde{\mathbf{x}}_i$ (= a, m) we lead to the following system:

$$\tilde{\mathbf{x}}_{(k)} = \begin{bmatrix} \tilde{X}_k \\ \tilde{\mathbf{x}}_m \end{bmatrix} = \begin{bmatrix} \mathbf{I} & \mathbf{a}_{km}\left(\mathbf{I}-\mathbf{A}_{mm}\right)^{-1} \\ \mathbf{0} & \left(\mathbf{I}-\mathbf{A}_{mm}\right)^{-1} \end{bmatrix} \begin{bmatrix} Y_k \\ \mathbf{y}_m \end{bmatrix} \tag{71}$$

According to the method of hypothetical extraction, the absolute degree of backward linkages of the k^{th} sector is defined as the difference between total sectoral output before and after extraction $\left[\mathbf{x}-\tilde{\mathbf{x}}_{(k)}\right]$. This reduction in production presents the dependence of this sector on the other sectors in the system[9]. Generalizing, this difference in the sector-based products can be calculated as follows:

$$\mathbf{d}_{(k)}=\left[\mathbf{x}-\tilde{\mathbf{x}}_{(k)}\right]=\left[(\mathbf{G}-\mathbf{I})+\mathbf{e}'_m\mathbf{B}_{mm}\mathbf{a}_{mk}\mathbf{G}\right]Y_k+$$
$$+\left[(\mathbf{G}-\mathbf{I})\mathbf{a}_{km}\mathbf{B}_{mm}+\mathbf{e}'_m\mathbf{B}_{mm}\mathbf{a}_{mk}\mathbf{G}\mathbf{a}_{km}\mathbf{B}_{mm}\right]\mathbf{y}_m \tag{72}$$

and

$$\mathbf{G}=\mathbf{1}/\left(\mathbf{1}-\mathbf{A}_{kk}-\mathbf{a}_{km}\mathbf{B}_{mm}\mathbf{a}_{mk}\right),\ \mathbf{B}_{mm}=\left(\mathbf{I}-\mathbf{A}_{mm}\right)^{-1} \tag{73}$$

The size of backward linkages of the sector k is determined by two factors: the relative size of the sector and the dependance per unit of product or in other words its multiplicative result. Since what interests more is the intensity of the backward linkages, Dietzenbacher and Van der Linden (1997) proposed the normalization of a change in the gross product of the economy with the initial product of sector k. This normalization leads to the backward linkage coefficients suggested by Dietzenbacher and Van der Linden, which are calculated as follows:

$$BL_k^{DL}=\frac{\mathbf{d}_{(k)}}{X_k} \tag{74}$$

where BL_k^{DL} are the backward linkages of sector k and show the change in the total product of the economy from the elimination of the intermediary markets of this sector from the model as percentage of its production.

For the calculation of forward linkage coefficients, Dietzenbacher and Van der Linden (1997) were based on the theoretical framework suggested by Augustinovics (1970). Specifically, the change in the economy's total output from the extraction of intermediate sales of sector k is calculated as:

[9] In the extreme case where a sector does not buy intermediary inputs from the system, then the hypothetical situation will be identical to the real one and the level of the backward linkage will be zero.

$$\mathbf{d}_{(k)}^{*} = \left[\mathbf{x} - \tilde{\mathbf{x}}_{(k)} \right] = VA_k \left[\left(\hat{\mathbf{G}} - \mathbf{I} \right) + \hat{\mathbf{G}} \mathbf{F}_{km} \mathbf{B}_{mm}^{*} \mathbf{e}_m \right] +$$
$$+ VA_m \left[\mathbf{B}_{mm}^{*} \mathbf{F}_{mk} \left(\hat{\mathbf{G}} - \mathbf{I} \right) + \mathbf{B}_{mm}^{*} \mathbf{F}_{mk} \hat{\mathbf{G}} \mathbf{F}_{km} \mathbf{B}_{mm}^{*} \right] \tag{75}$$

and

$$\hat{\mathbf{G}} = \mathbf{1} \Big/ \left(\mathbf{1} - \mathbf{F}_{kk} - \mathbf{F}_{km} \mathbf{B}_{mm}^{*} \mathbf{F}_{mk} \right),\ \mathbf{B}_{mm}^{*} = \left(\mathbf{I} - \mathbf{F}_{mm} \right)^{-1} \tag{76}$$

where **F** is the matrix of direct sales suggested by Augustinovics (1970). Using the same normalization as in the case of backward linkage coefficients, Dietzenbacher and Van der Linden (1997) forward linkage coefficient for sector *k* is calculated as:

$$FL_k^{DL} = \frac{\mathbf{d}_{(k)}^{*}}{X_k} \tag{77}$$

References

Augustinovics, M. (1970): Methods of International and Intertemporal Measures of Structures, in A. P. Carter and A. Brody (eds.). Contributions to Input-Output Analysis Amsterdam: North-Holland Publishing Co.

Cella, G. (1984): The Input-Output Measurement of Interindustry Linkages. Oxford Bulletin of Economics and Statistics, 46: 73-84.

Chenery, H. B. and Watanabe, T. (1958): International Comparisons of the Structure of Production. Econometrica, 26: 487-521.

Clements, B.J. (1990): On the Decomposition and Normalization of Interindustry Linkages. Economics Letters, 33: 337-340.

Czamanski, S. and Malizia, E. (1969): Applicability and limitations in the use of national input output tables for regional studies. Papers and Proceedings of the Regional Science Association, 23: 65-77.

Dewhurst, J. H. (1992): Using RAS technique as a test of hybrid methods of regional input-output table updating. Regional Studies, 26: 81-91.

Dietzenbacher, E. and Van der Linden, J.A. (1997): Sectoral and Spatial Linkages in the EC Production Structure. Journal of Regional Science, 37: 235-257.

Dietzenbacher, E., Van der Linden, J.A. and Steenge, A.E. (1993): The Regional Extraction Method: Applications to the European Community. Economic Systems Research, 5: 185-206.

Flegg, T. A., and Webber, C.D. (2000): Regional Size, Regional Specialization and the FLQ Formula, Regional Studies, 34 (6): 563-69.

Flegg, T. A., Webber, C.D. (1996a): Using location quotients to estimate regional input-output coefficients and multipliers, Local Econ. Quart., 4: 58-86.

Flegg, T. A. and Webber, C.D. (1996b): The FLQ formula for generating regional input-output tables: an application and reformation, Working Papers in Economics, 17, University of the West of England, Bristol.

Flegg, T. A. and Webber, C.D. (1997): On the Appropriate Use of Location Quotients in Generating Regional Input-Output Tables: Reply, Regional Studies, 31:795-805.

Flegg, T. A., Webber, C.D. and Elliot, M. V. (1995): On the appropriate use of location quotients in generating regional input-output tables. Regional Studies, 29: 547-561.

Heimler, A. (1991): Linkages and Vertical Integration in the Chinese Economy. Review of Economics and Statistics, 69: 261-267.

Hirschman, A. O. (1958): The Strategy of Economic Development. New Haven: Yale University Press.
Hoover, E. M. (1975): An introduction to regional economics. New York: Knopf.
Jensen, R. C., Mandeville, T. D. and Karunaratne, N. D. (1979): Regional Economic Planning: Generation of Regional Input-Output Analysis. London: Croom Helm.
Johns, P. M. and Leat, P. M. K. (1987): The Application of Modified GRIT Input-Output Procedures to Rural Development Analysis in Grampian Region. Journal of Agricultural Economics, 38, pp. 245-256.
Jones, L.P. (1976): The Measurement of Hirschmanian Linkage. Quarterly Journal of Economics, 90: 323-333.
Leontief, W. (1941). The Structure of the American Economy, 119-1929. New York: Oxford University Press. Second ed. 1951. White Plains: International Arts and Science Press.
Leontief, W. (1986): Input-Output Economics. New York: Oxford University Press, Second Edition.
Leontief, W. (1953): Studies in the structure of the American economy. New York: Oxford University Press.
Livas, P.Ch. (1994): Input-Output Analysis. Athens: Stamoulis Press (in Greek).
Malizia, E. and Bond, D. L. (1974): Empirical tests of the RAS method of interindustry coefficient adjustment. Journal of Regional Science, 14: 355-365
Mattas, K. and Shrestha, C. (1991): A New Approach to Determining Sectoral Priorities in an Economy: Input-Output Elasticities. Applied Economics, 23: 247-254.
Mattas, K., Pagoulatos, A. and Debertin, D. L. (1984): Building Input-Output Models Using Non-Survey Techniques. Southern Rural Development Centre, Mississippi Series, No. 72.
McCann, P. and Dewahurst, J. (1998): Regional Size, Industrial Location and Input-Output Expenditure Coefficients. Regional Studies, 32(5): 435-44.
Meller, P. and Marfán, M. (1981): Small and Large Industry: Employment Generation, Linkages and Key Sectors. Economic Development and Cultural Change, 19: 263-274.
Midmore, P. (1991): Input-Output and Agriculture: a review. In: Midmore P. (eds). Input-Output Models in the Agricultural Sector, Aldershot: Gower, 1-20.
Midmore, P. (1993): Input-Output Forecasting of Regional Agricultural Policy Impacts. Journal of Agricultural Economics, 44, pp 284-300.

Milana, C. (1985): Direct and Indirect Requirements for Gross Output in Input-Output Analysis. Metroeconomics, 37: 283-292.
Miller, R. E. and Blair, P. D. (1985): Input-Output Analysis: Foundations and Extensions. Prentice Hall, Englewood Cliffs, New Jersey.
Moore, F. T. and Petersen, J. W. (1955): Regional analysis: An interindustry model for Utah. Review of Economics and Statistics, 37: 368-83.
Morrison, W. I. and Smith, P. (1974): Non-survey input-output techniques at the small area level: An evaluation. Jounral of Regional Science, 14: 1-14.
Pasinetti, L. (1973): The Notion of Vertical Integration in Economic Analysis. Metroeconomics, 25: 1-29.
Rasmussen, P. N. (1956): Studies in Intersectoral Relations. Amsterdam: North-Holland.
Richardson, H. (1972): Input-Output and Regional Economics. New York: Jhon Wiley & Sons Inc., Halsted Press.
Round, J. I. (1972): Regional input-output models in the U.K.: A re-appraisal of some techniques. Regional Studies, 6: 1-9.
Round, J. I. (1978): On estimating trade flows in interregional input-output models. Regional Science and Urban Economics, 8: 289-302.
Schaffer, W. and Chu, K. (1969): Non-survey techniques for constructing regional interindustry models. Papers and Proceedings of the Regional Science Association, 23: 83-101.
Schaffer, W.A (1972): Estimating regional input-output coefficients. The Review of Regional Science, 2: 57-71.
Schultz, S. (1976): Intersectoral Comparisons as an Approach to the Identification of Key Sectors, in K. Polenske and J.V. Skolka (eds.), Advances in Input-Output Analysis. Cambridge Mass.: Ballinger.
Skolka, J. (1986): Input-Output Multipliers and Linkages. 8th International Conference on Input-Output Techniques, Sapporo, Japan, July 28-August 2.
Sonis, M., Guilhoto, J.J.M., Hewings, G.J.D. and Martins, E.B. (1995): Linkages, Key Sectors and Structural Change: Some New Perspectives. The Developing Economics, 33: 233-270.
Sraffa, P. (1960): Production of Commodities by Means of Consumption. Cambridge: Cambridge University Press.
Stone, R. (1961): Input-Output and National Accounts. Paris: Organization for European Economic Cooperation Publications.
Stone, R. (1963): Input-Output Relationships. 1954-66. University of Cambridge.

Stone, R. and Brown, A. (1962): A computable model for economic growth. Vol. 1, A Programme for Growth. London: Chapman and Hall.

Strassert, G. (1968): Zür Bestimmung Strategischer mit Hilfe von Input-Output Modellen. Jahrbrücher für Nationakökonomie und Statistik, 182: 211-215.

Su, T. (1970): A note on regional input-output models. Southern Economic Journal, 36: 325-327.

Tzouvelekas, V. and Mattas, K. (1995): Revealing a Region's Growth Potentials Through the Internal Structure of the Economy, International Advances in Economic Research, 1(3): 304-313.

Tzouvelekas, V. and Mattas, K. (2000): Tourism and agro-food as a growth stimulus to a rural economy: The Mediterranean island of Crete. Journal of Applied Input-Output Analysis, 5: 69-81.

6. SCENARIO DEFINITION AND METHODOLOGY FOR IMPACT ANALYSIS

Andrea Bonfiglio

1. Introduction

The core objective of the REAPBALK research is to investigate on the medium-term perspectives of each selected region with a particular reference to agricultural dynamics and overall employment patterns. This is made by assessing the impact of different scenarios on output, income and employment in the selected case study regions. The scenarios involve both general aspects, concerning national economic growth, and specific aspects, regarding EU accession and agricultural policies. The methodology used to evaluate the impact generated by alternative scenarios is based on the I-O approach. This technique allows the study of intersectoral adjustments within a territory following exogenous shocks. In addition, I-O analysis can bring useful insights into the differing effects on regional employment and on other important variables, stemming from the diversity of the Balkan regions in terms of their economic development and structural characteristics.

This analysis was performed over the general reference period 2003-2013. The main time points of interest are 2007 and 2013. The middle point 2007 is of particular interest since this year Bulgaria and Romania are foreseen to enter the EU. The end point, 2013, was chosen due to the fact that it is consistent with the EU timetable for full alignment of direct payments in the new members to the payments received by the EU-15. Thus, it represents the time point when a full integration of the new members into EU policies is expected.

Two different kinds of analysis are adopted: a static and a dynamic analysis. The former is the traditional one in which estimates are obtained by a static I-O model. The main limitation of this approach is that it is assumed that technology does not change over time. Conversely, the latter tries to capture also the effects generated by technology changes. Furthermore, market enlargement effects due to EU accession and CAP market support are evaluated, too. Both analyses are carried out at national and regional levels. The derivation of national estimates in addition to the regional ones allows us to draw any regional impacts into a clear focus within the national economy and it allows an assessment of the appropriateness of policies designed for the country as a whole on the study region.

The common policy scenarios and the main guidelines for their definition are briefly illustrated in the second section of this chapter. The third section details the methodology for impact analysis. The remaining sections describe the way policy instruments and scenarios are concretely implemented and analysed by the I-O methodology.

2. Policy scenarios

The main policy changes in the Balkan applicant countries are expected to be produced by accession to the EU, including those changes which occurred during the pre-accession phase. The main policy instruments analysed are thus the CAP framework and pre-accession programmes.

Within the CAP framework, five types of EU transfers are considered: (a) CAP market support flows[1]; (b) direct payments; (c) rural development funds; (d) general structural funds; (e) cohesion funds. In addition, possible national top-ups of direct payments and the required co-financing as a consequence of the application of the European schemes are taken into account.

Conditions of accession for Bulgaria and Romania are as established in the EU Commission's proposal defining a financial package for the period 2007-2009 (European Commission, 2004). As for Croatia, the EU budget financial framework for 2004-2006 for Slovakia is taken as a reference. Finally, conditions related to Slovenia are expressly indicated in the financial package established for the ten countries entering the EU in 2004 (European Commission, 2002).

With regard to pre-accession programmes, only SAPARD and ISPA are considered. The rationale to exclude PHARE programme was that the latter started at the beginning of the '90s. Therefore, its effects are built in the flows of the I-O tables. As for Croatia, estimates of pre-accession funds can be obtained again using Slovakia as a reference base. It can be assumed that the progress of building the structures and institutions required to apply aid schemes will increase the budget executions under

[1] This kind of instrument has been assessed in the dynamic analysis only.

the programmes, and particularly SAPARD. As a result, it seems reasonable to suppose that the studied countries will be likely able to use their annual allocations, totally. This possibility is strengthened by the Regulation (EC) no. 188/2003 which extended the time limit for use of appropriations for the annual allocations 2000-2002 to 2 years. For this reason, it is possible to use the annual planned allocations, including the amounts of co-financing from national budgets.

The analysis focuses on a limited number of *common policy scenarios* that allow the capture of policy and market access effects generated by accession to the EU. Given the extreme heterogeneity characterising the single case studies, it is allowed to adapt some of the scenarios to the local situations.

Five main policy scenarios are identified (Table 1):

- *Baseline scenario*: this scenario represents the existing situation in the five countries described by the latest I-O tables.
- *Scenario 1* (pre-accession): this scenario only considers application of pre-accession programmes. This scenario is applied to Croatia, Bulgaria, Romania and Slovenia.
- *Scenario 2* (accession): this scenario supposes that countries will enter the EU without benefiting from EU funds. Therefore, in addition to the effects produced by pre-accession programmes, only the effects induced by market enlargement (integration effects) are considered. This scenario is applied only in the dynamic analysis to the Bulgaria and Romania cases.
- *Scenario 3* (partial application of EU policies): this scenario considers application of pre-accession programmes and it adds both the integration effects and the effects related to partial application of CAP. Partial application refers to the application of all policy instruments and of the phase-in scheme related to direct payments. The scenario is split into two sub-scenarios: Direct payments are supposed to be coupled to production (3a - coupled); Direct payments are decoupled to production (3b - decoupled). This scenario is applied to Croatia, Bulgaria, Romania and Slovenia.
- *Scenario 4* (full application of EU policies): this scenario is similar to Scenario 3 with the difference that it is supposed that 100% of direct payments are paid in each year of policy application. Also in this case, two sub-scenarios are identified (Scenarios 3a and 3b), according to the way direct payments are linked to production. This scenario is applied to Croatia, Bulgaria, Romania and Slovenia.

Scenario 3 can be defined as the most realistic scenario among all the scenarios considered since it is consistent with the Commission's proposals and directives. Scenarios 1 and 2 are aimed at evaluating marginal effects induced by accession without policy (comparing Scenario 2 to Scenario 1) whereas Scenarios 2 and 3 allows us to assess the effects deriving from application of policy instruments (comparing Scenario 3 to Scenario 2). Scenario 4 is introduced to measure the loss of benefits which countries will undergo because of the decision of attributing direct payments to farmers gradually. Finally, introduction and comparison of sub-scenario (a) with sub-scenario (b) within Scenarios 3 and 4 are motivated by the need of estimating benefits or losses coming from the choice of coupling or decoupling direct payments to production.

As for Greece, scenarios other than baseline scenario are obviously not applicable since the country is an EU member. Therefore, in the case of Greece, it was decided to estimate only the effects generated by Community support frameworks for the periods 2004-06 and 2007-13.

Tab. 1 – Policy scenarios

Baseline		Scenario 1		Scenario 2		Scenario 3		Scenario 4
Current Situation (described by the latest I-O tables)		Current situation		Current situation		Current situation		Current situation
	+	Pre-Accession Funds	+	Pre-Accession Funds	+	Pre-accession funds	+	Pre-Accession Funds
			+	Integration Effects	+	Integration effects	+	Integration Effects
					+	EU policies (partial integration) (a) coupled direct payments (b) decoupled direct payments	+	EU policies (full integration) (a) coupled direct payments (b) decoupled direct payments

3. Methodology for evaluating policy scenarios

The impact analysis is performed by a demand-driven I-O model. In spite of some restrictive assumptions (Gerking *et al.*, 2001), I-O analysis represents an effective tool to quantify impact on output and, by a simple extension, on income and employment, resulting from a change in the final demand related to a given sector. The I-O methodology does not allow the capture of the only effects produced in the sector involved by final demand variation, but also of those induced by backward linkages among sectors. This technique has been often used to assess impact generated by policy changes (see, for instance, Leat and Chalmers, 1991; Roberts, 1994; Doyle *et al.*, 1997; Morillas *et al.*, 2000; Bonfiglio, 2002).

Two kinds of analysis are carried out: a static and a dynamic analysis. The static impact analysis assumes that the structure and technology state of an economy, described by I-O coefficients, do not vary over time[2]. Given this assumption, the impact generated by different scenarios at both national and regional level can be assessed by a traditional open I-O model, which, as usual, takes the following form: $\mathbf{x} = (\mathbf{I} - \mathbf{A})^{-1}\mathbf{y}$, where $\mathbf{x}$ is the output vector, $\mathbf{A}$ is the input coefficient matrix, $(\mathbf{I} - \mathbf{A})^{-1}$ is the Leontief inverse and $\mathbf{y}$ is a final demand vector. The sum of each column of the Leontief inverse represents the output multiplier, which quantifies the overall production change occurring when the final demand varies by one unit.

To measure the effects in terms of income generated by final demand variation, the I-O model has to be modified converting goods and services flows into income flows. This can be made as follows: $\mathbf{in} = \widehat{\mathbf{h}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{y}$, where $\mathbf{in}$ is a vector of income, whilst $\mathbf{h}$ is a vector of income coefficients obtained as ratios between household income and outputs. Similarly, in order to capture the effects in terms of employment generated by final demand variation, the I-O model has to be changed converting goods and services flows into employment flows, i.e.: $\mathbf{em} = \hat{\mathbf{e}}(\mathbf{I} - \mathbf{A})^{-1}\mathbf{y}$, where $\mathbf{em}$ is a vector of employment and $\mathbf{e}$ is a vector of employment coefficients obtained as ratios between employment and outputs.

In the dynamic impact analysis, the restrictive assumption about which the structure of an economy is not allowed to vary over time is relaxed. Hence, effects produced by policy are affected by both policy itself and structural changes. In this way, the extent of impact also depends on the economic structure that characterizes a given territory in a given moment. The I-O model used is a time-varying I-O coefficient model which takes the form: $\mathbf{x}_{t,s} = (\mathbf{I} - \mathbf{A}_t)^{-1}\mathbf{y}_{t,s}$, where t is time period, s refers to the policy scenario considered. $\mathbf{A}_t$ is I-O coefficient matrix in time t estimated by the RAS technique. The main limitation of this approach is that there is no relationship between policy and technology. In other terms, policy application has no effect on technology matrix. More details are given in chapter 12.

---

[2] In literature, empirical evidence has demonstrated that a given technology structure does not change significantly for a certain number of years at both national and regional level (Tilanus and Rey, 1964; Carter, 1970; Conway, 1980). Therefore, the hypothesis of unchanging technology can be accepted at least in the middle-short time.

The use of I-O methodology raises some questions about the kind of instrument which can be evaluated and the way to implement policy scenarios into the I-O model.

As mentioned above, this model allows an evaluation of impact caused by final demand variation. Therefore, from a policy standpoint, the I-O model is a valid tool to evaluate those instruments that are expressly addressed to increase production by stimulating final demand through investments. This is for example the case of structural policies aimed at increasing infrastructural endowment. On the contrary, this methodology faces difficulty or it even fails in evaluating those policy tools whose effects do not pass directly or do not pass at all through final demand changes (i.e. direct payments and market support) and those structural measures which aim to improve productivity. In these cases, it has to be kept in mind that the results obtained by applying I-O methodology tend to be overestimated or could be even totally unrealistic. However, the aim of this research is not to estimate policy impact punctually but only to get a rough approximation of possible and comparable effects induced by alternative policy scenarios.

Once accepted these limitations, a further and crucial problem consists of implementing policy into an I-O model concretely, which means to "translate" resources provided by policy instruments (CAP instruments and pre-accession programmes) and other changes (integration effects) into a vector of final demand changes. In the next sections, technical indications of how policy scenarios can be implemented into the methodology will be provided.

4. Direct payments and market support

Basically, direct payments are annual income payment to farmers, introduced to compensate the losses caused by dismantling protectionist mechanisms. Two kinds of direct payments are analysed: coupled and full decoupled direct payments (introduced by the 2003 reform). Given their characteristics, they cannot be assessed by I-O methodology directly. Therefore, strong simplification has to be made.

Coupled direct payments are treated as additional resources that farmers integrally invest in agriculture. The reason for this is twofold. Firstly, direct payments coupled to production might incentive farmers to increase production in order to receive additional direct payments. Secondly, if farmers are facing financial stress or credit constraints (and this is a frequent situation in the analysed case studies), payments can provide farmers with the necessary liquidity to finance investments in agriculture, which would have not been materialised otherwise.

Decoupled direct payments are dealt with as resources that farmers spend to purchase goods and services. The main reason for this decision is that this kind of direct payment is free from productive choices: whatever quantity and typology of products farmer produce, the same amount of direct payments is guaranteed. Therefore, within the I-O framework, income related to direct payments can be spent either investing, in agriculture or in other activities, or increasing consumption of goods and services. Since it is harder to foresee what type of investment farmer could choose and considering that countries under study are developing, the last option was taken into consideration.

Finally, market support, intended as financial flows generated by various instruments of commodity regimes, may be assimilated, in principle, to coupled direct payments, if one looks at how market support might affect farmer's choices. Actually, the reasoning is the same: market support, which also depends on the quantities produced, might incentive farmers to increase production in order to receive a further market support. For this reason, it is treated as coupled direct payments.

5. Integration effects

Integration effects are meant as effects produced in the economies of acceding countries by market enlargement following accession. These effects are estimated as import-export variation due to the entrance into the EU.

With regard to impact estimation, changes in exports do not pose problems, since, in the I-O framework, this variation corresponds to a change in final demand. On the other hand, keeping in mind that the aim of impact analysis is to estimate effects within the local economy generated by final demand variation of local products, some assumptions have to be made with reference to imports. In general, a change in imports can leave local production unaltered or, following a substitution process, can lead to a change in intermediate consumption of locally produced inputs and/or to a change in final consumption of locally produced goods and services, according to the kind of imports. For instance, an increase in imports of inputs could be accompanied by a reduction in locally produced inputs used in production of a given sector as well as an increase in imports of final goods and services could lead to a decrease in final local consumption.

Since accession to the EU is likely to increase the degree of competitiveness in the European market, it is peaceful to state that a change in imports is likely to produce a change in local production. It is assumed that this latter occurs only through a change in final local consumption. This choice depends on two reasons: firstly, the model used is not able to analyse effects generated by input substitution; secondly, it is practically impossible, given the data availability, to distinguish input imports from imports of goods and services.

Given this assumption, impact from a change in trade can be assessed as impact produced by a variation of net exports. Formally, if δ_i^{EXP} is the estimated change rate of exports for sector *i* and δ_i^{IMP} is the estimated change rate of imports for sector *i,* the total variation of final demand induced by integration in the sector *i* will be:

$$\Delta Y_i = EXP_i \cdot \delta_i^{EXP} - IMP_i \cdot \delta_i^{IMP} \tag{1}$$

where EXP_i and IMP_i are exports and imports of sector *i* appearing in the I-O tables, respectively. The adopted trade changes rates come from a Sulamaa and Widgren's (2003) study. In this latter, economic effects of the Eastern enlargement of the EU (the group of the ten acceding countries in 2004) are examined. The used model is a FTAP computable general equilibrium model. Alternative policy scenarios are considered and the relevant impacts are calculated. We focused on the scenario "EU-enlargement and internal market". This scenario is based on two assumptions. Firstly, it is supposed that all bilateral tariffs and export subsidies between the EU and the acceding countries are abolished and the EU average common external tariff is applied to the new countries. Secondly, implications of enlargement in the internal market in terms of abolishment of administrative and technical barriers to trade are also considered. From this study, it turns out that, owing to accession, imports of acceding countries will increase by 14.9% whilst exports will increase by 14.5%. These percentages were used in the REAPBALK research as estimates of trade changes rates, δ_i^{IMP} and δ_i^{EXP}, respectively.

6. Allocation of Funds

There are two main issues about allocation of funds: regionalization and distribution of funds among sectors. The first problem derives from the fact that data are often available at a national level only. In this circumstance, allocation of national structural funds to the region can be made by population ratios as proxy of relative importance and extension of the region. On the contrary, allocation of national direct payments can be carried out using measures of the relative importance of agriculture at a regional level, i.e. value added or GDP ratios.

With regard to the second issue, the problem consists of allocating resources delivered by policy instruments to the sectors represented within the I-O tables.

Specifically, direct payments and market support are treated as investments in agriculture. The vector of final demand variation becomes: $\mathbf{y} = [DP, 0, \ldots, 0]$, where DP is the amount of direct payments (or market support) allocated to the agricultural sector. Decoupled direct payments are treated as final consumption and they are distributed among sectors proportionally, on the basis of the weight of each sector in terms of household consumption. The vector of final demand variation is thus: $\mathbf{y} = [DP \cdot (C_1/C), DP \cdot (C_2/C), \ldots, DP \cdot (C_n/C)]$, where n is the number of sectors, C_i is household consumption related to product i and C is total household consumption.

With reference to the other policy instruments (rural development funds, structural funds, cohesion funds), the sectors, to which policy priorities and measures are addressed, have to be identified. The general principle that should be followed is to refer to past experience, local knowledge and expert's opinions. In literature, the problem of allocating policy funds sectorally has been often neglected. Morillas *et al.* (2000) illustrate a possible strategy with reference to structural funds. In their study, the measures of the CSF (Common Structural Funds) program for the period 1988-1993 were first regrouped into eight areas. Then, the funds aggregated into these areas were allocated to 44 NACE-CLIO sectors, on the basis of fixed percentages which take account of local needs (Table 2). This procedure cannot be employed in the REAPBALK research directly, since it was conceived to distribute the 1983-1993 CSF program funds in the Spanish context. Nevertheless, the methodology employed can be used as a general reference, provided that allocation percentages are adapted to the kind of instrument considered and, above all, to the needs and the characteristics of the local context.

Tab. 2 – Allocation of structural policy measures to 44 NACE-CLIO sectors

Code	44-sectors NACE-CLIO	Axes							
		A1	A2	A3	A4	A5	A6	A7	A8
01	Agricultural, forestry and fishery products	0	0	0.05	0.02	0	0	0	0.3
03	Coal, lignite (brown coal) and briquettes	0	0	0	0	0	0	0	0
05	Products of coking	0	0	0	0	0	0	0	0
07	Crude petroleum, natural gas and petroleum products	0	0	0	0.07	0	0	0	0
09	Electric power, gas, steam and water	0	0	0	0.08	0	0	0	0
11	Production and processing of radioactive materials and ores	0	0	0	0	0	0	0	0
13	Ferrous and non-ferrous ores and metals, other than radioactive	0	0	0	0	0	0	0	0
15	Non-metallic mineral products	0	0	0	0.25	0	0	0	0
17	Chemical products	0	0	0	0.02	0	0	0	0.15
19	Metal products except machinery and transport equipment	0	0	0	0.13	0	0	0	0
21	Agricultural and industrial machinery	0	0.5	0	0	0	0	0.2	0.15
23	Office and data processing machines; precision and optical instruments	0.6	0	0	0	0	0	0.15	0.1
25	Electrical goods	0.2	0.05	0	0	0	0	0	0
27	Motor vehicles	0	0.1	0	0	0	0	0	0
29	Other transport equipment	0	0.2	0	0.08	0	0	0.17	0
31	Meats, meat preparations and preserves, other products from slaughtered animals	0	0	0	0	0	0	0	0
33	Milk and dairy products	0	0	0	0	0	0	0	0
35	Other food products	0	0	0	0	0	0	0	0
37	Beverages	0	0	0	0	0	0	0	0
39	Tobacco products	0	0	0	0	0	0	0	0
41	Textiles and clothing	0	0	0	0	0	0	0	0
43	Leathers, leather and skin goods, footwear	0	0	0	0	0	0	0	0
45	Timber, wooden products and furniture	0	0	0	0	0	0	0	0
47	Paper and printing products	0	0	0.1	0	0	0.15	0	0
49	Rubber and plastic products	0	0	0.03	0	0	0	0	0
51	Other manufacturing products	0	0	0	0	0	0.05	0	0
53	Building and construction	0	0.1	0.55	0.18	0	0	0.1	0.05
55	Recovery and repair services	0	0	0	0	0	0	0	0
57	Wholesale and retail trade	0.05	0.02	0.1	0	0	0	0.03	0
59	Lodging and catering services	0	0	0	0	0.05	0	0	0
61	Inland transport services	0	0	0	0.04	0	0	0	0
63	Maritime and air transport services	0	0	0	0	0	0	0	0
65	Auxiliary transport services	0	0	0	0	0	0	0.05	0
67	Communication services	0.05	0	0	0.04	0.05	0	0.07	0
69	Services of credit and insurance institutions	0	0	0.07	0	0	0	0	0.05
71	Business services provided to enterprises	0.07	0.03	0.09	0.09	0.2	0.5	0.1	0.07
73	Services of renting of immovable goods	0	0	0	0	0.1	0	0	0
75	Market services of education and research	0.03	0	0.01	0	0.4	0.1	0.07	0.07
77	Market services of health	0	0	0	0	0	0	0	0
79	Recreational and cultural services, personal services, other market services n.e.c.	0	0	0	0	0	0	0	0
81	General public services	0	0	0	0	0	0	0	0
85	Non-market services of education and research provided by general government and private non-profit institutions	0	0	0	0	0.2	0.2	0.06	0.06
89	Non-market services of health provided by general government and private non-profit institutions	0	0	0	0	0	0	0	0
93	Domestic services and other non-market services n.e.c.	0	0	0	0	0	0	0	0
	TOTAL	1	1	1	1	1	1	1	1

Note: A1: Office-supply material computer equipment and precision equipment; A2: Other industrial equipment; A3: Construction; A4: Infrastructure; A5: Education and research; A6: Studies, advice and communication; A7: Aids to enterprises (except primary sector); A8: Aids to primary sector enterprises

Source: EUROSTAT; Morillas et al. (2000)

References

Bonfiglio, A. (2002): Input-Output Analysis and Rural Development Policies: An Application to Areas of Objective 5b in Arzeni, A., Esposti, R. and Sotte, F. (2002), European Policy Experiences with Rural Development, Wissenschaftsverlag Vauk Kiel KG, Kiel, pp. 207-227.

Carter, A. P. (1970): Structural Change in the American Economy, Cambridge, Harvard University Press.

Conway, R. S. (1980): Changes in Regional Input-Output Coefficients and Regional Forecasting, Regional Science and Urban Economics, 10, pp. 158-71.

Doyle, C. J., Mitchell, M. and Topp, K. (1997): Effectiveness of farm policies on social and economic development in rural areas, European Review of Agricultural Economics, 24, pp. 530-546.

European Commission (2002), FACT SHEET – Enlargement and agriculture: A fair and tailor-made package which benefits farmers in accession countries, MEMO/02/3001, Brussels.

European Commission (2004): A Financial Package for the Accession Negotiations with Bulgaria and Romania, COM (2004) 160 final.

Gerking, S., Isserman, A., Hamilton, W., Pickton, T., Smirnov, O. and Sorenson, D. (2001): Anti-Suppressants and the Creation and Use of Non-Survey Regional Input-Output Models. In Lahr, M. L. and Miller, R. E. (ed.), Regional Science Perspectives in Economic Analysis. Amsterdam: North-Holland, 379-406.

Leat, P.M.K. and Chalmers, N. (1991): Analysing agricultural adjustment in Grampian using an input-output model of the agricultural and food complex in Midmore, P. (eds), Input-Output Models in the Agricultural Sector, Avebury, Aldershot.

Morillas, A., Moniche, L. and Castro, M. (2000), Structural Funds. Light and Shadow from Andalusia, Paper presented at the XIII International Conference on Input-Output Techniques, University of Macerata, Italy, August 21-25th.

Roberts, D. (1994), A Modified Leontief Model for Analysing the Impact of Milk Quotas on the Wider Economy, Journal of Agricultural Economics, 45, pp. 90-101.

Sulamaa, P. and Widgrén, M. (2003): EU Enlargement and Beyond: a Simulation Study on EU and CIS Integration, Discussion Paper Series, International Trade, No. 3768, Centre for Economic Policy Research, London, UK.

Tilanus, C. B. and Rey, G. (1964): Input-Output Volume and Value Predictions for the Netherlands, 1948-1958, International Economic Review, 5, pp. 34-45.

7. THE IMPACT OF EU PRE-ACCESSION AND ACCESSION MEASURES ON THE ECONOMY OF THE BULGARIAN RURAL REGIONS

Plamen Mishev, Nedka Ivanova and Antoaneta Golemanova

1. Introduction

The CAP reform, following the agreement of the Council of Agricultural Ministers of the EU in Luxemburg on 26th June 2003, changed the nature of EU support for the rural economy. The EU paid a lot of attention to overcoming the disparities between rural and urban areas as laid out in Article 158 of the Treaty establishing the European Community.

The problem of disparities between rural and urban regions is even stronger in Bulgaria. Due to the egalitarian (to a certain extent) policies of the former socialist system, the transition process has contributed to stronger economic differentiation and to rural-urban disparities. Despite the fact that rural areas in Bulgaria are associated with high environmental values, they lag substantially behind their urban counterparts in terms of income and employment opportunities, population density and technical, social and cultural infrastructure.

The development of rural areas in Bulgaria directly depends on the process of EU accession and the adoption of its policies. However, EU policies and its accompanying national measures are not strictly determined. Their elements can be combined in a way that assures the best effects on rural development, and especially on employment, as its current low level is considered as one of the basic challenges for the Bulgarian rural areas.

2. Importance of Rural Areas in Bulgaria

Rural areas have traditionally played an important role in the Bulgarian economy and in maintaining social stability. The rural areas cover 90,371 km^2, or about 81% of the country. According to a survey conveyed by the National Statistical Institute, the rural population in Bulgaria for 2002 is 2.4 million and accounts for 30% of the total population. The number of rural residences is estimated to be 5,091, which consists of 95% of the settlements in the country.

The National Agriculture and Rural Development Plan formulates its priority this way: “Integrated rural region development aiming to preserve and strengthen their economies and help limit depopulation.”

Key directions for the economic development of rural regions include:

- restructuring the economy in favour of light industry, mainly foods;
- developing local crafts;
- increasing the scope of small business activities in village communities;
- agricultural development: reviving strategically important endeavours such as vineyards, market gardening, silkworm farming, attar rose harvesting, berry gardening;
- developing tourism where appropriate.

3. Policy framework for the development of the rural regions in Bulgaria

The economic development of the rural regions in Bulgaria is influenced by policies and instruments outlined in numerous documents: National Economic Development Plan (NEDP), National Agriculture and Rural Development Plan under SAPARD (NARDP) and Regional Operative Programme (ROP). These documents are the basis for the plans for regional development on NUTS 2I and NUTS 4 level. Most of the documents and different policy instruments are based on pre-accession agreement between Bulgaria and EU and rely on financing and modelling the regional policies according to the pre-accession programmes as PHARE, ISPA and SAPARD.

3.1 National Economic Development Plan (NEDP)

Bulgarian National Economic Development Plan for the period 2000-2006 is the most important policy document, influencing national and regional development. It is accepted as a tool of pre-accession policy and the strategic and policy document, which includes all major sectoral policies. The NEDP is considered to be a predecessor of "Framework for Supporting of Community" of Structural Funds of the EU. The main directions of the Plan are:

- improving the quality of life and adapting human resources to market requirements,
- achieving balanced and sustainable regional development,
- development of the sector of agriculture and rural regions.

NEDP sets out the vision of Bulgarian development and formulates the following national long-term priorities:

1. institution building in harmony with acquis communitaire,
2. improving Bulgarian business competitiveness,
3. accelerating the construction and improving the quality of basis infrastructure and the environment,
4. improving the quality of life and adapting human resources to new economic conditions and European integration,
5. attaining balanced and sustainable regional development.

3.2 National Agriculture and Rural Development Plan under SAPARD

The 2000-2006 National Agriculture and Rural Development Plan (NARDP) for Bulgaria has been prepared in compliance with the requirements of EU Council Regulations in June 1999, under the EU Special Accession Programme for Agriculture and Rural Development. The Plan extends EU financial aid for the implementation of agricultural and rural development measures in CEECs in the pre-accession period. The Plan was adopted by the Council of Ministers on 22nd November, 1999.

The main objectives of NARDP are:

- To improve the effectivity of Bulgarian agriculture and initiatives for the development of competitive food-processing sector through better market and technological infrastructure, as well as strategic investment policy towards attaining and implementing European standards.
- Sustainable development of the rural regions of Bulgaria in accordance with the best ecological practices through alternative employment, diversification of economic activities and building the requisite infrastructure. It will lead to improving the life style and standards of living for the rural areas, increasing the incomes and new opportunities for employment among the population.

The implementation of the two objectives of NARDP will be integrated in four *priorities*:

1. Improving conditions for producing, processing and marketing of agricultural, forest and fish products in accordance with EU requirements, as well as stimulating the initiative of ecological cultivation of the land and environment keeping.
2. Developing rural areas parallely to their economic and society preservation and consolidation.
3. Investment in human resources – vocational qualifications for agricultural producers and people employed in the sector of agriculture and forestry. Diversifying the activities in the rural areas.
4. Technical support.

3.3 Regional Operative Programme of Bulgaria, 2004-2006

The Bulgarian Regional Operative Programme for the period 2004-2006, in the context of NEDP, is based on the common and specific requirements for the development of the sixth planning regions of Bulgaria. It has integrated character and was prepared in compliance with the national strategy for economic and social development.

The main task of the Programme is to outline the objectives and the priorities for the regional development, as well as to be the stem during the coordination between regional and sectoral policies for the years 2004-2006.

Having in mind also the possibilities and perspectives for development of the regions, as well as their main problems, in ROP are formulated the following key priorities:

- increasing the regional and local economic activity,
- improving the basic infrastructure and the business environment,
- development of vocational qualifications in favour of the regional and local economic activity,
- development of peripheral regions,
- increasing the role of the regions themselves in setting out and implementing policies for regional development.

4. North-East Region

The impact of possible scenarios on regional and rural development in Bulgaria is one of the main objectives of the REAPBALK project. The criteria for selecting the region were as follows:

1. The region must be classified as NUTS 2.
2. The region must be rural, according to OECD definition.

Regions are defined as:

- predominantly rural if the population living in rural communities is more than 50% of the total regional population,
- significantly rural if the population living in rural communities is between 15% and 50%,
- predominantly urbanised if the population living in rural communities is below 15%.

3. The region fits the criteria of rurality if the ratio between the regional population living in rural communities and the total regional population is such that the region can be defined as predominantly rural.
4. The region must have positive employment dynamics that: span the decade 1991-2001; are relative to the country; are in industry and service sectors.

Following the above-presented methodology, the results from the selection process in Bulgaria showed that of the six NUTS 2 regions of Bulgaria, the North-East Region (NER) meets all these criteria and is also ranked in first place, which led to this region being chosen for the case study region for REAPBALK project.

The NER includes 6 administrative regions (NUTS 3). NER lies in third place among the six NUTS 2 of Bulgaria both with regard to its population, having 1,285,803 residents (16.5% of country population) and its land areas territory (18.0% of national territory).

The North-East Region forms about 14% of the country's GDP, while the GDP per capita is below the national level. The share of the service sector in the Gross Value Added of the region is growing in the last few years, reaching 62.2% in the year 2003. The sectors of agriculture and industry contribute 22.2% and 15.6% respectively in the total amount of GVA for the region. The comparison to the corresponding figures at national level (11.4% and 30%) clearly shows the importance of the agricultural sector for the economy of the NER as compared to the country as a whole.

The labour market in the Region is not showing any steady behaviour over the last decade. The level of unemployment is higher than the country's average (Table 1), which can be ascribed to the restructuring of the economy and more particularly to the closing down and privatisation of many industrial plants. As a result, a considerable number of the employed in the sector of industry remain jobless. Although some of them either engage themselves in the service sector or migrate to the rural regions and find employment in the agricultural sector, there are still people, who cannot adapt to the structural changes in the economy of the NER.

Tab. 1 - General Economic Information for Bulgaria and NER, 2003 year

	Bulgaria	NER	Share of NER (%)
Area (km^2)	111,002	19,973	18.0
Population* (in thousands)	7,801	1,286	16.5
GDP (million €, current prices)*	17,594	2,473	14.1
of which Agriculture (%)	11.4	22.2	27.3
Industry (%)	30.0	15.6	7.3
Services (%)	58.6	62.2	14.9
GDP per capita (€)	2,249	1,917	85.2
Unemployment rate (%)	13.7	19.4	

Source: www.nsi.bg

5. Relevant national and regional scenarios

One of the modes to evaluate the possible results of the pre-accession and accession measures is to define different scenarios on the basis of the local peculiarities and EU's requirements. In the process of designing the scenarios two principles were followed:

- the chosen scenarios to be as much as possible common to the scenarios used by all REAPBALK partners and achieving further comparisons in the results.
- the scenarios have to reflect the national and regional peculiarities.

Three scenarios are applicable:

A) Baseline scenario. The baseline scenario was developed at regional level. It describes the level and direction of investments as they would be if there is no process of accession. However, in this scenario funds under PHARE programme were also included. The logic of the idea is that the PHARE support to Bulgaria started in early 90s when the relation between EU and Bulgaria was targeted at co-operation and not to accession. However, the PHARE programme priorities changed over 90s and since 1997, as a response of the Luxemburg European Council's launching of the enlargement process, and they were re-focused on "pre-accession". But as PHARE funded projects are aimed more for technical preparation of accession (e.g. adoption of the "acquis communautaire"; institution building) and only a small component of them are for investments, they differ significantly from those funds entirely orientated for accession (e.g. SAPARD and ISPA). That is why the investments coming from PHARE projects in Bulgaria can be considered as component of scenario which is not aimed at accession.

B) "Pre-accession" Scenario. The second scenario explores the results of pre-accession measures and programmes undertaken in the North-East region in Bulgaria. It includes national funding and the application of typical pre-accession tools as SAPARD and ISPA.

ISPA provides financial support for investment in the areas of environment and transport in order to speed up the compliance in candidate countries with the EU legislation within these two sectors. Transport assistance is provided for large-scale transport infrastructure projects connecting the national transportation networks (railroads and highways, etc.) with the Trans-European (TEN) ones, as well as for the construction and renovation of ports and airports. The environmental protection measures financed by ISPA address mainly drinking water supply, wastewater and solid-waste management and air pollution projects.

The main activities which are currently funded under SAPARD programme are investments in agricultural holdings, improvement of processing and marketing of agricultural and fishery products, development and diversification of economic activities, provision of possibilities for multiple activities and alternative incomes. After the authorization of SAPARD agency in Bulgaria in August 2003 new measures started being implemented: forestry, afforestation of agricultural lands, investment in forest holdings, processing and marketing of forestry products, setting up of producers organizations, renovation and development of villages, protection and preservation of rural heritage and cultural tradition, development and improvement of rural infrastructure and improvement of qualification through vocational training.

C) Accession Scenario. The third scenario is related to the future accession of Bulgaria to the EU. The entrance into the EU will affect development of Bulgaria and of its rural regions, significantly. Forecasts about the possible effects induced by EU accession vary from too optimistic to entirely negative. Because of the importance of accession, this scenario was modelled both at a national and a regional level.

The investments considered in this scenario come from the EU's proposal about the 2007-09 financial package. Funds related to the previous two scenarios are not considered since the pre-accession tools PHARE, ISPA and SAPARD will not be anylonger operative following the accession of Bulgaria in 2007 and they will be replaced with commitments for agriculture and with structural operations. The accession scenario is explored with reference to both full (**Scenario 3a**) and partial (**scenario 3b**) integration. For each of these two sub-scenarios, direct payments are assumed to be either fully coupled or fully decoupled.

6. Data used

The static impact analysis at national level is performed on the basis of the last available Bulgarian Input-Output table for the year 1997, and on the derived multipliers from it. For the purposes of the regional analysis the national I-O table was regionalised applying the GRIT technique for the North-East region of the country.

The ranking (see tables 2 and 3) of the computed backward and forward coefficients at national and regional level differs.

The sector with the highest potential to generate output impacts both at national and regional level is Foods, beverages and tobacco. The Construction and the sector Other community, social and personal services are also among the major sectors creating output impact.

As it concerns the income multiplier, the importance of the national and regional linkages belong to the sectors: Education, Public administration, Health and social work, Transport equipment, Construction and Other community, social and personal services.

Similar ranking is observed regarding the national and regional sectors, creating high employment impact. Specifically, these are the sectors: Education, Other community, social and personal services, Health and social work, Hotels and restaurants.

Tab. 2 - Sectoral Ranking of Rasmussen and Hirchman Backward Linkage Coefficients at National Level

	Sectors	Rasmussen&Hirschman						Augustinovics					
		OBL	Rank	IBL	Rank	EBL	Rank	OFL	Rank	IFL	Rank	EFL	Rank
B1	Agriculture	1.93	**4**	0.10	**17**	0.18	**5**	2.13	**3**	0.13	**17**	0.20	**4**
B2	Mining and quarrying	1.64	**10**	0.40	**7**	0.11	**12**	2.59	**1**	0.57	**2**	0.18	**5**
B3	Foods, beverages and tobacco	2.10	**1**	0.20	**15**	0.13	**10**	1.36	**11**	0.15	**16**	0.07	**16**
B4	Chemicals, chemical products and manmade fibres	1.48	**16**	0.20	**14**	0.06	**17**	1.47	**9**	0.20	**15**	0.07	**17**
B5	Other non-metallic mineral products	1.97	**2**	0.36	**8**	0.14	**9**	1.91	**4**	0.38	**6**	0.15	**8**
B6	Transport equipment	1.80	**7**	0.47	**4**	0.15	**8**	1.50	**7**	0.44	**5**	0.13	**10**
B7	Other products of manufacturing	1.58	**12**	0.27	**11**	0.11	**13**	1.74	**5**	0.32	**10**	0.13	**11**
B8	Electricity, gas and water supply	1.54	**14**	0.23	**13**	0.06	**16**	2.13	**2**	0.34	**8**	0.12	**12**
B9	Construction	1.96	**3**	0.45	**5**	0.17	**6**	1.45	**10**	0.37	**7**	0.14	**9**
B10	Trade; repairing activities	1.65	**9**	0.20	**16**	0.16	**7**	1.50	**8**	0.22	**14**	0.15	**7**
B11	Hotels and restaurants	1.81	**6**	0.33	**9**	0.19	**4**	1.34	**12**	0.30	**11**	0.16	**6**
B12	Transport and communication	1.53	**15**	0.28	**10**	0.11	**14**	1.52	**6**	0.28	**12**	0.11	**13**
B13	Financial intermediation	1.26	**17**	0.24	**12**	0.08	**15**	1.23	**14**	0.24	**13**	0.08	**15**
B14	Real estate, renting and business activities	1.18	**18**	0.09	**18**	0.04	**18**	1.29	**13**	0.11	**18**	0.05	**18**
B15	Public administration	1.68	**8**	0.56	**2**	0.13	**11**	1.05	**18**	0.46	**4**	0.08	**14**
B16	Education	1.61	**11**	0.63	**1**	0.40	**1**	1.14	**16**	0.58	**1**	0.37	**1**
B17	Health and social work	1.55	**13**	0.52	**3**	0.33	**3**	1.20	**15**	0.48	**3**	0.31	**2**
B18	Other community, social and personal services	1.84	**5**	0.44	**6**	0.35	**2**	1.09	**17**	0.32	**9**	0.30	**3**

Note: OBL: output backward linkage; IBL: input backward linkage; EBL:employment backward linkage; OFL: output forward linkage; IFL: input forward linkage; EFL:employment forward linkage

Source: Own calculations

Tab. 3 - Sectoral Ranking of Rasmussen and Hirchman Backward Linkage Coefficients at Regional Level

	Sectors	Rasmussen&Hirschman						Augustinovics					
		OBL	Rank	IBL	Rank	EBL	Rank	OFL	Rank	IFL	Rank	EFL	Rank
B1	Agriculture	1.07	**18**	0.05	**18**	0.10	**11**	1.17	**12**	0.06	**17**	0.11	**9**
B2	Mining and quarrying	1.46	**3**	0.12	**16**	0.11	**8**	1.46	**2**	0.12	**16**	0.10	**11**
B3	Foods, beverages and tobacco	1.48	**2**	0.14	**15**	0.09	**14**	1.20	**8**	0.14	**15**	0.07	**16**
B4	Chemicals, chemical products and manmade fibres	1.18	**14**	0.16	**13**	0.04	**18**	1.28	**6**	0.17	**12**	0.06	**17**
B5	Other non-metallic mineral products	1.15	**15**	0.21	**10**	0.08	**15**	1.39	**4**	0.27	**8**	0.10	**10**
B6	Transport equipment	1.11	**17**	0.35	**4**	0.10	**10**	1.35	**5**	0.40	**4**	0.12	**7**
B7	Other products of manufacturing	1.40	**6**	0.23	**9**	0.15	**5**	1.65	**1**	0.29	**6**	0.18	**4**
B8	Electricity, gas and water supply	1.21	**13**	0.15	**14**	0.05	**16**	1.41	**3**	0.19	**11**	0.07	**14**
B9	Construction	1.45	**4**	0.33	**5**	0.14	**7**	1.19	**9**	0.29	**5**	0.12	**8**
B10	Trade; repairing activities	1.42	**5**	0.16	**12**	0.15	**6**	1.22	**7**	0.16	**14**	0.13	**6**
B11	Hotels and restaurants	1.33	**10**	0.27	**7**	0.16	**4**	1.18	**11**	0.27	**7**	0.15	**5**
B12	Transport and communication	1.25	**12**	0.24	**8**	0.09	**12**	1.19	**10**	0.22	**10**	0.09	**12**
B13	Financial intermediation	1.35	**9**	0.20	**11**	0.09	**13**	1.11	**14**	0.17	**13**	0.07	**15**
B14	Real estate, renting and business activities	1.14	**16**	0.06	**17**	0.05	**17**	1.15	**13**	0.06	**18**	0.05	**18**
B15	Public administration	1.39	**8**	0.45	**3**	0.11	**9**	1.05	**16**	0.41	**3**	0.08	**13**
B16	Education	1.30	**11**	0.59	**1**	0.39	**1**	1.01	**18**	0.55	**1**	0.37	**1**
B17	Health and social work	1.39	**7**	0.47	**2**	0.32	**3**	1.07	**15**	0.44	**2**	0.30	**2**
B18	Other community, social and personal services	1.52	**1**	0.32	**6**	0.33	**2**	1.03	**17**	0.24	**9**	0.29	**3**

Note: OBL: output backward linkage; IBL: input backward linkage; EBL:employment backward linkage; OFL: output forward linkage; IFL: input forward linkage; EFL:employment forward linkage

Source: Own calculations

For each scenario a vector of final demand is calculated[1] (Tables 5 and 6). This vector contains a single year flow of funds only generated by the policies considered in the scenario. In order to calculate the impacts the vector of output, income and employment linkages of each sector is multiplied with the vector of investments eligible for each scenario.

Data for the national investments included in the final demand vectors (national and pre-accession funds – PHARE, SAPARD and ISPA) are for year 2001. The main concerns for this are: the data available for the abovementioned year are final; the year is close to 1997 (for which year the last I-O table for Bulgaria was constructed and it is used for the analysis under the REAPBALK project); the funds of pre-accession programmes are final and the real effect of their inflows into the country and the North-East region could be seen at present. As it concerns scenario Accession, the data used are the annual average (for the period 2007-2009) of the inflows stipulated to reach Bulgaria after its accession. In order to obtain more precise estimation regarding the created changes in the national and regional economies, the calculated vectors of investments for each scenario are turned into 1997 prices.

However, to be used in the I-O analysis, these funds are necessary to be distributed among the sectors represented in the Bulgarian national and regional I-O table.

The problem with the lack of data for the funds from pre-accession instruments on the regional level was solved by using the population ratio.

Tab. 4 - Allocation of the pre-accessions funds for Bulgaria and NER, 2000-2002
in million leva

	Bulgaria			NER		
	PHARE	SAPARD	ISPA	PHARE	SAPARD	ISPA
2000	263.84	101.94	203.40	43.61	16.85	33.62
2001	353.61	103.71	208.88	58.45	17.14	34.53
2002	318.60	108.71	204.58	17.97	17.97	33.81

Source: www.evropa.bg; www.minfinn.bg

A) Pre-accessions programmes. The distribution of the funds (Table 4) from the pre-accessions programmes among the sectors represented within the Bulgarian regional Input-Output table is done as follows:

[1] For Scenario 3: Accession four vectors are calculated: full integration (considering direct payments as coupled and decoupled) and partial integration (with the same consideration regarding the direct payments).

- for PHARE: 75% of the total regional investments were allocated, the other 25% are national co-financing and were not included. The sectoral allocation of PHARE's funds is done on the basis of the priorities the programme has: consolidation of institutions, participation in Community programmes, regional and social development, industrial restructuring and development of the small-business sector. Having in mind this, as well as the local knowledge of the economy of the NER of Bulgaria, the PHARE flow was distributed among the sectors: Public administration, compulsory social security (1/2 of the funds); Education (1/6); Health and social work (1/6) and Other activities (1/6).
- for ISPA: as it was for PHARE, only 75% of the funds were distributed among the sectors of NER. The ISPA regional inflow was allocated considering its two priorities: development of transport and environmental infrastructure. Specifically, the sectors receiving support are: Transport and communication (1/2); Electricity, gas and water supply (1/4) and Construction (1/4).
- for SAPARD: the largest part of contribution provided by EU (max 80%) is taken into account. The rest is co-financed by the Government. The funds' distribution is done on the basis of the priorities and measures the programme has – modernisation of agriculture and rural development.

B) EU funds. The financial package for Bulgaria after the accession was limited by the Commission to a period of three years. For the purposes of the present paper the annual average base of the funds from the Financial Package for Bulgaria is taken into account. As it concerns the regionalisation of these funds it is presumed that all six NUTS 2 regions in Bulgaria would receive an equal contribution (except for the direct payments). The main fields that would be affected are as follows:

B.1 - Agriculture

For ***market measures*** under the common agricultural policy it is foreseen that the *acquis*, including the CAP reform, will apply fully to Bulgaria as from its accession to the Union. It is considered that all funds will be obtained by the sector of agriculture.

The ***direct payments*** would be introduced in Bulgaria at a level of 25% of the EU-15 level in 2007, 30% in 2008, 35% in 2009 and 40% in 2010. Although no expenditure would be incurred in 2007, due to the fact that reimbursements from the budget for expenditure by Member States on direct payments in any given year is made from the budget of the following year, the annual average for the period 2007 – 2009 is taken into account. The direct payments were regionalised on the basis of the schemes accepted in the Financial Package for Bulgaria. Direct payments will be applied in the I-O model as fully coupled or fully decoupled. Sectors receiving support in case of coupling are those directly connected with the production of agriculture. The allocation of the decoupled direct payments among the sectors is done having in mind the structure of the household consumption within the country and the region.

As regards ***rural development policy***, the available funds are allocated following the distribution scheme of SAPARD funds.

B.2 - Structural actions

As it concerns the structural funds their allocation among the sectors is done considering Bulgaria as Objective 1 region. 1/6 of the available funds for the country were distributed among the sectors of NER's economy.

C) Internal Policies. In view of the importance attached by the EU to a high level of nuclear safety, as well as the decision of the Bulgarian government to decommission installation at Kozloduy nuclear power, after the accession additional funds will be included in the financial package for Bulgaria at a rate of 70 million euro per year. Additional funds will be also allocated to Bulgaria in support of institution building measures in the first three years of the accession.

Tab. 5 - Sectoral rise of final demand in Bulgaria (million leva, 1997 prices)

	Sectors	Scenario Accession (3)			
		Scenario 3a Full integration		Scenario 3b Partial integration	
		DP - coupled	DP - decoupled	DP - coupled	DP - decoupled
B1	Agriculture, hunting, forestry and fishing	295,238	279,083	255,547	241,432
B2	Mining and quarrying	50,801	53,055	42,594	44,563
B3	Foods, beverages, and tobacco	25,666	88,306	17,966	72,694
B4	Chemicals, chemical products and manmade fibres	308,250	268,789	300,875	266,399
B5	Other non-metallic mineral products	229,812	149,068	219,463	148,917
B6	Transport equipment	115,425	74,581	83,348	47,664
B7	Other products of manufacturing	160,258	123,582	118,363	86,320
B8	Electricity, gas and water supply	443,324	460,966	432,324	447,738
B9	Construction	776,368	735,850	545,483	510,083
B10	Trade and repair activities	7,668	56,179	3,834	46,217
B11	Hotels and restaurants	65,935	78,925	65,935	77,284
B12	Transport and communication	791,935	826,698	784,235	814,607
B13	Financial intermediation	133,347	133,780	130,047	130,425
B14	Estate and business activities	143,176	211,917	79,242	139,301
B15	Public administration, compulsory social security	162,996	164,209	162,996	164,055
B16	Education	177,264	179,718	121,386	123,530
B17	Health and social work	137,498	130,988	126,291	120,604
B18	Other activities	103,971	113,237	85,638	93,734
	Total	**4,128,929**	**4,128,929**	**1,984,364**	**1,984,364**

Source: Own calculations

Tab. 6 - Sectoral Rise of Final Demand Within North-East Region (million leva, 1997 prices)

	Sectors	Baseline scenario	Scenario Pre-accession	Scenario Accession (3)			
				Scenario 3a Full integration		Scenario 3b Partial integration	
				DP - coupled	DP - decoupled	DP-coupled	DP-decoupled
B1	Agriculture, hunting, forestry and fishing	36,018	37,595	71,284	78,830	64,902	71,693
B2	Mining and quarrying	2,282	2,282	2,282	2,299	2,282	2,297
B3	Foods, beverages, and tobacco	0	736	4,278	17,524	2,994	14,916
B4	Chemicals, chemical products and manmade fibres	14,351	14,561	23,421	16,011	22,270	15,601
B5	Other non-metallic mineral products	0	0	15,696	530	14,127	477
B6	Transport equipment	5,618	7,090	25,856	18,097	20,587	13,604
B7	Other products of manufacturing	0	2,629	28,036	18,631	21,155	12,690
B8	Electricity, gas and water supply	0	6,018	7,478	10,918	5,645	8,741
B9	Construction	31,276	37,294	118,173	110,407	79,770	72,780
B10	Trade and repair activities	0	0	1,278	9,735	639	8,250
B11	Hotels and restaurants	75,627	75,627	75,627	79,238	75,627	78,877
B12	Transport and communication	0	10,668	4,278	12,283	2,994	10,199
B13	Financial intermediation	0	315	1,833	1,887	1,283	1,331
B14	Estate and business activities	0	0	24,373	26,697	13,756	15,848
B15	Public administration, compulsory social security	23,889	23,889	9,125	9,336	9,125	9,315
B16	Education	8,676	8,886	23,895	24,455	14,582	15,086
B17	Health and social work	12,172	12,172	15,805	14,579	13,953	12,849
B18	Other activities	12,912	13,437	10,704	11,965	7,648	8,783
	Total	**222 820**	**253,201**	**463,422**	**463,422**	**373,339**	**373,339**

Source: Own calculations

7. Results of the impact analysis at national and regional level

7.1 National Scenario "Accession"

The shocks to the national economy after the accession can be illustrated by applying new vectors of final demand to the national I-O model. The changes in the total and sectoral national output, income and employment are presented in the Annex (Tables A1 and A2; B1 and B2).

The two possible sub-scenarios are: full integration (which is the most optimistic scenario) and partial absorption of the EU funds. Both of these two sub-scenarios are analysed by considering the direct payments as fully coupled and fully decoupled.

Scenario "Accession" – full integration

In case of full utilization of EU funds, included in the final demand vector for Scenario 3a, the overall national output is expected to increase by 18%, the income with 23% and the employment with 19%. As it can be seen in Table A3 from the Annex, no difference in these figures is observed if the direct payments are applied coupled and decoupled. Therefore, the conclusion is that for the overall national economic growth, the division of the direct payments into coupled and decoupled does not have significance. The effects of the coupled and decoupled direct payments are visible only at the intersectoral level and it could be useful for the policy makers aiming the impact on some particular sectors from the national economy.

The highest growth rates are anticipated in the sectors: Construction, Other non-metallic mineral products, Transport equipment and Other activities. The reasons for this should be sought in the highest share of the investments in the infrastructure coming from the structural funds, as well as in the relatively high multipliers for some of these sectors (e.g. Construction). On the other hand sectors generating insignificant change in their output as a result of the EU funds are: Trade and repair activities, Foods, beverages and tobacco, Estate and business activities. The sector of Agriculture would raise its output with 7% if the direct payments are reinvested in it and with 6% if the direct payments are considered as fully decoupled. Whereas, the income for the people under this occupation would increase with 10% (direct payments - coupled) and 9% (decoupled DP). However, the level of employed in the sector of Agriculture would be raised with 6% both in case direct payments – coupled or decoupled.

Scenario "Accession" – partial integration

Having as an example the previous enlargements of the EU, it can be investigated that a part of the allocated funds may remain unused. Taking into account the amounts of the funds included in the final demand vector in case of partly accumulation of the EU funds (Scenario 3b) the total national output is expected to increase by 15% (Table B1 from the annex). The ranking of the sectoral growth is similar to those in the previous sub-scenario. The highest output growth is anticipated in the sectors Construction and Other non-metallic mineral products. There is no considerable difference in the output change in case of full and partial utilization of EU funds for the sector of Agriculture. However, the impact of the investments in this sector on the national economy is among the lowest –6%. From the Bulgarian I-O table is evident that the main beneficiary of the agricultural production is the sector itself (67% of the intermediate sales) and the other sectors do not receive many inputs from the Agriculture.

The trends in the income and employment are similar to the previous sub-scenario. The overall growth of the income would be 20% and of the employment 16%.

7.2 Regional Scenarios

As it has been already mentioned in the previous section, inflows included in the new vectors of final demand for the three scenarios for the development of NER are:

- Baseline scenario: national investments plus PHARE funds on the regional level;
- Scenario Pre-accession: the inflows from the Baseline scenario plus the funds form SAPARD and ISPA programmes;
- Scenario Accession: the national investments plus the annual average from the EU funds.

As a result of the accumulation of investments inflows for **Scenario Pre-accession** onto the inflows from the **baseline scenario** there is no significant change in the overall output, income and employment (Table C1 from the Annex). The change in the output is with around 5%, in the income – 8-9% and in the employment – 7%. For both scenarios the sectors creating the highest impact are Hotels and restaurants, Other activities and Construction. It corresponds to the regional specialization of the economy and to the priorities set in the regional plans for economic development of NER. Despite the fact that Agriculture is one of the sectors with traditions for the region, the change in its output, as well as in the income and employment, is insignificant – with around 2%. This is mainly due to the considerably low salaries and labour productivity in the sector.

The investments affecting the final demand vector of **Scenario Accession** are the national investments made for year 2001[2] and the inflows coming from the EU policies after the accession. No accumulation of inflows from the previous two scenarios was done. The Scenario Accession has two sub-scenarios: full and partial utilization of the EU funds. Both of these two sub-scenarios are explored considering the direct payments as coupled and decoupled. However, no difference is observed in the overall change of the regional output, income and employment when the direct payments are coupled or decoupled. It is evident only on sectoral level.

In case of full utilization of the EU funds, the output would be changed with 11% (Table D1 from the Annex). If the integration is partial it would rise with 8% (Table E1). Main contributors to these changes are the sectors Hotels and restaurants, Construction, Other activities, Education, Health and social work and Transport equipment. Nevertheless the investments for the sector of Agriculture from the EU funds would be considerably high the initiate that the sector creates is 4% change in the sector's output and employment and 5% change in income (both in case of full and partial integration).

The overall change in the income from Scenario 3a is 15% and from Scenario 3b – 12%. As regarding the employment, the changes are 13% for scenario 3a and 10% for scenario 3b. The patterns in the income and employment changes in NER economy follow the intersectoral output changes.

8. Concluding remarks

On the basis of the above results, some conclusions can be drawn about the application of the Input-Output model for future policy implications.

The calculated regional linkage coefficients for NER show quite different ranking of the sectors by impact importance from the structure of the investment's inflow in the region. The investments as general are not directed to the sectors, which according to the calculated coefficients, have the highest potential to generate impacts (output, income and employment). Better design regional strategy would speed the rate of

[2] The choice of this year was explained in the previous section.

economic development by stimulating the investment flow in the sector with higher potential to generate impact.

Further, the importance of the computed national and regional linkages can not be compared due to the strains of the applied methodology. It is particularly evident in the sector of Agriculture (sector, which is a significant contributor for NER's economy), the multipliers for which at national level are among the most significant and showing great initiative and at the same time at regional level the multipliers for this sector are ranked at the last positions. On the other hand, the sector Mining and quarrying, which does not have any tradition in the economic structure in the case of study posses very high rank whereas this is not present at national level.

After performing the scenarios is evident that there are small differences in the results of Baseline and scenario Pre-accession. Having in mind the main investment flows for the first two scenarios, could be concluded that ISPA is not very efficient and funds under SAPARD are too small to have substantial influence on the NER's economy.

However, the change in total level of output, income and employment in scenario Accession in comparison with Baseline scenario is substantial. This shows that even at the very beginning the accession of Bulgaria to EU would have important impact on the development of a typical rural region as North-East region in Bulgaria is.

Obviously, very important portion of the EU funds is directed to the sector of agriculture. Unfortunately the potential of agriculture to generate output, income and employment at regional level is relative modest.

Annex

Tab. A1 - National scenario accession; full integration (3a), changes

	Sectors	Output	Income	Employment	Rasmussen&Hirschman backward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	8,508,460	302,718	800,353	7%	10%	6%	6%	9%	6%
B2	Mining and quarrying	870,041	239,514	60,540	10%	8%	9%	10%	9%	10%
B3	Foods, beverages and tobacco	2,887,551	307,117	121,652	2%	2%	3%	6%	6%	9%
B4	Chemicals and chemical products	1,575,788	199,566	47,290	29%	32%	39%	25%	28%	34%
B5	Other non-metallic mineral products	555,578	105,673	39,072	82%	79%	80%	53%	51%	52%
B6	Transport equipment	259,091	86,908	24,354	80%	63%	71%	52%	40%	46%
B7	Other products of manufacturing	7,535,656	1,309,481	528,323	3%	3%	3%	3%	3%	3%
B8	Electricity, gas and water supply	1,874,947	239,262	50,198	36%	43%	55%	38%	45%	57%
B9	Construction	1,395,321	404,611	139,002	109%	87%	95%	103%	82%	90%
B10	Trade; repairing activities	2,760,777	368,748	310,369	0%	0%	0%	3%	3%	3%
B11	Hotels and restaurants	554,832	127,978	72,136	22%	17%	17%	26%	20%	21%
B12	Transport and communication	3,362,037	645,476	228,231	36%	35%	37%	38%	36%	39%
B13	Financial intermediation	698,473	140,074	39,968	24%	23%	25%	24%	23%	25%
B14	Real estate, renting and business activities	2,886,554	159,120	75,331	6%	8%	7%	9%	12%	11%
B15	Public administration	1,017,635	463,736	78,899	27%	20%	26%	27%	20%	27%
B16	Education	754,897	407,596	265,949	38%	28%	27%	38%	28%	27%
B17	Health and social work	619,083	272,779	177,642	34%	26%	26%	33%	25%	25%
B18	Other community, social and personal services	346,421	105,142	98,126	55%	44%	37%	60%	48%	40%
	Total	**38,463,142**	**5,885,499**	**3,157,435**	**18%**	**23%**	**19%**	**18%**	**23%**	**19%**

Tab. A2 - National scenario accession; full integration (3a), changes

	Sectors	Output	Income	Employment	Augustinovics forward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	8,508,460	302,718	800,353	7%	13%	7%	7%	12%	7%
B2	Mining and quarrying	870,041	239,514	60,540	15%	12%	15%	16%	13%	16%
B3	Foods, beverages and tobacco	2,887,551	307,117	121,652	1%	1%	2%	4%	4%	5%
B4	Chemicals and chemical products	1,575,788	199,566	47,290	29%	31%	44%	25%	27%	38%
B5	Other non-metallic mineral products	555,578	105,673	39,072	79%	83%	86%	51%	54%	56%
B6	Transport equipment	259,091	86,908	24,354	67%	58%	64%	43%	38%	41%
B7	Other products of manufacturing	7,535,656	1,309,481	528,323	4%	4%	4%	3%	3%	3%
B8	Electricity, gas and water supply	1,874,947	239,262	50,198	50%	63%	105%	52%	65%	109%
B9	Construction	1,395,321	404,611	139,002	81%	71%	76%	76%	68%	72%
B10	Trade; repairing activities	2,760,777	368,748	310,369	0%	0%	0%	3%	3%	3%
B11	Hotels and restaurants	554,832	127,978	72,136	16%	15%	15%	19%	19%	17%
B12	Transport and communication	3,362,037	645,476	228,231	36%	35%	39%	37%	36%	41%
B13	Financial intermediation	698,473	140,074	39,968	23%	22%	25%	23%	23%	25%
B14	Real estate, renting and business activities	2,886,554	159,120	75,331	6%	10%	10%	9%	14%	15%
B15	Public administration	1,017,635	463,736	78,899	17%	16%	17%	17%	16%	17%
B16	Education	754,897	407,596	265,949	27%	25%	25%	27%	25%	25%
B17	Health and social work	619,083	272,779	177,642	27%	24%	24%	25%	23%	23%
B18	Other community, social and personal services	346,421	105,142	98,126	33%	32%	31%	36%	35%	34%
	Total	**38,463,142**	**5,885,499**	**3,157,435**	**17%**	**23%**	**19%**	**17%**	**22%**	**18%**

Tab. B1 - National scenario accession; partial integration (3b), changes

	Sectors	Output	Income	Employment	Rasmussen&Hirschman backward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	8,508,460	302,718	800,353	6%	8%	6%	5%	8%	5%
B2	Mining and quarrying	870,041	239,514	60,540	8%	7%	8%	8%	7%	8%
B3	Foods, beverages and tobacco	2,887,551	307,117	121,652	1%	1%	2%	5%	5%	8%
B4	Chemicals and chemical products	1,575,788	199,566	47,290	28%	31%	38%	25%	27%	34%
B5	Other non-metallic mineral products	555,578	105,673	39,072	78%	75%	77%	53%	51%	52%
B6	Transport equipment	259,091	86,908	24,354	58%	45%	51%	33%	26%	29%
B7	Other products of manufacturing	7,535,656	1,309,481	528,323	2%	2%	2%	2%	2%	2%
B8	Electricity, gas and water supply	1,874,947	239,262	50,198	35%	42%	53%	37%	43%	55%
B9	Construction	1,395,321	404,611	139,002	77%	61%	66%	72%	57%	62%
B10	Trade; repairing activities	2,760,777	368,748	310,369	0%	0%	0%	3%	2%	2%
B11	Hotels and restaurants	554,832	127,978	72,136	22%	17%	17%	25%	20%	21%
B12	Transport and communication	3,362,037	645,476	228,231	36%	35%	37%	37%	36%	38%
B13	Financial intermediation	698,473	140,074	39,968	23%	23%	24%	23%	23%	25%
B14	Real estate, renting and business activities	2,886,554	159,120	75,331	3%	4%	4%	6%	8%	7%
B15	Public administration	1,017,635	463,736	78,899	27%	20%	26%	27%	20%	27%
B16	Education	754,897	407,596	265,949	26%	19%	18%	26%	19%	19%
B17	Health and social work	619,083	272,779	177,642	32%	24%	24%	30%	23%	23%
B18	Other community, social and personal services	346,421	105,142	98,126	45%	36%	30%	50%	39%	33%
	Total	**38,463,142**	**5,885,499**	**3,157,435**	**15%**	**20%**	**16%**	**15%**	**19%**	**16%**

Tab. B2 - National scenario accession; partial integration (3b), changes

	Sectors	Output	Income	Employment	Augustinovics forward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	8,508,460	302,718	800,353	6%	11%	6%	6%	11%	6%
B2	Mining and quarrying	870,041	239,514	60,540	13%	10%	13%	13%	11%	13%
B3	Foods, beverages and tobacco	2,887,551	307,117	121,652	1%	1%	1%	3%	4%	4%
B4	Chemicals and chemical products	1,575,788	199,566	47,290	28%	30%	43%	25%	27%	38%
B5	Other non-metallic mineral products	555,578	105,673	39,072	75%	79%	82%	51%	54%	56%
B6	Transport equipment	259,091	86,908	24,354	48%	42%	46%	28%	24%	26%
B7	Other products of manufacturing	7,535,656	1,309,481	528,323	3%	3%	3%	2%	2%	2%
B8	Electricity, gas and water supply	1,874,947	239,262	50,198	49%	61%	102%	51%	63%	106%
B9	Construction	1,395,321	404,611	139,002	57%	50%	54%	53%	47%	50%
B10	Trade; repairing activities	2,760,777	368,748	310,369	0%	0%	0%	3%	3%	2%
B11	Hotels and restaurants	554,832	127,978	72,136	16%	15%	15%	19%	18%	17%
B12	Transport and communication	3,362,037	645,476	228,231	36%	34%	39%	37%	36%	40%
B13	Financial intermediation	698,473	140,074	39,968	23%	22%	25%	23%	22%	25%
B14	Real estate, renting and business activities	2,886,554	159,120	75,331	4%	5%	6%	6%	9%	10%
B15	Public administration	1,017,635	463,736	78,899	17%	16%	17%	17%	16%	17%
B16	Education	754,897	407,596	265,949	18%	17%	17%	19%	17%	17%
B17	Health and social work	619,083	272,779	177,642	24%	22%	22%	23%	21%	21%
B18	Other community, social and personal services	346,421	105,142	98,126	27%	26%	26%	30%	29%	28%
	Total	**38,463,142**	**5,885,499**	**3,157,435**	**15%**	**19%**	**16%**	**15%**	**19%**	**16%**

Tab. C1 - Regional changes baseline and scenario pre-accession

	Sectors	Output	Income	Employment	Rasmussen&Hirschman backward linkage coefficients					
					Baseline Scenario			Scenario Pre-accession		
					O	I	E	O	I	E
					% change					
B1	Agriculture	1,805,092	64,222	169,797	2.1%	2.5%	2.1%	2.2%	2.6%	2.2%
B2	Mining and quarrying	26,141	1,331	1,819	12.7%	20.8%	13.4%	12.7%	20.8%	13.4%
B3	Foods, beverages and tobacco	456,850	47,308	19,247	0%	0%	0%	0.2%	0.2%	0.3%
B4	Chemicals and chemical products	333,984	42,298	10,023	5.1%	5.3%	6.3%	5.1%	5.4%	6.4%
B5	Other non-metallic mineral products	180,259	34,286	12,677	0%	0%	0%	0%	0%	0%
B6	Transport equipment	136,238	45,699	12,806	4.6%	4.3%	4.5%	5.8%	5.5%	5.7%
B7	Other products of manufacturing	456,967	76,943	53,999	0%	0%	0%	0.8%	0.8%	0.7%
B8	Electricity, gas and water supply	284,858	33,986	8,886	0%	0%	0%	2.5%	2.7%	3.4%
B9	Construction	205,320	53,913	20,454	22.1%	19.3%	20.8%	26.4%	23.0%	24.8%
B10	Trade; repairing activities	396,581	46,825	44,584	0%	0%	0%	0%	0%	0%
B11	Hotels and restaurants	112,357	25,916	14,608	89.8%	78.1%	81.7%	89.8%	78.1%	81.7%
B12	Transport and communication	563,985	108,279	38,286	0%	0%	0%	2.4%	2.4%	2.5%
B13	Financial intermediation	84,268	12,547	4,822	0%	0%	0%	0.5%	0.5%	0.6%
B14	Real estate, renting and business activities	262,810	8,117	8,984	0%	0%	0%	0%	0%	0%
B15	Public administration	156,960	62,396	11,160	21.1%	17.3%	22.6%	21.1%	17.3%	22.6%
B16	Education	111,721	61,442	40,890	10.1%	8.4%	8.3%	10.4%	8.6%	8.5%
B17	Health and social work	96,158	40,498	27,592	17.7%	14.1%	14.0%	17.7%	14.1%	14.0%
B18	Other community, social and personal services	43,964	10,421	12,453	44.8%	39.4%	33.8%	46.6%	41.1%	35.2%
	Total	**5,714,515**	**776,425**	**513,087**	**5.1%**	**8.1%**	**6.9%**	**5.8%**	**9.0%**	**7.5%**

Note: OBL - output backward linkage; IBL - income backward linkage; EBL - employment backward linkage

Tab. C2 - Regional changes baseline and scenario pre-accession

	Sectors	Output	Income	Employment	Augustinovics forward linkage coefficients					
					Baseline Scenario			Scenario Pre-accession		
					O	I	E	O	I	E
					% change					
B1	Agriculture	1,805,092	64,222	169,797	2.3%	2.5%	2.1%	2.4%	3.6%	2.4%
B2	Mining and quarrying	26,141	1,331	1,819	12.8%	20.8%	13.4%	12.8%	21.2%	12.7%
B3	Foods, beverages and tobacco	456,850	47,308	19,247	0%	0%	0%	0.2%	0.2%	0.3%
B4	Chemicals and chemical products	333,984	42,298	10,023	5.5%	5.3%	6.3%	5.6%	6.0%	8.7%
B5	Other non-metallic mineral products	180,259	34,286	12,677	0%	0%	0%	0%	0%	0%
B6	Transport equipment	136,238	45,699	12,806	5.6%	4.3%	4.5%	7.0%	6.2%	6.6%
B7	Other products of manufacturing	456,967	76,943	53,999	0%	0%	0%	1.0%	1.0%	0.9%
B8	Electricity, gas and water supply	284,858	33,986	8,886	0%	0%	0%	3.0%	3.4%	4.9%
B9	Construction	205,320	53,913	20,454	18.2%	19.3%	20.8%	21.6%	20.2%	21.2%
B10	Trade; repairing activities	396,581	46,825	44,584	0%	0%	0%	0%	0%	0%
B11	Hotels and restaurants	112,357	25,916	14,608	79.7%	78.1%	81.7%	79.7%	78.3%	76.1%
B12	Transport and communication	563,985	108,279	38,286	0%	0%	0%	2.3%	2.2%	2.4%
B13	Financial intermediation	84,268	12,547	4,822	0%	0%	0%	0.4%	0.4%	0.4%
B14	Real estate, renting and business activities	262,810	8,117	8,984	0%	0%	0%	0%	0%	0%
B15	Public administration	156,960	62,396	11,160	16.0%	17.3%	22.6%	16.0%	15.6%	16.7%
B16	Education	111,721	61,442	40,890	7.9%	8.4%	8.3%	8.1%	8.0%	8.0%
B17	Health and social work	96,158	40,498	27,592	13.6%	14.1%	14.0%	13.6%	13.1%	13.1%
B18	Other community, social and personal services	43,964	10,421	12,453	30.3%	39.4%	33.8%	31.6%	31.4%	31.0%
	Total	**5,714,515**	**776,425**	**513,087**	**4.5%**	**8.1%**	**6.9%**	**5.2%**	**8.6%**	**7.0%**

Note: OBL - output backward linkage; IBL - income backward linkage; EBL - employment backward linkage

Tab. D1 - Regional scenario accession full integration (3a) changes

	Sectors	Output	Income	Employment	Rasmussen&Hirschman backward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	1,805,092	64,222	169,797	4%	5%	4%	5%	6%	5%
B2	Mining,and,quarrying	26,141	1,331	1,819	13%	21%	13%	13%	21%	14%
B3	Foods,,beverages,and,tabacco	456,850	47,308	19,247	1%	1%	2%	6%	5%	8%
B4	Chemicals,and,chemical,products	333,984	42,298	10,023	8%	9%	10%	6%	6%	7%
B5	Other,non-metallic,mineral,products	180,259	34,286	12,677	10%	10%	10%	0%	0%	0%
B6	Transport,equipment	136,238	45,699	12,806	21%	20%	21%	15%	14%	15%
B7	Other,products,of,manufacturing	456,967	76,943	53,999	9%	8%	8%	6%	5%	5%
B8	Electricity,,gas,and,water,supply	284,858	33,986	8,886	3%	3%	4%	5%	5%	6%
B9	Construction	205,320	53,913	20,454	84%	73%	79%	78%	68%	73%
B10	Trade;,repairing,activities	396,581	46,825	44,584	0%	0%	0%	3%	3%	3%
B11	Hotels,and,restaurants	112,357	25,916	14,608	90%	78%	82%	94%	82%	86%
B12	Transport,and,communication	563,985	108,279	38,286	1%	1%	1%	3%	3%	3%
B13	Financial,intermediation	84,268	12,547	4,822	3%	3%	3%	3%	3%	3%
B14	Real,estate,,renting,and,business,activities	262,810	8,117	8,984	11%	17%	13%	12%	18%	14%
B15	Public,administration	156,960	62,396	11,160	8%	7%	9%	8%	7%	9%
B16	Education	111,721	61,442	40,890	28%	23%	23%	29%	24%	23%
B17	Health,and,social,work	96,158	40,498	27,592	23%	18%	18%	21%	17%	17%
B18	Other,community,,social,and,personal,services	43,964	10,421	12,453	37%	33%	28%	41%	37%	31%
	Total	**5,714,515**	**776,425**	**513,087**	**11%**	**15%**	**13%**	**11%**	**15%**	**13%**

Tab. D2 - Regional scenario accession full integration (3a) changes

	Sectors	Output	Income	Employment	Augustinovics forward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	1,805,092	64,222	169,797	5%	7%	5%	5%	7%	5%
B2	Mining and quarrying	26,141	1,331	1,819	13%	21%	13%	13%	21%	13%
B3	Foods, beverages and tobacco	456,850	47,308	19,247	1%	1%	1%	5%	5%	6%
B4	Chemicals and chemical products	333,984	42,298	10,023	9%	10%	14%	6%	7%	10%
B5	Other non-metallic mineral products	180,259	34,286	12,677	12%	12%	13%	0%	0%	0%
B6	Transport equipment	136,238	45,699	12,806	26%	23%	24%	18%	16%	17%
B7	Other products of manufacturing	456,967	76,943	53,999	10%	11%	9%	7%	7%	6%
B8	Electricity, gas and water supply	284,858	33,986	8,886	4%	4%	6%	5%	6%	9%
B9	Construction	205,320	53,913	20,454	69%	64%	67%	64%	60%	63%
B10	Trade; repairing activities	396,581	46,825	44,584	0%	0%	0%	3%	3%	3%
B11	Hotels and restaurants	112,357	25,916	14,608	80%	78%	76%	83%	82%	80%
B12	Transport and communication	563,985	108,279	38,286	1%	1%	1%	3%	3%	3%
B13	Financial intermediation	84,268	12,547	4,822	2%	2%	3%	2%	2%	3%
B14	Real estate, renting and business activities	262,810	8,117	8,984	11%	17%	14%	12%	19%	15%
B15	Public administration	156,960	62,396	11,160	6%	6%	6%	6%	6%	7%
B16	Education	111,721	61,442	40,890	22%	22%	21%	22%	22%	22%
B17	Health and social work	96,158	40,498	27,592	18%	17%	17%	16%	16%	16%
B18	Other community, social and personal services	43,964	10,421	12,453	25%	25%	25%	28%	28%	28%
	Total	**5,714,515**	**776,425**	**513,087**	**10%**	**15%**	**12%**	**10%**	**14%**	**12%**

Tab. E1 - Regional scenario accession partial integration (3b) changes

	Sectors	Output	Income	Employment	Rasmussen&Hirschman backward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	1,805,092	64,222	169,797	4%	5%	4%	4%	5%	4%
B2	Mining and quarrying	26,141	1,331	1,819	13%	21%	13%	13%	21%	14%
B3	Foods, beverages and tobacco	456,850	47,308	19,247	1%	1%	1%	5%	4%	7%
B4	Chemicals and chemical products	333,984	42,298	10,023	8%	8%	10%	6%	6%	7%
B5	Other non-metallic mineral products	180,259	34,286	12,677	9%	9%	9%	0%	0%	0%
B6	Transport equipment	136,238	45,699	12,806	17%	16%	17%	11%	10%	11%
B7	Other products of manufacturing	456,967	76,943	53,999	6%	6%	6%	4%	4%	4%
B8	Electricity, gas and water supply	284,858	33,986	8,886	2%	2%	3%	4%	4%	5%
B9	Construction	205,320	53,913	20,454	56%	49%	53%	52%	45%	48%
B10	Trade; repairing activities	396,581	46,825	44,584	0%	0%	0%	3%	3%	3%
B11	Hotels and restaurants	112,357	25,916	14,608	90%	78%	82%	94%	81%	85%
B12	Transport and communication	563,985	108,279	38,286	1%	1%	1%	2%	2%	2%
B13	Financial intermediation	84,268	12,547	4,822	2%	2%	2%	2%	2%	2%
B14	Real estate, renting and business activities	262,810	8,117	8,984	6%	10%	7%	7%	11%	8%
B15	Public administration	156,960	62,396	11,160	8%	7%	9%	8%	7%	9%
B16	Education	111,721	61,442	40,890	17%	14%	14%	18%	15%	14%
B17	Health and social work	96,158	40,498	27,592	20%	16%	16%	19%	15%	15%
B18	Other community, social and personal services	43,964	10,421	12,453	27%	23%	20%	30%	27%	23%
	Total	**5,714,515**	**776,425**	**513,087**	**8%**	**12%**	**10%**	**8%**	**12%**	**10%**

Tab. E2 - Regional scenario accession partial integration (3b) changes

	Sectors	Output	Income	Employment	Augustinovics forward linkage coefficients					
					DP - Coupled			DP - Decoupled		
					O	I	E	O	I	E
					% change					
B1	Agriculture	1,805,092	64,222	169,797	4%	6%	4%	5%	7%	5%
B2	Mining and quarrying	26,141	1,331	1,819	13%	21%	13%	13%	21%	13%
B3	Foods, beverages and tobacco	456,850	47,308	19,247	1%	1%	1%	4%	4%	5%
B4	Chemicals and chemical products	333,984	42,298	10,023	9%	9%	13%	6%	6%	9%
B5	Other non-metallic mineral products	180,259	34,286	12,677	11%	11%	12%	0%	0%	0%
B6	Transport equipment	136,238	45,699	12,806	20%	18%	19%	13%	12%	13%
B7	Other products of manufacturing	456,967	76,943	53,999	8%	8%	7%	5%	5%	4%
B8	Electricity, gas and water supply	284,858	33,986	8,886	3%	3%	5%	4%	5%	7%
B9	Construction	205,320	53,913	20,454	46%	43%	45%	42%	39%	41%
B10	Trade; repairing activities	396,581	46,825	44,584	0%	0%	0%	3%	3%	2%
B11	Hotels and restaurants	112,357	25,916	14,608	80%	78%	76%	83%	82%	79%
B12	Transport and communication	563,985	108,279	38,286	1%	1%	1%	2%	2%	2%
B13	Financial intermediation	84,268	12,547	4,822	2%	2%	2%	2%	2%	2%
B14	Real estate, renting and business activities	262,810	8,117	8,984	6%	10%	8%	7%	11%	9%
B15	Public administration	156,960	62,396	11,160	6%	6%	6%	6%	6%	7%
B16	Education	111,721	61,442	40,890	13%	13%	13%	14%	14%	14%
B17	Health and social work	96,158	40,498	27,592	16%	15%	15%	14%	14%	14%
B18	Other community, social and personal services	43,964	10,421	12,453	18%	18%	18%	21%	21%	20%
	Total	**5,714,515**	**776,425**	**513,087**	**8%**	**12%**	**10%**	**8%**	**11%**	**10%**

8. POTENTIAL IMPACTS OF EU-FUNDS ON A RURAL REGION OF CROATIA

Željko Mrnjavac, Branko Grčić and Blanka Petković

1. Some general information about Croatia

Croatia is geographically situated at the cross-roads between Central Europe and the Mediterranean. It stretches in the form of an arc from the Danube in the northeast to Istria in the west and Boka Kotorska in the South-East. Its area is 56,538 sq km, and the area of the coastal sea about 31,900 sq km.

Croatia is situated close to densely populated and industrially developed European countries. Many internationally important transport routes cross Croatia. The importance of the geographical position of the Republic of Croatia is also enhanced by the Adriatic Sea which is the northernmost gulf of the Mediterranean closest to the central part of the European continent.

The most important routes are centered along the Sava river, the Adriatic and the Drava river; there are also several important transversal routes from the border with Austria and Hungary to the Adriatic coast (to Rijeka and Split).

The area of Croatia can be divided into three major natural and geographic parts:

The *Pannonian and Peri-Pannonian area* comprises the lowlands and hilly parts of eastern and northwestern Croatia; mountains higher than 500 meters are rare and of an insular nature. Most of this area is being used for farming and livestock breeding. Slavonija and Baranja in the East are the most suitable for growing cereals; the humid valleys and hills are richly afforested while the North-Western part, which is drawn around Zagreb, is industrially the most developed.

The *hilly and mountainous area,* which separates Pannonian Croatia from its coastal part, is less developed. Its future development will be based on its transit importance, the growth of the already existing wood and timber industry, and the still underexploited potential for the production of health food, and winter and rural tourism.

The *Adriatic Area* includes a narrow coastal belt separated from the hinterland by high mountains. This is predominantly a karst area with very dry summers. The few streams mainly follow narrow gorges in breaking their way through to the sea. The Croatian coastal area may further be divided into the northern (Istria nad Kvarner) and southern (Dalmatia) parts. It also lends itself to a longitudinal division into the islands, the coast proper and the immediate hinterland.

The Croatian Adriatic coast is one of the most indented in the world: It has 1,185 islands and islets with a total coastline of 4,058 km: the total length of the mainland coast being 1,777 km. The largest island is Krk; other large islands include Cres, Brač, Hvar, Pag and Korčula. The largest peninsulas are Istria and Pelješac, and the largest bay is Kvarner Bay.

A considerable part of Croatia lies at an altitude of over 500 m, but there are no mountains higher than 2,000 m. Lowlands prevail in eastern and northwestern Croatia, while the highest mountains in the mountainous part are found in the area which separates the continental mainland from the Coast (Risnjak 1,528 meters, Velika Kapela 1,533 meters, Plješivica 1,657 meters) or close to the sea (Učka 1,396 meters, Velebit 1,758 meters). The highest mountains in Dalmatia are Biokovo (1,762 meters), which is close to the sea, and Dinara (1,831 meters) in the hinterland.

Most of Croatia's rivers belong to the Adriatic and the Black Sea basin; the rivers in the interior are larger and calmer (Sava, Drava and Danube). The coastal rivers are shorter and have a higher gradient. The longest coastal rivers are the Mirna and the Raša in Istria and the Zrmanja, the Krka and the Cetina in Dalmatia. Karst streams running partly underground prevail in Lika.

Croatia has no large lakes (the largest, Vrana, near Biograd, has an area of 30 sq km). The most attractive are the Plitvice Lakes (a chain of 16 lakes with the river Korana as the effluent), the Red and Blue Lakes near Imotski (named because of a unique karst phenomena), the freshwater Lake Vrana (a crypto depression on the island of Cres) and Lake Prokljan (along the Krka river near Šibenik). The best know man-made lakes are Lokve and Bajer in Gorski Kotar, Trakoščan in Hrvatsko Zagorje and Peruča along the river Cetina in Dalmatia. Lake Kopačevo and the surrounding swamp forests in Baranja are a major hatching ground and bird habitat.

The Adriatic Sea stretches from the northwest to the southeast between the Balkan and Apenine peninsulas for 783 km; its average width is 170 km and its average depth is 252 m. Its northwestern part is shallow (maximum 23 m in the Bay of Trieste), while it is much deeper in the south (1,200 m in the South Adriatic basin). The prevailing winds are the cold *bura*, the humid jugo and the refreshing *maestrale*. Northern Croatia has a continental climate. The Adriatic coast has a Mediterranean climate and the hinterland between these two areas has a sub-Mediterranean climate.

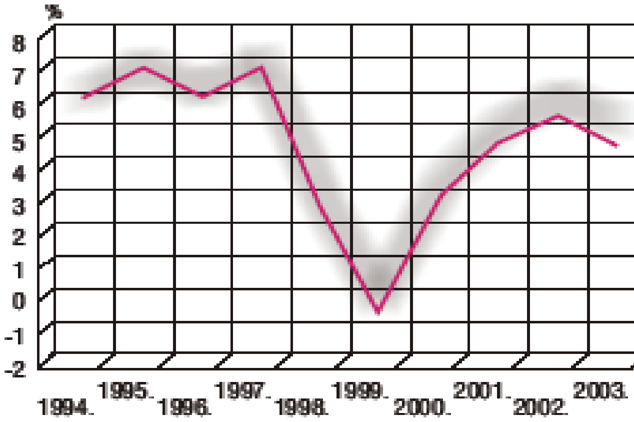
1.1 Economy (general)

Croatia has a small economy and a population of 4.4 million. Its population corresponds to about 1.2% of that of the EU-15. Generally speaking, the economic and financial situation in Croatia has improved over past few years. Following a one-year slump, which ended in autumn 1999, the economy has been growing steadily.

The macro-economic situation (Figure 1) is characterised by high GDP growth rates, along with growing employment and macro-economic stability. An unexpectedly strong growth of domestic demand boosted the growth of real GDP in 2002, reaching 5.2%. Such growth in domestic demand was stimulated by increased consumer spending influenced by credit expansion and growing investment spending due to investments in highway infrastructure. This also resulted in a growth of imports and an expansion of the current accounts deficit. During 2003, economic activity in Croatia remained strong despite the weaknesses observed in other world economies. Hence, a 5% growth of real GDP is forecast.

GDP per capita amounted to US$ 5,099 (€ 5,451) in 2002, and it was estimated to grow to US$ 6,228 (€ 5,709) by the end of 2003, which is greater than in certain other accessing countries. It actually reached the estimated number in 2003 (Table 1).

Fig. 1 - Annual growth rates of GDP, constant prices, 1994 - 2003



Tab. 1 - Basic macroeconomic indicators for the Croatian economy

Year	1997	1998	1999	2000	2001	2002	2003
GDP1 (in m €, current prices)	17,790	19,281	18,679	19,976	22,177	24,219	25,526
GDP (% rates of change, current prices)	6.8	2.5	-0.9	2.9	4.4	5.2	4.3
GDP per capita (in €)	3,891	4,284	4,102	4,560	4,999	5,451	5,747
Industrial production (growth rate in %)	6.8	3.7	-1.4	1.7	6.0	5.4	4.1
Average year-on-year inflation rate2 (in %, end of year)	3.6	5.7	4.0	4.6	3.8	1.7	1.8
Exports of goods and services (as % of GDP)	39.9	39.5	40.8	47	48.5	46.3	51.8
Imports of goods and services (as % of GDP)	56.6	48.7	49.2	52.1	54.4	57.3	59.7
Current account balance (as % of GDP)	-12.5	-6.7	-7	-2.5	-3.6	-8.5	-7.3
Outstanding external debt (million €, end of year)	6,593	8,632	9,363	11,984	12,632	16,360	20,959
Outstanding external debt (as % of GDP)	37.1	44.8	50.1	60.0	57.0	67.5	82.1
Outstanding external debt (as % of exports of goods and services)	92.9	113.3	122.9	127.6	117.4	145.8	158.4
External debt service3 (as % of exports of goods and services)	9.9	12.5	20.8	23.3	24.5	27.0	20.0
Gross international reserves (million €, end of year)	2,246	2,510	2,839	3,821	5,252	6,249	7,257
Gross international reserves (in terms of months of imports of goods and services, end of year)	2.70	3.20	3.70	4.40	5.20	5.40	5.70
Net wage and salary, in €	342	376	403	436	474	502	521
Average exchange rate (HRK4:1€)	6.96	7.14	7.58	7.63	7.47	7.41	7.56

Note:
1) Preliminary data for 2003.
2) The average year-on-year inflation rate was measured by the retail price index in the 1994-1998 period. From 1999 on, it is measured by the consumer price index.
3) Includes principal payments on long-term debt net of principal payments on trade credits and direct investments, as well as total interest payments net of interest payments on direct investments.
4) The legal currency in Croatia is the kuna (Local abbreviation kn, international abbreviation HRK), consisting of 100 smaller units, called lipa (lp). (The name kuna, meaning "marten", has its origin in ancient times, when the marten's fur was used as a trade unit. The word lipa means "linden (tree)").

Source: Croatian National Bank, Croatian Bureau of Statistics

The principal economic activities in the Republic of Croatia include agriculture, foodstuffs, textile, wood and timber, metalworking, chemical and petroleum industries, the electrical manufacturing industry, shipbuilding, the shipping industry and tourism.

Of a total of 3.18 million hectares of agricultural land, 63.5% is cultivated and the rest is pasture land. 80.4% of the cultivated land is privately owned. Mariculture, i.e. fish and shellfish breeding, is becoming increasingly important. Of a total of 2.1 million hectares of Croatian forests and woodland areas, 80% are state owned and the rest are in private hands. Conifers make up 12.7% of the forests, while in the remainder oak and beech are among the more important broad-leaved species. The production of food, beverages and tobacco generates 20.6% of Croatian GDP.

The Croatian industrial sector is intensively changing and the effects of the full-scale and strategically thought out restructuring of this sector are evident in many areas. Namely, from privatization to the strengthening of exports to western markets, the development of new products and innovations to existing products and manufacturing processes, to increasing the level and standardization of quality, satisfying environmental protection conditions, reaching cost effectiveness, etc. Industry currently represents about 20% of Croatia's GDP, which is getting closer to the European Union levels. The value of the industrial production level is estimated to be around 93 billion HRK (approx. 13.0 billion US$) for 1999 with an employment level of 293,000, which represents 27% of Croatia's total workforce. Industrial goods account for 97% of Croatia’s total exports.

Although situated in the heart of Europe and close to Central European capitals, Croatia has maintained a well-preserved natural environment. Across its entire territory Croatia offers diverse forms of tourism, including hunting and fishing, health tourism with 19 continental and sea resorts, nautical tourism with 44 marinas and about 15,000 berths, diving, religious tourism, and tourism related to family farms and cruising. Numerous cultural monuments, e.g. Dubrovnik and National Parks such as Plitvice Lakes, are protected by UNESCO. From Istria, which is closest for European travelers, through Opatija, a previous jet-set resort of the European aristocracy, to Dalmatia and Dubrovnik in the South, the Croatian coast remains attractive due to a mild climate throughout the entire year.

In 2003 Croatian construction, an important national industry, employed 108,101 employees in 11,280 companies. The total value of construction contracts carried out abroad amounted to 123 million US$, 97% of which was earned in Europe. In 2003, 12,557 flats (apartments) with a total area of 1,040,000 square meters were built, which corresponds to the average construction level in the previous three years.

Almost 50% of Croatian economic entities engage in trade. This activity employs 15% of the total workforce and generates about 10% of Croatian GDP, which makes it extremely important for the entire economy.

Croatia has a high quality education system. Croatian university programmes, especially those for science, medicine and engineering, meet the highest international standards, which is proven by the large number of Croats who have found work in reputable institutions - hospitals, universities, and institutes world-wide. In the academic year 2003/04, about 121,000 students were enrolled in Croatian University centers.

1.2 The milestones towards EU

On 29th October 2001 the Republic of Croatia signed the Stabilisation and Association Agreement (SAA) with the European Union and all its member states. In the interim period pending the effective implementation of the SAA, its trade and trade-related provisions are already being applied. In any case, the SAA is the first contractual relationship between Croatia and the European Union and thereby an important step towards the institutionalisation of relations with a view towards attaining full membership.

In order to speed up the process of assuming the obligations arising from the SAA, adopting the European standards and procedures and meeting the conditions for full membership, a Plan for the Implementation of the SAA has been adopted which reaffirms not only the reforms demanded under the SAA but also those set by Croatia itself and not explicitly mentioned in this document. This sets the stage for a highly demanding programme of reforms, the outcome of which should be the full implementation of SAA obligations by the year 2006.

Most measures are being carried out on schedule, especially those related to thorough harmonisation of the Croatian legislation with the *acquis communautaire*. The full success of the reforms will depend on the capability and will of all state administrative bodies to make potentially complex political decisions and obtain public consensus on them. In supporting the implementation of the Agreement, Croatia is also using the EU's technical and financial assistance available through the CARDS programme.

On 21st February 2003 Croatia officially applied for full membership into the EU. Based on the answers given to the Questionnaire of the European

Commission, on 20th April 2004 the European Commission announced its positive opinion ("avis") and proposed to the European Council to start membership talks with Croatia. At the European Council meeting held on 17th and 18th June 2004, Croatia received candidate status and the membership negotiations started in early 2005[3].

The goal of the Government of the Republic of Croatia is to be prepared for EU membership in 2007, which could and should, with the continuation of the EU enlargement policy, result in Croatia's membership in the EU. To make achievement of full membership possible, it is imperative to work out an EU integration programme, one which would treat the accession not only as a goal in itself, but also as a means of carrying out all necessary reforms in the interest of Croatian citizens.

This approach is adopted in the annual National Programmes of the Republic of Croatia for Integration into the European Union (NPIEU), which serve as a central management tool for directing the Government's activities in the area of European integration and represents a framework for combining annual planning, establishing short-term goals and monitoring the integration process in various sectors, in line with a strategic approach based on assumed obligations, our own capacities and national interests.

2. The selected region for the impact analysis

One of the first steps of this impact analysis of EU policy funds effects on the national and regional economic development was the selection of a Croatian rural region. The accent on rurality was because of the structure of EU financial support (pre-accession and post-accession), which is in large part oriented towards agriculture and rural development.

The Croatian County Bjelovar - Bilogora is an example of a rural region in which agricultural employment is significant, but at the same time there is a notable share of employment in other sectors. The region is rural according to the OECD definition, where rural communities are those with a population density below 150 inhabitants per square kilometer. The County of Bjelovar - Bilogora has a population density of 50.4 inhabitants per square kilometer and it can be characterized as predominantly rural.

[3] Following the European council's political decision to open negotiations and to convene the bilateral intergovernmental conference on accession, negotiations were formally opened on 3rd October 2005 at the first session of the intergovernmental conference between EU member states and the republic of Croatia, where the exchange of general positions of the European Union and the republic of Croatia took place. At the begining of 2006 the screening process for Croatia started in which eight chapters of the NPIEU will be included.

Moreover, there is no sufficiently strong urban agglomeration to change the predominantly rural characteristic of the region as a whole. Its population corresponds to 3% of that of the country as a whole.

Besides satisfying the OECD definitions, the region's area is in large part agricultural land (37.2%, according to the Agricultural Census in 2003) and 86% of it is cultivated. It occupies 4.6% of the total Croatian territory, 8.5% of the total agricultural land of Croatia and 9.7% of the total national cultivated agricultural land. Taking all of this into consideration the selection of Bjelovar-Bilogora County for the case study region was an appropriate choice.

The area of the region is mostly lowlands (57.9%), with a few mountain areas (5.8%) not higher than 500 meters (except Brezovo Polje, at 989 meters). The valleys and hills are covered with woods (36.4% of the region is woodland), which is 4.6% of the total forest area of Croatia, which gave rise to the development of forestry in the region. The share of meadows (26.2%) is also significant and that is the reason why food production is the basic economic activity in the County.

The climate in the region is continental (lower winter than summer temperatures, low rainfall, frequent North and Northeast winds). The natural resources of the County, besides farmland and woodland, are also oil and gas, coal, clay, construction stone and springs of mineral and thermal water.

The County of Bjelovar - Bilogora had 144,042 inhabitants in 1991 but this number decreased to 131,084 inhabitants in 2001. The population distribution by age shows a 65% share consists of a working age population, while under age and retirement age populations have similar shares of around 17%. This shows that the basic long-term demographic trends are depopulation and ageing of the population, which is caused by demographic transition (the transfer of populations) and low natural population growth.

The unemployment rate for 2001 was 15.8% (the unemployment rate is calculated as a ratio of unemployed persons (10,166) and the total active population (a labour force of 63,963) in the corresponding year).

2.1 Economy (general)

According to the 2003 data from the Financial Agency (FINA) in Croatia the County structure of economic entities by activity shows that 39.7% of the entities engaged in trade, 21.8% in manufacturing, 13.3% in real estate, 7.3% in construction and 4.4% in agricultural activities.

The distribution of employed persons in firms is similar for all three types of firms - small, medium and large (the total number of those employed in firms is around 15,823).

In the structure of revenue in 2003 the highest share is from trade (40.8%) followed by manufacturing industries (33.9%), construction (9.1%), transport and communication (5.5%) and agriculture, hunting and forestry (3.2%).

The average net wage and salary for 2003 in the County was 2,684 HRK (355 €), which is below the Country average (only cca. 70% of the country average) but it is 15% higher than it was the year before.

The share of the County exports in the total exports of Croatia was 1.1% and the share in imports was 0.9% in 2003.

In the structure of the County exports manufactured goods comprise 91.7% of the total exports and in imports the share of manufactured goods is 44.7%. Almost half of the total imports (47.8%) are related to trade goods whose import share rose by 20% in 2003.

The countries Bosnia and Herzegovina, Germany, Italy and Slovenia make up the Bjelovar-Bilogora export markets and 79.5% of total County exported goods goes to these countries while 62.8% of imported goods comes from Germany, Italy, Austria and Slovenia.

2.1.1 Agriculture and food industry

The County of Bjelovar-Bilogora is the most important agricultural area in central Croatia and has a long agricultural tradition with a domicile population. Beside this tradition the County has an advantage in agricultural production thanks to natural resources: a large agricultural area with a favourable climate and topography.

Containing 147,419 ha of agricultural land with 143,565 ha of cultivable land and 121,515 ha of cultivated land (that is 82.43 percentage points of total agricultural land) the region makes up 4.7% of the total agricultural land of Croatia (according to the data in 2000).

Arable land and gardens occupy the largest part of agricultural land (101,231 ha or 68.7%), meadows account for 36,659 ha (24.9%), orchards 3,927 ha (2.7%), pastures 3,854 ha (2.6%) and vineyards 1,748 ha (1.2%).

It is very difficult to estimate the real employment rate of agriculture because the private sector (individual farmers) is not included in the statistical figures. Therefore, only the census data gives a real picture of the active population and employment.

According to the 2001 Census, the County agricultural population comprises a 20.68% share of the total County population, which is almost four times higher than it is at the national level (5.54%).

In the last decade the size of the agricultural population and employed agricultural population decreased. The largest decreases were in the number of individual farmers, which went down by almost half, and the number of inactive agricultural population also declined. In percentages the share of the employed agricultural population in the total agricultural population increased while the share of the agricultural population in the total population also showed a downward trend.

The agricultural land is mainly owned by individual producers (82.43%) while the rest is owned by agricultural firms established in socialist times that are partly still state owned. Small family farms characterise the agricultural structure and 30.49% of total households are family farms that own from 1 to 3 ha of land; between 3 and 5 ha is owned by 22.10% of family farms, and 5 to 8 ha of land is owned by 18.63% of family farms. Only 2.65% of family farms have a larger area of land (more than 10 ha).

Wheat, maize and potatoes are the most important agricultural products of the County. This illustrates that the major orientation of the local farmers is towards the livestock industry and meat production. The share of the County in the country total of livestock, poultry and beehives was for any species between five and fifteen percentage points.

Intensive livestock production was the base for the development of milk and meat industries and today the Bjelovar - Bilogora County has a cca. 50% share in the total Croatian yearly milk production and this industry branch comprises the highest share of the County exports.

2.1.2 Wood industry

Industry, together with agriculture, is the most important activity in Bjelovar-Bilogora County and a long tradition consisting of food processing, the wood industry and the textile industry as well.

The wood industry that consists of the production and manufacture of wood and furniture production is one of the most important economic activities in the county regarding its exports and number of employees. In the last decade the share of exported wood industry products in the total number of exported manufactured products is constantly at the level of 30-31%; 12% of the total employed in manufacturing are in the wood industry branch, and its net revenue comprises 68.9% of the total revenue of the manufacturing industry.

3. The analyzed policy instruments and the definition of the relevant scenarios

This paragraph deals with EU pre-accession and post-accession funds availability. The mentioned financial support and the corresponding possible expected expenditures at the Croatian national and regional levels are analysed. The following text shortly describes the weights used for the allocation of EU funds at national and regional levels. The last sub - paragraph gives a detailed description of the scenarios under which the impact analysis is performed.

3.1 The pre-accession assistance

The EU policy instruments for pre-accession assistance are PHARE, ISPA and SAPARD. Having received candidate country status in June 2004, Croatia became eligible for the pre-accession programmes PHARE, ISPA and SAPARD early in 2005. Following the regulations 2257/2004 and amendments of the regulation 3906/89, 1267/1999, 1268/1999 and 2666/2000, the funds were made available to the RC.

The on-going EU support to Croatia under the CARDS Programme (Community Assistance for Reconstruction, Development and Stabilization) was also included in the analysis because, at the time this chapter is written, it is still not defined whether it is going to be replaced by the pre-accession policy instruments or if it will be granted to Croatia continually until the end of 2006. The existing financial framework of CARDS for Croatia was analysed and the average three-year amount is used for the impact analysis.

The pre-accession fund expenditures had to be projected at the national level and then at the regional level. The projections at the national level were done using weight against the main economic and geographic indicators of Croatia and the former ten applicant countries[4].

For ISPA and PHARE fund allocation the population ratio was used. Comparing Croatian indicators with the ten former applicant countries' indicators, Slovakia is the country most like Croatia (Table 2). Therefore, the possible amount of the PHARE and ISPA budget to Croatia is

---

[4] During the 2005 the EU has set the Pre-accession Funds amounts for Croatia. Within the PHARE programme the total budget for financial year 2005 and 2006 for Croatia is set to be € 160 million (€ 80 million per year). The funds total at 60 millions euros for the period of two years (2005 and 2006) will be spread evenly between the environment and transport sectors (ISPA). Within SAPARD, € 25 million has been approved for Croatia for the financial year 2006 (this means that the preparation and implementation of projects will start in 2006).

projected using the population ratio between Slovakia and Croatia. The annual budgets are projected under the assumption that the annual budget of the funds is flexible and can vary in small ranges. The average three-year amount (2000-2002) of the funds allocated to Slovakia was used for the projections.

The SAPARD funds are allocated on the basis of agricultural area. The projected amount for Croatia is done by indicating the ratio between the agricultural areas in Croatia and Slovakia and than calculating within these percentages.

Tab. 2 - General indicators of Croatia, Slovakia and the selected Region

Country	Total population on 1 January 2004 in millions	GDP in bn euro in 2002	Surface area in sq km	Agricultural area in hectares
Slovakia	5.40	23.70	49,036	2,444,000
Croatia	4.40	22.40	56,542	1,162,612
Bjelovar-Bilogora County	0.133		2,637	98,183

Source: Croatian Bureau of Statistics, World Bank

The described policy instruments taken into consideration and the amount of funds inflow projected at the national and regional levels are presented in Table 3[5]. For the regionalization of the projected national funds the same ratios were used as for the projections of the funds at the national level (the population ratio and land share between the region and the country as a whole).

Tab. 3 - The EU Policy Funds inflow projected at national and regional levels

Policy instruments	Average annual amounts in m €	
	Croatia	Bjelovar-Bilogora County
Current situation - 2004		
CARDS	63.0	1.89
Pre-accession policy instrument funds projections		
ISPA	38.13	1.15
PHARE	53.67	1.62
SAPARD	8.7	0.74
TOTAL	100.5	3.5

Source: Split Team's calculations

[5] These projections were made before Croatia became a candidate country. The difference between projected and real EU set amount is less than 20%, therefore the projections are still indicative for the proceeded analysis.

3.2 *The available EU funds after the accession*

After accession, the funds at national and regional levels are projected with similar weight as pre-accession funds. The EU Budget financial framework for 2004-2006 for Slovakia was the foundation for projections of the possible national and regional funds inflows. The average two-year (2005 and 2006) amount of the EU budget sources slotted for Slovakia was taken into consideration.

The average annual amounts for Croatia were projected using the population ratio between Croatia and Slovakia while the same average annual amounts for the Bjelovar-Bilogora County under heading 1 - *Common agricultural policy* are calculated using the ratio between the country and regional agricultural areas for the projected amounts under heading 2 - *Structural Operations* where the population ratio was taken into consideration.

The corresponding EU budget appropriations for payments for Internal Policies (heading 3) were not included in this impact analysis. Also, the projected annual amount of the EAGGF market measures expenditures were not included in the impact analysis as it was decided among the partners but they are given in Table 4.

The total volume of the possible annual budget for Croatia is projected to be 404.1 million €, and for the County of Bjelovar-Bilogora 22.5 million €. The corresponding expenditures are presented in Table 4.

Tab. 4 - The average annual amount of EU financial support after the EU accession

SOURCE:	Croatia	Bjelovar-Bilogora County
	In 000 HRK	In 000 HRK
1.a. First Pillar		
EAGGF-Market measures	**297,519**	**25,289**
EAGGF-Compesatory Direct Aids	**492,603**	**41,871**
Total 1.a.	790,428	67,186
1.b. EAGGF - Rural development	**629,896**	**53,541**
Total heading 1 – CAP	1,420,324	120,727
2.		
Structural Funds	**1,286,701**	**38,601**
Cohesion Fund	**343,691**	**10,310**
Total heading 2 – Structural & Cohesion	1,630,392	48,911
TOTAL:	3,050,717	169,639

Note: EXR 1 EUR = 7.55 HRK

Source: Team's calculations

3.3 The definition of relevant scenarios

The scenarios performed in this analysis of the effects on economic development are defined as follows:

Scenario 1 - represents the current situation and includes only the inflow of CARDS funds at the national and regional levels;
Scenario 2 - takes the amount of the pre-accession funds inflow into the impact analysis;
Scenario 2a - is the alternative among Scenarios 1 and 2 and includes the cumulative use of pre-accession funds and currently granted CARDS funds at the national and regional levels;
Scenario 3 - is a scenario that assumes EU accession but a lower level of absorption of funds (in comparison to Scenario 4). The pre-accession support is omitted from the scenario because of the fact that a country (a region) cannot be eligible for support from both pre-accession and full-membership related policy instruments.

The assumed absorption levels are: *EAGGF guarantee:* 0.85 direct payments, 0.7 rural development (Guarantee); *Structural funds*: 0.5 EAGGF guidance, 0.5 ERDF, 0.5 ESF; *Cohesion Fund*: 0.5. Direct payments are assumed to be fully coupled;
Scenario 3a - is a Scenario 3 sub-scenario which assumes that the direct payments are fully decoupled and therefore the total amount is transferred to the final demand of the households;
Scenario 4 - is the most optimistic scenario and stems from the assumption that all available funds will be absorbed in the country and the region. This scenario did not take the pre-accession funds into consideration and the impact analysis refers to the effects of inflows of the "post - accession" funds on the current situation - baseline. The direct payments are considered to be fully coupled;
Scenario 4a - is a version of scenario 4 but with the assumption that the direct payments are fully decoupled.

3.3.1 The general assumptions of the performed analysis are presented in the next paragraph

Before presenting the results of the performed analysis, these are the assumptions that are important for the understanding of the results and their explanations:

1. The scenario analysis is static and calculates the effects of different EU policy instruments on the basic economic variables at the

national and region levels measured as delta change in comparison to the baseline scenario (current situation);

2. Therefore, only the separate effects of each of the EU policy instrument funds inflow is measured, and the calculations of cumulative effects were not performed;
3. The analysis does not include national co-financing as there is a lack of relevant data;
4. This analysis predicts the possible impact of EU funds on the national and regional economies as net inflows, neglecting their contribution to the EU budget, and assuming the 100% absorption capacity of national and local economies to use all funds that EU policy puts at the disposition of the candidate countries (with briefly analyzing the partial absorption of the funds at levels defined in scenarios 3 and 3a).

3.3.2 The sectoral allocation of funds under each defined scenario - the rise of the final demand

By now it has been clarified that when the output multiplier vector is calculated the overall change in production due to a one-unit variation in the final demand can be quantified. Also, the vector of income coefficients is a quantifier of the effects in terms of income generated by final demand variation. Similarly, the vector of employment coefficients quantifies the change in employment generated by final demand variation. Therefore, for further analysis we have needed the vectors of final demand.

As for each scenario, the total change in final demand was calculated; the next step was the sectoral allocation of identified regional fund inflows to calculate the vectors of a new final demand. Firstly, each policy instrument was allocated to specific sectors on which development they are mainly focused. Then, using the specific ratios from the EU's sectoral allocations of each instrument the sectoral distribution of funds was completed[6].

Tables 5 and 6 represent the sectoral rise of the final demand due to the projected EU funds inflow at national and regional levels by each defined Scenario.

[6] The sectoral allocation of each policy instrument is given in the annex (Tables A5-A6).

Tab. 5 - Projections of the change in Final Demand - Specific Scenarios at the national level (▲FD)

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0,00	2,233.3	2,233.3	150,773	135,799	199,827.4	182,210.5
2	Manufacture of Food Products	0.00	0.00	0.00	93,433	90,749	127,188.6	124,030.1
3	Textiles and Dressing	0.00	0.00	0.00	0	13,471	0.00	15,848.7
4	Wood Products	0.00	0.00	0.00	0	0	0.00	0.00
5	Chemical and Metal Products	0.00	0.00	0.00	70,541	60,587	85,579.8	73,868.4
6	Machinery and Motor Vehicles	0.00	21,015.9	21,015.9	117,656	94,847	153,748.7	126,914.6
7	Furniture	0.00	0.00	0.00	0	12,890	0.00	15,164.9
8	Other Manufacturing	59,125.0	1,041.1	60,166.1	117,656	59,204	153,748.7	84,982.4
9	Electricity, Water and Gas	24,250.0	0.00	24,250.0	25,781	42,908	38,964.1	59,113.8
10	Construction	105,000.0	184,510.3	289,510.3	678,355	636,483	1,196,247.6	1,146,987.3
11	Trade and Hotels	18,750.0	0.00	18,750.0	4,066	27,368	8,132.0	35,545.8
12	Transportation	0.00	129,546.7	129,546.7	132,639	117,211	235,439.9	217,288.4
13	Financial Services and Real Estate	0.00	15,219.2	15,219.21	156,278	199,481	302,477.4	353,304.9
14	Public Administration, Education and Health Services	265,375.0	405,208.5	670,583.5	127,659	132,054	251,538.1	256,709.5
15	Other	0.00	0.00	0.00	0.00	51,785	0.00	60,923.0
	TOTAL	**472,500.0**	**758,775.0**	**1,231,275**	**1,674,837**	**1,674,837**	**2,752,892**	**2,752,892**

Note: In 000 HRK
EXR 1 EUR = 7.55 HRK

Tab. 6 - Projections of the change in Final Demand - Specific Scenarios at regional level (▲FD)

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0.00	188.67	188.67	22,958.85	15,543.13	49,414.26	19,754.23
2	Manufacture of Food Products	0.00	0.00	0.00	11,090.08	12,238.33	5,802.28	15,527.42
3	Textiles and Dressing	0.00	0.00	0.00	0.00	750.23	0.00	882.63
4	Wood Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Chemical and Metal Products	0.00	0.00	0.00	595.79	2,355.84	870.34	2,940.99
6	Machinery and Motor Vehicles	0.00	1,775.48	1,775.48	4,009.47	4,584.40	3,389.06	6,159.00
7	Furniture	0.00	0.00	0.00	0.00	2,359.63	0.00	2,776.04
8	Other Manufacturing	1,925.25	2,013.21	87.96	2,229.94	3,993.68	3,389.06	5,464.04
9	Electricity, Water and Gas	679.50	679.50	0.00	1,985.98	2,737.09	2,901.14	3,784.79
10	Construction	2,944.50	9,931.25	6,986.75	40,117.66	31,220.01	51,731.77	51,731.77
11	Trade and Hotels	453.00	453.00	0.00	121.98	1,248.62	243.96	1,569.42
12	Transportation	0.00	3,907.13	3,907.13	4,563.66	7,679.17	8,056.51	11,721.81
13	Financial Services and Real Estate	0.00	1,285.76	1,285.76	5,658.38	7,921.86	10,460.09	13,123.01
14	Public Administration, Education and Health Services	9,399.75	21,630.75	12,231.00	4,193.53	4,893.34	8,065.81	8,889.12
	TOTAL	**15,402.0**	**26,462.7**	**41,864.7**	**97,525.3**	**97,525.3**	**144,324.2**	**144,324.2**

Note: In 000 HRK
EXR 1 EUR = 7.55 HRK

4. The results of the impact analysis at national and regional levels

The results at the national and regional levels in this paragraph are briefly analyzed with the stress being on the comparative analysis of the results at both levels as the main aim of the REAPBALK project is to assess the implications for inter-sectoral rural employment patterns of policy changes. Because the analysis is concentrated on three main aspects: rurality, employment and agriculture within a medium-term perspective it was interesting to see the impacts of defined policy instruments funds inflow at the national level and to compare it with the impacts of the same policy instruments in the specific rural region.

4.1 The effects on national and regional output levels[7]

4.1.1 Pre - accession assistance

According to the results in *Scenario 1* the CARDS Programme affects the total national and regional output levels with nearly the same intensity (an increase of 0.25%). The difference is in the sectoral improvement of the output. The highest impact on national and regional output in this scenario occurs in the rise of the final demand in the sectors of Public administration, education and health services. It has nearly the same effect at both levels (an increase of 1.32% at the national level and 0.96% at the regional level). But, it can be seen that Construction and Other manufacturing contribute a higher impact to the change in national output than to the change in the regional output level (the difference is almost double).

The results of the pre-accession funds inflow - *Scenario 2* at both analyzed levels show that the total output change is again nearly the same but that the difference is in sectors generating a higher impact on the output change of the studied economies (0.42% at the national level and 0.37% at the regional level). Transportation and Construction are the two sectors whose rise in final demand has the strongest impact on the national and regional output levels, while at both levels the first ranking is taken by the sectors of Public administration, education and health services. The sector of Financial services and real estate has a considerably higher impact on the output level of an economy at the regional level than at the national level (0.65% vs. 0.14%).

As this scenario has also included the agricultural expenditure (SAPARD) at both national and regional levels a significant effect can not be found on the agricultural sector but the reason could be the small amounts of funds available for these expenditures under this scenario. *Scenario 2a* shows the effects of the cumulative use of CARDS and pre-accession funds.

The conclusion according to the results in these three vectors of output changes is that the sectors with important affects on the economies under study are Public administration, education and health services, Construction, Transportation, Electricity, water and gas and the sector Other manufacturing.

---

[7] Tables 7 and 8 present the percentage changes in the output at national and regional levels.

4.1.2 EU funds

The *Scenario 3* analysis shows the significant sectoral rise of output at both national and regional levels after accession with *partial absorption* of the funds. At the regional level the rise of the total output is even higher than at the national level (1.45% vs. 0.97%).

When the *direct payments* are taken into consideration at the national level there is no difference in the rise of total output, whether they have been assumed as coupled or decoupled. But at the regional level coupled direct payments show a lower impact on the total regional gross output level.

There is also a significant difference among the rise of the total output induced by the rise of the final demand in Agriculture, again at the regional level. If the direct payments are *coupled* Agriculture contributes a higher impact on the regional output level (by 2.10%) than when they are assumed to be decoupled. At the national level it is seen that there is not such a significant difference.

The results of the funds inflow after accession with a full absorption level (*Scenarios 4* and *4a*) show the highest difference between the national and regional levels (2.15% vs. 1.61%). According to these results the post-accession funds strongly affect the output level of the total regional economy.

The rise of the total national output level due to a rise of national final demand in *Scenarios 4* and *4a* makes no difference, which means that the coupled and decoupled direct payments have not shown any dissimilarity although at the regional level the decoupled direct payments have a slightly higher effect on the rise of the total output.

Sectorally, these effects differ at national and regional levels. The overall impact of Agriculture is stronger at the regional than at the national level. The effects of the rise of FD in the Agriculture sector on the national output level show a rise of around 1.4% when coupled or decoupled direct payments are taken into consideration. But when talking about this payment at the regional level coupled direct payments induce an increase of regional output by 2.61%, while decoupled payments produce a 1.81% increase of output.

The same goes for the sectors of the Manufacture of food products and Machinery and motor vehicles while the sector Other manufacturing has a stronger overall impact at the national level (almost double) when direct payments are assumed to be fully coupled and has nearly the same impact on the output level when the direct payments are fully decoupled. The Electricity, water and gas sector is affecting the regional output more forcefully than at the national level which can be also said for the sectors of Financial services and Real estate. The opposite is the case regarding the overall impact of the sectors of Transportation and Public Administration, Education and health services which are more intensively affecting output at the national level.

As is visible from the figures in Tables 7 and 8 the Construction sector is the one that has the highest overall impact on the output level of the national and regional economies (around 9%). For coupled and decoupled direct payments this impact is almost the same at the national level but it is higher for *Scenario 4* (coupled direct payments) than at the regional level (9% vs. 7.49%).

Tab. 7 - The impacts of the "new" final demand on national output

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0.00%	0.02%	0.02%	2.10%	1.42%	2.61%	1.81%
2	Manufacture of Food Products	0.00%	0.00%	0.00%	1.20%	1.32%	1.53%	1.68%
3	Textiles and Dressing	0.00%	0.00%	0.00%	0.00%	0.60%	0.00%	0.71%
4	Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	Chemical and Metal Products	0.00%	0.00%	0.00%	0.37%	1.48%	0.55%	1.85%
6	Machinery and Motor Vehicles	0.00%	0.29%	0.29%	0.65%	0.75%	0.89%	1.00%
7	Furniture	0.00%	0.00%	0.00%	0.00%	1.16%	0.00%	1.36%
8	Other Manufacturing	0.49%	0.02%	0.51%	0.57%	1.02%	0.86%	1.39%
9	Electricity, Water and Gas	0.85%	0.00%	0.85%	2.47%	3.41%	3.61%	4.71%
10	Construction	0.43%	1.01%	1.44%	5.81%	4.52%	9.00%	7.49%
11	Trade and Hotels	0.09%	0.00%	0.09%	0.03%	0.26%	0.05%	0.33%
12	Transportation	0.00%	0.98%	0.98%	1.15%	1.93%	2.03%	2.95%
13	Financial Services and Real Estate	0.00%	0.65%	0.65%	2.87%	4.02%	5.31%	6.66%
14	Public Administration, Education and Health Services	0.96%	1.25%	2.20%	0.43%	0.50%	0.82%	0.91%
	TOTAL	**0.23%**	**0.37%**	**0.60%**	**1.45%**	**1.49%**	**2.15%**	**2.20%**

Tab. 8 - The impacts on regional output

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0.00%	0.02%	0.02%	1.10%	1.00%	1.46%	1.34%
2	Manufacture of Food Products	0.00%	0.00%	0.00%	0.93%	0.90%	1.27%	1.23%
3	Textiles and Dressing	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.24%
4	Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	Chemical and Metal Products	0.00%	0.00%	0.00%	0.29%	0.25%	0.36%	0.31%
6	Machinery and Motor Vehicles	0.00%	0.07%	0.07%	0.41%	0.33%	0.53%	0.44%
7	Furniture	0.00%	0.00%	0.00%	0.00%	0.44%	0.00%	0.52%
8	Other Manufacturing	0.84%	0.01%	0.86%	1.68%	0.84%	2.19%	1.21%
9	Electricity, Water and Gas	0.74%	0.00%	0.74%	0.79%	1.32%	1.20%	1.81%
10	Construction	0.86%	1.47%	2.33%	5.56%	5.22%	9.81%	9.40%
11	Trade and Hotels	0.11%	0.00%	0.11%	0.02%	0.15%	0.05%	0.20%
12	Transportation	0.00%	1.78%	1.78%	1.84%	1.62%	3.26%	3.01%
13	Financial Services and Real Estate	0.00%	0.14%	0.14%	1.44%	1.83%	2.78%	3.25%
14	Public Administration, Education and Health Services	1.32%	2.02%	3.34%	0.64%	0.66%	1.25%	1.28%
15	Other	0.00%	0.00%	0.00%	0.00%	0.19%	0.00%	0.23%
	TOTAL	**0.26%**	**0.42%**	**0.67%**	**0.97%**	**0.97%**	**1.61%**	**1.61%**

4.2 *The effects on national and regional income*[8]

4.2.1 Pre - accession assistance

The changes in the total income level of the economy among different scenarios for the pre-accession period between the national and regional economies are almost the same (0.40%). The changes differ among sectors at national and regional levels but it can be seen that the ranking of the sectors is also nearly the same. The strongest overall impact on the income level is seen in the sectors of Public administration, education and health services when *Scenario 1* is taken into consideration, where the sector of Other manufacturing is second, followed in the third position by

[8] The results of the new final demand affecting the income level of the national and regional economies are given in Tables 9 and 10.

Construction. Transportation takes the second place in *Scenario 2* and in the alternative *Scenario 2a* Construction and Transportation change places.

4.2.2 EU funds

The partial absorption of the funds in *scenario 3* and *3a* shows lower impacts on the total national income level, mainly caused by the fact that Public administration, education and health services is the sector with the highest intersectoral dependences in the country and that in *Scenario 2a* the funds allocated to it are almost four times higher than in *Scenario 3* and *3a*. The highest impact on income concerns a rise of the final demand of the Construction sector (by approximately 5.5%), then Other manufacturing and finally, Agriculture takes third place.

Scenario 4 and *4a* show the difference of income changes at the level of country-wide economy and sectorally comparing the regions and Croatia. At the national level when fully coupled direct payments are taken into consideration the highest overall impact on income is caused by Construction followed by Transportation.

The sectoral impacts on overall regional income show that the highest impact is caused by Construction, like it is at the national level. But, as decoupled direct payments are taken into consideration in comparison with coupled payments at the regional level all of the sectors show a slight rise of effects, especially Furniture, Textiles and dressing and Chemical and metal products.

Comparing national and regional changes Construction, at the regional level, is more sensitive to the coupled and decoupled allocation of funds and is considerably decreasing its effects on the regional income level when the funds are fully decoupled. Agriculture shows the same pattern with decreased overall income effects when the direct payments are concerned to be fully decoupled.

Tab. 9 - Impact on national income

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0.00%	0.03%	0.03%	2.04%	1.84%	2.70%	2.46%
2	Manufacture of Food Products	0.00%	0.00%	0.00%	0.89%	0.86%	1.21%	1.18%
3	Textiles and Dressing	0.00%	0.00%	0.00%	0.00%	0.22%	0.00%	0.26%
4	Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	Chemical and Metal Products	0.00%	0.00%	0.00%	0.32%	0.27%	0.39%	0.33%
6	Machinery and Motor Vehicles	0.00%	0.09%	0.09%	0.48%	0.39%	0.63%	0.52%
7	Furniture	0.00%	0.00%	0.00%	0.00%	0.50%	0.00%	0.59%
8	Other Manufacturing	1.12%	0.02%	1.14%	2.22%	1.12%	2.91%	1.61%
9	Electricity, Water and Gas	0.73%	0.00%	0.73%	0.78%	1.30%	1.18%	1.79%
10	Construction	0.92%	1.62%	2.55%	5.97%	5.60%	10.53%	10.09%
11	Trade and Hotels	0.09%	0.00%	0.09%	0.02%	0.13%	0.04%	0.17%
12	Transportation	0.00%	1.75%	1.75%	1.79%	1.58%	3.17%	2.93%
13	Financial Services and Real Estate	0.00%	0.14%	0.14%	1.44%	1.83%	2.78%	3.25%
14	Public Administration, Education and Health Services	1.32%	2.02%	3.34%	0.64%	0.66%	1.25%	1.28%
15	Other	0.00%	0.00%	0.00%	0.00%	0.18%	0.00%	0.21%
	TOTAL	**0.46%**	**0.74%**	**1.20%**	**0.87%**	**0.89%**	**1.49%**	**1.52%**

Tab. 10 - Impact on regional income

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0.00%	0.02%	0.02%	2.60%	1.76%	3.22%	2.23%
2	Manufacture of Food Products	0.00%	0.00%	0.00%	1.15%	1.27%	1.47%	1.61%
3	Textiles and Dressing	0.00%	0.00%	0.00%	0.00%	0.59%	0.00%	0.70%
4	Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	Chemical and Metal Products	0.00%	0.00%	0.00%	0.44%	1.74%	0.64%	2.17%
6	Machinery and Motor Vehicles	0.00%	0.29%	0.29%	0.65%	0.75%	0.89%	1.00%
7	Furniture	0.00%	0.00%	0.00%	0.00%	1.17%	0.00%	1.38%
8	Other Manufacturing	0.92%	0.04%	0.96%	1.06%	1.90%	1.62%	2.61%
9	Electricity, Water and Gas	0.82%	0.00%	0.82%	2.41%	3.32%	3.52%	4.59%
10	Construction	0.43%	1.01%	1.44%	5.82%	4.53%	9.03%	7.51%
11	Trade and Hotels	0.09%	0.00%	0.09%	0.03%	0.26%	0.05%	0.33%
12	Transportation	0.00%	0.92%	0.92%	1.07%	1.81%	1.90%	2.76%
13	Financial Services and Real Estate	0.00%	0.67%	0.67%	2.94%	4.11%	5.43%	6.81%
14	Public Administration, Education and Health Services	0.96%	1.24%	2.20%	0.43%	0.50%	0.82%	0.90%
	TOTAL	**0.40%**	**0.66%**	**1.06%**	**1.28%**	**1.39%**	**2.00%**	**2.13%**

4.3 The impacts on national and regional employment[9]

4.3.1 Pre - accession assistance

At the national level the sector with the highest overall impact on employment in the pre-accession period (*Scenario 1, 2* and *2a*) is Public administration, education and health services followed by Construction, Other manufacturing and Electricity, water and gas. The same sectoral ranking according to the strength of their effects on the economy is seen at the regional level with the minor difference in percentages.

4.3.2 EU funds

The effects of the new final demand on the employment level of the total regional economy are smaller than at the national level in the pre-accession period, but in *Scenario 3* and *4* they are significantly higher, referring to the total rise of regional employment and sectorally referring to the rise of total employment caused by the sectoral rise of final demand in all sectors except Construction and Transportation.

What is noteworthy at the national level it is the difference of the impacts of *Scenario 2a* and *Scenario 3* and *3a* on the total employment level. *Scenario 2a* shows a higher rise of total employment at the national level even though the funds inflows in total are larger in *Scenario 3*. This is mainly the consequence of high vertical and horizontal interconnections in the sector of Public administration, education and health services in the national economy (see Annex Tables A1-A4) and the sectoral allocation of funds within the presented scenarios. Construction has the highest impact on employment *(Scenario 3* and *4* and *3a* and *4a*) in the national and regional economies but when direct payments are allocated decoupledly the effects of Construction show a downward trend particularly significant at the regional level (9.28% vs. 7.72%).

Comparing the coupled and decoupled allocations of direct payments all sectors, except the already mentioned Construction and Agriculture sectors demonstrate the increase of impacts. At the regional level the decoupled direct payments have a stronger impact on employment in the economy as a whole while at the national level they do not differ significantly.

[9] The results of the national and regional employment changes due to sectoral change in final demand are represented in Tables 11 and 12.

Tab. 11 - The impacts of the new final demand on national employment

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0.00%	0.02%	0.02%	1.42%	1.27%	1.88%	1.71%
2	Manufacture of Food Products	0.00%	0.00%	0.00%	0.97%	0.94%	1.32%	1.29%
3	Textiles and Dressing	0.00%	0.00%	0.00%	0.00%	0.20%	0.00%	0.24%
4	Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	Chemical and Metal Products	0.00%	0.00%	0.00%	0.40%	0.34%	0.48%	0.41%
6	Machinery and Motor Vehicles	0.00%	0.15%	0.15%	0.84%	0.67%	1.09%	0.90%
7	Furniture	0.00%	0.00%	0.00%	0.00%	0.48%	0.00%	0.56%
8	Other Manufacturing	0.86%	0.02%	0.87%	1.71%	0.86%	2.23%	1.23%
9	Electricity, Water and Gas	0.69%	0.00%	0.69%	0.73%	1.22%	1.10%	1.68%
10	Construction	0.91%	1.60%	2.52%	5.90%	5.53%	10.40%	9.97%
11	Trade and Hotels	0.08%	0.00%	0.08%	0.02%	0.12%	0.03%	0.15%
12	Transportation	0.00%	1.44%	1.44%	1.48%	1.30%	2.62%	2.42%
13	Financial Services and Real Estate	0.00%	0.14%	0.14%	1.44%	1.83%	2.78%	3.25%
14	Public Administration, Education and Health Services	1.32%	2.02%	3.34%	0.64%	0.66%	1.25%	1.28%
15	Other	0.00%	0.00%	0.00%	0.00%	0.28%	0.00%	0.33%
	TOTAL	**0.41%**	**0.65%**	**1.06%**	**1.01%**	**1.01%**	**1.72%**	**1.71%**

Tab. 12 - The impacts on regional employment

	Sectors	Scenario 1	Scenario 2	Scenario 2a	Scenario 3	Scenario 3a	Scenario 4	Scenario 4a
1	Agriculture	0.00%	0.02%	0.02%	2.65%	1.79%	3.28%	2.28%
2	Manufacture of Food Products	0.00%	0.00%	0.00%	1.19%	1.31%	1.52%	1.66%
3	Textiles and Dressing	0.00%	0.00%	0.00%	0.00%	0.56%	0.00%	0.66%
4	Wood Products	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	Chemical and Metal Products	0.00%	0.00%	0.00%	0.43%	1.68%	0.62%	2.10%
6	Machinery and Motor Vehicles	0.00%	0.29%	0.29%	0.65%	0.75%	0.89%	1.00%
7	Furniture	0.00%	0.00%	0.00%	0.00%	1.17%	0.00%	1.37%
8	Other Manufacturing	0.80%	0.04%	0.83%	0.92%	1.65%	1.40%	2.26%
9	Electricity, Water and Gas	0.82%	0.00%	0.82%	2.41%	3.32%	3.52%	4.59%
10	Construction	0.44%	1.04%	1.48%	5.99%	4.66%	9.28%	7.72%
11	Trade and Hotels	0.08%	0.00%	0.08%	0.02%	0.23%	0.04%	0.29%
12	Transportation	0.00%	0.95%	0.95%	1.11%	1.86%	1.95%	2.84%
13	Financial Services and Real Estate	0.00%	0.64%	0.64%	2.81%	3.94%	5.20%	6.52%
14	Public Administration, Education and Health Services	0.96%	1.25%	2.20%	0.43%	0.50%	0.82%	0.90%
	TOTAL	**0.30%**	**0.50%**	**0.79%**	**1.30%**	**1.45%**	**2.01%**	**2.18%**

5. Distribution effects on economic variables by defined scenarios

Each of the defined scenarios and their impacts presented in the previous paragraph refer to the effects caused by the *sectoral* rise in FD on the economy as a whole. But, this analysis is more complete if the distribution effects of the rise of FD are also analyzed. The distribution effects presented in this paragraph show the effects of the new plan of FD of an economy as a whole on the output level in each sector of economic activity.

For this analysis the EU Policy instruments and theirs projected expenditures are separated and each instrument's impact is estimated and analyzed separately[10]. Thanks to such analysis the policy implications can be considered.

5.1 Distribution effects of pre-accession funds inflow

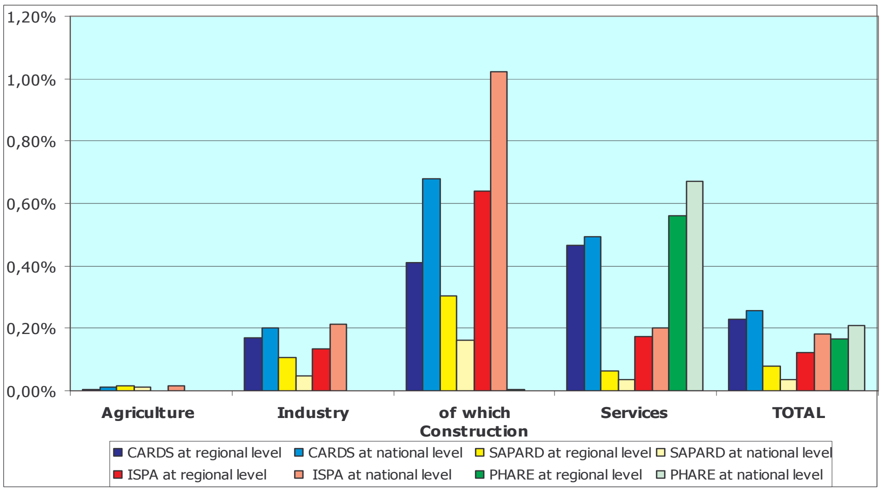
This paragraph reveals (Figure 2) what changes of output in the various sectors can be expected because of the change in FD in the total economy (see the new plan of FD in *Scenario 2a*). The effects of pre-accession funds on the sectoral output levels differ in terms of different policy instruments. The CARDS Programme has the highest impact on the changes in sectoral output at the national level in total and especially on Construction.

In the analysis of effects of pre-accession instruments, the funds under SAPARD which are mainly allocated to agriculture impact the rise of the agricultural output level, but they are too small to have substantial influence at national or regional levels. The intensity of the effects on agriculture is slightly higher at the regional level. The SAPARD influences the minor rise of output in industry and services as well.

The ISPA produces the highest impact on the rise of industry output, mainly on the Construction sector, while PHARE has the strongest impact (among the other instruments) on the output rise in Services, while it has no measurable impact on industry and agriculture.

[10] Sectorally, the new FD is allocated on the same basis as for the previous impact analysis.

Fig. 2 - National and regional sectoral rise of the output in percentages

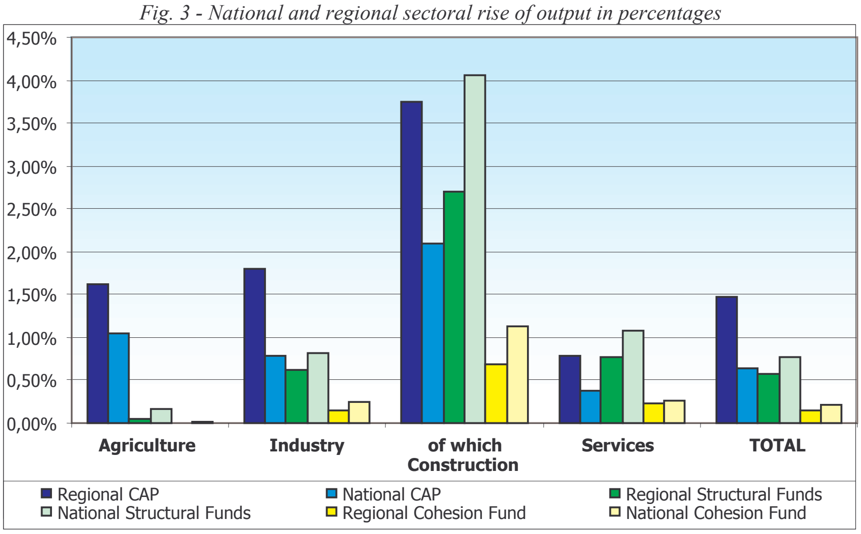


Source: Team's calculations

5.2 Distribution effects of EU funds inflow

After accession (Scenario 4), the funds from CAP show the strongest impact, at the national and especially at the regional level, on the rise of the total output. CAP at regional level has a stronger influence on the rise of output in all sectors than at the national level (always almost double the difference between Region and the Country). The opposite is the case for the impact of Structural and Cohesion Funds. They have stronger impacts on the output in all sectors at the national level, which is clearly visible in Figure 3.

Fig. 3 - National and regional sectoral rise of output in percentages



Source: Team's calculations

5.3 Policy implications

After this study some policy implications of individual policy mechanisms are noticeable:

CARDS and PHARE have similar objectives (institution building and Acquis-related Investment) and thus their similar influence on the output rise is expectable;

ISPA provides financial support for investment in the areas of environment and transport in order to speed up compliance in accession countries with the European legislation in force for these two sectors. Its impact on the rise of the national output level is higher in every sector of economic activity and in total than at the regional level which is probably the consequence of the level of infrastructural development in the region and country as a whole;

SAPARD (Special Accession Program for Agriculture and Rural Development) aims to support the efforts made by the candidate countries to prepare for their participation in the Common Agricultural Policy and the Single Market. It involves two major, explicit, operational objectives:

- to help solve the priority and specific problems in agriculture and rural development,

- to contribute to the implementation of the acquis communautaire (the whole body of Community legislation) concerning CAP and other agricultural priorities.

Therefore, its impact on the selected region's output level and its rise is a bit stronger than at the national level.

CAP and its instruments present the most favourable impact on the increase of overall regional output, while at the national level the expenditure from Structural Funds mechanisms is the most favourable one. The increase of output is the highest in the Construction sector, especially from CAP expenditure at the regional level (this can be explained by the fact that at the regional level at the moment the need for the revival of rural economies is predominant rather than market-oriented agricultural production), while at the national level the structural expenditures bring the biggest impact on output growth.

The Cohesion fund expenditures have the strongest impact on the industry sector. In total, it has the lowest impact on the output rise at the regional rather than at the national level.

6. Conclusions

The main aim of the regional policies can be defined as raising the regional development level to the national one and raising the regional contribution to the national economic development. This aim involves first the increase in production of goods and services indicated by faster growth of the regional GDP and the employment level.

By increase of production, development is possible in all fields - economic, political and social. For the Croatian region the increase of production is important because it has suffered the destruction of the war and a significant lack of investment activities, losing an important position in the market for which its capacities were developed in the time of former socialist Yugoslavia.

Although the results in the analysis point out the rise of regional GDP by 0.64 percentage points as a result of all included pre-accession funds and CARDS expenditures and it can have a significant share in the total regional GDP growth rate, it looks not to be enough to speed up the convergence of the rural region to the national level. More substantial effects on the economic development of the region may be expected to come from changes in the economic structure which the I-O Method can not estimate.

Therefore, all of these positive tendencies should be supported by a special national strategy for economic development at the regional level, especially concerning the most important production sectors in the region - Agriculture, Manufacture of food products and Construction. Employment in the public sector should be reduced and in that way the annual funds transfers could be directed in larger amounts towards sectors with the highest potential to generate impacts.

The result of the analysis of the post-accession funds inflow into the present national and regional economic structures points to the rise of total national output by approximately 1.5% and regional output by approximately 2% and it is significant, but it refers to the most optimistic scenario - the total absorption of the possible available funds after accession. Only if all mentioned assumptions are fulfilled could the presented changes be expected to happen.

The comparative analysis between national and regional levels in this paper shows no significant difference among sectoral ranking when the impact on all variables (output, income, employment) is concerned along with the total impact on the variables at both levels in the pre-accession period (Scenarios 1, 2 and 2a). But, the variation is considerable when the post-accession period is taken into consideration. The region shows a higher rise of income, employment and output of the economy as a whole. Sectoral analysis shows similar sectoral effects on the macro-economic variables of both national and regional economies when the sectoral ranking is taken into consideration, but the distinction is higher among sectors, especially Agriculture (it has a stronger impact on the regional output level, employment and income than Agriculture at the national level).

In this way the simulated policy impacts have been evaluated and the analysis shows that the analysed policy instruments have a larger impact on the development of the rural Region within the Country. These impacts differ at national and regional levels especially in the period "after accession", which is the expected consequence of both the structure of the funds and the annual available funds amounts.

References

Bonfiglio, A., Esposti, R., Ninka, E., Bailey, A., Davidova, S. and Zanni, A.(2004): Scenario definition and methodology for impact analysis. Deliverable no.11, REAPBALK research project.

European Commission (2002): Fact sheet - Enlargement and agriculture: A fair and tailor-made package which benefits farmers in accession countries. MEMO/02/3001, Brussels.

Hirschman, A. O. (1958): The Strategy of Economic Development. New Haven: Yale University Press.

Mattas, K., Louizou, S., Tzouvelekas, V. and Meropi, T. (2003): Regional Input-Output Tables. Deliverable no.9, REAPBALK research project.

Mattas, K., Louizou, S., Tzouvelekas, V. and Meropi, T. (2003): Multiplier's Analysis: Sectoral Regional Linkage Coefficients. Deliverable no.10, REAPBALK research project.

Rasmussen, P. N. (1956): Studies in Intersectoral Relations. Amsterdam: North-Holland.

9. THE IMPACT OF EUROPEAN FUNDS ON THE ROMANIAN NATIONAL AND REGIONAL ECONOMY

Maria Vincze, Lehel Györfy, Ştefana Varvari

1. Introduction

Romania signed the European Agreement on the 1st February 1993. This document represents the legal framework of the relationship after transition between Romania and the European Union. Romania submitted the application for accession to the European Union on the 22nd June 1995 and, during the Helsinki European Council, it was established the opening of the accession negotiations with Romania on the 11th December 1999. All of the negotiating chapters were closed at the end of 2004, and it is expected that Romania will join the European Union in 2007.

Romania, as a future member state, will benefit from the support of the Structural and Cohesion Funds and of the Common Agricultural and Rural Development Policies. The estimation of the impacts of these EU policies on the Romanian economy and mainly on rural regions development, is the most important objective of this study.

About 90% of the Romania's territory is rural, about 47% of population is living in rural areas, and 66% of rural active population is employed in agriculture: for this main reason the regional-rural studies are indeed important. The present analysis contains relevant results about the impact of the European Funds on output, income and employment for each sector of the Romanian economy and of the selected regional case (the North-West Development Region), before and after accession.

2. Main objectives of the national and regional development policies

The Romanian Government set up the strategic objectives of the macroeconomic policy in the ‘Economic pre-accession programme’ elaborated in 2003. Romania’s long-term plan is to achieve a stable economic growth, faster than the EU average, in a context of balanced regional development and, especially, of diminishing rural-urban disparities.

The national objectives are articulated along five priorities:

1. Improving the competitiveness of productive sectors and the attraction of foreign investments;
2. Improving and developing transport and energy infrastructure and ensuring the protection of the environment;
3. Developing human resources, increasing employability and fighting social exclusion;
4. Diversifying the rural economy and increasing productivity in agriculture;
5. Promoting a balanced participation of all Romanian regions to the socio-economic development process.

The main objectives for the development of the rural regions under study are largely consistent with the national ones, though biased towards the agricultural and rural economy. These objectives are set up in the ‘Strategy of the North-West Development Region’, elaborated by the North-West Regional Development Agency for 2004-2006 and also valid for 2007-2013. These trends are:

- Modernisation of agriculture and rural development;
- Development of productive sectors, increase of business competitiveness and promotion of private sector;
- Development and modernisation of transport infrastructure;
- Support to research, IT and technological innovation, creation of the informational society;
- Increase of employment, development of human resource and of social services;
- Protection and improvement of the environment quality.

3. EU financial support for Romania and for the North-West region

3.1 Financial support before accession

In the pre-accession period, Romania has been granted non-refundable assistance through three financial instruments: PHARE, SAPARD and ISPA. All these tools are settled on the basis of the Accession Partnership and the National Programme for the Adoption of the Acquis developed with the candidate countries. ISPA and PHARE follows an annual programme that is approved by the Commission upon the proposal of the candidate countries, while SAPARD operates on the basis of a multi-annual programme covering the period 2000-2006.

These funds are granted on the basis of the Economic Pre-accession Programme and the National Development Plan elaborated by the Romanian Government and including the most important information regarding objectives and measures established for Romania in the abovementioned period[1].

SAPARD measures aim to support agriculture and rural development. Romania selected from the list of admitted SAPARD measures (EC 1257/99) the most important ones for the rural development in the country. The National Development Plan for 2004-2006, elaborated by the Ministry of Integration, presents the financial package of the SAPARD pre-accession programme for 2004-2006 based on the specific measures of the fourth national priority 'Supporting agriculture and rural development':

4.1. Increasing the productivity of agriculture and development of rural infrastructure – 58% of funds

4.2. Improving competitiveness in processing agricultural and fishery products – 20% of funds

4.3. Diversification of rural economy and developing human resource – 20% of funds

4.4. Technical assistance / Institution building – 2% of funds.

The distribution of the annual support by measure in the Romanian SAPARD programme is shown in Table 1.

[1] In the definition of the "pre-accession" policy scenario, as described in next sections, the impact of transfers from the PHARE programme will not be considered. In fact, the PHARE programme started at the beginning of the 1990s and could be considered as being already included in the basic 1999 Input-Output table.

Tab.1 - 2004-2006 SAPARD funds for specific measures of the fourth national priority (million Euro)

	2004	2005	2006	Total	Average
4. Supporting rural development and improvement of productivity in agriculture	166.7	175.2	171.2	513.0	171.0
4.1. Increasing the productivity of agriculture and development of rural infrastructure	100.4	100.8	96.7	297.9	99.3
4.2. Improving competitiveness in processing agricultural and fishery products	27.8	36.9	36.9	101.6	33.9
4.3. Diversification of rural economy and developing human resource	35.0	34.0	34.1	103.0	34.3
4.4. Technical assistance / Institution building	3.5	3.5	3.5	10.5	3.5

Source: National Development Plan for 2004-2006, Ministry of Integration

ISPA supports large infrastructure projects in the transport and environment sectors. Following the approval of the ISPA Regulation no. 1267 on 21st June 1999, the European Commission has proposed an indicative allocation of ISPA resources for each beneficiary country. The Commission decided to allocate ISPA resources among the recipient countries using some criteria such as: population, per capita GDP (in Purchasing Power Parity terms) and total land area. On this base, Romania becomes the second largest recipient after Poland. The funds are roughly equally divided between transport and environment projects. From 2007 onwards, the ISPA support will be automatically converted into Cohesion Funds and thus the entire envelope will increase substantially (it is expected to be 7-8 times larger than the ISPA package).

According to 'ISPA in Romania' – a document issued by the Delegation of the European Commission in Romania in March 2004 – one can notice that the projects using ISPA grants for Romania in 2000-2003 follows the second national priority "Improving and developing transport and energy infrastructure and ensuring environmental protection", and were divided as follows:

2.1. Transport infrastructure – 55% of funds
2.3. Environment and related public utilities – 44% of funds
2.4. Institution building – 1% of funds

The way ISPA funds are distributed by measures at the national and regional level is shown in the Table 2:

Tab. 2 - 2004-2006 ISPA funds for specific measures of the national priority (million Euro)

	2004	2005	2006	TOTAL	Average
2. Improving and developing transport and energy infrastructure and ensuring environmental protection	301.6	326.87	306.73	935.2	311.7
2.1. Transport infrastructure	165.9	179.8	168.7	514.4	171.5
2.3. Environment and related public utilities	132.7	143.8	135.0	411.5	137.2
2.4. Technical assistance / Institution building	3.0	3.3	3.1	9.4	3.1

Source: National Development Plan for 2004-2006, Ministry of Integration

3.2 *Financial support after accession*

Three of the four alternative scenarios analysed in this paper include all the European funds Romania will receive after accession: Common Agricultural Policy (CAP) Direct Payments, Rural Development Policies, other CAP measures, Structural Funds and Cohesion Fund.

In February 2004 the Commission established a coherent financial 'package' for Romania and Bulgaria after accession. The Commission's proposals are based on the existing *acquis* as well as on the principles and methodology underlying the financial framework developed for the negotiations with the ten countries acceding on the 1st May 2004.

This financial package for Romania and Bulgaria is limited to a three-year period (2007-2009) and corresponds to that used for the ten new member states for 2004-2006. The reason is that the package must be adjusted in order to reflect future policy reforms or changes from an overall financial perspective.

Concerning Direct Payments, the Commission considers that they should be introduced gradually, over a period of 10 years, as the case of the new Member States. Therefore, they would be introduced at a 25% of the EU-15 level in 2007, 30% in 2008, 35% in 2009 and 40% in 2010. After that, there should be an annual increase of 10% until 2016, when it should reach the 100% of the EU-25 level.

In accordance with the new provisions of the Common Agricultural Policy, 2000-2002 is defined as the reference period to be used for calculating the historical production figures. These figures will be used as a basis to determine production quotas and support-related supply management instruments (e.g. base areas, reference yields and ceilings). The national ceilings for Romania under the Single Farm Payment (SFP) scheme are established using the same methodology adopted for the Member States.

Thus, the estimated Direct Payments in Romania in the first three years (2007-2009) after accession would amount to € 881 million. No expenditure would incur in 2007 due to the fact that reimbursements from the EU budget for expenditures by the Member States on direct payments in any given year is made from the budget of the following year.

The Rural Development envelope for Romania is calculated on the basis of the same criteria used for dividing the rural development envelope among the ten acceding countries. The three-year envelope rural development for Romania should be € 2,424 million.

The Structural Funds expenditure for Romania should be based on the global rate of phasing-in foreseen for the introduction of these funds in the ten countries that entered the EU in 2004. This should ensure a smooth phasing-in, which takes into account the absorption capacity in Romania. In the case of these funds, the rules deriving from the current *acquis* (such as the capping of total Structural and Cohesion funding at 4% of the national GDP in any given year) should be applied. Moreover, about one third of the total envelope would go towards the Cohesion Fund. Romania would thus benefit from structural actions for an amount of 2.4% of the its GDP in 2007, 3.2% in 2008, and 4% in 2009. Consequently, the total structural expenditure calculated on this basis would be € 5,973 million in the three-year period (2007-2009).

We cannot exclude the possibility that from an overall financial perspective some important aspects of the Romanian financial framework will be adapted as a consequence of future EU policy reforms or fundamental changes in Romania, especially after 2009. Nonetheless, for the scenario analysis, the abovementioned figures will be adopted[2].

3.3 Distribution by regions and sectors of the available

Two aspects should be evaluated regarding the allocation of funds received from the European Union before and after accession:

1. The share of EU funds received by the North-West development region (regionalisation);
2. The share of EU funds received by each sector (distribution among sectors).

3.3.1 Regional distribution of the available funds

To analyse the regional distribution of the European funds for Romania we have used the criterion proposed in the 'National Development Plan for 2004-2006'. The criterion is based on a set of indicators including per

[2] In this respect, it must be considered that the present analysis has been implemented before the agreement reached by the EU Council in December 2005 on 2007-2013 financial perspectives.

capita income, unemployment rate and several indicators of basic infrastructure endowment.

These indicators have been normalised as a ratio between regional and national value (in 2001 or in every year from 1998 to 2000) in order to show the disparities among regions. Each of the indicators here considered had been multiplied by a weighting coefficient, as shown in Table 3.

Tab. 3 - Weighting coefficients used in the regional distributions of funds available at the national level

Index	Weighting coefficient
GDP per capita	0.5000
Unemployment rate	0.2500
Density of roads	0.0625
Density of railways	0.0625
Number of localities supplied with natural gas and total number of localities	0.0250
Number of localities with drinking water installations and total number of localities	0.0500
Number of localities with sewerage installations and total number of localities	0.0500

Source: National Development Plan for 2004-2006, Ministry of Integration, 2003

Consequently, the share of national funds allocated to region *r* is:

$$SNF_r = 100 * \frac{I_r}{\sum_{r=1}^{8} I_r} \quad (1)$$

where SNF_r – share of national funds allocated to region *r*; I_r – development index of region *r*, which is a synthetic index calculated as a weighted sum of the abovementioned indicators.

According to these regional shares, the distribution of the European funds among the 8 Romanian NUTS 2 regions is presented in Table 4.

Tab. 4 - Share of the regional funds out of the total available national funds

Country / Region	2004 – 2006 regional funds(% in total national funds)
Romania	**100.0**
1. North – East	21.6
2. South – East	13.6
3. South	16.5
4. South – West	11.8
5. West	8.6
6. North – West	11.9
7. Center	10.8
8. Bucharest – Ilfov	5.2

Source: National Development Plan for 2004-2006, Ministry of Integration, 2003

For the North-West development region, this share is estimated at 11.9% of the total EU funds. This is the share we use in our calculations for the 2004-2006 and 2007-2009 periods. Table 5 contains real figures reflecting this amount of funds at national and regional level.

Tab. 5 - European Funds available at the national (RO) and the regional level (NW) (million Euro)

		2004	2005	2006	2007	2008	2009	Total	Yearly average
SAPARD	RO	167	175	171	-	-	-	513	171
	NW	20	21	20	-	-	-	61	20
ISPA	RO	312	312	312	-	-	-	936	312
	NW	37	37	37	-	-	-	111	37
Rural Development Fund	RO	-	-	-	506	881	1037	2424	808
	NW	-	-	-	60	105	123	288	96
Cohesion Fund	RO	-	-	-	466	657	868	1991	664
	NW	-	-	-	55	78	103	237	79
Structural Funds	RO	-	-	-	933	1314	1735	3982	1327
	NW	-	-	-	111	156	206	474	158
Direct Payments	RO	-	-	-	184	320	377	881	294
	NW	-	-	-	22	38	45	105	35

Source: Own calculations based on the National Development Plan for 2004-2006, Ministry of Integration, 2003; SEC (2004) 160 final, Communication from the Commission: A financial package for the accession negotiations with Bulgaria and Romania, 10th of February 2004, Brussels; AGRA FACTS No. 46-04 – Council Concludes Bulgarian & Romanian Accession Talks on Agriculture, 04/06/2004, Brussels, Belgium

3.3.2 Distribution of the EU Pre-Accession funds among sectors

The distribution of Pre-accession funds among sectors is achieved in 2 steps:

Step 1. Calculation of the yearly average financial contribution for each policy at both national and regional level;

Step 2. Identification of sectors directly influenced by the amount allocated by the different policies and distribution of this expediture among these sectors.

Considering that the target date for the accession of Romania to the European Union is 2007, we have to take into consideration the following types of EU transfers for Romania and the North-West region:

In the 2004-2006 period:

1. SAPARD and ISPA

In the 2007-2009 period:

2. Direct Payments
3. Rural Development Fund
4. Structural and Cohesion Funds

1. SAPARD and ISPA funds

Once the sectors directly influenced by the funds have been identified, the Pre-Accession financial resources were distributed among them according to the respective share on Gross Value Added, as shown in Table 6. The yearly average amount and the % distribution of SAPARD and ISPA funds by sectors in the 2004-2006 period is indicated in Table 7.

Tab. 6 - Sectors directly influenced by the allocation of the Pre-accession funds for different measures

Funds	**SAPARD**								**ISPA**					
Measure number	**4.1.**		**4.2.**		**4.3.**		**4.4.**		**2.1.**		**2.3.**		**2.4.**	
Country/Region	RO	NW	RO	NW	RO	NW	RO	NW	RO	NW	RO	NW	RO	NW
Total value (million Euro)	99.3	11.8	33.9	4.0	34.3	4.1	3.5	0.4	171.5	20.4	137.2	16.3	3.1	0.4
	Distribution of funds among sectors – (%)													
Total funds	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Agriculture	26.5	28.2	26.2	31.2	-	-	-	-	-	-	-	-	-	-
Mining	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Food Industry	11.5	9.9	11.3	11.0	9.0	8.0	-	-	-	-	-	-	-	-
Textiles and Leather Goods	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wood Products, Furniture and Paper	4.9	7.1	-	-	3.9	5.7	-	-	-	-	13.1	23.4	-	-
Chemical and Plastic Products	-	-	-	-	-	-	-	-	-	-	7.4	5.3	-	-
Building Materials	-	-	-	-	-	-	-	-	7.1	13.2	6.0	12.9	-	-
Metal Products	-	-	-	-	-	-	-	-	-	-	4.5	5.2	-	-
Machinery, Electronic Products and Cars	-	-	8.5	5.4	6.7	3.9	-	-	-	-	22.8	16.0	-	-
Electricity, Water and Gas	-	-	7.2	4.7	-	-	-	-	-	-	19.5	13.8	-	-
Construction	-	-	9.9	7.9	7.8	5.7	-	-	31.2	23.8	26.6	23.3	-	-
Trade	22.2	21.0	21.9	23.3	17.4	16.9	-	-	-	-	-	-	-	-
Hotels and Catering	-	-	-	-	3.9	3.3	-	-	-	-	-	-	-	-
Transports and Communication	19.8	18.8	-	-	15.5	15.1	-	-	61.8	63.0	-	-	-	-
Banking and Real Estate	-	-	-	-	18.5	24.0	-	-	-	-	-	-	-	-
Public Administration and Defense	-	-	-	-	5.2	5.4	30.5	31.2	-	-	-	-	30.5	31.2
Community, Social and Personal services	15.1	15.0	15.0	16.6	11.9	12.0	69.5	68.8	-	-	-	-	69.5	68.8

Source: Own calculations based on the national allocation of funds from the National Development Plan for 2004-2006 and on Morillas et al. (2000).

2. Direct Payments

In the case of CAP Direct Payments, we have to distinguish between 'decoupled' and 'coupled' payments, simulating the impact of these two types of support to farmers by making some assumptions (Table 8).

The fully 'decoupled' Direct Payments assume that farmers will spend these funds buying goods and services and using them for household consumption. In this case direct payments are considered as being an household income supplement used for consumption. The 'decoupled' direct payments increase the household consumption and, implicitly, the final demand, according to that part of total household income allocated to consumption. Consequently, the distribution among sectors is done on the basis of the weight of each sector in terms of household consumption.

In the case of fully 'coupled' Direct Payments it is assumed that the whole amount is invested in Agriculture. So they enter the the I-O table not as household consumption but as new investments (thus, new demand) by the farmers' sector.

3. Rural Development Funds

For the distribution of the Rural Development Funds across sectors, it was maintained the same structure of the SAPARD funds (Table 9).

Tab. 7 - SAPARD and ISPA funds across sectors for the North-West region and Romania (annual average value for the 2004-2006 period, million €)

	SAPARD				ISPA			
	NW average	%	RO average	%	NW average	%	RO average	%
TOTAL	**20.4**	**100.0**	**171.0**	**100.0**	**37.1**	**100.0**	**311.7**	**100.0**
Agriculture	5.1	25.2	38.9	22.7	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Food Industry	2.2	10.8	20.5	12.0	0.0	0.0	0.0	0.0
Textiles and Leather Goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wood Products, Furniture and Paper	1.3	6.2	7.2	4.2	3.8	10.3	18.0	5.8
Chemical and Plastic Products	0.0	0.0	0.0	0.0	0.9	2.3	10.1	3.2
Building Materials	0.0	0.0	0.0	0.0	4.8	12.9	20.4	6.5
Metal Products	0.0	0.0	0.0	0.0	0.8	2.3	6.2	2.0
Machinery, Electronic Products and Cars	0.4	2.0	5.7	3.3	2.6	7.0	31.3	10.1
Electricity, Water and Gas	0.2	0.9	2.4	1.4	2.3	6.1	26.7	8.6
Construction	1.6	7.7	17.9	10.5	8.7	23.4	89.9	28.9
Trade	0.9	4.6	7.4	4.3	0.0	0.0	0.0	0.0
Hotels and Catering	0.2	0.8	1.6	1.0	0.0	0.0	0.0	0.0
Transports and Communication	3.3	16.3	28.8	16.9	12.8	34.6	105.9	34.0
Banking and Real Estate	1.2	5.8	7.7	4.5	0.0	0.0	0.0	0.0
Public Administration and Defence	0.4	2.0	3.2	1.9	0.1	0.3	0.9	0.3
Community, Social and Personal Services	3.6	17.7	29.6	17.3	0.2	0.7	2.2	0.7

Source: Own calculations based on the national allocation of funds from the National Development Plan for 2004-2006

Tab. 8 - Distribution of CAP direct payments across sectors at the regional and the national level (annual average value for the period 2007-2009, million €)

	Fully 'decoupled' DP		Fully 'coupled' DP		50% 'decoupled' 50% 'coupled'	
	NW average	RO average	NW average	RO average	NW average	RO average
TOTAL	**29.0**	**247.0**	**35**	**294.0**	**21.0**	**271.0**
Agriculture	7.1	36.6	35.0	294.0	10.0	165.1
Mining	0.0	13.3	0.0	0.0	0.0	6.6
Food Industry	2.2	61.2	0.0	0.0	1.1	30.6
Textiles and Leather Goods	2.8	8.1	0.0	0.0	1.4	4.1
Wood Products, Furniture and Paper	1.7	7.7	0.0	0.0	0.9	3.8
Chemical and Plastic Products	0.4	5.8	0.0	0.0	0.2	2.9
Building Materials	0.4	1.9	0.0	0.0	0.2	0.9
Metal Products	0.1	0.3	0.0	0.0	0.1	0.1
Machinery, Electronic Products and Cars	1.1	13.0	0.0	0.0	0.6	6.5
Electricity, Water and Gas	1.2	4.9	0.0	0.0	0.6	2.5
Construction	0.4	2.0	0.0	0.0	0.2	1.0
Trade	0.1	2.4	0.0	0.0	0.0	1.2
Hotels and Catering	2.7	13.7	0.0	0.0	1.4	6.8
Transports and Communication	2.9	16.3	0.0	0.0	1.4	8.2
Banking and Real Estate	4.9	41.9	0.0	0.0	2.5	20.9
Public Administration and Defence	1.0	9.3	0.0	0.0	0.5	4.7
Community, Social and Personal Services	0.3	9.0	0.0	0.0	0.2	4.5

Source: Own calculations based on the figures from SEC (2004)

4. Structural and Cohesion Funds

The paper 'Communication of the Commission: A financial package for the accession negotiations with Bulgaria and Romania' (SEC, 2004) presents the commitment appropriations of Structural Actions for the 2007-2009 period and it is considered that one third of these funds concerns the Cohesion Fund.

For the distribution of the Structural Funds we used the share of the main economic activities on regional and national investments for 1999. We used the same structure as in the case of ISPA funds for the distribution of the Cohesion Fund across sectors (Table 10).

Tab. 9 - Distribution of rural development funds across sectors at the regional and the national level (annual average value for the period 2007-2009, million €)

	NW average	%	RO average	%
TOTAL	**96.0**	**100.0**	**808.0**	**100.0**
Agriculture	24.2	25.2	183.7	22.7
Mining	0.0	0.0	0.0	0.0
Food Industry	10.4	10.8	97.1	12.0
Textiles and Leather Goods	0.0	0.0	0.0	0.0
Wood Products, Furniture and Paper	5.9	6.2	33.9	4.2
Chemical and Plastic Products	0.0	0.0	0.0	0.0
Building Materials	0.0	0.0	0.0	0.0
Metal Products	0.0	0.0	0.0	0.0
Machinery, Electronic Products and Cars	1.9	2.0	26.8	3.3
Electricity, Water and Gas	0.9	0.9	11.5	1.4
Construction	7.4	7.7	84.5	10.5
Trade	4.4	4.6	35.1	4.3
Hotels and Catering	0.8	0.8	7.7	1.0
Transports and Communication	15.7	16.3	136.2	16.9
Banking and Real Estate	5.6	5.8	36.4	4.5
Public Administration and Defence	1.9	2.0	15.3	1.9
Community, Social and Personal Services	17.0	17.7	139.8	17.3

Source: Own calculations based on the figures from SEC (2004)

4. Relevant regional and national scenarios

We analyse the impact of the pre- and after accession funds received by Romania and its North-West region on output, income and employment in the case of alternative scenarios. By comparing them with a baseline scenario, the impact four alternative scenarios have been elaborated in order to estimate the impacts of European Funds entries. These scenarios are here shortly described:

Baseline scenario

The baseline scenario represents the existing situation in Romania and in its North-West development region and it is described by the national and the regional Input-Output tables. Thus, no EU policy is included with the only exception of the PHARE funds.

Alternative scenarios

Romania's accession to the EU is assumed to take place in 2007. Therefore, the simulation firstly includes only the inflow of the yearly average pre-accession funds, that is the funds expected for 2004-2006 (Scenario 1). Then, the simulation includes, instead of these pre-accession funds, all the funds for which Romania (and the NW region) becomes eligible after accession (i.e., starting in 2007) (Scenario 2, Scenario 3 and Scenario 4).

Tab. 10 - Distribution by sectors of the Cohesion and Structural Funds at the regional and the national level (annual average value for the 2007-2009 period, million €)

	Cohesion Funds				Structural Funds			
	NW average	%	RO average	%	NW average	%	RO average	%
TOTAL	**79.0**	**100.0**	**664.0**	**100.0**	**158.0**	**100.0**	**1327.0**	**100.0**
Agriculture	0.0	0.0	0.0	0.0	10.4	6.6	94.5	7.1
Mining	0.0	0.0	0.0	0.0	7.7	4.9	78.9	5.9
Food Industry	0.0	0.0	0.0	0.0	12.9	8.2	82.5	6.2
Textiles and Leather Goods	0.0	0.0	0.0	0.0	6.7	4.2	42.6	3.2
Wood Products, Furniture and Paper	8.1	10.3	38.4	5.8	7.5	4.8	47.9	3.6
Chemical and Plastic Products	1.9	2.3	21.5	3.2	7.5	4.7	47.9	3.6
Building Materials	10.2	12.9	43.4	6.5	6.6	4.2	42.2	3.2
Metal Products	1.8	2.3	13.3	2.0	8.0	5.0	50.9	3.8
Machinery, Electronic Products and Cars	5.6	7.0	66.8	10.1	10.6	6.7	68.0	5.1
Electricity, Water and Gas	4.8	6.1	56.9	8.6	24.5	15.5	121.1	9.1
Construction	18.4	23.4	191.6	28.8	4.9	3.1	91.8	6.9
Trade	0.0	0.0	0.0	0.0	28.7	18.2	56.1	4.2
Hotels and Catering	0.0	0.0	0.0	0.0	2.0	1.3	66.4	5.0
Transports and Communication	27.4	34.7	225.7	34.0	18.5	11.7	234.6	17.7
Banking and Real Estate	0.0	0.0	0.0	0.0	1.3	0.8	61.6	4.6
Public Administration and Defence	0.3	0.3	2.0	0.3	0.3	0.2	70.5	5.3
Community, Social and Personal Services	0.5	0.7	4.6	0.7	0.3	0.2	69.5	5.2

Source: Own calculations based on the figures from SEC (2004)

Consequently, the four alternative scenarios are built up as follows:

Scenario 1 – In this scenario, we only take into consideration the transfer of funds from the pre-accession programmes (SAPARD and ISPA) that Romania will receive between 2004 and 2006;

Scenario 2 – In this scenario, the transfer of funds includes all the after-accession policies. We assume that CAP Direct Payments support the agricultural household income and they are used only for consumption (fully 'decoupled' scenario);

Scenario 3 – The only difference with respect to Scenario 2 is that here all CAP Direct Payments are fully invested in the agricultural sector; technically, 100% of these Direct Payments increase the final demand in agriculture (fully ‘coupled’ scenario). The rest of EU funds remains the same of Scenario 2;

Scenario 4 – In this scenario a combination of Scenarios 2 and 3 is assumed for the CAP Direct Payments: 50% are ‘decoupled’ (used for agricultural household consumption), 50% are ‘coupled’ (used for investments in agriculture) (partial ‘decoupling’ scenario). The rest of EU funds remains the same of Scenarios 2 and 3.

5. Data source and methodology

According to the methodological approach presented in this book, the static impact analysis assumes that the structure and technology of the economy, described by I-O coefficients, remain the same throughout the analysed period.

The changes in total output, income and employment caused by EU fund entries were calculated by multiplying the Rasmussen and Hirschmann output, income and employment linkages matrix (Appendix 1 and Appendix 2) with the Final Demand change matrix, which contains the final demand changes caused by the EU fund inflows, as it was commonly agreed and as it is presented in the previous chapters.

The monetary unit used in the present calculations is *billion (bn.) lei*, 1999 prices; accordingly, all monetary data previously presented about the European funds are converted into this currency.

For this impact analysis, we used both the Input-Output Table (IOT) of the North West region and the aggregated IOT of Romania. In order to derive the IOT of the North-West region, we strated from the 1999 national IOT and applied the GRIT methodology (Jensen *et al.*, 1979) to derive the regional IOT. The employment data required for the GRIT methodology were obtained from the Romanian National Statistical Institute.

Both regional and national IOT include 17 sectors obtained by aggregation of branches with similar technology.

6. Results of the analysis at the regional and national level

6.1 Estimation of the impact of European Funds

Before providing a more detailed analysis of the results for all sectors included in the I-O table, a general overview is presented below. The results of the simulation at regional level for the main sectors are shown in Table 11.

Tab. 11 – Simulations at the regional level (NW): total output, household income and employment variation by main sectors of the economy under the five scenarios. The relative changes refer to the Baseline scenario (initial situation)

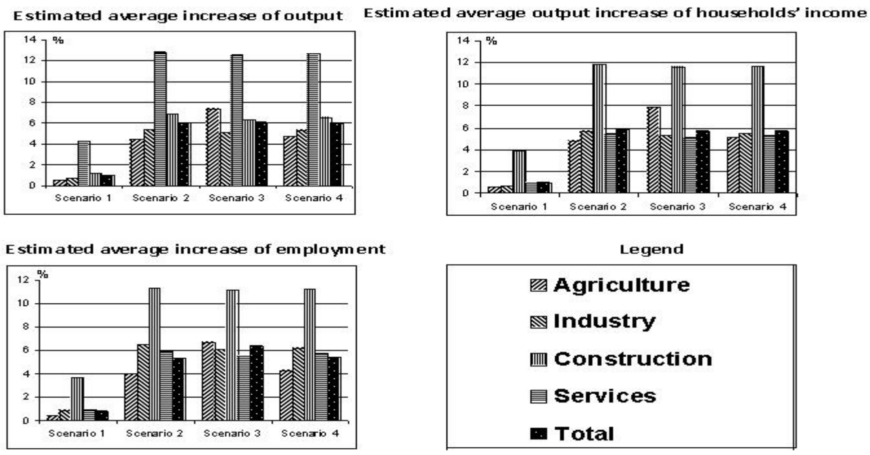
	Baseline		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
	Initial value, 1999	Structure	Change	Structure	Change	Structure	Change	Structure	Change	Structure
	Initial value of regional output (bn. Lei)	in %, total output=100%	Estimated relative changes in value of total **output** (%, baseline (initial) output=100%) and estimated structure of the regional total output (%, total regional output=100%)							
Agriculture	20,340.7	14.3	0.54	14.2	4.39	14.0	7.33	14.4	4.70	14.1
Industry*	71,587.30	50.2	0.66	50.1	5.42	49.9	5.07	49.7	5.25	49.9
- Food Industry	*15,894.4*	*11.2*	*0.36*	*11.1*	*4.14*	*11.0*	*3.78*	*10.9*	*3.96*	*10.9*
Construction	44,545.9	4.3	4.19	4.4	12.72	4.5	12.55	4.5	12.63	4.5
Services	6,073.8	31.2	1.16	31.3	6.86	31.5	6.24	31.3	6.55	31.4
Total	142,547.7	100.0	0.95	100.0	6.03	100.0	6.07	100.0	5.89	100.0
	Initial regional household income (bn, lei)	in %, total household income=100%	Estimated relative changes in **household income** (%, baseline value=100%) and estimated structure of the household income (%, total regional household income=100%)							
Agriculture	1,445.9	6.7	0.58	6.6	4.75	6.6	7.92	6.8	5.08	6.6
Industry*	8,197.0	37.7	0.72	37.6	5.67	37.7	5.31	37.6	5.50	37.7
- Food Industry	*724.0*	*3.3*	*0.46*	*3.3*	*5.35*	*3.3*	*4.89*	*3.3*	*5.12*	*3.3*
Construction	1,098.0	5.1	3.87	5.2	11.75	5.3	11.60	5.3	11.67	5.3
Services	10,986.8	50.6	0.94	50.5	5.50	50.4	5.06	50.3	5.28	50.4
Total	21,727.7	100.0	0.98	100.0	5.83	100.0	5.68	100.0	5.67	100.0
	Initial regional employment (1000 pers)	in %, total employment= =100%	Estimated relative changes in the level of **employment** (%, baseline (initial) value=100%) and estimated structure of the regional employment (%, total regional output=100%)							
Agriculture	519.4	45.3	0.49	45.1	4.02	44.7	6.71	45.4	4.30	44.8
Industry*	272.3	23.7	0.83	23.7	6.46	24.0	6.03	23.6	6.25	23.9
- Food Industry	*65.2*	*5.7*	*0.64*	*5.7*	*7.44*	*5.8*	*6.80*	*5.7*	*7.12*	*5.8*
Construction	38.9	3.4	3.71	3.5	11.29	3.6	11.14	3.5	11.21	3.6
Services	317.1	27.6	0.92	27.7	5.92	27.8	5.51	27.4	5.72	27.7
Total	1,147.7	100.0	0.80	100.0	5.37	100.0	6.37	100.0	5.39	100.0

Note: *Food industry included

The estimated average increase of regional output, income and employment accoprding to the scenarios is reported in Figure 1. The first conclusion of the general overview of the results, after having analysed the four main sectors, is that total output and household income of the regional economy increase significantly (on average, by about 6%) only in the scenarios where the region benefits of all after-accession funds (EU Structural Funds and CAP Direct Payments).

The results of the simulation for the Scenario 1 show that the total output and household incomes do not exceed the 1% yearly growth. The analysis points out that pre-accession funds (SAPARD and ISPA) will have a minor effect on the regional economy, even if it is supposed that all funds are absorbed. Similar tendencies can also be observed in the impact on employment, but generally the relative changes of the employment are lower than output and income growth, except Scenario 3. It has also to be mentioned that the adopted methodology does not allow changes in the technology, therefore simulation of massive investments in agriculture (considering that all 'coupled' payments will be used for investments in agriculture) might indicate a too high increase of employment in agriculture, especially in the initial conditions of low labour productivity.

Fig.1 - Estimated average increase of output, income and employment in the North-West region



In all the four alternative scenarios, the highest impacts on regional output and household income are expected in the services sector (see Tables A3 and A4 in the Appendix). The most important output and income increase is expected to be in Transports, Communication and Construction sectors, as a result of the infrastructural development, showing mainly the effect of the ISPA and Structural Funds. The relatively high increase of output and household income of Building Materials and Electricity, Water and Gas sectors can also be explained with the infrastructural development.

The output and income increases of Agriculture have their basis mainly in the SAPARD, Rural development actions and CAP Direct Payments (especially in the Scenario 3). Even if there are important increases in the income and output of the secondary and tertiary sectors, the structure will not suffer significant changes.

Our model emphasizes (Table A5) that there are small chances of solving in the short or medium term the over-employment in agriculture, the key problem of rural areas in the North-West region (or in Romania). The share of employment in agriculture (according to our simulation) tends to decrease slowly or not at all.

6.2 Impact on regional output

A more detailed analysis on the 17 sectors (Table A3) indicates that the highest relative output increase under Scenario 1 is expected in Construction, Transports and Communication, Building Materials, Machinery, Electronic Products and Cars and Wood Products, Furniture and Paper sectors. In absolute terms, the output increase is higher in Transport and Communication, Construction, Wood Products, Furniture and Paper, Agriculture and Building Material sectors. This is often due to the higher amounts received by these sectors from the pre-accession funds between 2004-2006 rather than to higher multipliers. In any case, the yearly average pre-accession funds inflows will have a limited impact on the regional total output, the increase being estimated at 0.95%.

Regarding the output changes under Scenario 2 it can be emphasized that the effect of yearly average inflows of 'decoupled' Direct Payments, Rural Development, Structural and Cohesion Funds in the 2007-2009 period could have a more significant effect on the regional economy than Pre-accession funds. In this case, the yearly regional output increase is 6.03% on the average. The main difference between Scenario 2 and Scenario 1 is the amount of European funds; in the former scenario it is also presumed that all Direct Payments are 'decoupled'. The highest relative change in total output concerns sectors linked with infrastructural development: Transports and Communication, Construction, Electricity, Water and Gas sectors. The impact is also high on those sectors providing technologies for the development of other sectors: Machinery, Electronic Products and Cars sectors. In absolute terms, the highest output impact is expected, again, in Transport and Communication, Agriculture, Construction, Electricity, Water and Gas and Trade sectors.

Under Scenario 3, the effect of 'coupled' Direct Payments, Rural Development, Structural and Cohesion Funds in the 2007-2009 period presents small differences in comparison with the situation shown in Scenario 2. The highest relative change in total output is confirmed in Transports and Communication, Construction Electricity, Water and Gas and Machinery, Electronic Products and Cars sectors, as a result of regional infrastructure development and of increasing final demand of advanced technologies. The most important difference between Scenario 2 and the Scenario 3 is that output increase of the agricultural sector is estimated to be, as expected, higher under ‘coupled’ direct payments.

Under Scenario 4 (50% of the direct payments considered to be used for investments and 50% for consumption), the effect of the EU Funds and CAP Direct Payments in 2007-2009 is similar to the situation under Scenario 2, with relatively small differences in absolute and relative values.

6.3 Impact on regional household income

The changes induced on household income are similar to those observed on the total output (Table A4). Under Scenario 1, income increase caused by the pre-accession funds in 2004-2006 is expected to be about 1%. The highest relative income increase is expected in Construction, Transports and Communication, Building Materials, Machinery, Electronic Products and Cars, Wood Products, Furniture and Paper. In absolute terms, the income increase is the highest in Transports and Communication, Construction, Community, Social and Personal Services, Building Materials, Wood Products, Furniture and Paper and Machinery, Electronic Products and Cars sectors.

Evidently, under Scenario 2 the average ‘decoupled’ Direct Payments, Rural Development, Structural and Cohesion Fund inflows in the 2007-2009 period have a more significant effect on income than the pre-accession funds (+5.84%). The highest relative change is generated in Transports and Communication, Construction, Electricity, Water and Gas, Chemical and Plastic Products and Machinery, Electronic Products and Cars sectors, whereas, in absolute terms, is expected in Transport and Communication, Trade, Community, Social and Personal Services, Construction and Electricity, Water and Gas sectors.

Under Scenario 3, the effect of ‘coupled’ Direct Payments and EU Funds presents small differences in comparison with the situation of Scenario 2. As before, taking into consideration the increase of household income in absolute and relative terms, the most important difference between Scenario 2 and Scenario 3 is the higher increase of agricultural income in the case of ‘coupled’ Direct Payments.

The results obtained under Scenario 4 are extremely close to those obtained under Scenario 2.

6.4 Impact on regional employment

We finally analyse the impact of the EU funds on the regional employment. In this respect, an important assumption is that the technical coefficients remain unchanged during the transition period. The detailed results are presented in Table A5.

The average yearly inflow of the Pre-accession funds generates an employment increase of 0.8%. Under this scenario (Scenario 1), the relative employment increase is the highest in Construction, Transports and Communication, Building Materials, Machinery, Electronic Products and Cars and Wood Products, Furniture and Paper sectors. In absolute terms, the highest increase is observed in Agriculture, Transport and Communication and Construction.

Under Scenario 2, the average yearly inflow of European funds will generate an employment increase of 5.36%. The relative increase of employment is the highest in Transports and Communications, Electricity, Water and Gas and Construction, whereas, in absolute terms, the highest growth is expected in Agriculture, Transports and Communication, Trade, Food Industry and Construction.

The highest relative increase of regional employment is observed under Scenario 3 (+6.36%). In the same scenario, when CAP Direct Payments are considered to be totally coupled, the highest relative impact is on Transports and Communications, Electricity, Water and Gas and Construction. In absolute terms, the increase is higher in Agriculture, Transports and Communication, Trade, Construction and Food Industry.

Again, under Scenario 4 the impact on regional employment is very closed to what observed under Scenario 2.

6.5 The impact of EU funds on the national economy

In this final part of our study, we analyse the impact of the European funding on output, income and employment for each sector at the national level, during both the pre-accession and the after-accession period. The impact analysis for the main sectors at the national level indicates the same geneal tendencies observed at the regional level (Table 12 and Figure 2).

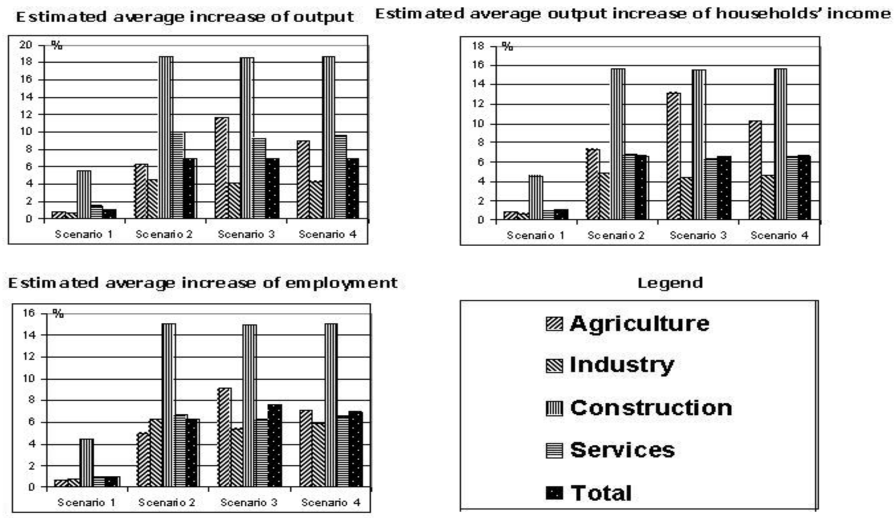
The relative increase of total output, household income and employment is slightly higher than in the North-West region reaching 1.1% under Scenario 1 and about 7% under Scenarios 2, 3 and 4 (Figure 2). The most important relative increase in all scenarios is expected in services. Another similarity between national and regional levels is the higher average impact on sectors linked with the infrastructural development, like Transports and Communications, Construction, Building Materials, Electricity, Water and Gas. At the national level, it can also be observed that EU funds will not solve the problems of Romanian rural areas in the short term. The annual average inflow causes small changes in the structure of employment (about 41% in agriculture for the different scenarios), income (about 5%) and output (about 10%).

Tab. 12 - Simulations at the national level (RO): total output, household income and employment variation by main sectors of the economy under the five scenarios. The relative changes refer to the Baseline scenario (initial situation)

	Baseline		**Scenario 1**		**Scenario 2**		**Scenario 3**		**Scenario 4**	
	Initial value, 1999	Structure	Change	Structure	Change	Structure	Change	Structure	Change	Structure
	Initial output, Romania (bn. Lei)	in %, total output=100 %	Estimated relative changes in value of the total **output** (%, baseline (initial) output=100%) and estimated structure of the l total output (%, total output=100%), Romania							
Agriculture	140,541	10.9	0.79	10.9	6.39	10.9	11.62	11.4	9.00	11.1
Industry*	736,518	57.2	0.61	57.0	4.55	56.0	4.09	55.7	4.32	55.8
- Food Industry	156,123	*12.1*	*0.40*	*12.1*	*4.70*	*11.9*	*3.51*	*11.7*	*4.11*	*11.8*
Construction	62,375	4.8	5.44	5.1	18.66	5.4	18.56	5.4	18.61	5.4
Services	347,111	27.0	1.50	27.1	10.01	27.8	9.28	27.6	9.65	27.7
Total output	1,286,545	100.0	1.10	100.0	6.91	100.0	7.01	100.0	6.96	100.0
	Initial household income, Romania (bn. lei)	in %, total households' income=100 %	Estimated relative changes **in households' income** (%, baseline value=100%) and estimated structure of the households' income (%, total regional households' income=100%), Romania							
Agriculture	9,649	5.1	0.90	5.1	7.26	5.1	13.20	5.4	10.23	5.3
Industry*	69,550	36.7	0.68	36.6	4.83	36.1	4.44	36.0	4.63	36.0
- Food Industry	6,301	*3.3*	*0.58*	*3.3*	*6.81*	*3.3*	*5.08*	*3.3*	*5.95*	*3.3*
Construction	11,327	6.0	4.56	6.2	15.63	6.5	15.55	6.5	15.59	6.5
Services	98,947	52.2	0.96	52.2	6.80	52.3	6.35	52.1	6.58	52.2
Total households' income	189,473	100.0	1.07	100.0	6.63	100.0	6.55	100.0	6.59	100.0
	Initial employment, Romania (1000 pers,)	in %, total employment =100%	Estimated relative changes in the level of **employment** (%, baseline (initial) value=100%) and estimated structure of the employment (%, total regional output=100%), Romania							
Agriculture	3,466.10	41.2	0.62	41.0	5.02	40.7	9.12	41.8	7.07	41.2
Industry*	2,054.15	24.4	0.80	24.4	6.28	24.4	5.41	23.9	5.84	24.2
- Food Industry	520.77	*6.2*	*0.86*	*6.2*	*10.05*	*6.4*	*7.50*	*6.2*	*8.77*	*6.3*
Construction	338.40	4.0	4.38	4.2	15.01	4.4	14.93	4.3	14.97	4.3
Services	2,560.95	30.4	0.97	30.4	6.68	30.5	6.27	30.0	6.48	30.3
Total employment	8,419.60	100.0	0.92	100.0	6.23	100.0	7.58	100.0	6.91	100.0

*Note: Food Industry sector included

Fig.2 - Estimated average increase of the output, income and employment in Romania



As Table A6 indicates in detail, under Scenario 1 we estimate a total national output change of 1.1%. The output increase caused by pre-accession funds in relative terms is higher in Construction, Trade and Transports and Communication sector but, in absolute terms, the highest impact is estimated for Transports and Communication, Construction, Electricity, Water and Gas and Agriculture. These sectors remain the mostly affected also in the other alternative scenarios.

In the case of Scenario 2, the output increase is 6.91%, while when Direct Payments are fully 'coupled' (Scenario 3) the main effect is a more remarkable increase agricultural output. As in the regional results, similar evidence is observed under Scenario 2 and Scenario 4: in the latter the impact on agricultural employment (both in relative and absolute terms) is higher than Scenario 2, but lower than Scenario 3.

Table A7 presents the impact analysis at the national level concerning household income. As a consequence of the yearly average payments, it increases by 1.07% under Scenario 1, by 6.63%, 6.55%, 6.59% under Scenarios 2, 3 and 4, respectively. Again, the most significant relative increase is estimated in Construction, Transports and Communication, Building Materials, Electricity, Water and Gas sectors under all scenarios. But in Scenarios 2, 3 and 4 an high impact on household income can be observed also in Agriculture. In the case of Scenario 3, the relative impact on the agricultural household income is higher than in Scenarios 2 and 4.

Finally, Table A8 reports the detailed analysis of the impact of EU funds on the country-level employment. Employment increases in all alternative scenarios with respect to the baseline; by 0.92% under Scenario 1, and by 6.23%, 7.58% and 6.91% under Scenarios 2, 3 and 4, respectively. In all scenarios, the highest impact in relative terms can be observed in the Construction, Transports and Communication, Building Materials, Electricity, Water and Gas sectors, but, again, the highest employment increase in absolute values concerns the agriculture sector. This result can be explained by the fact that the Romanian agriculture has a very low labour productivity and a labour-intensive character.

7. Policy implications: some concluding remarks

The European funds' transfers to the North-West region of Romania is expected to generate output increases especially in sectors linked with infrastructural development (Transports and Communication, Construction, Building Materials, Electricity, Water and Gas) and sectors on which the modernization of industry and the development of the new technologies are based (Machinery, Electronic Products and Cars).

The multiplying effect of these investments can also be put into evidence. A significant household income increase and job creation in other industries and services are expected. This effect can be extremely positive for the North-West development region and the Romanian rural space by favouring income-diversification in the rural households.

Increase of output, household income, employment, as well as technological developments are expected in the agricultural sector as positive direct or indirect effects generated by European funds. In the case of 'coupled' direct payments, important improvements can be observed in agriculture in comparison with the 'decoupled' direct payments. The modernization of Romanian agriculture, new infrastructure and new investments are expected to increase market possibilities after the accession.

The study underlines that investments made in agriculture at the national level and in the North-West region have to be done in accordance with investments in infrastructure and in new technology sectors. The over-employment in agriculture is a serious obstacle to the increase of efficiency and market-orientation of the farms. The investments in agriculture have to be correlated with the new job creation in services and industry in rural areas.

The development of the rural infrastructure and of those sectors supplying new technologies, should be a priority for the policy makers at the beginning of the 3rd Millennium in Romania. The accession of Romania to the European Union and the support through the European funds represent a necessity as well as an opportunity for the Romanian rural areas and the Romanian agriculture perspective.

References

Agra Facts (2004): Council Concludes Bulgarian & Romanian Accession Talks on Agriculture. Brussels: Belgium, No. 46-04.

Mattas, K., Loizou, S., Tzouvelekas, V. and Meropi, T. (2003a): Regional Input-Output Tables. 4th REAPBALK Workshop, Tucepi, Croatia.

Mattas, K., Loizou, S., Tzouvelekas, V. and Meropi, T (2003b): Multipliers' Analysis: Sectoral Regional Linkage Coefficients. 5th REAPBALK Workshop, Sofia, Bulgaria.

Bailey, L., Bonfiglio, A., Davidova, S., Esposti, R., Ninka, E. and Zanni, A. (2004): Relevant regional scenarios, Part A: Scenario definition and methodology for impact analysis. REAPBALK Final workshop, Cluj-Napoca, Romania.

Morillas, A., Moniche, L. and Castro, M. (2000): Structural Funds. Light and Shadow from Andalusia. Paper presented at the XIII International Conference on Input-Output Techniques, University of Macerata, Italy.

European Commission (2004): Communication from the Commission: a financial package for the accession negotiations with Bulgaria and Romania. European Commission, Brussels, SEC (2004) 160 final.

Appendix

Own calculations based on Mattas *et al.* (2003a; 2003b) and Bailey *et al.* (2004).

Tab. A1 - Regional (North-West) Hirschman and Rasmussen Output, Income and Employment Linkage coefficients

	Sectors	Rank OBL	OBL	Rank IBL	IBL	Rank EBL	EBL (1000 pers/1 bn. lei)
1	Agriculture	**16**	1.314	**16**	0.101	**1**	0.030747
2	Mining	**10**	1.463	**10**	0.260	**12**	0.006352
3	Food Industry	**5**	1.584	**5**	0.093	**3**	0.01167
4	Textiles and Leather Goods	**4**	1.599	**4**	0.224	**15**	0.005193
5	Wood Products, Furniture and Paper	**13**	1.397	**13**	0.173	**8**	0.007104
6	Chemical and Plastic Products	**3**	1.601	**3**	0.151	**14**	0.005495
7	Building Materials	**15**	1.324	**15**	0.201	**10**	0.006644
8	Metal Products	**2**	1.792	**2**	0.233	**16**	0.005156
9	Machinery, Electronic Products and Cars	**1**	1.837	**1**	0.253	**7**	0.008273
10	Electricity, Water and Gas	**7**	1.511	**7**	0.188	**17**	0.004474
11	Construction	**6**	1.524	**6**	0.255	**6**	0.008662
12	Trade	**17**	1.278	**17**	0.250	**4**	0.010753
13	Hotels and Catering	**9**	1.470	**9**	0.165	**9**	0.006715
14	Transports and Communication	**14**	1.388	**14**	0.232	**11**	0.006482
15	Banking and Real Estate	**11**	1.426	**11**	0.193	**13**	0.005654
16	Public Administration and Defence	**8**	1.490	**8**	0.742	**5**	0.009451
17	Community, Social and Personal Services	**12**	1.405	**12**	0.445	**2**	0.013249

Tab. A2 - National Hirschman and Rasmussen Output, Income and Employment Linkage coefficients

	Sector	Rank OBL	OBL	Rank IBL	IBL	Rank EBL	EBL (1000 pers/1 bn. lei)
1	Agriculture	**8**	1.7515	**15**	0.1366	**1**	0.03391
2	Mining	**9**	1.7408	**10**	0.1911	**16**	0.00457
3	Food Industry	**4**	1.8720	**17**	0.1094	**3**	0.01334
4	Textiles and Leather Goods	**17**	1.3609	**14**	0.1566	**15**	0.00415
5	Wood Products, Furniture and Paper	**12**	1.6693	**12**	0.1764	**8**	0.00743
6	Chemical and Plastic Products	**13**	1.6558	**16**	0.1352	**17**	0.00362
7	Building Materials	**5**	1.8071	**7**	0.2326	**9**	0.0072
8	Metal Products	**2**	2.0614	**8**	0.2270	**12**	0.00485
9	Machinery, Electronic Products and Cars	**15**	1.5401	**13**	0.1755	**14**	0.00432
10	Electricity, Water and Gas	**1**	2.4544	**4**	0.2879	**11**	0.00592
11	Construction	**3**	1.9307	**3**	0.2937	**6**	0.00843
12	Trade	**16**	1.5365	**5**	0.2740	**4**	0.01121
13	Hotels and Catering	**7**	1.7697	**9**	0.1919	**7**	0.00744
14	Transports and Communication	**11**	1.6970	**6**	0.2645	**10**	0.00661
15	Banking and Real Estate	**14**	1.6191	**11**	0.1866	**13**	0.00478
16	Public Administration and Defence	**10**	1.7402	**1**	0.7634	**5**	0.0089
17	Community, Social and Personal Services	**6**	1.7853	**2**	0.4839	**2**	0.01444

Tab. A3 - Changes in the relative (%) and the absolute values (bn. Lei) of the total output in the North-West region

	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Funds allocated:	**Pre-accession**		**Structural Cohesion Rural Development 'decoupled' Direct Payments**		**Structural Cohesion Rural Development 'coupled' Direct Payments**		**Structural Cohesion Rural Development Direct Payments (50% 'decoupled'-50% 'coupled')**	
Sectors	**%**	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**
Agriculture	0.54	109.72	4.37	888.39	7.30	1484.41	4.67	950.64
Mining	0.00	0.00	3.82	183.99	3.81	183.40	3.81	183.69
Food Industry	0.36	56.74	4.02	638.42	3.66	581.10	3.84	609.76
Textiles and Leather Goods	0.00	0.00	1.65	246.42	1.17	173.89	1.41	210.15
Wood Products, Furniture and Paper	1.20	115.64	5.47	526.38	5.07	487.26	5.27	506.82
Chemical and Plastic Products	0.72	22.69	8.05	254.70	7.71	243.95	7.88	249.33
Building Materials	2.10	103.49	7.56	372.46	7.36	362.87	7.46	367.67
Metal Products	0.51	24.82	5.98	288.36	5.92	285.61	5.95	286.98
Machinery, Electronic Products and Cars	1.41	90.49	8.99	575.77	8.47	542.62	8.73	559.19
Electricity, Water and Gas	0.86	60.15	11.03	774.95	10.60	745.36	10.82	760.16
Construction	4.19	254.23	12.83	779.41	12.67	769.56	12.75	774.48
Trade	0.19	19.55	6.68	699.44	6.66	697.89	6.67	698.67
Hotels and Catering	0.13	3.92	4.45	136.37	2.31	70.96	3.38	103.66
Transports and Communication	3.59	365.91	14.23	1448.82	13.60	1,384.38	13.92	1,416.60
Banking and Real Estate	0.33	27.42	3.35	277.39	1.98	163.53	2.66	220.46
Public Administration and Defence	0.54	12.48	3.73	85.46	2.63	60.27	3.18	72.86
Community, Social and Personal Services	0.86	88.32	4.12	422.52	4.05	415.19	4.08	418.85
TOTAL	**0.95**	**1,355.59**	**6.03**	**8,599.26**	**6.07**	**8,652.23**	**5.89**	**8,389.99**

Tab. A4 - Changes in relative (%) and absolute values (bn. Lei) of the household income level in the North-West region

	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Funds allocated:	**Pre-accession**		**Structural Cohesion Rural Development 'decoupled' Direct Payment**		**Structural Cohesion Rural Development 'coupled' Direct Payment**		**Structural Cohesion Rural Development Direct Payment (50% 'decoupled'-50% 'coupled')**	
Sectors	**%**	**bn. Lei**	**%**	**bn. lei**	**%**	**bn. Lei**	**%**	**bn. lei**
Agriculture	0.58	8.43	4.72	68.28	7.89	114.09	5.05	73.07
Mining	0.00	0.00	3.66	32.67	3.65	32.56	3.65	32.61
Food Industry	0.46	3.34	5.19	37.55	4.72	34.18	4.95	35.87
Textiles and Leather Goods	0.00	0.00	1.63	34.44	1.15	24.30	1.39	29.37
Wood Products, Furniture and Paper	1.21	14.33	5.53	65.22	5.12	60.37	5.32	62.80
Chemical and Plastic Products	0.83	2.14	9.29	24.04	8.90	23.02	9.10	23.53
Building Materials	2.09	15.68	7.51	56.44	7.32	54.98	7.42	55.71
Metal Products	0.59	3.22	6.84	37.46	6.78	37.10	6.81	37.28
Machinery, Electronic Products and Cars	1.40	12.47	8.88	79.38	8.37	74.81	8.62	77.09
Electricity, Water and Gas	0.90	7.48	11.58	96.38	11.14	92.70	11.36	94.54
Construction	3.87	42.46	11.86	130.18	11.71	128.53	11.78	129.36
Trade	0.17	3.83	6.02	137.06	6.01	136.76	6.01	136.91
Hotels and Catering	0.12	0.44	4.27	15.27	2.22	7.95	3.25	11.61
Transports and Communication	3.45	61.03	13.65	241.64	13.04	230.89	13.34	236.27
Banking and Real Estate	0.34	3.72	3.47	37.60	2.05	22.16	2.76	29.88
Public Administration and Defence	0.40	6.21	2.76	42.54	1.95	30.00	2.36	36.27
Community, Social and Personal Services	0.71	27.98	3.38	133.83	3.32	131.51	3.35	132.67
TOTAL	**0.98**	**212.77**	**5.84**	**1,269.97**	**5.69**	**1,235.92**	**5.68**	**1,234.83**

Tab. A5 - Changes in relative (%) and absolute values (1000 pers.) of the employment level in the North-West region

	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Funds allocated:	**Pre-accession**		**Structural Cohesion Rural Development 'decoupled' Direct Payment**		**Structural Cohesion Rural Development 'coupled' Direct Payment**		**Structural Cohesion Rural Development Direct Payment (50% 'decoupled'-50% 'coupled')**	
Sectors	**%**	**1000 pers.**	**%**	**1000 pers.**	**%**	**1000 pers.**	**%**	**1000 pers.**
Agriculture	0.49	2.57	4.00	20.78	6.69	34.72	4.28	22.24
Mining	0.00	0.00	3.77	0.80	3.76	0.80	3.76	0.80
Food Industry	0.64	0.42	7.22	4.70	6.57	4.28	6.89	4.49
Textiles and Leather Goods	0.00	0.00	1.93	0.80	1.36	0.56	1.65	0.68
Wood Products, Furniture and Paper	1.26	0.59	5.72	2.68	5.30	2.48	5.51	2.58
Chemical and Plastic Products	0.74	0.08	8.27	0.87	7.92	0.84	8.09	0.86
Building Materials	2.01	0.52	7.24	1.87	7.05	1.82	7.15	1.84
Metal Products	0.69	0.07	7.97	0.83	7.89	0.82	7.93	0.83
Machinery, Electronic Products and Cars	1.27	0.41	8.10	2.59	7.64	2.44	7.87	2.52
Electricity, Water and Gas	0.94	0.18	12.14	2.29	11.68	2.21	11.91	2.25
Construction	3.71	1.45	11.39	4.43	11.24	4.37	11.32	4.40
Trade	0.17	0.16	6.13	5.89	6.11	5.87	6.12	5.88
Hotels and Catering	0.15	0.02	5.37	0.62	2.79	0.32	4.08	0.47
Transports and Communication	3.54	1.71	14.01	6.77	13.38	6.46	13.70	6.61
Banking and Real Estate	0.36	0.11	3.59	1.10	2.12	0.65	2.86	0.87
Public Administration and Defence	0.50	0.08	3.45	0.54	2.44	0.38	2.94	0.46
Community, Social and Personal Services	0.73	0.83	3.47	3.99	3.41	3.92	3.44	3.95
TOTAL	**0.80**	**9.18**	**5.36**	**61.55**	**6.36**	**72.96**	**5.38**	**61.74**

Tab. A6 - Changes in relative (%) and absolute values (bn. Lei) of the total output level in Romania

		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Funds allocated:	**Initial Output**	**Pre-accession**		**Structural Cohesion Rural Development 'decoupled' Direct Payment**		**Structural Cohesion Rural Development 'Coupled' Direct Payment**		**Structural Cohesion Rural Development Direct Payment (50% 'decoupled'-50% 'coupled')**	
Sectors	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**
Agriculture	140,541	0.79	1,109.67	6.39	8,983.25	11.61	16,321.43	9.00	12,652.34
Mining	90,571	0.00	0.00	2.89	2,613.71	2.47	2,237.57	2.68	2,425.64
Food Industry	156,123	0.40	626.59	4.71	7,345.63	3.51	5,477.25	4.11	6,411.29
Textiles and Leather Goods	90,104	0.00	0.00	1.25	1,125.37	1.05	945.07	1.15	1,035.33
Wood Products, Furniture and Paper	55,766	1.23	685.19	6.24	3,478.50	5.86	3,270.14	6.05	3,374.32
Chemical and Plastic Products	62,294	0.44	272.20	3.26	2,027.86	3.00	1,871.64	3.13	1,949.89
Building Materials	22,389	2.68	599.71	11.50	2,573.65	11.25	2,518.88	11.37	2,546.27
Metal Products	39,673	0.53	209.39	5.46	2,166.12	5.44	2,156.71	5.45	2,161.42
Machinery, Electronic Products and Cars	138,582	0.67	928.65	3.16	4,379.22	2.92	4,052.47	3.04	4,215.85
Electricity, Water and Gas	81,016	1.44	1,165.04	9.60	7,776.28	9.36	7,579.51	9.48	7,677.90
Construction	62,375	5.44	3,392.24	18.66	11,638.07	18.56	11,575.15	18.61	11,606.61
Trade	4,171	4.46	186.13	56.22	2,344.95	54.78	2,284.86	55.50	2,314.90
Hotels and Catering	30,592	0.15	47.00	8.27	2,529.89	6.98	2,135.41	7.63	2,332.65
Transports and Communication	95,161	3.92	3,726.56	17.81	16,944.80	17.33	16,493.80	17.57	16,719.44
Banking and Real Estate	121,073	0.17	203.06	3.05	3,690.80	2.14	2,585.85	2.59	3,138.32
Public Administration and Defence	25,190	0.47	119.05	10.93	2,754.42	9.89	2,490.13	10.41	2,622.28
Community, Social and Personal Services	70,924	1.30	923.57	9.14	6,484.97	8.77	6,222.56	8.96	6,353.77
TOTAL	**1,286,543**	**1.10**	**14,194.04**	**6.91**	**88,857.50**	**7.01**	**90,218.44**	**6.96**	**89,538.20**

Tab. A7 - Changes in relative (%) and absolute values (bn. lei) of the household income level in Romania

		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Funds allocated:	**Initial Income**	**Pre-accession**		**Structural Cohesion Rural Development 'Decoupled' Direct Payments**		**Structural Cohesion Rural Development 'Coupled' Direct Payments**		**Structural Cohesion Rural Development Direct Payments (50% 'decoupled' - 50% 'coupled')**	
Sectors	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**	**%**	**bn. lei**
Agriculture	9,649	0.90	86.54	7.26	700.55	13.19	1,272.80	10.23	986.67
Mining	9,471	0.00	0.00	3.03	286.95	2.59	245.65	2.81	266.30
Food Industry	6,301	0.58	36.62	6.81	429.35	5.08	320.14	5.95	374.74
Textiles and Leather Goods	10,784	0.00	0.00	1.20	129.51	1.01	108.76	1.10	119.15
Wood Products, Furniture and Paper	5,856	1.24	72.42	6.28	367.65	5.90	345.63	6.09	356.64
Chemical and Plastic Products	4,358	0.51	22.23	3.80	165.63	3.51	152.87	3.65	159.26
Building Materials	3,121	2.47	77.20	10.62	331.31	10.39	324.26	10.50	327.79
Metal Products	4,106	0.56	23.06	5.81	238.53	5.78	237.49	5.80	238.01
Machinery, Electronic Products and Cars	15,926	0.66	105.80	3.13	498.91	2.90	461.69	3.02	480.30
Electricity, Water and Gas	9,627	1.42	136.67	9.48	912.26	9.24	889.17	9.36	900.71
Construction	11,327	4.56	516.10	15.63	1,770.64	15.55	1,761.07	15.59	1,765.86
Trade	19,224	0.17	33.19	2.17	418.10	2.12	407.38	2.15	412.74
Hotels and Catering	3,610	0.14	5.10	7.60	274.27	6.41	231.50	7.01	252.88
Transports and Communication	16,654	3.49	580.89	15.86	2,641.35	15.44	2,571.05	15.65	2,606.22
Banking and Real Estate	12,819	0.18	23.41	3.32	425.44	2.33	298.07	2.82	361.76
Public Administration and Defence	16,898	0.31	52.22	7.15	1,208.33	6.46	1,092.39	6.81	1,150.36
Community, Social and Personal Services	29,742	0.84	250.34	5.91	1,757.78	5.67	1,686.65	5.79	1,722.22
TOTAL	**189,473**	**1.07**	**2,021.79**	**6.63**	**12,556.54**	**6.55**	**12,406.59**	**6.59**	**12,481.60**

Tab. A8 - Changes in relative (%) and absolute values (1000 pers.) of the employment level in Romania

		Scenario 1		Scenario 2		Scenario 3		Scenario 4	
Funds allocated:	**Initial Employment**	**Pre-accession**		**Structural Cohesion Rural Development 'Decoupled' Direct Payments**		**Structural Cohesion Rural Development 'Coupled' Direct Payments**		**Structural Cohesion Rural Development Direct Payments (50% 'decoupled' - 50% 'coupled')**	
Sectors	**1000 pers.**	**%**	**1000 pers.**	**%**	**1000 pers.**	**%**	**1000 pers.**	**%**	**1000 pers.**
Agriculture	3,466.1	0.62	21.48	5.02	173.91	9.12	315.98	7.07	244.94
Mining	219.4	0.00	0.00	3.13	6.86	2.68	5.87	2.90	6.36
Food Industry	520.8	0.86	4.46	10.05	52.34	7.49	39.03	8.77	45.68
Textiles and Leather Goods	212.1	0.00	0.00	1.62	3.43	1.36	2.88	1.49	3.15
Wood Products, Furniture and Paper	232.9	1.31	3.05	6.64	15.47	6.24	14.55	6.44	15.01
Chemical and Plastic Products	121.3	0.49	0.60	3.66	4.44	3.38	4.09	3.52	4.27
Building Materials	107.2	2.23	2.39	9.56	10.25	9.36	10.04	9.46	10.15
Metal Products	77.2	0.64	0.49	6.59	5.09	6.56	5.07	6.58	5.08
Machinery, Electronic Products and Cars	389.1	0.67	2.60	3.15	12.27	2.92	11.36	3.04	11.82
Electricity, Water and Gas	174.1	1.61	2.81	10.77	18.75	10.50	18.28	10.63	18.51
Construction	338.4	4.38	14.81	15.01	50.80	14.93	50.53	14.97	50.66
Trade	756.3	0.18	1.36	2.26	17.10	2.20	16.67	2.23	16.88
Hotels and Catering	99.8	0.20	0.20	10.65	10.63	8.99	8.97	9.82	9.80
Transports and Communication	405	3.58	14.51	16.29	65.96	15.85	64.21	16.07	65.08
Banking and Real Estate	306.7	0.20	0.60	3.55	10.90	2.49	7.64	3.02	9.27
Public Administration and Defence	140.9	0.43	0.61	10.00	14.09	9.04	12.74	9.52	13.42
Community, Social and Personal Services	852.3	0.88	7.47	6.15	52.44	5.90	50.31	6.03	51.38
TOTAL	**8,419.6**	**0.92**	**77.43**	**6.23**	**524.74**	**7.58**	**638.19**	**6.91**	**581.46**

10. IMPACTS OF EU EXPENDITURE ON ECONOMIC PERFORMANCE OF THE *PERIPHERAL SLOVENIA* REGION

Luka Juvančič, Aleš Kuhar, Emil Erjavec and Urban Sila

1. Introduction

Slovenia is experiencing a problem of divergence in economic performance of its regions. Despite the fact that balanced regional development has been highly ranked in the policy agenda, regional differences in economic development have been deepening throughout the period of economic transition (IMAD, 2003). To a great extent driven by the EU-Accession, Slovenia has tackled this problem by putting in place the institutional set-up and by extending the range of policy instruments with a 'regional scope'. Conditions for a faster economic convergence of lagging regions are gradually being created.

As it stands at the moment, with regard to the territorial scope of EU policies dealing with cohesion, management of natural resources and rural development, which form the bulk of EU expenditure promoting regional development, Slovenia is treated as one single region. Nevertheless, the main research focus of this paper is the estimation of the regional impact of public expenditure from these sources. It is widely assumed that public expenditure for promotion of regional development affects economic performance and employment patterns exclusively in the 'receiving' sectors. Especially agricultural expenditure is often subject to such claims. This paper attempts to challenge these claims by unveiling the multiplicative effects that various sources of public expenditure have on the rest of the economy. Its primary research focus lies in the quantification of these 'spill-over' effects.

The paper attempts to unveil the impact of the above listed EU policies on the region of Peripheral Slovenia (i.e., whole Slovenia except the NUTS 3 region including the capital with its surroundings), where effects at the national level are used as a comparative benchmark. The reason for choosing the region that occupies almost the whole national territory lies in the fact that economic disparities mainly assume the core – periphery shape. The central part of Slovenia around the capital city is developing much faster, while Peripheral Slovenia is lagging behind. GDP per capita in Peripheral Slovenia is about 13% below the national average (SORS, 2004) and increased competition following the EU accession may cause further negative effects on regional disparities. Hence, Peripheral Slovenia is expected to receive the bulk of cohesion expenditure after the accession to the EU[1].

The paper is organised as follows. It starts with a brief presentation of main socio-economic characteristics of the region and continues with a brief description of the methodology undertaken in derivation of the regional I-O table. This is followed by a systematic presentation of the various EU funds and of the expected allocation of these funds to the region of *Peripheral Slovenia*.

As a further step of the analysis, the estimated effects of EU funds on the vector of final demand of the region under study are presented. These effects are analysed using the I-O model applying the framework of policy scenarios, which have been commonly defined within the REAPBALK project. This allows for a more detailed justification of policy scenarios that are tested in the subsequent steps. Main results of the scenario analysis are presented. The paper ends with commenting some of the most relevant results and by discussing the implications for further research.

2. Contextual and empirical background

2.1 Peripheral Slovenia - some general characteristics of the region

The region occupies 87.4% of Slovenian territory and provides residence for about 75% of its population (Table 1). Over the last decade the number of inhabitants in the Peripheral Slovenia has been stagnating, which has resulted in correspondingly stagnant population density. The population is ageing quickly and ageing index is above the national average. In terms of settlement distribution, the region is characterised by villages and small

[1] The process of regionalisation in Slovenia is under way at the moment and there are various concepts at stake. The concept used in our analysis is one of them and does not prejudice the likely regional division. As a matter of fact, according to the implications of the EU cohesion policy in the next programming period (2007-2013), Slovenia will most likely be treated as one single region

towns, and only a few mid-size towns that are main generators of economic exchange and entrepreneurship. The share of people living in rural municipalities (62%) is higher than the national one (55%).

Tab. 1 – Peripheral Slovenia: some main socio-economic characteristics (year 2001)

	Slovenia	Peripheral Slovenia	Share of Peripheral Slovenia (%)
Area (km^2)	20,273	17,718	87.4
Population (in thousands)	1,992	1,501	75.4
GDP (Million €, current prices)	21,829	14,351	66.7
GDP per capita (€ PPS)	16,829	14,683	87.2
Unemployment rate (%)*	6.7	7.2	107.5

Note: * ILO definition

Source: SORS (2004)

As a general observation, economic development of Peripheral Slovenia is lagging behind the national average. In year 2001 the region contributed around 67% of the national GDP. The regional GDP per capita was lagging behind the national average by 13% and amounted to 63% of the EU average. The per capita taxable earnings in the region have been lower than national ones for a number of past years - they reached 92% of national average in 2001.

Although the registered annual unemployment rate is gradually decreasing, it still remains higher than national one (by 0.5 percentage points in 2001). Differences in unemployment growth at the sub-regional level have not been increasing with the same intensity as before. The ratio between sub-regions with the lowest and the highest registered unemployment rate at the NUTS 3 level was 1:2.8 in the year 2001 (IMAD, 2003).

Despite the regional relatively successful economic recovery after transition, the divergence in the level of economic growth compared to the capital persists. This can be attributed to various reasons, e.g. less favourable sectoral structure (additionally impaired by harsh market conditions), uncompetitive firm structure, emigration and consequent loss of human capital. The period has also been characterised by growing disparities among individual sub-regions (NUTS 3 level) within the region with respect to available economic infrastructure and, even more, with respect to their labour and employment indicators. Highly agriculture-dependent or declining industrial areas can still be found, with lack of working opportunities and low educational level of population. Jobs in the manufacturing sector remains prevailing, while the number of working places is falling. Continous net migration is typical for these economically stagnating areas, many of which are located near the state border.

2.2 Regional I-O model for Peripheral Slovenia

The basic source is the national 59 sector input-output table estimated by Statistical Office of the Republic of Slovenia for the year 2000. Two symmetric, commodity-commodity tables in current basic prices, one with total and one with domestic flows, were available. In addition, some other statistical data were used. The following sources should be pointed out in this respect:

i) employment data at the national and regional level;
ii) some superior data on agricultural sector within the region (derived from the Agricultural Census 2000);
iii) some additional socio-economic indicators, such as income tax base and percentage of the national value added produced within the region.

The decision about the appropriate sectors to include in the regional I-O table was adopted by taking into account the structure of economic activities in the analysed region. Due to its relative size (it accounts for about two thirds of the national GDP), the region exhibits a great diversity of economic activities[2]. Agriculture, forestry and fisheries, formerly aggregated into one sector, were therefore disaggregated into two sectors, enabling a more plausible application of scenarios linked to the Common Agricultural Policy (CAP) expenditure. Specific patterns of regional development in Slovenia before the transition[3], together with the relative size of the region in terms of national economy were the main arguments to analyse a relatively broad set of economic activities. Thus, the final regional input-output table comprises 29 sectors.

The regional I-O table was derived from the national one using the GRIT methodology (Jensen *et al.*, 1979), with slight modification. The main motivation for the methodology modification was to obtain a satisfying level of accuracy of the regional I-O table and the availability and quality of superior data (Sila *et al.*, 2003). The methodology of regionalisation of

[2] The regional economic structure and its size in relation to the national economy are discussed in greater detail in Juvančič *et al*., 2002.
[3] This pattern of regional development is a consequence of the so called 'poli-centric' approach towards regional development policy. It is characterised by intensive (sometimes forced) public intervention in order to assure a spatially scattered and diversified industry mix (Nared, 2003).

the national I-O table is thoroughly presented in chapter 5 of this book. In short, it consists of the following five-step regionalisation procedure: (a) adjusting for a consistent national I-O table; (b) adjusting for regional technical coefficients; (c) aggregating regional sectors; (d) deriving a prototype transactions table; (e) final checking and balancing.

3. Policy analysis: the allocation of funds

3.1 Funds at the national level

3.1.1 Pre-accession period and EU programming period 2004-2006

Impact analysis using the I-O model has been carried out under different scenarios regarding various policy instruments available to Slovenia in the pre-accession period and in the first programming period after the EU accession (2004-2006). The policies taken into consideration are listed in Table 2 presenting also the envisaged public expenditure (inflows from EU and - where applicable - national contribution) for these policies. Description of policy instruments and the corresponding financial breakdown derives from various programming documents (Single Programming Document, Cohesion Strategy, Rural Development Plan). In the case of CAP expenditure from the Guarantee section of European Agricultural Guarantee and Guidance Fund (EAGGF), where allocation of funds (apart from the Rural Development measures) is not subject to programming, estimates carried out by MAFF (2004) are used.

These various financial sources are briefly outlined below.

Pre-accession period

Total allocation of public funds for the pre-accession support in agriculture and rural development in Slovenia under the SAPARD programme amounts to 7.06 billion SIT, which corresponds to the sum of financial allocations under Annual Financial Agreements (AFA) 2000-2003. Due to accession to the EU in 2004, Slovenia is not eligible for financial support under the remaining three AFAs. Due to a delayed start of the programme (2002), the programme is expected to be in operation in the period 2002-04, which infers annual allocation of 2.35 billion SIT.

The programme envisages implementation of four measures: (i) Support for investments in agricultural holdings (33.5% of funds); (ii) Support for investments in food processing industry (38.3%); (iii) Support for economic diversification of farms (tourism and crafts) (13.4%) and (iv) Support for development of rural infrastructure (13.7%). The remaining

1% of funds is attributed to technical assistance. In the scenario analysis, a 100% absorption rate of these funds is envisaged.

Tab. 2 – Total public funds (both EU and national sources) committed to Slovenia in the pre-accession period and period 2004-2006 (in billion Slovenian Tolars [4] - prices 2000)

Source	Total	Annuity
Prior to accession to the EU		
SAPARD	7.06	2.35
ISPA	34.51	8.63
After accession to the EU		
Structural funds	61.99	20.66
Cohesion fund	32.31	10.77
C. I. Interreg	5.84	1.95
C. I. Equal	1.58	0.53
Schengen	19.49	6.50
EAGGF - direct payments	59.56	19.85
EAGGF - market interventions	15.26	5.09
EAGGF Guarantee - rural development	57.93	19.31
TOTAL	**253.85**	**84.62**

Sources of data: Single Programming Document, Cohesion Strategy, Rural Development Plan, MAFF (2004)

The second pre-accession fund, the ISPA programme, aimed at the development of economic infrastructure, was planned in the 2000 – 2003 period and amounts to 34.51 billion SIT or, correspondingly 8.63 billion SIT at the annual level.

The programme is meant to be a predecessor for the type of investments carried out by Cohesion fund. As revealed from the ISPA reports for Slovenia, about 54% of total expenditure is attributed to investments in environmental infrastructure, mainly waste water management facilities. Most of the remaining support (45%) goes to investments in transport infrasfructure, mainly dealing with upgrading the railway network.

Accession period 2004-2006

After accession to the EU, Slovenia is entitled for support from the following Community funds: Structural Funds, Cohesion fund, Community initiatives, Schengen and the European Agricultural Guarantee and Guidance Fund (EAGGF).

[4] Prices 2000 are used in order to render the public expenditure items directly applicable to the I-O tables, which are based on 2000 prices. The average exchange rate in 2000 was 205.32 SIT / 1 €.

As regards the Structural Funds, Slovenia is treated as an Objective 1 region. The implementation strategy is outlined in the Single Programming Document (SPD) 2004-06[5]. The EU assistance from Structural funds (with corresponding national contribution) concentrates on a limited number of priorities and measures.

The first priority is attributed to 'Promotion of the productive sector and competitiveness' and will be delivered via five measures financed by the ERDF: (i) Innovative environment; (ii) Promoting the development of tourist destinations; (iii) Improving the support environment for entrepreneurship (iv) Economic infrastructure and (v) Public services related to development of economic infrastructure.

The second priority deals with 'Knowledge, human resource development and employment' and will be delivered via four measures financed by the ESF: (i) Developing and promoting active labour market policies; (ii) Facilitating social inclusion; (iii) Lifelong learning and (iv) Fostering entrepreneurship and adaptability.

The third priority is given to 'Restructuring of agriculture, forestry and fisheries'. It will be delivered via five measures financed from the Guidance section of the EAGGF and two measures financed from the Financial Instrument for Fisheries Guidance (FIFG). The EAGGF Guidance assisted measures are: (i) Improving processing and marketing of agricultural products; (ii) Investments in agricultural holdings; (iii) Diversification of agricultural activities and activities close to agriculture; (iv) Investments in forests to improve the economic and ecological value of forests and (v) Marketing of quality agricultural and food products. The FIFG assisted measures are: (i) Modernization of existing vessels and small-scale coastal fisheries and (ii) Development of aquaculture, processing and marketing.

It is envisaged that 55% of total public expenditure is related to the ERDF measures, ESF measures amount to 30%, EAGGF Guidance to 14% and FIFG to 1% of total public expenditure. Eligible activities for each measure are outlined in the SPD and have been taken into consideration when estimating their effect on the final demand vector of various sectors.

Activities eligible for support from the Cohesion fund are outlined in the 'Overall Transport and Environmental Strategy', which is a part of the SPD. This strategy provides a coherent and integrated information about the planned investments in the transport and environment sectors until 2012 and defines participation of the Cohesion Fund in these investments.

[5] Single Programming Document for Slovenia (2004-2006) (Structural funds and Cohesion Fund expenditure): Government Office for Structural Policy and Regional Development, Ljubljana, http://www.gov.si/svrp/3str/a1s-3.html

Total expenditure from Cohesion fund (and corresponding national co-financing) attributes 50% to the transport and 50% to environmental projects. The bulk of expenditure from Cohesion fund in the field of transport refers to railways (62%), whereas investments in motorways and ports amount to 32% and 6%, respectively. Environmental investments from Cohesion fund relate to waste management (49%) and water management (51%).

After accession, Slovenia is eligible for funding under two Community Initiatives, INTERREG and EQUAL. The projects carried out under the former are expected to maintain the diversity of contents of the INTERREG Cross-Border Cooperation (CBC) programmes (e.g. tourist trails, cultural heritage, SME support). The support under the Community Initiative EQUAL is expected to intervene on various sources of discrimination and inequality experienced by both working and unemployed population.

The Copenhagen European Council in December 2002 introduced the Schengen Facility as a temporary instrument to help new Member States, between the date of accession and the end of 2006, to fund actions at the new external borders of the Union for the implementation of the Schengen acquis and external border control. Investments on police stations, technical equipment and transport means, information and telecommunication equipment and training are estimated at 49%, whereas investments on construction of 29 border posts on the future EU external border, i.e. the border with the Republic of Croatia, are estimated at 51% of allocated funds.

The EAGGF can be divided into three main components: direct payments, market interventions and rural development measures. For direct payments Slovenia is, like other new Member states, initially eligible for 25% of the existing level in 'old member states', gradually increasing to 100% in 2013. Due to envisaged decrease of agricultural prices and relatively high level of direct payments prior to accession, Slovenia is permitted to add a nationally financed top-up of direct payments. Topping-up of direct payments is envisaged at the 85% level of direct payments for EU-15 in 2004 and gradually increasing at the 5% yearly rate, amounting to 100% of direct payments for EU-15 in 2007. The level of absorption of direct payments is assumed to be 95%.

Agricultural support via market interventions determined by the Common Market Organizations (CMOs) is provided by the EAGGF – Guarantee. The presented figures under this heading (Table 2) relate to the estimated costs incurred by CMOs (such as export refunds, storage intervention etc.). However, funds attributed to CAP market interventions are not taken into account in the scenario analysis. As a policy mechanism whose primary function is preservation of price stability, they do not directly affect the vector of final demand and are therefore already contained in the original I-O table.

Certain Rural Development measures, the so called 'CAP - accompanying measures', are allocated.Under EAGGF – Guarantee / Rural development heading. Programming these measures is therefore subject to the provisions outlined in the Rural Development Plan 2004-06. Considerable funds for the implementation of these measures (larger than the aggregate amount of Structural funds for Slovenia) are allocated via the following measures: (i) compensatory allowances for farming in Less Favoured Areas – LFA (43%); (ii) Agri-environmental measures (31%); (iii) Early retirement scheme (5%) and to (iv) Adaptation of farms to EU standards (8%). 2% of these funds are allocated to technical assistance and 11% as a contribution to the national topping-up of direct payments.

Community financial period 2007-2013

The analysis takes into account the proposed EU budgetary appropriations for the New Financial Perspective (NFP) 2007-2013 as outlined in the Communication from the Commission to the Council and the European Parliament (COM/2004/487 final) from July 2004. The document only describes the overall financial framework by expenditure headings, while appropriations for commitments by Member States were not yet presented at time this study was completed. Qualified estimates of these EU budgetary appropriations are obtained in consultation with the corresponding national working documents for cohesion (Mrak and Rant, 2004) and agricultural expenditure (MAFF, 2004).

As it was announced already by the Third Cohesion report (European Commission, 2004), together with the budgetary proposal for the new financial perspective, the Commission also proposed some modifications to the operating rules of its financial mechanisms in the Cohesion policy, the structural actions will focus on three priorities: (i) Convergence and Competitiveness; (ii) Regional competitiveness and Employment and (iii) European territorial cooperation. An important change is going also to be separation of the FIFG and the CAP Rural Development activities from the Structural Funds, which implies reduction of the Structural fund actions to those eligible under ESF and ERDF. The FIFG and the CAP Rural Development activities are planned to be carried out within a separate European Agricultural Fund for Rural Development (EAFRD).

The CAP support is likely to see some significant changes, too. A further decrease of market support can be envisaged (especially in the sugar, fruit and vegetables and perhaps also wine sectors). In the policy domain of

CAP direct payments, the CAP reform agreed between Member States in 2003 and 2004, implies gradual decoupling of these payments, but at a varying form and degree of decoupling between the Member States.

Slovenia is likely to surpass the 75% threshold of the average GDP/capita (PPS) of EU-25. It is therefore likely to lose full eligibility for support under the 'Convergence' objective, which accounts for the largest part of EU cohesion expenditure. Nevertheless, due to a so called 'statistical effect' (i.e. country's GDP is likely to amount to less than 75% of EU-15 GDP/head but more than 75% of EU-25), Slovenia is likely to remain eligible for EU structural expenditure, but on a gradually decreasing scale. While Slovenia will remain eligible for Cohesion fund actions for the whole programming period, its eligibility status for Structural funds is not yet defined. There are two options at stake:

1. temporary 'phasing out' support for regions whose per capita GDP exceeds 75% of the Community average solely due to statistical effect;
2. temporary (and less lucrative) 'phasing in' support designed to consolidate the process of catching up in regions that have surpassed the 75% GDP/capita threshold due to the economic progress achieved.

Estimated financial implications for Slovenia from the NFP are presented in Table 3[6]. It is assumed that Slovenia remains treated as one single region also in the forthcoming programming period. As already indicated, figures related to cohesion expenditure are presented in both, 'phasing-in' *(p-i)* and 'phasing-out' *(p-o)* versions.

[6] Although there is a consensus between the Member states about the importance of granting the regions affected by the 'statistical effect' a transitional status of eligibility for higher rates of structural support, an open question remains about the rate of financial support in these regions. The Commission currently remains divided between two alternative approaches: (i) 'conservative approach' proposed and promoted by DG Budget and (ii) 'rich approach' promoted by DG Regio. The estimates of cohesion expenditure presented in Table 3 represent the conservative estimates.

Tab. 3 – Estimated total public funds (both EU and national sources) committed to Slovenia in the period 2007-2013 (in billion Slovenian Tolars - prices 2000)

Source	Status	Total	Annuity
Structural funds	*Phasing-out*	375.85	53.69
	Phasing-in	136.90	19.56
Cohesion Fund	*Phasing-out*	309.49	44.21
	Phasing-in	311.42	44.49
Territorial integration	*Phasing-out*	44.11	6.30
	Phasing-in	29.74	4.25
EAGGF - direct payments	-	176.85	25.26
EAGGF - market interventions	-	47.43	6.78
European Agricultural Rural Devel. Fund	-	225.79	32.26
TOTAL	*Phasing-out*	1,209.26	172.75
	Phasing-in	928.13	132.59

Source of data: own calculations, based on estimates by Rant and Mrak (2004), MAFF (2004)

Heading 'Structural Funds' is meant as the policy instrument dealing with promotion of (i) regional competitiveness and (ii) active labour market policy. As such, it can be interpreted as the continuation of the actions supported by ERDF and ESF in the previous programming period (2004-2006).

The total amount of committed funds for this policy instrument is assumed proportional to the Structural Fund appropriations in the 2004-06 structural expenditure. Funds previously attributed to EAGGF Guidance and FIFG are proportionally allocated to ERDF (about 65 per cent) and ESF-type measures (about 35 per cent).

The legislative proposal laying down general provisions on the Structural funds and Cohesion fund (COM/2004/492 final) puts a 90% of EU 25 average GNI/head as an eligibility threshold for Community support under the heading 'Convergence and Competitiveness'. These include activities in transport and environment under the Cohesion Fund. With regard to the current macroeconomic situation and underlying trends for Slovenia (IMAD, 2004), Slovenia is likely to fit within this threshold in the New Financial Perspective 2007-2013 (NFP) of the EU. The structure of Cohesion fund expenditure in the NFP is assumed to follow a similar logic as in the period 2004-2006. Half of funds are assumed to be destined to transport and the other half to the environmental investments.

The NFP is expected to grant a status of a new policy priority to the principle of inter-regional and cross border co-operation (including external cross-border co-operation) entitled 'Territorial Integration'. In other words, good experience with the Interreg Community Initiative has contributed towards a decision to give this principle a higher relevance. Implicitly, the Commission (COM/2004/496 final) proposes to reform the existing system of Community Initiatives. While the previous Community Initiative Interreg is getting a status of a new policy priority, the remaining two initiatives Equal and Leader+ are likely to be included in the mainstream structural policies (within the ESF and new European Agricultural Rural Development Fund, respectively).

Estimated allocation of public funds for territorial integration in the programming period 2007-13 corresponds proportionally to the funds allocated to the Interreg Community Initiative in Slovenia for the period 2004-2006.

In 2007, the level of CAP direct payments (comprising of the EAGGF Guarantee and national top-up payments) in Slovenia could reach 100% of the corresponding EU-level. The aggregate yearly allocations for direct payments are therefore expected to remain at the same level throughout the programming period. Similarly to the 2004-2006 period, the level of absorption of direct payments is assumed to be 95% and the CAP market interventions is not taken into account in the impact analysis.

In the new programming period, programming and financing Rural Development measures within the CAP and FIFG measures will be simplified by their inclusion in the new European Agricultural Rural Development Fund (EARDF). The rise of budgetary appropriations for Rural Development policy reflects the trend outlined in the Commission proposal (COM/2004/490 final).

For policy simulation purposes, the presented budgetary appropriations have been further divided into various types of measures. These have been proportionally allocated within the EAGGF Guidance-, EAGGF Guarantee- and FIFG-type measures. It is assumed that the list of eligible measures and the corresponding financial allocations have remained the same as in the 2004-2006 programming period.

3.2 Regional allocation of funds

Several regional weights were applied for the estimation of the inflow of funds to the *Peripheral Slovenia* region. These regional weights were applied according to the characteristics of each policy instrument. Table 4 illustrates the approach undertaken in estimating the regional expenditure on individual policy instruments.

Tab. 4 – Regional weights applied for the estimation of inflow of funds to Peripheral Slovenia

Policy instrument	Regional weight	Estimated share of regional expenditure
SAPARD	Actual regional absorption of funds	94.4%
ISPA	Actual regional absorption of funds	92.7%
Structural funds		
ERDF (55%)	share of regional GDP	67.2%
ESF (30%)	share of regional employment	71.3%
EAGGF (14%)	share of regional ESU	89.8%
FIFG (1%)	entire amount is going to the region	100.0%
Cohesion fund	share of regional population	75.3%
Interreg	entire amount is going to the region	100.0%
Equal	share of regional employment	71.3%
Schengen	entire amount is going to the region	100.0%
EAGGF - direct payments	share of regional ESU	89.8%
EAGGF - rural development	share of regional ESU	89.8%

Source: Own compilation based on various national statistical sources

The funds attributed to Peripheral Slovenia have been estimated according to the above described regionalization weights. Besides this, in some cases additional assumptions were taken into account. Financial allocations under the SAPARD program assume 100% absorption, regional distribution of funds is assumed to follow the same pattern observed in years 2002 and 2003. In the case of ISPA, the regional allocation takes into account the actual allocation of total funds under this program.

The corresponding regional expenditure estimates for the programming period 2004-2006 are presented in the Table 5.

The structure of Community expenditure between the two observed accession periods is not entirely comparable. The pre-accession financial mechanisms (SAPARD, ISPA) and support for establishing Schengen facilities are no longer available. Activities previously financed from the Community initiatives have been either transformed into a new priority or streamlined into the existing structural expenditure. Structural expenditure (heading ‘Competitiveness and Employment’) is focused only on ERDF and ESF type measures. Heading ‘European Agricultural Rural Development Fund’ embraces all rural development measures. Estimated annuities for 2007-2013 for the Peripheral Slovenia region are presented in Table 6.

Tab. 5 – National and EU funds available for the Peripheral Slovenia in the period 2004-2006 (annuities, in billion Slovenian Tolars – prices 2000)

Policy instrument	Annuity
SAPARD	7
ISPA	8.14
Structural funds	14.81
ERDF	7.64
ESF	4.44
EAGGF	2.61
FIFG	0.11
Cohesion fund	8.11
Interreg	1.95
Equal	0.38
Schengen	6.50
EAGGF – direct payments	17.83
EAGGF Guarantee - rural development.	17.34

Source: Own compilation based on various national and EU sources

Tab. 6 – National and EU funds available for the Peripheral Slovenia in the period 2007-2013 (annuities, in million Slovenian Tolars – prices 2000)

Policy instrument	'phasing out'	'phasing in'
Structural funds	36.86	13.43
ERDF-type measures	23.36	8.51
ESF-type measures	13.49	4.92
Cohesion fund	33.29	33.50
Territorial Integration	6.30	4.25
EAGGF - direct payments		22.69
European Agricultural Rur. Devel. Fund		28.99
CAP RD-Guarantee type		25.97
CAP RD-Guidance type		2.79
Fisheries		0.23

Source: Own compilation based on various national and EU sources

3.3 The effects of policies on final demand

In order to evaluate the impacts generated by various EU financial mechanisms and to obtain information about their economy-wide effects, we have decided to apply simulation with an Input-Output (I-O) model. I-O table, which provides a detailed snapshot of the I-O linkages within the economy, can be used for predicting the consequences of any planned and potential changes in the demand for the economy's outputs (Armstrong and Taylor, 1993)[7]. In this respect, it was deemed a useful tool to assess the potential impact of external shocks to the economy, such as EU budgetary transfers after accession. Immediate results of such analysis provide information about additional output, created by increased final demand. The effects of simulated policies on final demand, i.e. components of the 'shock vector', have been estimated separately for the two analysed programming periods, nationally and regionally.

The structure of investment demand from the national I-O table 2000 was taken as a basis for the sectoral distribution of funds. No additional weights or corrections were applied for assessing the structure of demand in the case of policies with general 'investment' patterns. A different approach was undertaken in the case of more objective-oriented policies. In that case, allocation of funds along the vector of final demand has been selected in accordance with the described activities and the scope of implementation as outlined in the corresponding programming documents. Where applicable, the policy instruments were disaggregated and an appropriate structure of the final demand was applied. In the case of policies with an income support character (e.g. decoupled direct payments in agriculture), the effects were distributed according to the final household demand structure.

In the last stage of estimation of the final demand vector the origin of demanded good has been taken into account. In the case of investment demand, the share of domestic goods in investment from the national I-O table was applied. Similarly, correction of the household final demand was calibrated with the proportion of the domestic total market supply.

4. Estimated policy impacts - scenario analysis

4.1 Definition of scenarios

The analysed scenarios should be able to capture effects generated by accession to the EU. This approach should also draw the regional impacts into a clear focus within the national economy. In order to allow comparability of results, some common rules in establishing the policy scenarios have been agreed for all countries under study (Slovenia, Croatia, Romania, Bulgaria and Greece). These scenarios should reflect

[7] The main virtue of the I-O model is its ability to provide multipliers presenting the linkages between sectors in the economy. Nevertheless, these results have to be taken with caution due to restrictive assumptions underlying the I-O technique (static character, linear production function, no impact of scale economies, no substitution, infinitely elastic supply).

differences between effects of policy in the pre-accession period and after accession to the EU. They should take into account different intensity rates of support and linkages of expenditure with production (particularly in the case of CAP direct payments). Since the period analysed (2001-2013) embraces two programming periods that significantly differ by structure of policy and financial volume, it also makes sense to treat the two programming periods separately.

Scenario 1: 'pre-accession support': It is assumed that only SAPARD and ISPA funds are additionally available. Regional distribution of the pre-accession support has been described in the previous section. In order to estimate the maximum potential of the pre-accession support, we have assumed a (rather unrealistic) 100% absorption rate of these funds. As the pre-accession support is an applicable policy in the programming period 2004-2006 only, this scenario was not tested for the period 2007-2013.

Scenario 2: 'partial integration'[8]: This scenario attempts to give the 'conservative' estimates of various EU financial mechanisms after the accession to the EU. In the first programming period after the accession, these 'conservative' estimates relate to a lower level of absorption of funds[9]. The assumed absorption level for the CAP-related expenditure is 85% in the case of direct payments, 90% in the case of market interventions and 70% for rural development measures. The assumed absorption level for Structural funds and Cohesion fund is 50%, whereas for Schengen facilities assistance is assumed to be somewhat higher (70%). Concerning the NFP 2007-2013, the 'conservative' financial estimates relate to the less favourable status of Slovenia in terms of its eligibility for EU cohesion expenditure. The scenario takes into account full eligibility of Slovenia for the Cohesion fund support. In the case of Structural funds, Slovenia is assumed to be treated as a 'phasing in' region within the objective 'Regional competitiveness and employment'. The total amount for CAP Direct payments after 2007 is transferred to the final demand of households, that is are fully decoupled.

Scenario 2a: 'partial integration DP coupled': Besides the above scenario, we have decided to test also a sub-scenario, which is based on the same assumptions of Scenario 2, but with direct payments assumed to be

---

[8] In contrast to Bailey *et al.* (2004) we have omitted the pre-accession support from the scenario. The argument for such decision lies in the fact that a country (a region) cannot be eligible for support from both, pre-accession and full-membership related policy instruments.

[9] Experience gained from previous enlargements (European Commission 1996, 2001, 2004) and recent experience with low absorption levels of the pre-accession funds in Slovenia (DAAC Consortium, 2004)), have led us to believe that in the initial period after accession part of the allocated funds may remain unused.

spent along the vector of intermediate demand of agricultural sector. This assumption is used as a proxy for CAP direct payments fully coupled with production. In this case, total amount of direct payments is therefore reinvested in agriculture.

Scenario 3: 'full integration': In contrast to Scenario 2, this scenario attempts to provide information about the maximum potential effect of the analysed funds. In this respect, we have taken an optimistic assumption that all available funds will be absorbed at 100% absorption rate. Slovenia is assumed to be eligible for the EU cohesion expenditure in the NFP under the 'Convergence' objective. This entails full eligibility for Cohesion fund support and transitional support from Structural funds for regions concerned by the 'statistical effect' (i.e. treatment of Slovenia as a 'phasing in' region). Direct payments are assumed to be fully decoupled for both analysed periods.

Scenario 3a: 'full integration DP coupled': This sub-scenario rests on same assumptions of the Scenario 3, with the only exception that CAP direct payments are, similarly to Scenario 2a, fully coupled.

Four separate runs of scenario analysis were carried out. In order to provide a benchmark for assessment of regional impacts, the policy scenarios were tested with I-O model at regional and national levels. As the structure and expected volume of EU budgetary transfers differ significantly between the analysed two programming periods, they were analysed separately.

4.2 Description of results

4.2.1 Change in the gross output

The most straightforward outcome of scenario analysis with the I-O model is the change in gross output by sectors. Main results in absolute terms and as a percentage of total effects for the main sectoral aggregates (agriculture, industry, services) are presented in Tables 7 and 8.

As expected, there are no big differences in the structure of effects between the two analysed programming periods. The results suggest that in the next programming period (2007-2013) output increase will be slightly more on industry, especially construction. This is due to projected proportional increase of funding in productive and infrastructural investments in the next programming period. Significant differences, however, can be observed in the magnitude of the effects. Compared to year 2000, the projected impacts in terms of increased gross output tend to accrue by 110-140 per cent more during the 2007-2013 programming period.

A general observation about the national-regional comparison is that there are no major differences in the structure of the effects. Observing the sectoral aggregates, the impact on agriculture and industry tends to be somewhat higher in the Peripheral Slovenia region. Taking into account the structure of economic activities in the Peripheral Slovenia region this result is not surprising.

Beside the absolute increase of output from the year 2000, the model results provide an insight about the relative changes of aggregate output. The respective projections of output growth as an immediate impact of analysed public expenditure are presented in Table 9.

Tab. 7 – Simulation results: total effect of the public expenditure on the gross output in the period 2004-2006 (in billion SIT, prices 2000, and as a proportion of the total effects)

	Unit	**Scenario 1** Pre-accession support	**Scenario 2** 'partial integration'	**Scenario 2a** 'partial integration & DP coupled'	**Scenario 3** 'full integration'	**Scenario 3a** 'full integration & DP coupled'
Peripheral Slovenia						
Agriculture	mio. SIT	0.23	2.42	3.12	3.20	4.08
	%	1.33	3.75	5.11	3.30	4.39
Industry	mio. SIT	14.32	25.75	32.25	42.91	50.95
	%	*83.79*	*39.92*	*52.75*	*44.26*	*54.91*
- of which construction	mio. SIT	10.95	12.41	20.08	23.27	32.75
	%	*64.07*	*19.24*	*32.85*	*23.99*	*35.30*
Services	mio. SIT	2.55	36.33	25.76	50.85	37.76
	%	*14.89*	*56.33*	*42.14*	*52.44*	*40.69*
Total	mio. SIT	17.09	64.50	61.13	96.96	92.79
	%	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
Slovenia						
Agriculture	mio. SIT	0.22	2.88	3.68	3.81	4.80
	%	*1.24*	*3.49*	*4.71*	*3.06*	*4.03*
Industry	mio. SIT	14.49	32.31	39.34	54.07	62.78
	%	*81.43*	*39.19*	*50.40*	*43.42*	*52.70*
- of which construction	mio. SIT	11.18	15.85	24.40	29.86	40.44
	%	*62.84*	*19.23*	*31.26*	*23.97*	*33.95*
Services	mio. SIT	3.08	47.26	35.04	66.67	51.540
	%	*17.33*	*57.32*	*44.89*	*53.53*	*43.27*
Total	mio. SIT	17.80	82.45	78.06	124.55	119.12
	%	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Due to a relatively limited change of final demand caused by ISPA and SAPARD programmes in Slovenia, no considerable economic impact is detected as a consequence of the pre-accession programmes co-financed by the EU (Scenario 1). This happens even under the unrealistic assumption of 100% absorption of available funds. As a matter of fact, only the construction sector exhibits significant (2.0%) increase of gross output (mainly due to large-scale infrastructure investment projects supported by ISPA).

Tab. 8 – Simulation results: total effects of the public expenditure on the gross output in the period 2007-2013 (million SIT, prices 2000, and as proportion of the total effects)

	Unit	**Scenario 2** 'partial integration'	**Scenario 2a** 'partial integration & DP coupled'	**Scenario 3** 'full integration'	**Scenario 3a** 'full integration & DP coupled'
Peripheral Slovenia					
Agriculture	mio. SIT	4.70	5.81	5.11	6.23
	%	*2.92*	*3.73*	*2.53*	*3.17*
Industry	mio. SIT	88.66	98.89	110.13	120.36
	%	*55.11*	*63.57*	*54.57*	*61.26*
- of which construction	mio. SIT	55.31	67.38	70.11	82.19
	%	*34.38*	*43.31*	*34.74*	*41.83*
Services	mio. SIT	67.52	50.87	86.56	69.90
	%	*41.97*	*32.70*	*42.89*	*35.58*
Total	mio. SIT	160.87	155.57	201.80	196.49
	%	*100.0*	*100.0*	*100.0*	*100.0*
Slovenia					
Agriculture	mio. SIT	4.85	5.99	5.38	6.51
	%	*2.45*	*3.12*	*2.12*	*2.63*
Industry	mio. SIT	111.89	121.84	139.82	149.77
	%	*56.51*	*63.53*	*55.07*	*60.47*
- of which construction	mio. SIT	73.05	85.14	92.36	104.45
	%	*36.90*	*44.39*	*36.38*	*42.17*
Services	mio. SIT	81.25	63.96	108.69	91.41
	%	*41.04*	*33.35*	*42.81*	*36.90*
Total	mio. SIT	197.99	191.79	253.89	247.69
	%	*100.0*	*100.0*	*100.0*	*100.0*

Taking into account more pessimistic estimates of EU budgetary inflow after accession (Scenario 2), the projected increase of overall regional output is 1.1% in 2004-2006 and 2.6% in 2007-2013. Performance of agriculture is projected to surpass the aggregate output increase in 2004-2006 (1.2%). No very significant improvements are expected in the manufacturing sector, where only sectors of mining and quarrying[10], food manufacturing, supply of electricity, water and gas surpass the average levels of output increase in the period 2004-2006. In 2007-2013, favourable output increase prospects diminish in the sectors of food manufacturing and supply of electricity, water and gas, whereas significant improvements are projected for production of other non-metallic mineral products. The highest increases are again anticipated in the construction sector, whose output as a consequence of EU public expenditure is projected to grow by 2.3% in 2004-06 and by 10.0% in 2007-2013 compared to the year 2000. Most of this is due to infrastructural investments, and partly also due to investments in real estate (which form a significant part of Structural fund support) and transitional support for Schengen facilities in 2004-2006.

EU public support is projected to stimulate above-average increase of output of services. Model estimates for services a 1.4% increase in 2004-2006 and 2.6% in 2007-2013. The most positive prospects concern wholesale, tourism and real estate, renting and business activities. The model results however suggest no substantial role of EU funds for improvements in activities dealing with human capital in the period 2004-2006. The situation is likely to improve by 2007-2013, where EU funds are expected to yield higher output increase (3.0%) in education.

[10] It can be stipulated that this growth of output can be induced by increased demand for construction materials, resulting from high output growth in the construction sector.

Tab. 9 - Simulation results: percentage changes in total output by policy scenarios

	Scenario 1 Pre-accession support	**Scenario 2** 'partial integration'	**Scenario 2a** 'partial integration & DP coupled'	**Scenario 3** 'full integration'	**Scenario 3a** 'full integration & DP coupled'
Peripheral Slovenia, 2004-2006					
Agriculture	0.11%	1.17%	1.52%	1.56%	1.98%
Industry	0.43%	0.77%	0.97%	1.29%	1.53%
- of which construction	1.99%	2.25%	3.64%	4.22%	5.94%
Services	0.10%	1.40%	1.00%	1.97%	1.46%
Total	**0.28%**	**1.05%**	**1.00%**	**1.58%**	**1.51%**
Slovenia, 2004-2006					
Agriculture	0.11%	1.40%	1.79%	1.85%	2.33%
Industry	0.43%	0.97%	1.18%	1.62%	1.88%
- of which construction	2.03%	2.87%	4.42%	5.41%	7.33%
Services	0.12%	1.83%	1.35%	2.58%	1.99%
Total	**0.29%**	**1.35%**	**1.27%**	**2.03%**	**1.94%**
Peripheral Slovenia, 2007-2013					
Agriculture	-	2.28%	2.82%	2.49%	3.03%
Industry	-	2.66%	2.97%	3.30%	3.61%
- of which construction	-	10.03%	12.21%	12.71%	14.90%
Services	-	2.61%	1.97%	3.35%	2.70%
Total	**-**	**2.63%**	**2.54%**	**3.29%**	**3.21%**
Slovenia, 2007-2013					
Agriculture	-	2.06%	2.55%	2.29%	2.77%
Industry	-	2.58%	2.81%	3.23%	3.46%
- of which construction	-	9.07%	10.57%	11.47%	12.97%
Services	-	2.00%	1.58%	2.68%	2.25%
Total	**-**	**2.30%**	**2.22%**	**2.94%**	**2.87%**

These trends in projected output increase for individual sectors are not significantly changed if direct payments in agriculture are assumed to be fully coupled and therefore reinvested within agriculture (Scenario 2a). In general, output increase is somewhat lower, apart from the sectors of agriculture and construction. The projected output increase for agriculture would be higher by 0.4% in 2004-2006 and by 0.5% in 2007-2013. A more significant increase is projected in the construction sector: 1.4% in 2004-2006 and 2.0% in 2007-2013.

Scenarios 3 and 3a provide a benchmark for potential maximum impact of the analysed public funds. If this 'optimistic' scenario of EU budgetary inflow was realised, the gross regional output would increase by 1.6% for the period 2004-2006, whereas the corresponding levels of aggregate output increase by 2007-2013 would be significantly higher, i.e. +3.3% for Scenario 3 and +3.2% for Scenario 3a. Observed trends of output increase per sector are similar to the previous respective Scenarios (2 and 2a).

4.2.2 Employment effects

One can use the estimated changes in gross output also to make some preliminary assessments of the changes in regional employment. The reasoning behind this approach is based on the assumption that the change in output automatically implies the change in labour input. Since labour productivity may differ across sectors, it can be expected that the changes in labour input will act correspondingly. This assessment however contains some highly restrictive assumptions, such as no technical progress (implying constant labour productivity) and infinite elasticity of labour supply. Reader should therefore consider reported results with needed caution. Rather than projected change in employment, we interpret the results as change in labour requirements by the analysed sectors (Table 10).

Under the pre-accession scenario the total number of labour requirements increases by 1,458 full-time employment (FTE) equivalents in the period 2004-2006 in Slovenia. Majority of this increase is concentrated within the Peripheral Slovenia. Scenario 2 shows overall increase of labour requirements by 7.69 FTE equivalents in the whole country and 5,961 in the region. The biggest increase in labour requirements takes place within the service sector. Such evolution is partly reversed if direct payments are considered as coupled, where agriculture and industry get bigger share of labour demand increase. Scenario 3 generates an increase of total regional labour requirements by 8.91. If all the estimated labour requirements would translate into new jobs, this implies increase of the aggregate number of employed workforce by 1 per cent. This corresponds to slightly less than 10 per cent of the registered unemployed persons at present.

Tab. 10 – Simulation results: changes in labour demand (in FTE equivalents) by policy scenario

	Scenario 1 Pre-accession support	**Scenario 2** 'partial integration'	**Scenario 2a** 'partial integration & DP coupled'	**Scenario 3** 'full integration'	**Scenario 3a** 'full integration & DP coupled'
Peripheral Slovenia, 2004-2006					
Agriculture	27	291	383	386	500
Industry	1,119	1,893	2,453	3,200	3,892
- of which construction	856	970	1,570	1,819	2,561
Services	238	3,777	2,651	5,322	3,928
Total	**1,384**	**5,961**	**5,487**	**8,908**	**8,320**
Slovenia, 2004-2006					
Agriculture	27	350	457	464	595
Industry	1,143	2,396	3,013	4,070	4,833
- of which construction	884	1,254	1,930	2,361	3,198
Services	288	4,943	3,630	7,023	5,399
Total	**1,458**	**7,689**	**7,100**	**11,556**	**10,826**
Peripheral Slovenia, 2007-2013					
Agriculture	-	565	710	614	760
Industry	-	6,721	7,603	8,380	9,262
- of which construction	-	4,325	5,269	5,482	6,426
Services	-	6,979	5,204	9,198	7,423
Total	**-**	**14,265**	**13,517**	**18,193**	**17,445**
Slovenia, 2007-2013					
Agriculture	-	589	740	653	803
Industry	-	8,606	9,478	10,781	11,653
- of which construction	-	5,776	6,732	7,303	8,259
Services	-	8,437	6,581	11,650	9,794
Total	**-**	**17,632**	**16,798**	**23,084**	**22,250**

Compared to year 2000, partial integration (Scenario 2) boosts labour requirements in the period 2007-2013 by 14,265 FTE equivalents in Peripheral Slovenia. About 50% of the increase, 6,979 FTE equivalents, accrues within the service sectors. Agricultural labour demand increases by 565 and industrial labour demand increases by 6.72.

4.2.3 *Impacts of individual policy mechanisms*

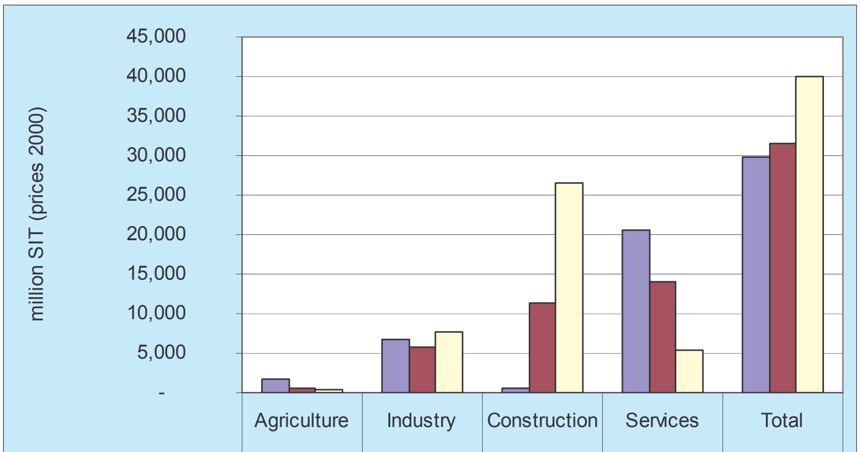
Beside the scenario analysis, another relevant issue from both the scientific and policy perspective is to estimate the magnitude of impacts of individual financial mechanisms separately. This exercise is useful especially in order to check multiplicative effects of commonly financed policies.

The analysed financial mechanisms have been merged into three distinctive groups:

i) Common agricultural policy (CAP), consisting of CAP market support, direct payments and rural development measures financed from the Guarantee section of EAGGF;
ii) Structural funds and Community initiatives, embracing measures financed by ERDF, ESF, FIFG, Guidance section of the EAGGF, and Community initiatives Equal and Interreg;
iii) Cohesion funds.

The analysis is based on the simple assumption that the same amount of funds (100 million €) is allocated to one group of policies only. This amount is allocated between various financial mechanisms (e.g., expenditure on direct payments and rural development in CAP) in the same proportions observed in the 2004-2006 programming period. Vectors of final demand are adjusted accordingly. Results of this analysis are presented in Figure 1.

Fig. 1 – Distribution of effects according to three distinctive groups of EU policy (million SIT, prices 2000)



	Agriculture	Industry	Construction	Services	Total
CAP	1,665	6,770	663	20,653	29,751
Struct.f +C.Initiat.	505	5,694	11,402	13,960	31,561
Cohesion f.	306	7,760	26,533	5,409	40,008

Observing the overall magnitude of impact on output, results suggest that expenditure from Cohesion fund brings the most favourable effects. Taking into account the fact that virtually all expenditure from this fund is attributed to infrastructure, which is characterised by a widespread vector of intermediate consumption, this result is hardly surprising.

The magnitude of impacts on overall output between the CAP and Structural funds (including Community initiatives) appear to be fairly similar. There are however significant differences with regard to the sectors targeted by these two sources of EU expenditure. The structural expenditure brings the biggest impacts on output growth in the construction sector, whereas the prevailing output increase caused by agricultural expenditure (about 70%) is attributed to services (mainly on personal and household goods and in the real estate, renting and business activities).

5. Concluding remarks

This chapter tries to quantify the effects of EU funds on the regional economy using an Input–Output methodology. Additionally, some comparative analysis about the magnitude and distribution of effects of various EU policies was made. The policy relevance of the research undertaken can be argued by provision of a valuable insight into the pattern of policy expenditure through various sectors of the regional economy. In this respect, the following conclusions can be derived.

1. The analysed funds can bring a significant contribution to the overall output increase of the regional economy after the accession (especially in the 2007-2013 period), whereas this can not be stated for the pre-accession funds. In this respect, the significance of pre-accession funds can be seen more in terms of institutional building and preparation of the implementation structures for successful absorption of funds after the accession.
2. Optimistic scenarios about the accession effects (scenario 3) for 2004-06 and 2007-13 provide a benchmark or the potential maximum impact of the analysed public funds. If this 'optimistic' situation, assuming full absorption of available funds within the region was accomplished, the gross regional output would increase by 1.6% for the period 2004-2006, whereas would be significantly higher, i.e. 3.3%, in 2007-2013.
3. The favourable post-accession effects, however, should be regarded with some caution. There are various factors that can worsen the optimistic view expressed by Scenario 3. These factors range from budgetary issues (status of Slovenian regions for EU cohesion expenditure in 2007-2013, limited co-financing capacities of national budget) to organisational ones (implementation structures, co-funding by private capital, lower absorption level). The abovementioned factors could significantly deteriorate favourable results. Our results suggest that these issues could generate about 0.6% lower growth in total output.
4. Another interesting observation derives from the analysis of how agricultural support is distributed to different elements of the I-O table. Different assumptions regarding the structure of final demand vector caused by agricultural support could be stated as a proxy for changes in the agricultural direct payments schemes from production-coupled (thus assumed to be reinvested in agriculture) to decoupled (thus spent according to the vector of household demand). Results show that the projected output increase for individual sectors is not significantly affected by this different distribution of the direct payments support.
5. The question whether the analysed EU funds are actually able to reduce regional disparities, is answered by comparing model results of the regional I-O model with its national counterpart. As a general observation, there are no major differences in the structure of effects

between Slovenia and Peripheral Slovenia region. In both cases, high public investments are channelled into labour intensive sectors (construction, agriculture) with low labour productivity. I-O model results reveal that impacts are allocated throughout the sectors more equally. However, one can not disregard the fact that impacts on output are lagging behind in the manufacturing sector. Results suggest that the impacts of analysed funds on output are higher in the Peripheral Slovenia in 2007-2013. Nevertheless, the projected faster output growth in Peripheral Slovenia is rather moderate. Our results therefore suggest that the analysed funds contribute to reduction of regional disparities in Slovenia. The question, however, remains whether the dynamics of regional convergence is sufficient.

6. The research brings some interesting results on the magnitude and redistribution effects of public expenditure items. Results suggest that expenditure from Cohesion fund brings the most favourable effects. Some interesting results emerge in the case of agricultural expenditure, where a relative low impact on overall output is observed but, on the other hand, only about 6% of this increase is attributed to agriculture. This interesting high multiplicative effects of agricultural expenditure are in contrast with the "popular" opinion on low redistributive and short-term effects of agricultural expenditure (Rodriguez-Pose and Fratesi, 2004).
7. Limitations of the research undertaken have to be acknowledged. First of all, it has to be borne in mind that financial transfers from the EU budget represent only one dimension of the accession-related effects. The analysis does not deal with other important aspects of integration, such as increased competition, division of labour, specialisation and change in relative prices. Secondly, one should take a full account of the limitations of the adopted I-O methodology (no substitution amongst factors of production, no choice of technique, constant import coefficients, and therefore no increasing import substitution, etc.). However, provided that regional I-O table is estimated accurately, theoretically implausible assumptions of the model are in some respect overshadowed by its empirical realism and simplicity. Finally, within this methodological approach, also no aspect related to the flow of externalities (e.g. food safety, environmental management, rural development) can be taken into account. Since these externalities are gaining increasing policy relevance in the EU, they should not be neglected from future analysis.

References

Armstrong, H., Taylor, J. (1993): Regional economics and policy. Harvester Wheatsheaf, London (international): 31-57.

Bailey, A., Bonfiglio, A., Davidova, S., Esposti, R., Ninka, E. and Zanni, A. (2004): Scenario definition and methodology for impact analysis. REAPBALK Working Paper.

Bonfiglio, A. (2002): Regionalization Methodology. REAPBALK Working Paper.

DAAC Consortium (2004): Mid-term evaluation of the SAPARD Programme (Final Report). Ministry of agriculture, forestry and food, Ljubljana: 142 pp.

European Commission (1996): First progress report on economic and social cohesion. Regional Policy Directorate-General, Brussels.

European Commission (2001): Second progress report on economic and social cohesion. Regional Policy Directorate-General, Brussels.

European Commission (2004): Third progress report on economic and social cohesion. Regional Policy Directorate-General, Brussels.

IMAD (2003): Development report 2004 - Summary of the main findings. Institute for Macroeconomic Analyses and Development, Ljubljana, http://www.sigov.si/zmar/aprojekt/dr/04/main.pdf.

Juvančič, L., Kvistgaard, M., Erjavec, E. and Olsson, J.P. (2004): Problems in adoption of 'evaluation paradigm' in rural de-velopment policies – Evaluating SAPARD in Slovenia. Paper presented at the 87th EAAE Seminar Assessing rural development policies of the CAP, Vienna.

Juvančič, L., Sila U., Erjavec E., Kolarek P., and Kuhar A. (2002): Peripheral Slovenia: Policy Context, Development Status, Trends and Projections. REAPBALK Working Paper, http://www.reapbalk.unian.it/.

Mattas, K., Loizou, S. and Tzouvelekas, V. (2002): Input-Output Model Description and REAPBALK Common I-O Model. Reapbalk Working Paper, http://www.reapbalk.unian.it/.

MAFF (2004): Nova finančna perspektiva 2007- 2013 – kmetijstvo (New financial perspective 2007-2013 – agriculture). Working document (16th June 2004). Ministry for Agriculture, Forestry and Food, Ljubljana.

Mrak, M. and Rant, V. (2004): Slovenija in kohezijska politika EU v novi finančni perspektivi 2007-2013. (Slovenia and EU cohesion policy in the New Financial Perspective 2007-2013). Working document, University of Ljubljana, Economic Faculty, Ljubljana.

Nared, J. (2003): Legislation in the field of regional policy in Slovenia and an analysis of its spatial impact = Zakonodaja s področja regionalne politike v Sloveniji in analiza njenih učinkov v prostoru. Acta geogr. Slov., 43(1): 85-110

NEI, Regional and Urban Development (2002): Absorption capacity for Structural Funds in the regions of Slovenia. Final report. Contractor: National Agency for Regional Development.

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): 97-113.

Rural Development Plan for Slovenia (2000-2006) (SAPARD): Ministry of Agriculture, Forestry and Food, Ljubljana, http://europa.eu.int/comm/agriculture/external/enlarge/countries/slovenia/index_en.htm

Rural Developmnent Plan for Slovenia (2004-2006) (EAGGF Guarantee funded Rural Development measures): Ministry of Agriculture, Forestry and Food, Ljubljana.

Sila, U., Juvančič, L. and Erjavec, E. (2003): Peripheral Slovenia Input-Output Table (Explanation of the Regionalisation Methodology Applied). REAPBALK Working Paper.

SORS (2004): Statistical yearbook 2003. Statistical Office of the Republic of Slovenia, Ljubljana.

11. OLD EU MEMBER STATES IN THE BALKANS: THE CASE OF THE REGION OF THESSALIA

Konstatinos Mattas, Stratos Loizou, Vangelis Tzouvelekas and Tsakiri Meropi

1. Introduction

Economic and social cohesion among regions is one of the primary targets for every economy. The reduction of interregional disparities and the real cohesion among all the European Union (EU) regions became one of the primary targets of its regional development policy. EU supported and continues to support regional policies in its member states, through various initiatives. Greece is one of the EU members that faces many problems and it needs a lot of actions-initiatives to approach a counterbalanced development among its regions. Such initiatives are the Community Support Frameworks (CSF), which were applied in Greece. The last of them, the 3rd CSF http://www.hellaskps.gr which was approved by the Commission at the end of 2000, will be in operation during the years 2000-06 and it is going to be substantially more extensive in actions and far reaching in impact than the 1st and 2nd CSF's implemented during the 1989-99 period.

The effectiveness of these impacts of the applied programs both in the Greek economy and in the regional economy of Thessalia will be attempted to be surveyed and measured in this chapter. The region of Thessalia, although it is not as less favored and mountainous as others, has many problems and difficulties that cause development which is less than its potentials. In order to deal with these problems and difficulties several measures of policies have been and will be applied in the region by both the country and the EU. So the impacts of these measures are expected to be rather extensive and to include all the sectors of the regional economy.

This chapter is organized as follows. The second section contains a brief presentation of the most important characteristics of the region. The third section describes the national and regional developing initiatives analyzed. Finally, the last part shows the results from impact analysis.

2. The Region of Thessalia

The region of Thessalia covers a total area of 14,036 km^2 and it is the fifth largest region in Greece. Total population of the region amounts to 742,947 inhabitants (National Statistical Service, 1999) placing the region in the third place covering 7.1% of the total population. The population density is 97.5 inhabitants per km^2 compared to 79.7 inhabitants per km^2, which is the population density of Greece. The total urban population of the region is 43.4% of total population, the rural population is 39.6% and the semi-urban population takes 16.2%.

Tab. 1 - The region of Thessalia

	Thessalia	Greece	Regional share
Area (km^2)	14,036	131,957	10.6%
Population (1999)	742,947	10,521,669	7.1%
Labor force (in persons, 2000)	258,395	3,866,979	6.7%
GDP (million drs, current prices, 2000)	2,372,123	32,200,875	7.4%

Source: National Statistical Service of Greece (NSSG)

The region of Thessalia produces 7% (in 2000) of the total Gross Domestic Product and has the third highest share in Greece. The Gross Domestic Product of the region has been increasing through the last decade at a high rate. Regarding agriculture, this sector is one of the most significant sectors both in the region and in the country. As for industrial development of the region, there are four industrial areas, each one in every prefecture nearby their capitals. In the manufacturing sector, there is a decrease in the total number of medium and big enterprises, which represent a decrease in total economic development of the region. The service sector in the region of Thessalia is in the first place in workforce and it is considered as developed. Furthermore, the transportation sector has some problems mainly in remote and mountainous areas of the region. On the other hand, tourism services have been developed in the last decade and now the region has a great tourist advantage.

So, for the regional economy of Thessalia and also for the Greek economy, projections in the near future are in general very positive. Despite the significant reduction of inflation rate, public deficits and an increase in GDP, it is estimated that this trend will continue in the next years mainly due the incomings funds from the 3rd Community Support

Framework from the economic activity for the 2004 Olympic Games and from privatization of significant public companies (e.g telecommunications, electricity, etc.). So the projected economic growth is expected to reduce the inequalities between Greece and the other EU countries and also within the country among its regions and inside the region of Thessalia itself.

3. Policies for national and regional economic and social development

From the 3rd Community Support Framework (CSF) a number of developing programs-instruments are funded; for the present analysis, we are mostly interested in development of policies that are focused mainly on rural development and agriculture in the region of Thessalia. The principles of the CSF were set up considering the current global trends and by following the EU guidelines arising from the new challenges of European rural policies and Agenda 2000. Moreover the CSF is designed to finance large-scale integrated regional and national developing projects, concerning investments in physical and the human capital, in order to promote an integrated and sustainable economic growth and development in the country and in its regions.

Several developing initiatives are being forwarded for the period 2000-06, as a part of the 3rd CSF. The present study focuses specifically on three major development programs, which are directly or indirectly related with agriculture and rural activities and which generally promote the development of the region of Thessalia. The three development initiatives considered are: the “Regional Operational Program” which runs under the guidance of the Regional Directorate of Thessalia (it refers to a regional level). There is a specific one for each of the 13 regions of the country, which was formulated according to the particular economic characteristics and structural problems of each region. Both programmes, the “Operation Program Countryside Development - Restructuring of Rural Areas” and the “Agricultural Development Program”, run under the guidance of the Greek Ministry of Agriculture and they refer to national level (Tables A1-A3 in the Appendix[1]).

The aim of abovementioned development initiatives is to promote long-run changes in structural characteristics of the rural activities in the region of Thessalia. These three initiatives promote changes mostly in rural activities and they affect all the sectors of economic activity in the region

---

[1] The funds in Tables A1-A3 are reported in million drs and euroand they concern the whole period of the projects (2000-04).

in terms of output, employment or income simply through the funds inflows from their implementation. Within this context, it would be important, from a policy point of view, to analyze the impact in the regional economy of Thessalia as well as in the country's economy.

3.1 The Development programs

Considering the current situation of rural areas and having the experience of the first and second CSF (regional programs and other operational developing programs and support initiatives), the responsible authorities realized the need for an alternative rural development policy. The rural development policy adopted through the third CSF shifted from a one-dimensional view based on agricultural sector to an integrated approach, oriented to all sectors of the economy.

The axes and measures of the three programs were formulated following the basic principles of the new European rural policy - the second pillar of CAP - which are described explicitly by regulation 1257/1999. This new regulation propounds the following seven general rural development measures:

- investments in farm businesses
- human resources
- less favored areas and areas subject to environmental constraints
- forests
- processing and marketing of agricultural products
- agri-environmental measures and
- various measures for the general development of rural areas.

3.1.1 The Regional Operational Program (ROP) of the Thessalia

Firstly, the Regional Operational Program (ROP) of the Thessalia region (Table A1, Appendix) consists of six major axes detailed in 40 measures, with a total budget of 928.8 million euro (316,502 million drachmas). As mentioned above, the program was organized and structured taking into consideration the problems and the special features and characteristics of the region due mainly to the fact that the Regional Directorate of Thessalia supervises this program.

The funds of the ROP of Thessalia for the three years (2004-06) period totally and per axis are shown in Table A4 in the Appendix. The funds were estimated by summing, for three years, the annual average of the seven years period (2000-2006)[2]. For the next programming period (2007-13), where the 4th CSF will be in effect, it was assumed that the ROP for Thessalia region will be designed with the same axes and measures. It was assumed that the available funds for the new period will be 65% of the previous one (2000-2006)[3]. Using this share, the funds of the 2007-13 period were estimated for all the axes of the new ROP in order to be used for the impact analysis. These funds are shown in the first row of Table A5 in the Appendix.

Despite the philosophy and objectives of the previous developing initiatives in the region (period 1986-1999) to promote integrated development, no significant results can be noted. This is mainly due to excessive needs for basic infrastructures that cause a greater dispersion of sources, in burden of actions, which promoted integrated development. Consequently, the 3rd ROP pursues an integrated development approach concentrating on economic sectors with comparative advantage, on specific disadvantaged areas of the region and on its major problems that restrain its growth. Generally, the program pays special attention to three major groups of actions: the diffusion of innovations in the region, integrated development of less developed urban areas, the integrated development of mountainous and isolated rural areas of the region.

The program through six axes concentrated on six major development priorities. The first of them is the productive environment of the region. The objective of this particular axis is the improvement of competitiveness, the support to investments, the improvement of quality of products and services, the modernization the organizational and productive processes of SME and the promotion of new technologies and innovation. Secondly, the integrated development of its rural areas is promoted. In particular, countryside is supported by a unified strategy of "integrated growth of countryside" which gives support to competitiveness of rural sector and to the viability in the regions. This axis is distinguished in two sub-axes with the corresponding interventions, the enhancement of the competitiveness of the infrastructures in rural Thessalia and the integrated development of mountainous and costal areas.

---

[2] It was assumed, for an analytical reason, an equal-average allocation of the funds for every year though it does not happen in reality; this assumption was undertaken for all programs.

[3] Though the negotiations for the 4th CSF were not finalized yet, information from policy makers dealing with the CSF estimate that the total funds of the new programming period will be around 65% of the previous period. This is mainly due to the May 2004 enlargement and to the accession of 10 new countries that are eligible for development funds.

Another axis that is contemplated is the improvement of the quality of life. It includes measures that concern the completion of infrastructures about health, providence, education, urban interventions, the completion of systems of management solid and humid waste, the networks of water supplies, tourist and cultural centers, the completion of interventions about urban growth in local areas of small scale. Moreover, there are also measures to take advantage of the Region's location in order to exploit it as a transportations network. This includes measures for the completion of transregional road axes for the connection of Thessalia with the other regions, the improvement/completion of road axes of interperipheral connections and networks, the creation of merchandising central Thessalia, the modernization of railway infrastructures, the completion of ports, the improvement or creation of bypasses in big urban and semi-urban centers.

The development of human resources is also promoted (training, promotion of employment, growth of feminine employment and promotion of equality of the two sexes). These resources are included within a frame of completed intervention and they function additionally and in synergy with the other actions of the program. Finally, technical support for applying the program is intended mainly for the planning, the preparation, the exploitation, the application and the control of the entire program.

In order to perform the analysis at a country level and to assess the impacts, all the ROP's of the 13 NUTS 2 regions were aggregated though there were differences in the structure and in the number of the measures of each axis. The funds inflows for the three years period (2004-06) were estimated following the same procedure as with the region, as descried above. These funds are shown, per axis, in the first row of Table A6 in the Appendix.

The first row of the next table (A7) presents the funds for the new programming period (2007-13). Again, it was assumed that the ROP's of the 13 regions will be the same in the structure as with those of the 2000-06 period and hence the funds per axis were estimated by taking 65%, as for the region of Thessalia.

3.1.2 The Operational Program Countryside Development - Restructuring of Rural Areas (OPCDRRA)

The Operational Program Countryside Development - Restructuring of Rural Areas (OPCDRRA) is the largest (at national level) among all three initiatives (Table A2 Appendix). It consists of 33 measures and seven general axes with a total budget 2,984.6 million euro (1,017,016 million drachmas). The three basic targets of the program constitute the main philosophy upon which the Ministry of Agriculture bases its general rural development policy. Specifically, the three general targets are: the improvement of the Greek agricultural sector competitiveness, considering the current competitive trends in the international environment; the sustainable and integrated development of the countryside in order to increase its competitiveness and attractiveness, and also, the maintenance and improvement of the countryside land and the natural resources.

The first axis of the program, which includes three specific measures, targets to assist the agricultural sector to enhance its competition through structural changes. In order to achieve this target, specific measures promoting investments at a farm level and supporting agricultural organizations are introduced. The second axis aims to improve the agricultural products competitiveness through two measures. The first one provides investments for the reinforcement of the processing and marketing activities of the agricultural products whereas the second one ias addressed to forestry products.

The first two axes are related to the first of the three general targets of the program while the third axis is related to the second, which aims to a viable and sustainable development of rural areas. Specific actions are promoted to encourage the establishment of new farmers in order to improve the age structure of rural population. The fourth axis aims to strengthen the support means and information to rural population using new technologies. The fifth axis promotes interventions to improve the products of livestock and crop production. The sixth axis was set up following the principles of the third general target; that is, the protection of the natural environment. The various actions that are promoted mainly concern the management of water resources and the improvement of the related infrastructure. The last axis aims to rural development through 14 diversified measures, taking into consideration the specific characteristics of each area. The actions of the present axis are supplemented by resembling measures of the ROPs.

Following the same way, as above with the ROP, we calculate initially the funds for the three years (2004-06) and then for the 2007-13 period to be used for the impact analysis for the region of Thessalia. That is, three years average annual funds were used for the period 2004-06 and 65% of the 2000-06 period were used for the new programming period 2007-13 (Tables A8-A9). Moreover, in the regional analysis, the funds of the OPCDRRA were regionalized (calculating the share of the region) since the program funds concern the national level. The problem and the way of regionalizing the funds is described in the next section.

In the national analysis, there was no problem to regionalize the funds (since it is a national one) and consequently for the 2004-06 period we proceeded as for the ROP. For the 2007-13 period, the 65% share of the previous period was used again (see Tables A10-A11).

3.1.3 The Agricultural Development Program (ADP)

Finally, the third initiative is the Agricultural Development Program (ADP), which consists of four main axes and one for technical support. Totally, 17 measures are promoted, related to rural sector development. The total budget is 2,687 million euro. The general targets of the plan is to counterbalance the agricultural income losses arising from the less favored nature of rural areas, to sustain the employment in such areas and to restrain the outflow of their people. Also the plan promotes measures to protect environment and natural resources.

The ADP is a national product and hence the adjustment of funds for impact analysis was done as for the case of the OPCDRRA (see Tables A12-A13 for regional level and A14-A15 for national level).

3.2 Funds Allocation at national and regional level

A crucial issue is the allocation of funds inflows, firstly to the region of Thessalia and secondly to the sectors of the regional I-O table in order to construct the final demand vectors and to perform the impact analysis. The first problem (allocation of funds to the region) appears only for the last two national developing initiatives and not for the ROP of Thessalia. The second problem (allocation to the sectors of the I-O table) has to be faced for all the three initiatives.

As mentioned, the first program, the Regional Operational Program of Thessalia, is directed by the Regional Directorate of Thessalia and it concerns Thessalia only. The funds concern only the region and hence there is a need only to allocate the funds to the sectors of the regional I-O table, as they appeared in the classification scheme. In order to allocate the funds to the sectors, comprehensive information is needed about the measures of each axis; that is, information about the main target of each measure and the beneficiaries of the funds. This helps us to recognize the type of investment that is going to be performed and hence to allocate the funds. Personal justification, information by technicians and a capital flow matrix will guide us to allocate the funds by measure and totally by axis to the sectors.

As for the last two initiatives (the national programs), we have to face both problems. The allocation to the sectors of the I-O table should be treated as described above for the ROP. In order to allocate the national funds and identify the share of the region of Thessalia (among the 13 of the country) we can use population or area shares as allocation measures. Moreover, information by experts from the Ministry of Agriculture and specifically from the authority that manages the funds of the programs can be very useful.

The share of Thessalia region on the total funds of the OPCDRRA was 10%. This decision was based mainly on the population and acreage of the region compared to the country. The share of the region on the third program (ADP) was 10% again. This was based on information taken from the Greek Ministry of Agriculture, suggesting that the share of the region will be around its respective share from the 2^{nd} CSF.

In Table 2, the funds of the different regional operational programs of the thirteen regions of Greece can be seen. These funds were necessary for the analysis at a country level. In order to assess the impacts in the country, it was necessary to sum up all the 13 ROP's of the NUTS 2 regions of the country. The largest part of the funds goes to the region of Attiki where more than half of the country's population lives. This region is followed by Kentriki Makedonia and Anatoliki Makedonia-Thraki. Thessalia occupies the fourth place in the rank of the regions with total inflows in the region amounting to 928,839,893 euro for all the years. In the region the most important axis is the one concerning the integrated development of the rural areas of the region covering the 32.3% of the total funds. It is followed by the axis regarding the Region's location in order to exploit it as a transportations network, which amounts to 29.3% of the total funds of the region. It is also worth mentioning that not all the regions have the same number of axes. Examples are Boreio and Notio Aigaio, about which the human resources axis is missing.

After summing the 13 ROP's, there was a need to allocate the funds to construct the final demand vector for the country level. The allocation done to the sectors of the I-O model was uniform for all the 13 ROP's, which is not so realistic since each region invests its funds according to its problems, needs and particularities. However, in order to perform the analysis at a national level, it was necessary to proceed in this way. The allocation of funds to the sectors of the regional and national I-O model (per axis and totally) can be seen in Tables A4-A15, in absolute prices and as shares.

Tab. 2 - The budget of thirteen ROP of Greece (in 000 euro)

Regions	Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6	Total (in 000 euro)
An.Makedonia-Thraki	207,380	350,137	85,232	266,537	196,585	9,778	**1,115,649**
Ken.Makedonia	401,174	321,884	127,953	520,696	75,715	11,501	**1,458,923**
Dyt.Makedonia	61,922	200,889	118,822	163,903	24,705	10,271	**580,514**
Hpeiros	91,385	238,038	88,985	218,688	37,109	5,808	**680,013**
Thessalia	157,080	299,870	154,310	272,220	36,420	8,940	**928,840**
Sterea Ellada	118,292	256,295	349,669	104,533	36,970	7,350	**873,110**
Ionia Nisia	110,120	83,592	39,620	110,060	28,950	2,804	**375,147**
Attiki	444,543	472,622	399,607	114,854	94,180	8,531	**1,534,338**
Peloponissos	96,650	237,821	86,700	251,570	17,300	8,650	**698,691**
Dyt.Ellada	111,249	176,346	155,921	160,057	28,844	5,518	**637,935**
Kriti	306,265	221,551	109,675	42,492	41,667	8,660	**730,310**
N.Aigaio	251	0.067	0.124	0.172	0	0.007	**0.610**
B.Aigaio	66	89	119	212	0	6.164	**0.493**
Total (in 000 euro)	**2,106,378**	**2,859,201**	**1,716,738**	**2,225,993**	**618,447**	**87,826**	**9,614,572**
Total (in mn drs)	**718**	**974**	**585**	**759**	**211**	**30**	**3276**

Source: http://www.hellaskps.gr/ (Regional Operational Programs of Greece)

3.3 *Alternative Scenario*

The analysis in the present section concerns the two programming periods 2004-06 and 2007-13. The three developing programs and their funds are available only for the first period (2000-2006). In order to perform the impacts analysis for the new programming period (2007-13), it was decided to take 65% of the previous period, since the final funds are still not available. This share was taken after the information we had from the respective authority responsible for managing the CSF's[4]. The major reduction of the support to Greece is mainly due to the enlargement of the EU to twenty-five members instead of fifteen and to the immediate need for vast sums of money to support the newly entered countries and to cover the basic needs caused by their accession. So these diminished funds can be utilized for the data needs to examine the alternative scenario about which a new impact analysis, to assess the consequences of its application, will be performed. In the present study, the analysis presented next for the

[4] Even though the share of the 4th CSF and the funds to be received will be as those estimated here (for the period 2007-13), the analysis using the same developing programs and axis is restrictive. This is because, according to the proposals of the European Commission, the system and the developing priorities of the new programming period will change (see CEC, 2004 (COM 101)). Consequently, the developing programs and the target of the funds will probably be different from those examined in the present analysis.

new programming period 2007-13 concerns only the alternative scenario, that is, the diminished funds.

4. Impact Analysis Results

4.1 Results at Regional Level

The results of the impact analysis, in terms of output, household income and employment, for the region of Thessalia due to funds inflows are presented below in Tables 3 and 4. The positive impacts were estimated for the three year period 2004-06. Table 3 indicates the estimated results for each program separately and total results in terms of output, income and employment. Apart from the impacts in absolute terms, the impacts are also shown relatively to the current magnitudes (output, income and employment) of the region. Specifically, it can be seen that, according to the reported results, employment in Thessalia region, after the application of the ROP, will increase by 12,362 people who represent 4.8% of the current labor force level[5]. In the same way the total increase in output, income and employment from the three programs together is reported. Specifically, employment in the region will increase by 21,338 persons. These are the employment needs needed to undertake the activities that will be created after the funds inflows, according to the interrelationships which emerge from the I-O model. The highest impacts are coming from the ROP due mainly to its higher budget.

---

[5] The reported results should be seen with caution for several reasons:

- The restrictive assumptions related to the I-O model;
- Usually, the funds of the developing programs are not used in the programming examined period because of delays and no full absorption. Moreover, many times they are not used effectively for the specific purposes for which funds were given;
- The funds allocation (as was done for the analysis) to the sectors affects significantly the results.

Tab. 3 - Total impact in the Region of Thessalia from the Developing Programs (2004-06)

Funds Inflows (in mn drs)	Total Impact in		
	Output (in mn drs)	Income (in mn drs)	Employment (in employees)
Regional Operational Program of Thessalia 2004-06 (6 Axis)			
135,644	165,393	63,611	12,362
4.37%	5.33%	4.62%	4.78%
Operation Program Countryside Development - Restructuring of Rural Areas 2004-06 (7 Axis)			
43,586	53,640	19,033	4,341
1.40%	1.73%	1.38%	1.68%
Agricultural Development Plan 2004-06 (5 Axis)			
39,244	45,612	19,617	4,635
1.26%	1.47%	1.42%	1.79%
Total the 3 Developing Programs			
218,474	**264,646**	**102,261**	**21,338**
7.03%	**8.52%**	**7.42%**	**8.26%**

Note: the shares (%) indicate the percentage increase in the total output income and employment current levels

Table 4 below presents an intersectoral distribution (source) of the impacts, according to the constructed regional I-O table. In specific, the total employment increase from the ROP will come from the primary sectors by 10.8%, from the secondary manufacturing by 43.5% and services sectors by 45.7%. It is clearly shown from these results that even though the developing programs are funding rural activities in the regions and mainly the agricultural sector, the impacts affect the whole regional economy, and mainly secondary and tertiary sector[6]. It can be seen that the share of the primary sector in the induced impacts from the other two programs is higher. This is mainly because they are scheduled to support mostly agriculture and the related activities.

[6] The model gives the user the possibility of identifying these impacts in detail. In other words, it allows one to know exactly which sectors of the regional economy (as they appear in the I-O table) the positive impacts are coming from. These results are available but they were not reported here for reasons of space.

Tab. 4 - Intersectoral distribution of output, income and employment impact from the Developing Programs (period 2004-06)

	Output		Income		Employment	
	(mn drs)	(%)	(mn drs)	(%)	(persons employees)	(%)
Regional Operational Program of Thessalia 2004-06 (6 Axis)						
Primary	8,237	4.98%	5,001	7.86%	1,338	10.82%
Secondary	97,691	59.07%	28,745	45.19%	5,371	43.45%
Tertiary	59,465	35.95%	29,865	46.95%	5,654	45.73%
TOTAL	**165,393**		**63,611**		**12,362**	
Operation Program Countryside Development - Restructuring of Rural Areas 2004-06 (7 Axis)						
Primary	6,446	12.02%	3,914	20.56%	1,047	24.11%
Secondary	39,321	73.31%	11,075	58.19%	2,307	53.15%
Tertiary	7,873	14.68%	4,045	21.25%	987	22.74%
TOTAL	**53,640**		**19,033**		**4,341**	
Agricultural Development Plan 2004-06 (5 Axis)						
Primary	12,901	28.28%	7,833	39.93%	2,095	45.20%
Secondary	21,328	46.76%	5,962	30.39%	1,222	26.37%
Tertiary	11,383	24.96%	5,822	29.68%	1,317	28.43%
TOTAL	**45,612**		**19,617**		**4,635**	

The results about the regional economy for the new programming period (2007-13) are shown in Tables 5 and 6. The first table indicates the absolute and relative impacts of each program. The positive effects are shown to be very high in the region for the new programming period; a reason is the very high (higher than the previous period) funds inflows. Certainly, the results should be seen with caution for many reasons (see footnote 7) and mainly because in the new programming period the programs will probably have different structure and aims.

Tab. 5 - Total impact in the Region of Thessalia from the Developing Programs (period 2007-13)

Funds Inflows (in mn drs)	Total Impact in Output (in mn drs)	Income (in mn drs)	Employment (in employees)
Regional Operational Program of Thessalia 2007-13 (6 Axis)			
205,726	250,847	96,477	18,750
6.62%	8.08%	7.00%	7.26%
Operation Program Countryside Development - Restructuring of Rural Areas 2007-13 (7 Axis)			
66,106	81,354	28,867	6,584
2.13%	2.62%	2.09%	2.55%
Agricultural Development Plan 2007-13 (5 Axis)			
59,521	69,179	29,753	7,029
1.92%	2.23%	2.16%	2.72%
Total the 3 Developing Programs			
331,353	**401,380**	**155,096**	**32,363**
10.67%	**12.92%**	**11.26%**	**12.52%**

Note: the shares (%) indicate the percentage increase in the total output income and employment current levels

Table 6 below indicates the total impacts and their intersectoral distribution. Observing more carefully the sectoral distribution it can be seen that, in relative terms, it is the same as that of the 2004-06 period (Table 4), though in absolute terms it is different. This is because we followed the same percentage sectoral allocation of funds for both periods, since, as mentioned, the new programs are not finalized yet.

Tab. 6 - Intersectoral distribution of output, income and employment impact from the Developing Programs (period 2007-13)

	Output (mn drs)	(%)	Income (mn drs)	(%)	Employment (persons employees)	(%)
Regional Operational Program of Thessalia 2007-13 (6 Axis)						
Primary	12,493	4.98%	7,586	7.86%	2,029	10.82%
Secondary	148,164	59.07%	43,596	45.19%	8,146	43.45%
Tertiary	90,189	35.95%	45,295	46.95%	8,575	45.73%
TOTAL	**250,847**		**96,477**		**18,750**	
Operation Program Countryside Development - Restructuring of Rural Areas 2007-13 (7 Axis)						
Primary	9,776	12.02%	5,936	20.56%	1,587	24.11%
Secondary	59,637	73.31%	16,796	58.19%	3,499	53.15%
Tertiary	11,941	14.68%	6,134	21.25%	1,497	22.74%
TOTAL	**81,354**		**28,867**		**6,584**	
Agricultural Development Plan 2007-13 (5 Axis)						
Primary	19,566	28.28%	11,880	39.93%	3,177	45.20%
Secondary	32,347	46.76%	9,042	30.39%	1,854	26.37%
Tertiary	17,265	24.96%	8,830	29.68%	1,998	28.43%
TOTAL	**69,179**		**29,753**		**7,029**	

4.2 Results at National Level

Tables 7 and 8 present the results at a national level for the 2004-06 period. In terms of employment, it can be seen that the increase will be 214,632 persons, or in other words 5.5% of total labor force (much less than the relative impact at a regional level). This outcome is observed not only for employment but also for output and income. This might be an indication of the effectiveness of the programs and the structure of the region as portrayed by the relevant I-O table.

Tab. 7 - Total impacts at Country level from the Developing Programs (period 2004-06)

Funds Inflows (in mn drs)	*Total Impact in*		
	Output (in mn drs)	Income (in mn drs)	Employment (in employees)
Regional Operational Programs of the 13 Regions 2007-13 (6 Axis)			
1,404,073	2,154,052	1,006,853	130,216
2.18%	3.34%	3.17%	3.35%
Operation Program Countryside Development - Restructuring of Rural Areas 2004-06 (7 Axis)			
435,864	651,622	271,084	39,098
0.68%	1.01%	0.85%	1.01%
Agricultural Development Plan 2004-06 (5 Axis)			
392,443	579,465	284,204	45,318
0.61%	0.90%	0.89%	1.17%
Total the 3 Developing Programs			
2,232,379	**3,385,140**	**1,562,141**	**214,632**
3.47%	**5.26%**	**4.92%**	**5.53%**

Note: the shares (%) indicate the percentage increase in the total output income and employment current levels

Table 8 presents the intersectoral allocation of the impacts of the three programs, which is quite similar to that of the region.

Tab. 8 - Intersectoral distribution of output, income and employment impact from the Developing Programs, at country level (period 2004-06)

	Output		Income		Employment	
	(mn drs)	(%)	(mn drs)	(%)	(persons employees)	(%)
Regional Operational Programs of the 13 Regions 2007-13 (6 Axis)						
Primary	118,416	5.50%	67,758	6.73%	16,383	12.58%
Secondary	1,200,845	55.75%	434,802	43.18%	54,046	41.50%
Tertiary	834,791	38.75%	504,293	50.09%	59,788	45.91%
TOTAL	**2,154,052**		**1,006,853**		**130,216**	
Operation Program Countryside Development - Restructuring of Rural Areas 2004-06 (7 Axis)						
Primary	90,808	13.94%	51,960	19.17%	12,563	32.13%
Secondary	463,613	71.15%	157,131	57.96%	19,426	49.69%
Tertiary	97,201	14.92%	61,992	22.87%	7,109	18.18%
TOTAL	**651,622**		**271,084**		**39,098**	
Agricultural Development Plan 2004-06 (5 Axis)						
Primary	181,744	31.36%	103,994	36.59%	25,144	55.48%
Secondary	260,175	44.90%	89,807	31.60%	10,778	23.78%
Tertiary	137,546	23.74%	90,403	31.81%	9,396	20.73%
TOTAL	**579,465**		**284,204**		**45,318**	

Next, the results for the new programming period are shown in tables 9 and 10. The analysis is analogous to the one abovementioned for the region, bearing also the same limitations. Moreover, it is reminded to the reader that the 13 ROP's were summed to calculate the total amount for the country. Totally the country's employment will increase by 5.4% as it shown by the results; the change in total output and income is analogous.

Tab. 9 - Total impacts at Country level from the Developing Programs (period 2007-13)

Funds Inflows (in mn drs)	*Total Impact in*		
	Output (in mn drs)	Income (in mn drs)	Employment (in employees)
Regional Operational Programs of the 13 Regions 2007-13 (6 Axis)			
2,129,510	3,266,979	1,527,061	197,495
3.31%	5.07%	4.81%	5.09%
Operation Program Countryside Development - Restructuring of Rural Areas 2007-13 (7 Axis)			
66,106	98,829	41,114	5,930
0.10%	0.15%	0.13%	0.15%
Agricultural Development Plan 2007-13 (5 Axis)			
59,521	87,886	43,104	6,873
0.09%	0.14%	0.14%	0.18%
Total the 3 Developing Programs			
2,255,137	**3,453,694**	**1,611,279**	**210,298**
3.50%	**5.36%**	**5.07%**	**5.42%**

Note: the shares (%) indicate the percentage increase in the total output income and employment current levels

Finally, in Table 10 the source of the impacts for the 2007-13 programming period is shown.

Tab. 10 - Intersectoral distribution of output, income and employment impact from the developing programs, at country level (period 2007-13)

	Output		Income		Employment	
	(mn drs)	(%)	(mn drs)	(%)	(persons employees)	(%)
Regional Operational Programs of the 13 Regions 2007-13 (6 Axis)						
Primary	179,598	5.50%	102,766	6.73%	24,847	12.58%
Secondary	1,821,281	55.75%	659,449	43.18%	81,969	41.50%
Tertiary	1,266,100	38.75%	764,845	50.09%	90,678	45.91%
TOTAL	**3,266,979**		**1,527,061**		**197,495**	
Operation Program Countryside Development - Restructuring of Rural Areas 2007-13 (7 Axis)						
Primary	13,772	13.94%	7,881	19.17%	1,905	32.13%
Secondary	70,315	71.15%	23,832	57.96%	2,946	49.69%
Tertiary	14,742	14.92%	9,402	22.87%	1,078	18.18%
TOTAL	**98,829**		**41,114**		**5,930**	
Agricultural Development Plan 2007-13 (5 Axis)						
Primary	27,565	31.36%	15,772	36.59%	3,814	55.48%
Secondary	39,460	44.90%	13,621	31.60%	1,635	23.78%
Tertiary	20,861	23.74%	13,711	31.81%	1,425	20.73%
TOTAL	**87,886**		**43,104**		**6,873**	

5. Conclusions

In the current section an attempt was made to assess the impacts, in terms of output, income and employment, of certain rural development policies in the region of the Thessalia. The analysis was also extended at a country level in order to assess the impacts of the respective programs, by calculating the impact indicators from the national I-O table. Moreover, the analysis covered two programming periods: 2004-06 and 2007-13.

The results indicated very high impacts at regional level, in terms of employment as well as in terms of output and income; a case that did not happen at a national level, where the results were more logical. As also mentioned in the analysis above, the results should be seen with certain caution also in consideration of the restrictive assumptions made.

References

European Commission of the European Communities (2004): Building our common Future, Policy challenges and Budgetary means of the Enlarged Union 2007-2013. (COM 101).

Greek Ministry of Agriculture (2001a): Agricultural Development Plan, 2000-2006 (in Greek).

Greek Ministry of Agriculture (2001b): Operation Program Countryside Development - Restructuring of Rural Areas, 2000-2006 (in Greek).

Regional Directorate of Thessalia (2001). Regional Operational Plan of Thessalia, 2000-2006 (in Greek).

Tab. A1 - Regional Operational Program of Thessalia Region 2000-06

Axis and measures	Description	Funds	
		(euro)	(million drs)
Axis 1	**Productive environment**	**157,080,000**	**53,525.0**
Measure 1.1	Infrastructures in enterprises productive environment	22,010,000	7,499.9
Measure 1.2	Means for supporting and networking enterprises	3,900,000	1,328.9
Measure 1.3	Private investments	36,680,000	12,498.7
Measure 1.4	Innovative actions for improving SME competitiveness	25,820,000	8,798.2
Measure 1.5	Enhancement and modernization tourism accommodations	61,630,000	21,000.4
Measure 1.6	Improvement of SME competitiveness	7,040,000	2,398.9
Axis 2	**Integrated development of rural areas**	**299,870,000**	**102,180.7**
Sub-Axis 2A	**Enhancement of infrastructures competitiveness in rural Thessalia**	**130,320,000**	**44,406.5**
Measure 2.1	Investments in agricultural farms	59,740,000	20,356.4
Measure 2.2	Enhancement of orientation to the market and international economy	4,500,000	1,533.4
Measure 2.3	Development and modernization of infrastructures for improving the quality of products and safeguarding public health – sustainable development of agriculture and livestock	10,310,000	3,513.1
Measure 2.4	Land re-allotment	4,400,000	1,499.3
Measure 2.5	Modernization and improvement of fish shelters and actions for promoting fish sector	9,920,000	3,380.2
Measure 2.6	Protection and promotion of the natural environment	13,570,000	4,624.0
Measure 2.7	Completion of the 2nd CSF land reclamation works	27,880,000	9,500.1
Sub-Axis 2B	**Integrated development of mountainous and costal areas and actions for protection and sustainable management of Thessalias environment**	**169,550,000**	**57,774.2**
Measure 2.8	Rational management of water and land resources	41,090,000	14,001.4
Measure 2.9	Special actions for rural development	11,720,000	3,993.6
Measure 2.10	Management of natural and cultural resources (settlements) of Thessalias rural areas	15,260,000	5,199.8
Measure 2.11	Forests protection and management	13,210,000	4,501.3
Measure 2.12	Access improvement and infrastructures creation for promoting mountainous tourist areas	49,210,000	16,768.3
Measure 2.13	Improvement of agricultural farms competitiveness	6,410,000	2,184.2
Measure 2.14	Formation of agricultural activities to promote pluri-activity and keep population in rural areas	12,060,000	4,109.4
Measure 2.15	Encouragement of tourism and handicraft activities	7,540,000	2,569.3

Tab. A1 - Regional Operational Program of Thessalia Region 2000-06 (continued)

Measure 2.16	Investments for improving the competitiveness of first processing and marketing small-medium agricultural enterprises	6,300,000	2,146.7
Measure 2.17	Development and improvement of agricultural sector infrastructures in rural areas	6,750,000	2,300.1
Axis 3	**Quality of life**	**154,310,000**	**52,581.1**
Measure 3.1	Infrastructures for health and welfare	28,780,000	9,806.8
Measure 3.2	Urban interventions	14,010,000	4,773.9
Measure 3.3	Systems for managing liquid and solid wastes	24,810,000	8,454.0
Measure 3.4	Promotion - exploitation tourism and cultural centers	11,950,000	4,072.0
Measure 3.5	Integrated interventions for urban development in small scale areas	16,050,000	5,469.0
Measure 3.6	Integrated interventions for urban development in small scale areas	6,720,000	2,289.8
Measure 3.7	Enhancement and creation of education infrastructures	51,990,000	17,715.6
Axis 4	**Exploitation of the Region’s Location to promote it as a transportations network**	**272,220,000**	**92,759.0**
Measure 4.1	Interregional transport networks	115,880,000	39,486.1
Measure 4.2	Inter-prefecture road connections	75,950,000	25,880.0
Measure 4.3	Infrastructures for transport and trade	29,400,000	10,018.1
Measure 4.4	Diversions of urban centers	50,990,000	17,374.8
Axis 5	**Human resources**	**36,420,000**	**12,410.1**
Measure 5.1	Development of human resources	13,800,000	1,363.0
Measure 5.2	Local actions to promote employment for unemployed and special social groups	8,800,000	615.8
Measure 5.3	Promotion of women’s employment and promotion of the two sexes equal opportunities	13,820,000	1,067.5
Axis 6	**Application**	**8,939,893**	**3,046.3**
Measure 6.1	Technical support	3,999,999	1,363.0
Measure 6.2	Technical support	1,807,074	615.8
Measure 6.3	Technical support	3,132,820	1,067.5
	TOTAL	**928,839,839**	**316,502.2**

Source: Regional Directorate of Thessalia (2001)

Tab. A2 - Operation Program Countryside Development - Restructuring of Rural Areas (OPCDRRA) 2000-06

Axis and measures	Description	Funds	
		(euro)	(million drs)
Axis 1	**Integrated actions at farm level**	**826,866,075**	**281,755**
Measure 1.1	Investments at farm level	795,898,677	271,202
Measure 1.2	Support to institutions for the planning of rural development policy	28,134,537	9,587
Measure 1.3	Obligations for producers groups	2,832,861	965
Axis 2	**Actions for the processing and marketing of the agricultural and forestry primary products**	**871,697,587**	**297,031**
Measure 2.1	Investments in the processing and marketing of agricultural products	777,463,013	264,921
Measure 2.2	Improvement of woodcutting processing and marketing of forestry products	94,234,574	32,110
Axis 3	**Improvement of the average age of the agricultural population – Young farmers**	**291,208,224**	**99,229**
Measure 3.1	Lump sum prim for first establishment	226,628,894	77,224
Measure 3.2	Assistance in first establishment expenditures	64,579,330	22,005
Axis 4	**Improvement of support means and rural populations information for exploiting new technologies**	**81,195,413**	**27,667**
Measure 4.1	Exploitation of advance communication and informatics means for improving the diffusion of information to the rural population	21,705,296	7,396
Measure 4.2	Advancement of infrastructure for the information, education and sensitization of population	22,662,890	7,722
Measure 4.3	Actions for supporting exports	20,113,315	6,854
Measure 4.4	Development and modernization of infrastructures for improving the quality of products and safeguarding public health – labs certification	7,082,153	2,413
Measure 4.5	Database development for encountering diseases and pests. Development of information network in plant protection issues.	9,631,759	3,282
Axis 5	**Interventions to the agricultural product**	**37,102,987**	**12,643**
Measure 5.1	Integrated services program for supporting breeders in developing and using the proper for each area reproductive livestock	19,765,843	6,735
Measure 5.2	Development and promotion of biological and integrated pest management practices for the most important crops	17,337,144	5,908
Axis 6	**Development and protection of the environment and natural resources**	**294,617,563**	**100,391**
Measure 6.1	Completion of the 2nd CSF land reclamation works	101,983,002	34,751
Measure 6.2	Enrichment of ground waters, improvement of irrigation practices	141,643,059	48,265
Measure 6.3	Plans for managing the sustainable development of forest and ecologically sensitive areas – development of genetic material bank	19,830,028	6,757
Measure 6.4	Development of geographic data base and mapping of agricultural land	16,997,167	5,792
Measure 6.5	Confrontation of damages in crop and livestock production	14,164,307	4,826

Tab. A2 - Operation Program Countryside Development - Restructuring of Rural Areas (OPCDRRA) 2000-06 (continued)

Axis 7	**Projects for rural development**	**581,951,621**	**198,300**
Measure 7.1	Land reclamation works	12,012,415	4,093
Measure 7.2	Development of services for managing agricultural farms	7,886,639	2,687
Measure 7.3	Marketing of high quality agricultural products	16,583,062	5,651
Measure 7.4	Basic services for rural economy and rural population	27,224,357	9,277
Measure 7.5	Renovation of villages – protection of rural heritage	55,013,154	18,746
Measure 7.6	Differentiation of agricultural activities in order to provide the opportunity to develop alternative activities or to create alternative incomes	60,557,594	20,635
Measure 7.7	Management of agriculture's water resources	18,773,278	6,397
Measure 7.8	Development and improvement of infrastructures related with the development of agriculture	13,141,295	4,478
Measure 7.9	Encouragement of tourism and handicraft activities	125,155,187	42,647
Measure 7.10	Environment protection in combination with agriculture, forestry and landscape conservation and moreover improvement of animals life conditions	23,466,598	7,996
Measure 7.11	Improvement of agricultural farms competitiveness.	106,059,710	36,140
Measure 7.12	Investments for improving the competitiveness of first processing and marketing of agricultural products	62,948,714	21,450
Measure 7.13	Investments for improving woodcutting, processing and marketing of forest products	8,196,423	2,793
Measure 7.14	Supply of essential services for rural economy and rural population	44,933,195	15,311
	TOTAL	**2,984,639,470**	**1,017,016**

Source: Ministry of Agriculture (2001a)

Tab. A3 - Agricultural Development Plan 2000-06

Axis and measures	Description	Funds	
		(euro in 000)	(drs in billions)
Axis 1 (1 measure)	Early retirement	1,150.4	392
Axis 2 (1 measure)	Integrated interventions for disadvantaged areas and areas under environmental control	956.7	326
Axis 3 (13 measures)	Agri-environmental measures	400	136.3
Axis 4 (1 measure)	Afforestation of agricultural land	165.5	56.4
Axis 5 (1 measure)	Technical support	14.7	5
	TOTAL	**2687.3**	**915.7**

Source: Ministry of Agriculture (2001b)

Tab. A4 - Final Demand Vector from the ROP of Thessalia 2000-06 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	TOTAL FD vector
G1	Agriculture	5%	1,147	15%	6,569	0%	0	0%	0	2%	106	0%	0	**7,822**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	5%	1,147	15%	6,569	3%	676	0%	0	2%	106	0%	0	**8,498**
G4	Textile and Clothing	5%	1,147	2%	876	0%	0	0%	0	0%	0	0%	0	**2,023**
G5	Wood Products and Paper	0%	0	5%	2,190	0%	0	0%	0	1%	53	5%	65	**2,308**
G6	Chemical and Plastic Products	2%	459	0%	0	0%	0	10%	3,975	0%	0	0%	0	**4,434**
G7	Non-Metal Products	0%	0	5%	2,190	2%	451	5%	1,988	0%	0	2%	26	**4,654**
G8	Metal Products	5%	1,147	5%	2,190	5%	1,127	5%	1,988	0%	0	0%	0	**6,451**
G9	Manufacture of Machinery and Equipm	10%	2,294	5%	2,190	3%	676	10%	3,975	0%	0	10%	131	**9,265**
G10	Electricity, Gas and Water Supply	3%	688	3%	1,314	10%	2,253	4%	1,590	2%	106	5%	65	**6,017**
G11	Construction	10%	2,294	20%	8,758	20%	4,507	42%	16,697	5%	266	0%	0	**32,522**
G12	Trade and Repairing Activities	10%	2,294	7%	3,065	10%	2,253	5%	1,988	10%	532	10%	131	**10,263**
G13	Hotels and Catering	22%	5,047	3%	1,314	7%	1,577	0%	0	5%	266	0%	0	**8,204**
G14	Transportation and Communication	5%	1,147	3%	1,314	5%	1,127	10%	3,975	5%	266	10%	131	**7,959**
G15	Banking and Finance	5%	1,147	2%	876	5%	1,127	2%	795	3%	160	10%	131	**4,235**
G16	Public Administration	3%	688	5%	2,190	5%	1,127	2%	795	10%	532	10%	131	**5,462**
G17	Education	0%	0	0%	0	15%	3,380	0%	0	20%	1,064	20%	261	**4,705**
G18	Community, Social and Personal Services	10%	2,294	5%	2,190	10%	2,253	5%	1,988	35%	1,862	18%	235	**10,821**
	Total	**100%**	**22,939**	**100%**	**43,792**	**100%**	**22,535**	**100%**	**39,754**	**100%**	**5,319**	**100%**	**1,306**	**135,644**

Tab. A5 - Final Demand Vector from the ROP of Thessalia for the period 2007-13 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	**TOTAL FD vector**
G1	Agriculture	5%	1,740	15%	9,963	0%	0	0%	0	2%	161	0%	0	**11,864**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	5%	1,740	15%	9,963	3%	1,025	0%	0	2%	161	0%	0	**12,889**
G4	Textile and Clothing	5%	1,740	2%	1,328	0%	0	0%	0	0%	0	0%	0	**3,068**
G5	Wood Products and Paper	0%	0	5%	3,321	0%	0	0%	0	1%	81	5%	99	**3,501**
G6	Chemical and Plastic Products	2%	696	0%	0	0%	0	10%	6,029	0%	0	0%	0	**6,725**
G7	Non-Metal Products	0%	0	5%	3,321	2%	684	5%	3,015	0%	0	2%	40	**7,059**
G8	Metal Products	5%	1,740	5%	3,321	5%	1,709	5%	3,015	0%	0	0%	0	**9,784**
G9	Manufacture of Machinery and Equipment	10%	3,479	5%	3,321	3%	1,025	10%	6,029	0%	0	10%	198	**14,053**
G10	Electricity, Gas and Water Supply	3%	1,044	3%	1,993	10%	3,418	4%	2,412	2%	161	5%	99	**9,126**
G11	Construction	10%	3,479	20%	13,283	20%	6,836	42%	25,323	5%	403	0%	0	**49,325**
G12	Trade and Repairing Activities	10%	3,479	7%	4,649	10%	3,418	5%	3,015	10%	807	10%	198	**15,565**
G13	Hotels and Catering	22%	7,654	3%	1,993	7%	2,392	0%	0	5%	403	0%	0	**12,442**
G14	Transportation and Communication	5%	1,740	3%	1,993	5%	1,709	10%	6,029	5%	403	10%	198	**12,072**
G15	Banking and Finance	5%	1,740	2%	1,328	5%	1,709	2%	1,206	3%	242	10%	198	**6,423**
G16	Public Administration	3%	1,044	5%	3,321	5%	1,709	2%	1,206	10%	807	10%	198	**8,284**
G17	Education	0%	0	0%	0	15%	5,127	0%	0	20%	1,613	20%	396	**7,136**
G18	Community, Social and Personal Services	10%	3,479	5%	3,321	10%	3,418	5%	3,015	35%	2,823	18%	356	**16,412**
	Total	**100%**	**34,791**	**100%**	**66,417**	**100%**	**34,178**	**100%**	**60,293**	**100%**	**8,067**	**100%**	**1,980**	**205,726**

Tab. A6 - Final Demand Vector from the ROP's of the 13 Regions of the Country 2004-6 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	TOTAL FD vector
G1	Agriculture	5%	15,380	15%	62,632	0%	0	0%	0	2%	1,806	0%	0	**79,818**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	5%	15,380	15%	62,632	3%	7,521	0%	0	2%	1,806	0%	0	**87,340**
G4	Textile and Clothing	5%	15,380	2%	8,351	0%	0	0%	0	0%	0	0%	0	**23,731**
G5	Wood Products and Paper	0%	0	5%	20,877	0%	0	0%	0	1%	903	5%	641	**22,422**
G6	Chemical and Plastic Products	2%	6,152	0%	0	0%	0	10%	32,507	0%	0	0%	0	**38,660**
G7	Non-Metal Products	0%	0	5%	20,877	2%	5,014	5%	16,254	0%	0	2%	257	**42,402**
G8	Metal Products	5%	15,380	5%	20,877	5%	12,535	5%	16,254	0%	0	0%	0	**65,047**
G9	Manufacture of Machinery and Equipm	10%	30,761	5%	20,877	3%	7,521	10%	32,507	0%	0	10%	1,283	**92,949**
G10	Electricity, Gas and Water Supply	3%	9,228	3%	12,526	10%	25,071	4%	13,003	2%	1,806	5%	641	**62,276**
G11	Construction	10%	30,761	20%	83,509	20%	50,141	42%	136,531	5%	4,516	0%	0	**305,458**
G12	Trade and Repairing Activities	10%	30,761	7%	29,228	10%	25,071	5%	16,254	10%	9,032	10%	1,283	**111,627**
G13	Hotels and Catering	22%	67,673	3%	12,526	7%	17,549	0%	0	5%	4,516	0%	0	**102,265**
G14	Transportation and Communication	5%	15,380	3%	12,526	5%	12,535	10%	32,507	5%	4,516	10%	1,283	**78,748**
G15	Banking and Finance	5%	15,380	2%	8,351	5%	12,535	2%	6,501	3%	2,709	10%	1,283	**46,760**
G16	Public Administration	3%	9,228	5%	20,877	5%	12,535	2%	6,501	10%	9,032	10%	1,283	**59,456**
G17	Education	0%	0	0%	0	15%	37,606	0%	0	20%	18,063	20%	2,565	**58,234**
G18	Community, Social and Personal Services	10%	30,761	5%	20,877	10%	25,071	5%	16,254	35%	31,610	18%	2,309	**126,881**
	Total	**100%**	**307,606**	**100%**	**417,545**	**100%**	**250,705**	**100%**	**325,074**	**100%**	**90,315**	**100%**	**12,826**	**1,404,073**

Tab. A7 - Final Demand Vector from the ROP's of the 13 Regions of the Country 2007-13 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	TOTAL FD vector
G1	Agriculture	5%	23,327	15%	94,992	0%	0	0%	0	2%	2,740	0%	0	**121,058**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	5%	23,327	15%	94,992	3%	11,407	0%	0	2%	2,740	0%	0	**132,465**
G4	Textile and Clothing	5%	23,327	2%	12,666	0%	0	0%	0	0%	0	0%	0	**35,992**
G5	Wood Products and Paper	0%	0	5%	31,664	0%	0	0%	0	1%	1,370	5%	973	**34,006**
G6	Chemical and Plastic Products	2%	9,331	0%	0	0%	0	10%	49,303	0%	0	0%	0	**58,634**
G7	Non-Metal Products	0%	0	5%	31,664	2%	7,605	5%	24,651	0%	0	2%	389	**64,309**
G8	Metal Products	5%	23,327	5%	31,664	5%	19,012	5%	24,651	0%	0	0%	0	**98,654**
G9	Manufacture of Machinery and Equipment	10%	46,654	5%	31,664	3%	11,407	10%	49,303	0%	0	10%	1,945	**140,973**
G10	Electricity, Gas and Water Supply	3%	13,996	3%	18,998	10%	38,024	4%	19,721	2%	2,740	5%	973	**94,451**
G11	Construction	10%	46,654	20%	126,655	20%	76,047	42%	207,072	5%	6,849	0%	0	**463,278**
G12	Trade and Repairing Activities	10%	46,654	7%	44,329	10%	38,024	5%	24,651	10%	13,698	10%	1,945	**169,301**
G13	Hotels and Catering	22%	102,638	3%	18,998	7%	26,617	0%	0	5%	6,849	0%	0	**155,102**
G14	Transportation and Communication	5%	23,327	3%	18,998	5%	19,012	10%	49,303	5%	6,849	10%	1,945	**119,434**
G15	Banking and Finance	5%	23,327	2%	12,666	5%	19,012	2%	9,861	3%	4,109	10%	1,945	**70,919**
G16	Public Administration	3%	13,996	5%	31,664	5%	19,012	2%	9,861	10%	13,698	10%	1,945	**90,175**
G17	Education	0%	0	0%	0	15%	57,035	0%	0	20%	27,396	20%	3,890	**88,322**
G18	Other Community, Social and Personal Services	10%	46,654	5%	31,664	10%	38,024	5%	24,651	35%	47,942	18%	3,501	**192,436**
	Total	**100%**	**466,536**	**100%**	**633,277**	**100%**	**380,236**	**100%**	**493,030**	**100%**	**136,978**	**100%**	**19,452**	**2,129,510**

Tab. A8 - Final Demand Vector from the OPCDRRE for Thessalia for the period 2004-06 (in million drs)

	Sector	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	Axis 7	mn drs	**TOTAL FD vector**
G1	Agriculture	15%	1,811	12%	1,528	40%	1,701	0%	0	50%	271	5%	215	7%	595	**6,121**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	2%	255	0%	0	0%	0	10%	54	0%	0	2%	170	**479**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	0%	0	4%	509	4%	170	2%	24	2%	11	0%	0	6%	510	**1,224**
G6	Chemical and Plastic Products	0%	0	0%	0	4%	170	0%	0	0%	0	5%	215	0%	0	**385**
G7	Non-Metal Products	5%	604	4%	509	5%	213	3%	36	2%	11	5%	215	4%	340	**1,927**
G8	Metal Products	1%	121	5%	636	5%	213	2%	24	2%	11	8%	344	2%	170	**1,519**
G9	Manufact of Machinery and Equip	34%	4,106	22%	2,801	10%	425	30%	356	5%	27	8%	344	17%	1,445	**9,503**
G10	Electricity, Gas and Water Supply	0%	0	0%	0	0%	0	5%	59	0%	0	2%	86	1%	85	**230**
G11	Construction	34%	4,106	40%	5,092	8%	340	2%	24	2%	11	53%	2,280	39%	3,314	**15,167**
G12	Trade and Repairing Activities	5%	604	2%	255	2%	85	10%	119	5%	27	1%	43	2%	170	**1,302**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	2%	170	**170**
G14	Transportation and Communication	0%	0	0%	0	1%	43	5%	59	3%	16	1%	43	2%	170	**331**
G15	Banking and Finance	0%	0	0%	0	11%	468	2%	24	1%	5	1%	43	1%	85	**625**
G16	Public Administration	0%	0	0%	0	0%	0	2%	24	1%	5	1%	43	1%	85	**157**
G17	Education	0%	0	0%	0	0%	0	5%	59	1%	5	0%	0	2%	170	**235**
G18	Social and Personal Services	6%	725	9%	1,146	10%	425	32%	379	16%	87	10%	430	12%	1,020	**4,212**
	Total	**100%**	**12,075**	**100%**	**12,730**	**100%**	**4,253**	**100%**	**1,186**	**100%**	**542**	**100%**	**4,302**	**100%**	**8,499**	**43,586**

Tab. A9 - Final Demand Vector from the OPCDRRE for Thessalia for the period 2007-13 (in million drs)

	Sector	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	Axis 7	mn drs	**TOTAL FD vector**
G1	Agriculture	15%	2,747	12%	2,317	40%	2,580	0%	0	50%	411	5%	326	7%	902	**9,283**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	2%	386	0%	0	0%	0	10%	82	0%	0	2%	258	**726**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	0%	0	4%	772	4%	258	2%	36	2%	16	0%	0	6%	773	**1,856**
G6	Chemical and Plastic Products	0%	0	0%	0	4%	258	0%	0	0%	0	5%	326	0%	0	**584**
G7	Non-Metal Products	5%	916	4%	772	5%	322	3%	54	2%	16	5%	326	4%	516	**2,923**
G8	Metal Products	1%	183	5%	965	5%	322	2%	36	2%	16	8%	522	2%	258	**2,303**
G9	Manufact of Machinery and Equip	34%	6,227	22%	4,248	10%	645	30%	540	5%	41	8%	522	17%	2,191	**14,413**
G10	Electricity, Gas and Water Supply	0%	0	0%	0	0%	0	5%	90	0%	0	2%	131	1%	129	**349**
G11	Construction	34%	6,227	40%	7,723	8%	516	2%	36	2%	16	53%	3,458	39%	5,027	**23,003**
G12	Trade and Repairing Activities	5%	916	2%	386	2%	129	10%	180	5%	41	1%	65	2%	258	**1,975**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	2%	258	**258**
G14	Transportation and Communication	0%	0	0%	0	1%	64	5%	90	3%	25	1%	65	2%	258	**502**
G15	Banking and Finance	0%	0	0%	0	11%	709	2%	36	1%	8	1%	65	1%	129	**948**
G16	Public Administration	0%	0	0%	0	0%	0	2%	36	1%	8	1%	65	1%	129	**238**
G17	Education	0%	0	0%	0	0%	0	5%	90	1%	8	0%	0	2%	258	**356**
G18	Social and Personal Services	6%	1,099	9%	1,738	10%	645	32%	575	16%	131	10%	653	12%	1,547	**6,388**
	Total	**100%**	**18,314**	**100%**	**19,307**	**100%**	**6,450**	**100%**	**1,798**	**100%**	**822**	**100%**	**6525**	**100%**	**12,890**	**66,106**

Tab. A10 - Final Demand Vector from the OPCDRRE for Country level for the period 2004-06 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	Axis 7	mn drs	**TOTAL FD vector**
G1	Agriculture	15%	18,113	12%	15,276	40%	17,011	0%	0	50%	2,709	5%	2,151	7%	5,949	**61,209**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	2%	2,546	0%	0	0%	0	10%	542	0%	0	2%	1,700	**4,788**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	0%	0	4%	5,092	4%	1,701	2%	237	2%	108	0%	0	6%	5,099	**12,238**
G6	Chemical and Plastic Products	0%	0	0%	0	4%	1,701	0%	0	0%	0	5%	2,151	0%	0	**3,852**
G7	Non-Metal Products	5%	6,038	4%	5,092	5%	2,126	3%	356	2%	108	5%	2,151	4%	3,399	**19,271**
G8	Metal Products	1%	1208	5%	6,365	5%	2,126	2%	237	2%	108	8%	3,442	2%	1,700	**15,186**
G9	Manufact of Machinery and Equip	34%	41,056	22%	28,006	10%	4,253	30%	3,557	5%	271	8%	3,442	17%	14,448	**95,032**
G10	Electricity, Gas and Water Supply	0%	0	0%	0	0%	0	5%	593	0%	0	2%	860	1%	850	**2,303**
G11	Construction	34%	41,056	40%	50,920	8%	3,402	2%	237	2%	108	53%	22,803	39%	33,144	**151,670**
G12	Trade and Repairing Activities	5%	6,038	2%	2,546	2%	851	10%	1,186	5%	271	1%	430	2%	1,700	**13,021**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	2%	1,700	**1,700**
G14	Transportation and Communication	0%	0	0%	0	1%	425	5%	593	3%	163	1%	430	2%	1,700	**3,311**
G15	Banking and Finance	0%	0	0%	0	11%	4,678	2%	237	1%	54	1%	430	1%	850	**6,249**
G16	Public Administration	0%	0	0%	0	0%	0	2%	237	1%	54	1%	430	1%	850	**1,571**
G17	Education	0%	0	0%	0	0%	0	5%	593	1%	54	0%	0	2%	1,700	**2,347**
G18	Social and Personal Services	6%	7,245	9%	11,457	10%	4,253	32%	3,794	16%	867	10%	4,302	12%	10,198	**42,117**
	Total	**100%**	**120,752**	**100%**	**127,299**	**100%**	**42,527**	**100%**	**11,857**	**100%**	**5,418**	**100%**	**43,025**	**100%**	**84,986**	**435,864**

Tab. A11 - Final Demand Vector from the OPCDRRE for Country level for the period 2007-13 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	Axis 6	mn drs	Axis 7	mn drs	**TOTAL FD vector**
G1	Agriculture	15%	2,747	12%	2,317	40%	2,580	0%	0	50%	411	5%	326	7%	902	**9,283**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	2%	386	0%	0	0%	0	10%	82	0%	0	2%	258	**726**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	0%	0	4%	772	4%	258	2%	36	2%	16	0%	0	6%	773	**1,856**
G6	Chemical and Plastic Products	0%	0	0%	0	4%	258	0%	0	0%	0	5%	326	0%	0	**584**
G7	Non-Metal Products	5%	916	4%	772	5%	322	3%	54	2%	16	5%	326	4%	516	**2,923**
G8	Metal Products	1%	183	5%	965	5%	322	2%	36	2%	16	8%	522	2%	258	**2,303**
G9	Manufact of Machinery and Equip	34%	6,227	22%	4,248	10%	645	30%	540	5%	41	8%	522	17%	2,191	**14,413**
G10	Electricity, Gas and Water Supply	0%	0	0%	0	0%	0	5%	90	0%	0	2%	131	1%	129	**349**
G11	Construction	34%	6,227	40%	7,723	8%	516	2%	36	2%	16	53%	3,458	39%	5,027	**23,003**
G12	Trade and Repairing Activities	5%	916	2%	386	2%	129	10%	180	5%	41	1%	65	2%	258	**1,975**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	2%	258	**258**
G14	Transportation and Communication	0%	0	0%	0	1%	64	5%	90	3%	25	1%	65	2%	258	**502**
G15	Banking and Finance	0%	0	0%	0	11%	709	2%	36	1%	8	1%	65	1%	129	**948**
G16	Public Administration	0%	0	0%	0	0%	0	2%	36	1%	8	1%	65	1%	129	**238**
G17	Education	0%	0	0%	0	0%	0	5%	90	1%	8	0%	0	2%	258	**356**
G18	Social and Personal Services	6%	1,099	9%	1,738	10%	645	32%	575	16%	131	10%	653	12%	1,547	**6,388**
	Total	**100%**	**18,314**	**100%**	**19,307**	**100%**	**6,450**	**100%**	**1,798**	**100%**	**822**	**100%**	**6,525**	**100%**	**12,890**	**66,106**

Tab. A12 - Final Demand Vector from the ADP for Thessalia for the period 2004-06 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	**TOTAL FD vector**
G1	Agriculture	40%	6,720	10%	1,397	60%	3,505	26%	628	0%	0	**12,250**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	0%	0	3%	175	0%	0	0%	0	**175**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	4%	672	3%	419	0%	0	3%	73	5%	11	**1,174**
G6	Chemical and Plastic Products	4%	672	3%	419	2%	117	2%	48	0%	0	**1,256**
G7	Non-Metal Products	5%	840	2%	279	0%	0	0%	0	2%	4	**1,124**
G8	Metal Products	5%	840	2%	279	2%	117	0%	0	0%	0	**1,236**
G9	Manufact of Machinery and Equip	10%	1,680	5%	699	5%	292	30%	725	10%	21	**3,417**
G10	Electricity, Gas and Water Supply	0%	0	5%	699	2%	117	0%	0	5%	11	**826**
G11	Construction	8%	1,344	35%	4,890	15%	876	20%	483	0%	0	**7,594**
G12	Trade and Repairing Activities	0%	0	7%	978	5%	292	10%	242	10%	21	**1,533**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G14	Transportation and Communication	0%	0	0%	0	0%	0	2%	48	10%	21	**70**
G15	Banking and Finance	14%	2,352	0%	0	2%	117	2%	48	10%	21	**2,539**
G16	Public Administration	0%	0	3%	419	2%	117	2%	48	10%	21	**606**
G17	Education	0%	0	2%	279	2%	117	0%	0	20%	43	**439**
G18	Social and Personal Services	10%	1,680	23%	3,213	0%	0	3%	73	18%	39	**5,005**
	Total	**100%**	**16,800**	**100%**	**13,971**	**100%**	**5,841**	**100%**	**2,417**	**100%**	**214**	**39,244**

Tab. A13 - Final Demand Vector from the ADP for Thessalia for the period 2007-13 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	**TOTAL FD vector**
G1	Agriculture	40%	10,192	10%	2,119	60%	5,316	26%	953	0%	0	**18,580**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	0%	0	3%	266	0%	0	0%	0	**266**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	4%	1,019	3%	636	0%	0	3%	110	5%	16	**1,781**
G6	Chemical and Plastic Products	4%	1,019	3%	636	2%	177	2%	73	0%	0	**1,905**
G7	Non-Metal Products	5%	1,274	2%	424	0%	0	0%	0	2%	7	**1,704**
G8	Metal Products	5%	1,274	2%	424	2%	177	0%	0	0%	0	**1,875**
G9	Manufact of Machinery and Equip	10%	2,548	5%	1,060	5%	443	30%	1,100	10%	33	**5,183**
G10	Electricity, Gas and Water Supply	0%	0	5%	1,060	2%	177	0%	0	5%	16	**1,253**
G11	Construction	8%	2,038	35%	7,417	15%	1,329	20%	733	0%	0	**11,517**
G12	Trade and Repairing Activities	0%	0	7%	1,483	5%	443	10%	367	10%	33	**2,325**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G14	Transportation and Communication	0%	0	0%	0	0%	0	2%	73	10%	33	**106**
G15	Banking and Finance	14%	3,567	0%	0	2%	177	2%	73	10%	33	**3,850**
G16	Public Administration	0%	0	3%	636	2%	177	2%	73	10%	33	**919**
G17	Education	0%	0	2%	424	2%	177	0%	0	20%	65	**666**
G18	Social and Personal Services	10%	2,548	23%	4,874	0%	0	3%	110	18%	59	**7,590**
	Total	**100%**	**25,480**	**100%**	**21,190**	**100%**	**8,860**	**100%**	**3,666**	**100%**	**325**	**59,521**

Tab. A14 - Final Demand Vector from the ADP for the Country for the period 2004-06 (in million drs)

	Sectors	Axis1	mn drs	Axis2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	TOTAL FD vector
G1	Agriculture	40%	67,200	10%	13,971	60%	35,049	26%	6,285	0%	0	**122,505**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	0%	0	3%	1,752	0%	0	0%	0	**1,752**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	4%	6,720	3%	4,191	0%	0	3%	725	5%	107	**11,744**
G6	Chemical and Plastic Products	4%	6,720	3%	4,191	2%	1,168	2%	483	0%	0	**12,563**
G7	Non-Metal Products	5%	8,400	2%	2,794	0%	0	0%	0	2%	43	**11,237**
G8	Metal Products	5%	8,400	2%	2,794	2%	1,168	0%	0	0%	0	**12,363**
G9	Manufact of Machinery and Equip	10%	16,800	5%	6,986	5%	2,921	30%	7,251	10%	214	**34,172**
G10	Electricity, Gas and Water Supply	0%	0	5%	6,986	2%	1,168	0%	0	5%	107	**8,261**
G11	Construction	8%	13,440	35%	48,900	15%	8,762	20%	4,834	0%	0	**75,936**
G12	Trade and Repairing Activities	0%	0	7%	9,780	5%	2,921	10%	2,417	10%	214	**15,332**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G14	Transportation and Communication	0%	0	0%	0	0%	0	2%	483	10%	214	**698**
G15	Banking and Finance	14%	23,520	0%	0	2%	1,168	2%	483	10%	214	**25,386**
G16	Public Administration	0%	0	3%	4,191	2%	1,168	2%	483	10%	214	**6,057**
G17	Education	0%	0	2%	2,794	2%	1,168	0%	0	20%	429	**4,391**
G18	Social and Personal Services	10%	16,800	23%	32,134	0%	0	3%	725	18%	386	**50,045**
	Total	**100%**	**168,000**	**100%**	**139,714**	**100%**	**58,414**	**100%**	**24,171**	**100%**	**2,143**	**392,443**

Tab. A15 - Final Demand Vector from the ADP for the Country for the period 2007-13 (in million drs)

	Sectors	Axis 1	mn drs	Axis 2	mn drs	Axis 3	mn drs	Axis 4	mn drs	Axis 5	mn drs	**TOTAL FD vector**
G1	Agriculture	40%	10,192	10%	2,119	60%	5,316	26%	953	0%	0	**18,580**
G2	Mining	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G3	Food Manufacture	0%	0	0%	0	3%	266	0%	0	0%	0	**266**
G4	Textile and Clothing	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G5	Wood Products and Paper	4%	1,019	3%	636	0%	0	3%	110	5%	16	**1,781**
G6	Chemical and Plastic Products	4%	1,019	3%	636	2%	177	2%	73	0%	0	**1,905**
G7	Non-Metal Products	5%	1,274	2%	424	0%	0	0%	0	2%	7	**1,704**
G8	Metal Products	5%	1,274	2%	424	2%	177	0%	0	0%	0	**1,875**
G9	Manufact of Machinery and Equip	10%	2,548	5%	1,060	5%	443	30%	1,100	10%	33	**5,183**
G10	Electricity, Gas and Water Supply	0%	0	5%	1,060	2%	177	0%	0	5%	16	**1,253**
G11	Construction	8%	2,038	35%	7,417	15%	1,329	20%	733	0%	0	**11,517**
G12	Trade and Repairing Activities	0%	0	7%	1,483	5%	443	10%	367	10%	33	**2,325**
G13	Hotels and Catering	0%	0	0%	0	0%	0	0%	0	0%	0	**0**
G14	Transportation and Communication	0%	0	0%	0	0%	0	2%	73	10%	33	**106**
G15	Banking and Finance	14%	3,567	0%	0	2%	177	2%	73	10%	33	**3,850**
G16	Public Administration	0%	0	3%	636	2%	177	2%	73	10%	33	**919**
G17	Education	0%	0	2%	424	2%	177	0%	0	20%	65	**666**
G18	Social and Personal Services	10%	2,548	23%	4,874	0%	0	3%	110	18%	59	**7,590**
	Total	**100%**	**25,480**	**100%**	**21,190**	**100%**	**8,860**	**100%**	**3,666**	**100%**	**325**	**59,521**

12. A DYNAMIC IMPACT ANALYSIS OF PRE-ACCESSION AND ACCESSION EU POLICIES: THE CASES OF ROMANIA AND BULGARIA

Andrea Bonfiglio

1. Introduction

This chapter represents the application of the dynamic analysis outlined in chapter 6 to the cases of Romania and Bulgaria[1]. The objective is to attempt to estimate overall impact in terms of output, income and employment produced by EU pre-accession and accession under alternative hypotheses for the period 2004-2009. The crucial year is 2007, when the two countries are likely to accede to the EU.

The dynamic analysis is carried out by applying the input-output methodology. The model adopted is a well-known demand-driven I-O model. However, contrary to traditional analysis based on fixed I-O coefficients, in this analysis, the structure of an economy is allowed to change over time. In this way, effects produced by the policy under study are affected by forecasted changes in the economic structure in addition to policy expenditure itself.

The dynamic analysis is applied at both regional and national level. The regions under study are the Romanian North-West region and the Bulgarian North-East region, which were selected as study cases within the REAPBALK project.

2. Identifying policy scenarios

In view of accession to the EU, Romania and Bulgaria have been benefiting from pre-accessions funds which form part of a wide-ranging

[1] Only the cases of Romania and Bulgaria were selected since they are more similar in terms of accession modalities as well as more interesting because they were not entered the EU yet.

package of Community programmes represented by SAPARD, ISPA and PHARE for the period 2000-2006. Accession to the EU is forecasted to happen in 2007. The entrance into the EU will imply a further transfer of financial funds owing to application of the first and the second pillar of the CAP.

This analysis focuses on the effects induced by pre-accession programmes (except for PHARE) and application of the CAP instruments.

The SAPARD programme is used mainly to prepare the agricultural sector and rural areas in candidate countries for EU membership. It aims to contribute to the implementation of Community legislation and to help candidate country to solve specific problems related to the sustainable development of the agricultural sector and of rural areas. The ISPA programme was designed to address environmental and transport infrastructure priorities. Like the PHARE programme, ISPA pursues the aim of economic and social cohesion. With reference to Romania, the estimates of annually allocated funds for the period 2004-2006 used for impact analysis come from the National Development Plan (Romanian Ministry of Integration, 2003). As for Bulgaria, the estimates used are from the 2002 proposal's Commission of increasing financial assistance in order to support Bulgaria in taking the remaining steps necessary to meet criteria for membership (European Commission, 2002b). Since the proposal does not provide information about allocation of funds among the three programmes, distribution was made by applying the average percentages of allocation deduced by financial distribution among programmes for the period 2000-2002[2] (Table 1).

Information on the CAP framework comes from an EU Commission's proposal defining a financial package for the accession negotiations with Bulgaria and Romania (European Commission, 2004). This proposal is based largely on the existing *acquis* and on the principles and methodology underlying the financial package developed for the negotiations with the ten countries entered the EU in 2004. The time period covered is limited to three years and it goes from 2007 to 2009. Of the categories of expenditure outlined within the proposal, five types of EU transfers are considered in this analysis: (a) CAP market support flows; (b) Direct payments; (c) Rural Development funds; (d) Cohesion funds; (e) Structural funds other than cohesion funds.

However, the proposal does not distinguish funds in terms of countries, measures and time, clearly. Therefore, some assumptions consistent with the general logic of the proposal were made.

[2] The percentage allocation is as follows: 17% to SAPARD, 33% to ISPA, 50% to PHARE.

Tab. 1 – Pre-accession Programmes, Total Financial Allocation, 2004-2006 (€ mio, 2004 prices)

	2004	2005	2006	TOTAL
Bulgaria				
SAPARD	68	74	80	222
ISPA	134	145	157	436
TOTAL	202	219	237	658
Romania				
SAPARD	161	161	161	483
ISPA	312	338	364	1,014
TOTAL	473	499	525	1,497

Source: Author's elaboration on data from Romanian National Development Plan, 2003; European Commission (2002b)

Data on market support, direct payments and rural development funds are provided as totals of the three years. Moreover, the proposal provides the time distribution of the sum of funds related to the three measures (labelled as "agriculture"). Therefore, it was necessary to estimate annually allocated funds for every measure. In this connection, an early estimate was obtained using the annual percent distribution of each measure established for the ten acceding countries in the period 2004-2006 (European Commission, 2002a). Then, funds of each measure and by year were constrained to both the total of appropriated annually funds related to agriculture (column sum) and the total of funds of each measure related to the whole period (row sum) using a RAS-type constrained matrix technique. Afterwards, annual funds were allocated to the two countries applying the relevant shares attributed to each country. The relevant shares for Romania are 65.4% (of total market support), 67.1% (of total direct payments) and 79.7% (of total rural development funds), while, for Bulgaria, they are 34.6%, 32.9% and 20.3%.

Data on structural actions are available for each year. The distribution of structural funds allocated to both countries is 1,938 € mio in 2007, 2,731 € mio in 2008 and 3,605 € mio in 2009. The overall amount of structural funds allocated to Romania for the period 2007-09 is 5,973 € mio while the amount related to Bulgaria is 2,300 € mio. However, distribution of funds over time is not specified expressly. The Commission's proposal establishes that each country will benefit from structural actions commitments amounting to 2.4% of GDP in 2007, 3.2% of GDP in 2008 and 4% of GDP in 2009. However, the GDP reference value is not specified. Solving the equation about which the total amount of funds (known variable) equals the percent distribution of funds in terms of GDP (unknown variable), it was easy to estimate the used GDP reference value.

By applying the percentages above to GDP, the annually allocated funds were derived for each country.

Finally, cohesion funds for each country were obtained as one-third on structural funds (as the proposal establishes). The other structural funds were derived as a residual.

In Tab. 2 allocation of CAP funds between the two countries is shown. Policy scenarios are defined as outlined in chapter 6. Resuming briefly the methodology, five policy scenarios are analysed: baseline scenario, pre-accession scenario (Scenario 1), accession scenario (Scenario 2), partial application of EU policies (Scenario 3) and full application of EU policies (Scenario 4). Both Scenario 3 and 4 contemplate two different hypotheses: coupled direct payments (Scenario 3a and 4a) and decoupled direct payments (Scenario 3b and 4b).

Tab. 2 – CAP Financial Allocation per kind of policy instrument, 2007-2009 (million euro, 2004 prices)

	2007	2008	2009	TOTAL
Romania				
Agriculture	855.2	1,463.0	1,718.7	4,037.0
Direct payments	*185.9*	*303.8*	*391.2*	*881.0*
Market support	*88.9*	*302.1*	*341.0*	*732.0*
Rural development	*580.4*	*857.1*	*986.5*	*2,424.0*
Structural Actions	1,493.3	1,991.0	2,488.8	5,973.0
Structural Funds	*995.5*	*1,327.3*	*1,659.2*	*3,982.0*
Cohesion Funds	*497.8*	*663.7*	*829.6*	*1,991.0*
Total	2,348.5	3,454.0	4,207.5	10,010.0
Bulgaria				
Agriculture	285.8	526.9	623.3	1,436.0
Direct payments	*91.0*	*148.6*	*191.4*	*431.0*
Market support	*47.1*	*160.1*	*180.8*	*388.0*
Rural development	*147.7*	*218.2*	*251.1*	*617.0*
Structural Actions	444.8	740.0	1,116.3	2,300.0
Structural Funds	*296.5*	*493.3*	*744.2*	*1,533.3*
Cohesion Funds	*148.3*	*246.7*	*372.1*	*766.7*
Total	730.6	1,266.9	1,739.6	3,736.0

Source: Author's elaboration on data from European Commission (2004)

3. Methodology to assess policy impact

In order to assess the overall impact in terms of output, employment and income generated by policy, the I-O methodology is adopted. Traditional analysis is based on the assumption that technology remains unaltered over time. In this way, estimated effects only take account of policy and they neglect structural changes. The advantage of this approach is the possibility of isolating effects generated by policy from all the other effects which occur during the period of analysis. However, impact from policy can be affected by the time in which policy injects resources into the economy since in that period technology structure can be changed. Traditional analysis neglects this aspect. For this reason, a time-varying coefficient approach is adopted (see chapter 6). The insertion of the time variable in the analysis is done by attempting to forecast structural changes in the period under study. Estimation of technological changes is made by projecting the available national I-O table from its date of construction to 2004 and from this year to 2009. Projections of the regional tables are instead made by regionalizing the projected national tables on the basis of a slightly rearranged version of the regionalization procedure described in chapter 5.

3.1 Projecting national I-O tables

Projections of the national I-O table were derived by the application of the RAS technique to the full I-O tables. RAS is a constrained matrix technique that iteratively adjusts both columns and rows of a given matrix until this matrix converges to a new matrix, which respects the constraints in terms of row and column totals. Initially, RAS was proposed in order to update national tables. Subsequently, it was extended to updating and estimation of regional tables from national tables (Czamanski and Malizia, 1969; Morrison and Smith, 1974; Malizia and Bond, 1974; McMenamin and Haring, 1974; Hewings, 1977; Harrigan *et al.*, 1980a, Dewhurst, 1992, Junius and Oosterhaven, 2003). Its properties and its conditions of convergence and uniqueness have been widely discussed in several studies (see for example Bacharach, 1970 and Lecomber, 1975).

The RAS technique updates an old matrix as follows:

$$\mathbf{A}_1 = \mathbf{R}\,\mathbf{A}_0\,\mathbf{S} \tag{1}$$

where $\mathbf{A}_0$ is the initial full table to be updated whilst $\mathbf{A}_1$ is the updated full table. $\mathbf{R}$ and $\mathbf{S}$ are diagonal matrices of multipliers r_i and s_j, obtained in such a way that the following conditions are satisfied:

$$\mathbf{R}\,\mathbf{A}_0\,\mathbf{S}\,\mathbf{1} = \mathbf{x}_s \tag{2}$$

$$\mathbf{1}' \mathbf{R}\, \mathbf{A}_0\, \mathbf{S} = \mathbf{x}'_p \tag{3}$$

where $\mathbf{x}_s$ and $\mathbf{x}'_p$ are respectively the column vector of totals and the row vector of totals, while $\mathbf{1}$ represents the unit vector. However, the RAS-algorithm is able to minimize loss information only when the matrix $\mathbf{A}_0$ contains non-negative entries. Unfortunately, the Bulgarian and Romanian I-O tables used also contain negative values in the quadrants related to other final demand and other final payments. The ways to treat usually this problem are twofold. One way is to apply the RAS-algorithm to the old table, inclusive of negative entries. However, this procedure can produce a new table which strongly deviates from the initial table. Deviations are particularly significant in rows and columns containing relatively larger negative entries. The other way is to treat the negative entries outside the RAS-procedure. This approach hypothesises that negative entries do not provide any contribution to the iterative adjustment procedure. Therefore, from a minimal information loss point of view, this approach could produce a sub-optimal solution. For this reason, Junius and Oosterhaven (2003) have developed an algorithm (GRAS) which would seem to be able to take account effectively of both negative and positive entries in the procedure. Comparing a simple table obtained applying the approach separately treating negative values to a table obtained by applying GRAS, they concluded that their algorithm is more effective in minimizing loss information. Although these first results are encouraging, no work has been done to demonstrate the existence, uniqueness and stability of the solution of the GRAS-algorithm. Moreover, results show that the difference between the two methods in terms of information loss is not particularly great, though experiments were based on very simple tables. Therefore, pending more robust results, we decided to adopt the approach based on dealing with negative entries separately, also considering the relative simplicity of this approach.

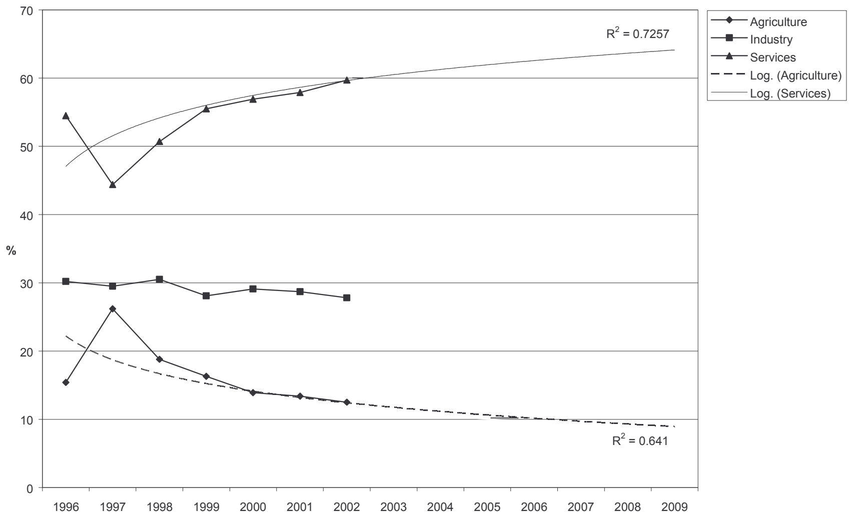
This is done in the following way. The matrix $\mathbf{A}_0$ is decomposed in two matrices: the matrix $\mathbf{P}_0$ with non-negative entries of $\mathbf{A}_0$ and the matrix $\mathbf{N}_0$ with the absolute values of the negative entries of $\mathbf{A}_0$. Therefore, it results that $\mathbf{A}_0 = \mathbf{P}_0 - \mathbf{N}_0$. The RAS-algorithm is then applied to $\mathbf{P}_0$, $\tilde{\mathbf{x}}_s$ and $\tilde{\mathbf{x}}_p$ where $\tilde{\mathbf{x}}_s = \mathbf{x}_s + \mathbf{Ni}$ and $\tilde{\mathbf{x}}_p = \mathbf{x}_p + \mathbf{iN}$. This yields the matrix $\tilde{\mathbf{A}}_1$. The target matrix is derived as $\mathbf{A}_1 = \tilde{\mathbf{A}}_1 - \mathbf{N}$.

The application of RAS to the full table requires estimates of total outputs, total primary inputs and total final demand. Official estimates about these aggregates for the period under study were not available. These figures were indirectly estimated using the following data: (a) FAPRI projections in terms of GDP growth rates (FAPRI, 2003) and (b) historic data on the weights, or shares, of macro-sectors (agriculture, industry and services) in terms of GDP. The former were used to estimate GDP in absolute values for the period 2004-2009. The latter were used to project the weights of macro-sectors in terms of GDP for the period 2004-2009. GDP shares of agriculture and services were estimated by logarithmic regression assuming that recent trends will continue into the future under constraints represented by average shares of these macro-sectors in EU[3] (Figures 1 and 2). The share related to industry was instead derived as a residual. By the application of the projected shares for macro-sectors to projected GDP, it was possible to estimate GDP in absolute values for macro-sectors. From these figures, the growth rates were easily derived (Table 3, Table 4).

Estimates of total outputs were derived supposing that outputs of productive sectors will vary at the same rate as GDP of the corresponding macro-sector, whilst estimates of final demand and primary inputs totals were obtained assuming that they will vary at the same rate as total GDP. After the totals were obtained, the RAS technique was applied to project six national I-O tables, one for each year between 2004 and 2009. Each table is derived by updating the table of the previous year. Formally, $\mathbf{A}_1 = \mathbf{R}_1 \, \mathbf{A}_0 \, \mathbf{S}_1$, $\mathbf{A}_2 = \mathbf{R}_2 \, \mathbf{A}_1 \, \mathbf{S}_2$ and so forth.

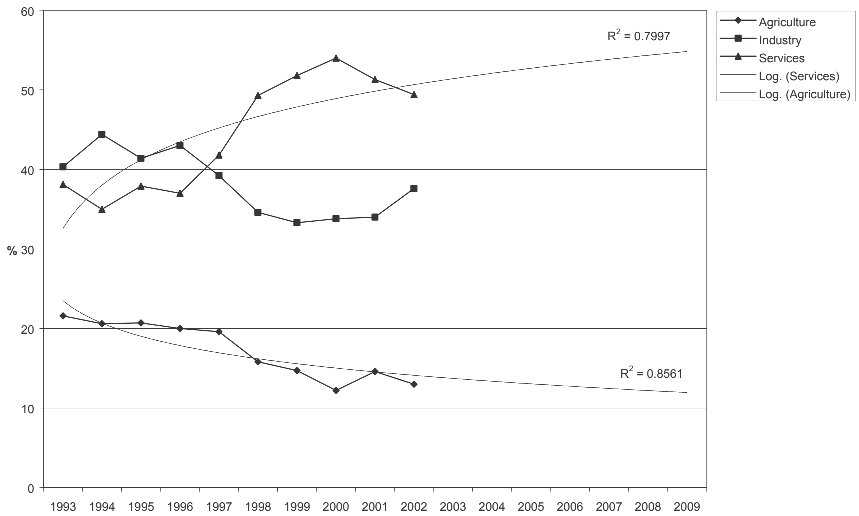
[3] The logarithmic regression function was found to perform better than other traditional functions. In any case, we recognize that the scarcity of data used for regression could affect the reliability of results negatively.

Fig. 1 - Past and forecasted trend of GDP macro-sector shares, Bulgaria, 1996-2009



Source: Authors' elaborations on data from REAPBALK database

Fig. 2 - Past and forecasted trend of GDP macro-sector shares, Romania, 1993-2009



Source: Authors' elaborations on data from REAPBALK database

Tab. 3 - Forecasted percentage GDP growth rates for macro-sectors, Romania, 1999-2009

	Agriculture	Industry	Services	Total
2004*	14.9	30.0	24.7	24.8
2005	2.6	4.5	6.9	5.5
2006	2.6	4.3	6.6	5.3
2007	2.2	3.9	6.0	4.8
2008	2.4	4.0	5.9	4.8
2009	2.4	3.9	5.7	4.7

Note: * 1999-2004 growth rates

Source: Authors' elaborations on data from: REAPBALK database; European Commission (2003b), 2003 Regular Report on Romania; National Institute of Statistics of Romania; FAPRI (2003)

Tab. 4 - Forecasted percentage GDP growth rates for macro-sectors, Bulgaria, 1997-2009

	Agriculture	Industry	Services	Total
2004*	-45.9	25.5	88.8	35.0
2005	-0.3	3.8	5.4	4.4
2006	0.1	4.0	5.4	4.5
2007	-0.1	3.5	4.8	4.0
2008	0.1	3.6	4.8	4.0
2009	0.1	3.4	4.5	3.8

Note: * 1997-2004 growth rates

Source: Authors' elaborations on data from: REAPBALK database; European Commission (2003a), 2003 Regular Report on Bulgaria; FAPRI (2003)

4. Projecting regional I-O tables

Projections of regional I-O tables were derived indirectly by regionalizing the projected national tables by a modified version of the regionalization procedure described in chapter 5. This procedure is based on the well-known GRIT methodology developed by Jensen *et al.* (1979). The main differences are: (a) the use of Flegg's Location Quotient (FLQ) (Flegg *et al.* 1995; Flegg and Webber, 1996a, 1996b, 1997; Brand, 1997; McCann and Dewhurst, 1998; Flegg and Webber, 2000) instead of Simple Location Quotient (SLQ), (b) the non-inclusion of superior data which, unfortunately, reduces this procedure being substantially a non-survey method. The principal steps of the procedure are:

1. *National sectoral aggregation*. The national table will be aggregated if the sector detail of employment at regional level is lower than that at national level.
2. *Reallocation of international trade*. A technology matrix is derived by redistributing imports among secondary sectors.

3. *Derivation of the national direct requirements matrix*. The national table is converted into I-O coefficients and the main diagonal is zeroed to avoid overestimating regional intra-sectoral trade.
4. *Computation of the regional direct requirements matrix*. Firstly, non-existing sectors at regional level are eliminated attributing the corresponding rows of the national matrix to the vector of regional imports and the corresponding columns of the matrix table to the vector of regional exports. Secondly, regional input and import coefficients are estimated by the application of FLQ. The parameter δ on which FLQ is based is chosen in such a way that sectoral final demand, obtained as a difference between the estimated regional output and intermediate sales (estimated by FLQ), is always positive.
5. *Regional sectoral aggregation*. The regional direct requirements matrix is aggregated to fit it to a simpler economic structure characterising the region.
6. *Computation of the complete regional input-output tables*. In this phase, a full regional table is derived. Final demand is estimated as a difference between regional output and intermediate sales. Regional output and most regional components of final demand and primary inputs (i.e. household consumption, exports, household income) are estimated by employment ratios and are further adjusted if SLQ is less than one, by multiplying components by SLQ. Other final demands and other primary inputs are derived as a residual.

We decided to employ this procedure to derive regional tables, making some modifications. These modifications are related to: (a) the treatment of national intra-sectoral flows; (b) construction of FLQ and (c) estimation of final demand components. As for point (a), we decided not to zero the main diagonal of the national table for two reasons. First, the low sector level of the national table advised against zeroing intrasectoral coefficients. Second, local experts suggested leaving unaltered the national table since the zeroing of national intrasectoral coefficients brought about the derivation of regional tables judged as unrealistic.

With regard to point (b), we chose a value of 0.3 as an estimate of the parameter δ on which FLQ is based. This choice was mainly motivated by the fact that the inventors of FLQ propose to use this value since some empirical evidence demonstrated that this value is valid for even very different regions. However, it is also true that the same authors recognize the need to make further experiments at regional level to validate their results. Moreover, from experiments carried out with the national tables, it results that the value of the parameter which makes final demands positive resulted to be too high and likely unrealistic.

The choice of a value of 0.3 for the parameter δ implied that final demand for some sectors (obtained as a residual) was negative. In these cases, the problem was solved as the original GRIT suggests, i.e. estimating separately components of final demand, calculating a new estimate of total final demand obtained as a sum of all its components, deriving a new estimate of total intermediate sales as a difference between regional output and new final demand, constraining the row of intermediate sales to the new total of intermediate sales and attributing discrepancies to the regional import vector.

With reference to the last point, all components of final demand, including other final components, were estimated from national components and then constrained to the total final demand obtained as a residual.

This modified version of GRIT methodology was applied to each national table estimated from 2004 to 2009, deriving six corresponding regional I-O tables[4].

5. Allocation of funds

In order to examine the effects produced by policy at national and regional levels by the use of a demand-driven I-O model, two issues have to be faced: regionalizing expenditure, whose data are available only at national level, and distributing expenditure among sectors (see chapter 6 for more details).

As for the first issue, it is necessary to distinguish the case of Romania from that of Bulgaria. The Romanian development plan for 2004-2006 defined the regional allocation of resources on criteria consistent with those described in art. 7 of EU Regulation 1260/1999. Criteria are based on a complex index considering population size, income, unemployment and infrastructure endowment of the regions. The resulting percentage of national funds going to the North-West region in the period 2004-2006 is 11.9%. We took this estimate to allocate the total national amount of pre-accession and CAP funds to the North-West region. With regard to Bulgaria, allocation criteria are different according to the kind of policy instrument. As for pre-accession funds, we used population ratio (about

[4] In Appendix D, projected regional tables are shown. These tables are expressed in local currency at 1999 prices (as for the Romanian table) and 1997 prices (as for the Bulgarian table). In order to carry out impact analysis based on 2004 data expressed in euro, flows of tables were transformed into 2004 € prices.

16% in 2000) to allocate funds to the North-East region. As far as the CAP support is concerned, regional direct payments and market support were estimated using a measure of the relative importance of agriculture in the region i.e. agricultural land ratio (24% in 2000). The regional funds related to the other CAP measures were instead estimated using population ratio.

About the second issue, policy expenditure was distributed among sectors into the vector of final demand on the basis of criteria defined by local experts and consistent with the methodology described in chapter 6. However, some specifications have to be done for direct payments. Under the hypothesis of full integration (100% of direct payments), it was assumed that in each year from 2007 to 2009, the amount of direct payments equals the total amount which was indirectly estimated knowing that the amount of direct payments in 2007 is 25% of total funds.

In Table 5 and Table 6, allocation of pre-accession and CAP funds to the regions under study is shown.

Tab. 5 – Pre-accession Programmes, Total Financial Allocation, 2004-2006 (€ mio, 2004 prices)

	2004	2005	2006	TOTAL
North-East region (Bulgaria)				
SAPARD	11.2	12.1	13.1	36.4
ISPA	21.9	23.8	25.6	71.3
TOTAL	33.1	35.9	38.7	107.7
North-West region (Romania)				
SAPARD	19.1	19.1	19.1	57.3
ISPA	37.1	40.2	43.3	120.6
TOTAL	56.2	59.3	62.4	177.9

Source: Author's elaboration

Tab. 6 – CAP Financial Allocation per kind of policy instrument, 2007-2009 (million euro, 2004 prices)

	2007	2008	2009	TOTAL
North-West region (Romania)				
Agriculture	101.8	174.1	204.6	480.4
Direct payments	22.1	36.2	46.6	104.8
Market support	10.6	35.9	40.6	87.1
Rural development	69.1	102	117.4	288.5
Structural Actions	177.7	236.9	296.2	710.8
Structural Funds	118.5	158	197.4	473.9
Cohesion Funds	59.2	79	98.7	236.9
Total	279.5	411	500.8	1,191.2
North-East region (Bulgaria)				
Agriculture	57.3	109.6	130.2	297
Direct payments	21.8	35.6	45.8	103.1
Market support	11.3	38.3	43.3	92.9
Rural development	24.2	35.7	41.1	101
Structural Actions	72.8	121.1	182.7	376.4
Structural Funds	48.5	80.7	121.8	250.9
Cohesion Funds	24.3	40.4	60.9	125.5
Total	130.1	230.7	312.9	673.4

Source: Author's elaboration

6. Policy impact analysis

By applying a time-varying coefficient I-O model, it was possible to estimate overall impact in terms of income, employment and output, generated by the policy scenarios hypothesised, in the areas under study and in the period 2004-2009, taking account of structural changes. Matrices of final demand related to each scenario are shown in Appendix A. From the analysis of multipliers and impacts (Appendices B and C), a general consideration can be made. The dynamic analysis carried out generally produces lower impacts than those deriving from a static approach. This is a result of the general tendency of multipliers to decrease. In this connection, nations register on average higher negative variations than the corresponding regions. Romania exhibits a higher variation than Bulgaria. Differences in terms of income and output impact are quite contained (generally less than 1%) whereas those related to employment tend to be more significant.

Here below, for every area under study, the main results from the impact analysis are presented.

6.1 Romania

6.1.1 The national level

Over the period 2004-2009, multipliers tend to change. In terms of output, all sectors tend to lose their importance in the economy. The average variation of output multipliers amounts to -2%. Sectors having a negative variation, equal or more than 3%, are: agriculture, food industry and public administration. With reference to income, most sectors reduce their economic contribution except for trade and "community, social and personal services" sectors whose multiplicative effects increase. The average multiplier variation is -2.1%. Finally, as for employment, all sectors reduce their impact in the economy. The variation is on average minus 21.8%. Reduction of employment multipliers can be interpreted as a result of the increasing labour productivity which involves all sectors. The sector having the lowest negative variation in terms of employment multiplier is agriculture, whilst those which are mainly interested by an increase in productivity are the tertiary sectors.

In 2004, the first three key sectors, in terms of output, are: (a) electricity, water and gas; (b) metal products; (c) trade. In terms of income, they are: (a) public administration; (b) community services and (c) trade. With reference to employment, they are: (a) agriculture; (b) trade; (c) community services. In 2009, sector ranking remains about unaltered. Some positions change but these modifications are insignificant.

Results in terms of impact are shown in Appendix C (Tables C1, C2, C3 and C4). The only application of pre-accession instruments (Scenario 1) in the period 2004-2006 will produce an increase in output by 2,800 € mio, in income by 400 € mio and in employment by 207,086 workers[5]. This implies that, through application of pre-accession instruments, in the period 2004-2006, output will rise by 6.8%, income will increase by 6.9% and employment will grow by 2.5%.

The entrance into EU (Scenario 2) will produce negative effects in the period 2007-2009, because of an increase of net imports, attenuating the increases generated by application of pre-accession instruments. Variations of output, income and employment due to accession are -860 € mio, -89 € mio and -11,740 labour units, respectively. In the period 2004-2009, because of accession, output would only increase by 4.7%, income by 5.4% and employment by 2.3%.

[5] It has to be reminded that a significant part of the estimated increases in employment will be translated into absorption of unemployed.

The partial application of policy with decoupling (Scenario 3b) will produce an increase by 20,248 € mio in output, by 2,886 € mio in income and by 1,800,469 labour units. With reference to the period 2004-2009, output variation will be +49.1%, income variation will be +49.9% and finally employment variation will be +21.4%. For every one € million, policy is able to generate an increase in output by 1.84 € mio, in income by 0.26 € mio and in employment by 164 labour units.

The partial application of policy with coupling (Scenario 3a) will bring about an increase by 20,198 € mio in output, by 2,798 € mio in income, by 2,071,434 labour units. Comparing Scenarios 3b and 3a, it can be noted hat decoupling produces impacts which are more than 0.2% (output) and 3.1% (income) of impact produced by coupling, but smaller, in terms of employment, than 13.1%.

The full application of policy with decoupling (Scenario 4b) generates increases amounting to 22,675 € mio, 3,207 € mio and 2,016,884 labour units, respectively. The loss of benefits coming from accepting a gradual transfer of direct payments (comparing Scenarios 4b and 3b) can be quantified as: -10.7% of output, -10% of income and -10.7% of employment.

The full application of policy with coupling (scenario 4a) produces an increase in output by 22,550 € mio, in income by 2,987 € mio and in employment by 2,704,808 labour units. The loss of benefits coming from accepting a gradual transfer of direct payments (comparing Scenarios 4a and 3a) can be quantified as: -10.4% of output, -6.8% of income and -23.4% of employment. Comparing Scenarios 4b and 4a, it results that decoupling produce impacts which are more than 0.6% and 7.4% of impacts produced by coupling, in terms of output and employment, respectively. However, decoupling generates employment impact which is smaller than 25.4% of impact induced by coupling.

6.1.2 The North-West region

In the period analysed, even at a regional level, multipliers change although to a lesser extent than national multipliers. Generally, dynamics of sectors reflects the national one. In terms of output, all sectors tend to lose their importance in the economy. The average variation of output multipliers amounts to -0.7%. Sectors having a bigger negative variation (more than 1%) are the following ones: agriculture, food industry and public administration. With reference to income, most of sectors reduce their potential impact excluding trade and "community, social and personal services" sectors whose multipliers increase. The average multiplier variation is -1%. Finally, as for employment, all sectors reduce their multipliers. The variation is on average -20.7%. The least involved sector by a change in productivity is agriculture. Tertiary sectors are again those whose productivity increases to a bigger extent.

The main key sectors existing in 2004, in terms of output, are: (a) machinery, electronic products and cars; (b) metal products; (c) chemicals. In terms of income, they are: (a) public administration; (b) community services and (c) trade. With reference to employment, they are: (a) agriculture; (b) trade; (c) community services. From 2004 to 2009, sector ranking does not change significantly.

In Appendix C (Tables C5, C6, C7 and C8), results from impact analysis are shown.

Application of pre-accession instruments (Scenario 1) in the period 2004-2006 will cause an increase in output by 256 € mio (9.2% of national impact), in income by 39 € mio (9.8%) and in employment by 22,938 workers (11.1%). This brings about that, through application of pre-accession instruments, in the period 2004-2006, output growth will be 5.6%, income will increase by 5.9% and employment will rise by 2.0%.

The entrance into the EU (Scenario 2) will produce negative effects in the period 2007-2009, more than compensating increases generated by application of pre-accession instruments. Variations of output, income and employment due to accession are -265 € mio, -45 € mio and -39,452 labour units, respectively. In comparison with 2004, owing to accession, output will decrease by 0.2%, income by 0.9% and employment by 1.4%.

The partial application of policy with decoupling (Scenario 3b) will cause an increase by 1,703 € mio in output (8.4% of national impact), by 248 € mio in income (8.6% of national impact) and by 165,653 labour units (9.2% of national impact). With reference to the period 2004-2009, output variation will be +37.5%, income variation will be +37.4% and, finally, employment variation will be +14.4%. For every one € million, policy will generate an increase in output by 1.44 € mio, in income by 0.21 € mio and in employment by 140 labour units.

The partial application of policy with coupling (Scenario 3a) will generate an increase by 1,689 € mio in output (8.4% of national impact), by 238 € mio in income (8.5% of national impact), by 191,549 labour units (9.2% of national impact). From comparison of Scenarios 3b with Scenario 3a, it can be noted that decoupling produces impacts which are more than 0.8% (output) and 4.2% (income) of impacts produced by coupling, but smaller, in terms of employment, than 13.5%. These differences are broader than those emerging at a national level.

The full application of policy with decoupling (Scenario 4b) generates increases equal to 1,932 € mio (8.5% of national impact), 280 € mio (8.7%

of national impact) and 192,204 labour units (9.5% of national impact), respectively. The loss of benefits coming from phase-in scheme (comparing Scenarios 4b and 3b) can be quantified as: -11.9% of output, -11.4% of income and -13.8% of employment.

The full application of policy with coupling (Scenario 4a) produces an increase in output by 1,897 € mio (8.4% of national impact), in income by 254 € mio (8.5% of national impact) and in employment by 257,805 labour units (9.5% of national impact). The loss of benefits coming from phase-in scheme (comparing Scenarios 4a and 3a) are: -11% of output, -6.7% of income and -25.7% of employment. Comparing Scenarios 4b and 4a, decoupling produces impacts which are more than 1.8% and 10.2% of impacts produced by coupling, in terms of output and employment, respectively. However, decoupling generates employment impact which is smaller than 25.4% of impact induced by coupling.

6.2 Bulgaria

6.2.1 The national level

From 2004 to 2009, multipliers will change but less than Romanian multipliers. This can be ascribed to a different development stage characterising the two countries. In terms of output, many sectors increase their potential impact in the economy. However, the average variation of output multipliers is negative and it amounts to -0.2%. This result is mainly affected by significant decreases involving agriculture (-3.1%) and food industry (-1.7%). With reference to income, most sectors reduce their economic contribution except for food industry and other products of manufacturing whose multiplicative effects increase. The average multiplier variation is -0.4%. Finally, as for employment, all sectors reduce their impact in the economy. The variation is on average -17.5%. Agriculture is the sector having the lowest negative variation in terms of employment multiplier. Tertiary sectors are instead those mainly interested by a reduction of multipliers.

In 2004, the first three key sectors, in terms of output, are: (a) construction; (b) other non-metallic mineral products; (c) other activities. In terms of income, they are: (a) education; (b) public administration and defence; (c) health and social works. With reference to employment, they are: (a) agriculture; (b) public administration; (c) other activities. In 2009, sector ranking remains about unaltered.

Results in terms of impact are shown in Appendix C (Tables C9, C10, C11 and C12).

The application of pre-accession instruments (Scenario 1) in the period 2004-2006 will produce an increase in output by 1,125 € mio, in income by 161 € mio and in employment by 145,626 workers. By means of application of pre-accession instruments, in the period 2004-2006, output will rise by 4.3%, income will increase by 4.0% and employment will rise by 4.6%.

The entrance into the EU (Scenario 2) will produce positive effects in the period 2007-2009, because of an increase in net exports. Variations of output, income and employment due to accession are +1,392 € mio, +181 € mio and +120,600 labour units, respectively. With respect to 2004, accession will lead to an increase in output by 9.7%, in income by 8.4% and in employment by 8.4%.

The partial application of policy with decoupling (Scenario 3b) will produce an increase by 8,906 € mio in output, by 1,359 € mio in income and by 1,181,388 labour units. In the period 2004-2009, output variation will be +34.4%, income variation will be +33.3% and employment variation will be +37.4%. For every one € million, policy produces an increase in output by 1.69 € mio, in income by 0.26 € mio and in employment by 225 labour units.

The partial application of policy with coupling (Scenario 3a) will lead to an increase by 8,925 € mio in output, by 1,320 € mio in income, by 1,311,940 labour units. Comparing Scenarios 3b and 3a, it turns out that decoupling produces income impact which is more than 3% of the corresponding impact produced by coupling. However, output and employment impact is smaller than 0.2% and 10% of the relevant impact related to coupling.

The full application of policy with decoupling (Scenario 4b) generates increases amounting to 9,924 € mio, 1,480 € mio and 1,294,172 labour units, respectively. The loss of benefits coming from accepting a gradual transfer of direct payments (comparing Scenarios 4b and 3b) can be quantified as: -10.3% of output, -8.2% of income and -8.7% of employment.

The full application of policy with coupling (Scenario 4a) generates an increase in output by 9,972 € mio, in income by 1,382 € mio and in employment by 1,623,092 labour units. The loss of benefits deriving from the application of the phase-in scheme (comparing Scenarios 4a and 3a) are: -10.5% of output, -4.7% of income and -19.2% of employment. From the comparison of Scenarios 4b with 4a, it results that decoupling brings about income impact which is more than 7.1% of income impact produced by coupling. At the same time, decoupling produces output and employment impact which is smaller than 0.5% and 20.3% of impact generated by coupling.

6.2.2 The North-East region

In the period examined, regional multipliers vary but to a lesser extent than national multipliers. In terms of output, many sectors (more than national sectors) increase their importance in the economy except for some sectors such as agriculture and food industry whose multipliers diminish by 1.8% and 1%, respectively. On average, there are not changes in output multipliers. As for income, most sectors reduce their multipliers excluding agriculture, food industry and other products of manufacturing, whose potential impact rises. The average multiplier variation is -0.4%. Finally, as far as employment is concerned, all sectors reduce their multipliers in the economy. The variation is on average -17.4%. Agriculture is the least involved sector by changes in employment multiplier. Again, tertiary sectors are those whose multipliers decrease to a bigger extent.

The main key sectors existing in 2004, in terms of output, are: (a) food industry; (b) other activities; (c) construction. In terms of income, they are: (a) education; (b) public administration (c) health and social work. With reference to employment, they are: (a) mining; (b) other activities; (c) education. From 2004 to 2009, sector ranking does not change significantly. The only interesting aspect which is worth noting is that the position of agriculture in terms of employment improves passing from the fourth to the second place.

Results in terms of impact are shown in Appendix C (Tables C13, C14, C15 and C16).

Application of pre-accession instruments (Scenario 1) in the period 2004-2006 will produce an increase in output by 148 € mio (13.2% of national impact), in income by 22 € mio (13.7%) and in employment by 20,829 workers (14.3%). In the period 2004-2006, through pre-accession policy instruments, output will rise by 4.5%, income will increase by 4% and employment will rise by 4.1%.

Different from the national situation, the entrance into the EU (Scenario 2) will produce negative effects in the period 2007-2009, reducing increases generated by application of pre-accession instruments. Variations of output, income and employment due to accession are -17 € mio, -10 € mio and -12,067 labour units, respectively. In comparison with 2004, owing to accession, output would increase only by 4%, income by 2.3% and employment by 1.7%.

The partial application of policy with decoupling (Scenario 3b) will produce an increase by 1,060 € mio in output (11.9% of national impact), by 161 € mio in income (11.8% of national impact) and by 168,350 labour units (14.3% of national impact). With reference to the period 2004-2009, output variation will be +32.5%, income variation will be +29.8% and finally employment variation will be +32.8%. For every one € million, policy is able to generate an increase in output by 1.38 € mio, in income by 0.21 € mio and in employment by 219 labour units.

The partial application of policy with coupling (Scenario 3a) will bring about an increase by 1,051 € mio in output (11.8% of national impact), by 27.7 € mio in income (11.4% of national impact) and by 189,690 labour units (14.5% of national impact). Comparing Scenarios 3b and 3a, it can be noted that decoupling produces impact which is more than 0.9% (output) and 7.3% (income) of impact produced by coupling, but smaller, in terms of employment, than 11.2%.

The full application of policy with decoupling (Scenario 4b) generates increases amounting to 1,274 € mio (12.8% of national impact), 187 € mio (12.6% of national impact) and 201,656 labour units (15.6% of national impact), respectively. The loss of benefits coming from the decision of attributing direct payments gradually (comparing Scenarios 4b and 3b) amounts to: -16.8% of output, -13.9% of income and -16.5% of employment.

The full application of policy with coupling (Scenario 4a) produces an increase in output by 1,252 € mio (12.6% of national impact), in income by 160 € mio (11.6% of national impact) and in employment by 254,991 labour units (15.7% of national impact). The loss of benefits coming from accepting a gradual transfer of direct payments (comparing Scenarios 4a and 3a) can be quantified as: -16.1% of output, -6.7% of income and -25.6% of employment. Comparing scenarios 4b and 4a, there results that decoupling produce impacts which are more than 1.8% and 16.9% of impacts produced by coupling, in terms of output and employment, respectively. However, decoupling generates employment impact which is smaller than 20.9% of impact induced by coupling.

7. Concluding remarks

Results of this analysis can be examined from two different points of view: methodology used and policy information.

From the first standpoint, impact estimated by the dynamic analysis is generally lower than the one deriving from a static analysis owing to the decreasing tendency of multipliers. Since these gaps are likely to increase over time and differences in terms of employment between the two approaches are already high in a 6-year period, a static approach to an impact analysis may be adopted and major costs related to application of a time-varying coefficient model may be avoided when the number of years considered is small (say not more than 5 years). However, when time period is longer, it can be preferable to accept higher costs in terms of elaboration related to the use of a time-varying coefficient model in order to gain more benefits in terms of precision of estimation (provided that forecasts of technological changes are close to the real ones).

With regard to policy information, some considerations can be put forward.

A first consideration is about the policy capability of producing impacts. Indeed, calculating ratios between impact and final demand, it is possible to obtain information in terms of policy effectiveness comparing the different areas under study. From results, it results that policy is more effective in generating output, income and employment at a national level than at a regional level. Moreover, policy effectiveness is bigger in Romania in terms of output and income and in Bulgaria in terms of employment.

Secondly, the only accession without application of EU policies, excluding the national case of Bulgaria, will produce negative effects due to an increase in deficit of payment balance. As a result, the implementation of EU policy in the areas considered, generally, will not only lead to benefits to economic development (even if they are decreasing owing to the natural tendency of multipliers to diminish) but it will also allow a protection of the economies analysed from possible trade unbalances following the opening of frontiers.

Third, as was logical to expect, the acceptance of a gradual transfer of payments, instead of a full transfer, will produce in the areas under study a loss of benefits in terms of output, income and employment. Losses vary according to areas, impact variable and hypothesis about the links to production (decoupling or coupling) considered. In the case of decoupling, output loss goes from 10.3% (Bulgaria) to 16.8% (the Bulgarian North-East region). Income loss is included in the interval 8.2-13.9% (extremes are represented by Bulgaria and the relevant North-East region), and, finally, employment loss goes from 8.7% (Bulgaria) to 16.5% (the Bulgarian North-East region). Under the hypothesis of coupling, output loss goes from 10.4% (Romania) to 16.1% (the Bulgarian North-East region). Income loss goes from 4.7% (Bulgaria) to 6.8% (Romania) and, finally, employment loss goes from 19.2% (Bulgaria) to 16.5% (the Romania North-West region). The loss of benefits in terms of income and output is generally bigger in the case of decoupling, while the one in terms of employment is smaller.

Lastly, decoupling (sub-scenario "b") tends to produce bigger positive effects than coupling (sub-scenario "a") but only in terms of output and income. The only exception is Bulgaria about which decoupling produces more substantial impact only in terms of income. However, as far as employment is concerned, whatever area is considered, coupling yields higher impacts than decoupling. This last result can be explained by a higher employment multiplier characterising agriculture, which is consistent with the situation of areas under study, whose economies are still under-developed and mainly oriented to agriculture. Moreover, it results that full application in comparison with partial integration would tend to emphasise these differences. In other words, under the hypothesis of full policy application, decoupling would be both more advantageous in terms of output (except for Bulgaria) and income and more disadvantageous with reference to employment. In any case, independently of the hypothesis of full or partial application and considering that target variables are usually income and employment (and not output), if the aim was to increase employment, coupling would be more effective than decoupling. This is due to the important role that agriculture still will play over the next six years in the areas under study. But if the aim was to increase income, a less sectoral approach (i.e. decoupling direct payments to production) should be preferred.

References

Bacharach, M. (1970): Biproportional Matrices and Input-Output Change, Cambridge University Press, London.

Brand, S. (1997): On the Appropriate Use of Location Quotients in Generating Regional Input-Output Tables: A Comment, Regional Studies, 31, pp. 791-794.

Czamanski, S. and Malizia, E. (1969): Applicability and limitations in the use of national input-output tables for regional studies, Regional Science Association Papers and Proceedings, 23, pp. 65-77.

Dewhurst, J. H. L. (1992), Using the RAS Technique as a Test of Hybrid Methods of Regional Input-Output Table Updating", Regional Studies, 26, pp. 81-91.

European Commission (2002a): Fact sheet - Enlargement and agriculture: A fair and tailor-made package which benefits farmers in accession countries, MEMO/02/3001, Brussels.

European Commission (2002b): Roadmaps for Bulgaria and Romania, COM (2002) 624 final.

European Commission (2003a): 2003 Regular Report on Bulgaria's progress towards accession.

European Commission (2003b): 2003 Regular Report on Romania's progress towards accession.

European Commission (2004): A Financial Package for the Accession Negotiations with Bulgaria and Romania, COM (2004) 160 final.

FAPRI (2003): World 2003 Agricultural Outlook.

Flegg, T. A. and Webber, C. D. (1996a): Using location quotients to estimate regional input-output coefficients and multipliers, Local Economy Quarterly, 4, pp. 58-86.

Flegg, T. A. and Webber, C. D. (1996b): The FLQ formula for generating regional input-output tables: an application and reformation, Working Papers in Economics, 17, University of the West of England, Bristol.

Flegg, T. A. and Webber, C. D. (1997): On the Appropriate Use of Location Quotients in Generating Regional Input-Output Tables: Reply, Regional Studies, 31, pp. 795-805.

Flegg, T. A. and Webber, C. D. (2000): Regional Size, Regional Specialization and the FLQ Formula, Regional Studies, 34, pp. 563-69.

Flegg, T. A., Webber C. D. and Elliot, M. V. (1995): On the appropriate use of location quotients in generating regional input-output tables, Regional Studies, 29, pp. 547-561.

Harrigan, F. J., McGilvray, J. W. and McNicoll, I. H. (1980), Simulating the structure of a regional economy, Environment and Planning A, 12, pp. 927-936

Hewings, G. J. D. (1977): Evaluating the Possibility for Exchanging Regional Input-Output Coefficients, Environment and Planning A, 8, pp. 927-944.

Jensen, R. C., Mandeville, T. D. and Karunarante, N. D. (1979): Regional Economic Planning: Generation of Regional Input-Output Analysis, Croom Helm, London.

Junius T. and Oosterhaven J. (2003), "The Solution of Updating or Regionalizing a Matrix with both Positive and Negative Entries", Economic Systems Research, 15, pp. 87-96.

Lecomber, J. R. C. (1975): A Critique of Methods of Adjusting, Updating and Projecting Matrices in Allen R. I. G. and Gossling W. F. (Ed.), Estimating and Projecting Input-Output Coefficients, Input-Output Publishing Company, London, pp. 1-25.

Malizia, E. and Bond, D. L. (1974): Empirical Tests of the RAS method of interindustry coefficient adjustment, Journal of Regional Science, 14, pp. 355-365.

McCann, P. and Dewhurst, J. H. L. (1998): Regional Size, Industrial Location and Input-Output Expenditure Coefficients, Regional Studies, 32, pp. 435-444.

McMenamin, D. G. and Haring, J. E. (1974): An Appraisal of nonsurvey techniques for estimating regional Input-Output models, Journal of Regional Science, 14, pp. 191-203.

Morrison, W. I. and Smith, P. (1974): Nonsurvey Input-Output Techniques at the Small Area Level: An Evaluation, Journal of Regional Science 14, 1-14.

Romanian Ministry of Integration (2003): Romanian Development Plan, 2004-2006.

Appendix A – Matrices of final demand

Tab. A1 – Matrix of final demand, Romania, Scenario 1 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007-09	TOTAL
Agriculture	36.5	36.5	36.5	0	109.5
Mining	0	0	0	0	0
Food Industry	19.3	19.3	19.3	0	57.9
Textiles and Leather Goods	0	0	0	0	0
Wood Products, Furniture and Paper	24.8	26.3	27.8	0	78.9
Chemical and Plastic Products	10.1	10.9	11.8	0	32.8
Building Materials	20.4	22.1	23.8	0	66.3
Metal Products	6.2	6.7	7.2	0	20.1
Machinery, Electronic Products and Cars	36.6	39.2	41.8	0	117.6
Electricity Water and Gas	29	31.2	33.4	0	93.6
Construction	106.8	114.3	121.8	0	342.9
Trade	6.9	6.9	6.9	0	20.7
Hotels and Catering	1.6	1.6	1.6	0	4.8
Transports and Communication	133.1	141.9	150.7	0	425.7
Banking and Real Estate	7.2	7.2	7.2	0	21.6
Public Administration and Defence	4	4	4.1	0	12.1
Community, social and personal services	30	30.2	30.4	0	90.6
TOTAL	472.5	498.3	524.3	0	1,495.1

Source: Authors' elaboration

Tab. A2 – Matrix of final demand, Romania, Scenario 2 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.5	36.5	36.5	18.2	18.9	19.6	166.2
Mining	0	0	0	-63.8	-66.5	-69.3	-199.6
Food Industry	19.3	19.3	19.3	-39.3	-41.3	-43.4	-66.1
Textiles and Leather Goods	0	0	0	50.4	52.3	54.3	157
Wood Products, Furniture and Paper	24.8	26.3	27.8	41.2	43	44.8	207.9
Chemical and Plastic Products	10.1	10.9	11.8	-72.2	-75.2	-78.3	-192.9
Building Materials	20.4	22.1	23.8	4.8	5.1	5.3	81.5
Metal Products	6.2	6.7	7.2	48.3	50.6	53	172
Machinery, Electronic Products and Cars	36.6	39.2	41.8	-126.2	-131.5	-137	-277.1
Electricity Water and Gas	29	31.2	33.4	2.2	2.3	2.5	100.6
Construction	106.8	114.3	121.8	2.2	2.3	2.4	349.8
Trade	6.9	6.9	6.9	0	0	0	20.7
Hotels and Catering	1.6	1.6	1.6	-11.2	-12	-12.7	-31.1
Transports and Communication	133.1	141.9	150.7	-4.2	-4.4	-4.6	412.5
Banking and Real Estate	7.2	7.2	7.2	-13.3	-14.2	-15	-20.9
Public Administration and Defence	4	4	4.1	-9.8	-10.4	-11	-19.1
Community, social and personal services	30	30.2	30.4	5.2	5.5	5.9	107.2
TOTAL	472.5	498.3	524.3	-167.5	-175.5	-183.5	968.6

Source: Authors' elaboration

Tab. A3 – Matrix of final demand, Romania, Scenario 3a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.5	36.5	36.5	495.6	913.9	1,094	2613
Mining	0	0	0	-4.6	12.4	29.4	37.2
Food Industry	19.3	19.3	19.3	92.3	144.1	178.1	472.4
Textiles and Leather Goods	0	0	0	82.3	94.9	107.6	284.8
Wood Products, Furniture and Paper	24.8	26.3	27.8	130.3	165.2	194	568.4
Chemical and Plastic Products	10.1	10.9	11.8	-20.1	-5.8	8.5	15.4
Building Materials	20.4	22.1	23.8	69.1	90.7	112.4	338.5
Metal Products	6.2	6.7	7.2	96.4	114.7	133.1	364.3
Machinery, Electronic Products and Cars	36.6	39.2	41.8	-6	31.5	63.9	207
Electricity Water and Gas	29	31.2	33.4	143.8	192.3	238.8	668.5
Construction	106.8	114.3	121.8	275.6	375.6	460.1	1,454.2
Trade	6.9	6.9	6.9	67	93	112.6	293.3
Hotels and Catering	1.6	1.6	1.6	44.4	63	80.2	192.4
Transports and Communication	133.1	141.9	150.7	439.1	600.7	737.4	2,202.9
Banking and Real Estate	7.2	7.2	7.2	59	86	106.4	273
Public Administration and Defence	4	4	4.1	55.6	78.3	98.3	244.3
Community, social and personal services	30	30.2	30.4	161.3	228	269.3	749.2
TOTAL	472.5	498.3	524.3	2,181.1	3,278.5	4,024.1	10,978.8

Source: Authors' elaboration

Tab. A4 – Matrix of final demand, Romania, Scenario 3b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.5	36.5	36.5	331.2	644.6	746.5	1,831.8
Mining	0	0	0	4.4	27.1	48.2	79.7
Food Industry	19.3	19.3	19.3	133.9	211.6	264.5	667.9
Textiles and Leather Goods	0	0	0	87.9	103.9	119	310.8
Wood Products, Furniture and Paper	24.8	26.3	27.8	135.5	173.7	204.9	593
Chemical and Plastic Products	10.1	10.9	11.8	-16.1	0.7	16.8	34.2
Building Materials	20.4	22.1	23.8	70.3	92.8	115	344.4
Metal Products	6.2	6.7	7.2	96.6	115	133.5	365.2
Machinery, Electronic Products and Cars	36.6	39.2	41.8	3	46.1	82.6	249.3
Electricity Water and Gas	29	31.2	33.4	147.2	197.8	245.8	684.4
Construction	106.8	114.3	121.8	277	377.9	463	1,460.8
Trade	6.9	6.9	6.9	87.2	126.3	155.8	390
Hotels and Catering	1.6	1.6	1.6	54	78.8	100.7	238.3
Transports and Communication	133.1	141.9	150.7	450.5	619.5	761.9	2,257.6
Banking and Real Estate	7.2	7.2	7.2	88.4	134.6	169.6	414.2
Public Administration and Defence	4	4	4.1	62.3	89.4	112.7	276.5
Community, social and personal services	30	30.2	30.4	167.8	238.8	283.3	780.5
TOTAL	472.5	498.3	524.3	2,181.1	3,278.6	4,023.8	10,978.6

Source: Authors' elaboration

Tab. A5 – Matrix of final demand, Romania, Scenario 4a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.5	36.5	36.5	1,053.4	1,353.7	1,446.4	3,963
Mining	0	0	0	-4.6	12.4	29.4	37.2
Food Industry	19.3	19.3	19.3	92.3	144.1	178.1	472.4
Textiles and Leather Goods	0	0	0	82.3	94.9	107.6	284.8
Wood Products, Furniture and Paper	24.8	26.3	27.8	130.3	165.2	194	568.4
Chemical and Plastic Products	10.1	10.9	11.8	-20.1	-5.8	8.5	15.4
Building Materials	20.4	22.1	23.8	69.1	90.7	112.4	338.5
Metal Products	6.2	6.7	7.2	96.4	114.7	133.1	364.3
Machinery, Electronic Products and Cars	36.6	39.2	41.8	-6	31.5	63.9	207
Electricity Water and Gas	29	31.2	33.4	143.8	192.3	238.8	668.5
Construction	106.8	114.3	121.8	275.6	375.6	460.1	1,454.2
Trade	6.9	6.9	6.9	67	93	112.6	293.3
Hotels and Catering	1.6	1.6	1.6	44.4	63	80.2	192.4
Transports and Communication	133.1	141.9	150.7	439.1	600.7	737.4	2,202.9
Banking and Real Estate	7.2	7.2	7.2	59	86	106.4	273
Public Administration and Defence	4	4	4.1	55.6	78.3	98.3	244.3
Community, social and personal services	30	30.2	30.4	161.3	228	269.3	749.2
TOTAL	472.5	498.3	524.3	2,738.9	3,718.3	4,376.5	12,328.8

Source: Authors' elaboration

Tab. A6 – Matrix of final demand, Romania, Scenario 4b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.5	36.5	36.5	395.7	696.1	788.7	1,990
Mining	0	0	0	31.5	48.5	65.4	145.4
Food Industry	19.3	19.3	19.3	258.9	310.7	344.8	972.3
Textiles and Leather Goods	0	0	0	104.5	117.1	129.8	351.4
Wood Products, Furniture and Paper	24.8	26.3	27.8	151.2	186.2	215	631.3
Chemical and Plastic Products	10.1	10.9	11.8	-4.2	10.1	24.4	63.1
Building Materials	20.4	22.1	23.8	74.1	95.7	117.4	353.5
Metal Products	6.2	6.7	7.2	97.2	115.5	133.9	366.7
Machinery, Electronic Products and Cars	36.6	39.2	41.8	30	67.5	100	315.1
Electricity Water and Gas	29	31.2	33.4	157.2	205.7	252.1	708.6
Construction	106.8	114.3	121.8	281.3	381.3	465.8	1,471.3
Trade	6.9	6.9	6.9	147.7	173.6	193.2	535.2
Hotels and Catering	1.6	1.6	1.6	82.7	101.3	118.5	307.3
Transports and Communication	133.1	141.9	150.7	484.7	646.3	783	2,339.7
Banking and Real Estate	7.2	7.2	7.2	176.6	203.6	224	625.8
Public Administration and Defence	4	4	4.1	82.4	105.1	125.1	324.7
Community, social and personal services	30	30.2	30.4	187.4	254.1	295.4	827.5
TOTAL	472.5	498.3	524.3	2,738.9	3,718.4	4,376.5	12,328.9

Source: Authors' elaboration

Tab. A7 – Matrix of final demand, North-West region (ROM), Scenario 1 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007-09	TOTAL
Agriculture	4.8	4.8	4.8	0	14.4
Mining	0	0	0	0	0
Food Industry	2.1	2.1	2.1	0	6.3
Textiles and Leather Goods	0	0	0	0	0
Wood Products, Furniture and Paper	5	5.3	5.6	0	15.9
Chemical and Plastic Products	0.9	1	1.1	0	3
Building Materials	4.8	5.2	5.6	0	15.6
Metal Products	0.8	0.9	0.9	0	2.6
Machinery, Electronic Products and Cars	3	3.2	3.4	0	9.6
Electricity Water and Gas	2.5	2.7	2.9	0	8.1
Construction	10.2	10.9	11.6	0	32.7
Trade	0.9	0.9	0.9	0	2.7
Hotels and Catering	0.2	0.2	0.2	0	0.6
Transports and Communication	15.9	17	18.1	0	51
Banking and Real Estate	1.1	1.1	1.1	0	3.3
Public Administration and Defence	0.5	0.5	0.5	0	1.5
Community, social and personal services	3.6	3.6	3.6	0	10.8
TOTAL	56.3	59.4	62.4	0	178.1

Source: Authors' elaboration

Tab. A8 – Matrix of final demand, North-West region (Romania), Scenario 2 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	4.8	4.8	4.8	-15	-15.1	-15.3	-31
Mining	0	0	0	-2.5	-2.7	-2.8	-8
Food Industry	2.1	2.1	2.1	-17.1	-17.6	-18.2	-46.6
Textiles and Leather Goods	0	0	0	15.4	16.1	16.8	48.3
Wood Products, Furniture and Paper	5	5.3	5.6	3.2	3.4	3.6	26.1
Chemical and Plastic Products	0.9	1	1.1	-2.1	-2.2	-2.3	-3.6
Building Materials	4.8	5.2	5.6	0.1	0.2	0.2	16.1
Metal Products	0.8	0.9	0.9	9.8	10.2	10.5	33.1
Machinery, Electronic Products and Cars	3	3.2	3.4	-1.5	-1.5	-1.5	5.1
Electricity Water and Gas	2.5	2.7	2.9	-12.4	-12.9	-13.3	-30.5
Construction	10.2	10.9	11.6	-5.6	-5.8	-6	15.3
Trade	0.9	0.9	0.9	-7.3	-7.8	-8.2	-20.6
Hotels and Catering	0.2	0.2	0.2	-3	-3.2	-3.4	-9
Transports and Communication	15.9	17	18.1	-5.8	-6	-6.3	32.9
Banking and Real Estate	1.1	1.1	1.1	-4.8	-5.1	-5.4	-12
Public Administration and Defence	0.5	0.5	0.5	-1.3	-1.3	-1.4	-2.5
Community, social and personal services	3.6	3.6	3.6	-10.3	-10.9	-11.5	-21.9
TOTAL	56.3	59.4	62.4	-60.2	-62.2	-64.5	-8.8

Source: Authors' elaboration

Tab. A9 – Matrix of final demand, North-West region (Romania), Scenario 3a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	4.8	4.8	4.8	42.9	93	114.4	264.7
Mining	0	0	0	3.2	5	6.8	15
Food Industry	2.1	2.1	2.1	0.1	6.3	10.6	23.3
Textiles and Leather Goods	0	0	0	20.4	22.8	25.1	68.3
Wood Products, Furniture and Paper	5	5.3	5.6	19.1	25.3	30.4	90.7
Chemical and Plastic Products	0.9	1	1.1	5	7.2	9.5	24.7
Building Materials	4.8	5.2	5.6	12.8	17	21.3	66.7
Metal Products	0.8	0.9	0.9	17.1	19.9	22.7	62.3
Machinery, Electronic Products and Cars	3	3.2	3.4	12	16.7	21	59.3
Electricity Water and Gas	2.5	2.7	2.9	10.2	17.4	24.4	60.1
Construction	10.2	10.9	11.6	17.4	25.5	32.4	108
Trade	0.9	0.9	0.9	17.3	25.5	33	78.5
Hotels and Catering	0.2	0.2	0.2	-1	-0.4	0.1	-0.7
Transports and Communication	15.9	17	18.1	39.8	56.4	70	217.2
Banking and Real Estate	1.1	1.1	1.1	0.1	2.1	3.1	8.6
Public Administration and Defence	0.5	0.5	0.5	0.5	1.2	1.6	4.8
Community, social and personal services	3.6	3.6	3.6	2.5	7.9	10.2	31.4
TOTAL	56.3	59.4	62.4	219.4	348.8	436.6	1,182.9

Source: Authors' elaboration

Tab. A10 – Matrix of final demand, North-West region (Romania), Scenario 3b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	4.8	4.8	4.8	25	63.6	76.3	179.3
Mining	0	0	0	3.4	5.2	7.1	15.7
Food Industry	2.1	2.1	2.1	5.1	14.4	21	46.8
Textiles and Leather Goods	0	0	0	21.4	24.3	27.1	72.8
Wood Products, Furniture and Paper	5	5.3	5.6	20.5	27.4	33.1	96.9
Chemical and Plastic Products	0.9	1	1.1	5.2	7.6	9.9	25.7
Building Materials	4.8	5.2	5.6	13.4	18.1	22.6	69.7
Metal Products	0.8	0.9	0.9	17.1	19.9	22.7	62.3
Machinery, Electronic Products and Cars	3	3.2	3.4	12.3	17.1	21.6	60.6
Electricity Water and Gas	2.5	2.7	2.9	10.8	18.4	25.7	63
Construction	10.2	10.9	11.6	17.5	25.8	32.7	108.7
Trade	0.9	0.9	0.9	19.5	29.1	37.6	88.9
Hotels and Catering	0.2	0.2	0.2	0	1.2	2.2	4
Transports and Communication	15.9	17	18.1	41.6	59.4	74	226
Banking and Real Estate	1.1	1.1	1.1	2.4	5.8	7.8	19.3
Public Administration and Defence	0.5	0.5	0.5	1	2.1	2.8	7.4
Community, social and personal services	3.6	3.6	3.6	3.3	9.3	12.1	35.5
TOTAL	56.3	59.4	62.4	219.5	348.7	436.3	1,182.6

Source: Authors' elaboration

Tab. A11 – Matrix of final demand, North-West region (Romania), Scenario 4a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	4.8	4.8	4.8	109.3	145.4	156.3	425.4
Mining	0	0	0	3.2	5	6.8	15
Food Industry	2.1	2.1	2.1	0.1	6.3	10.6	23.3
Textiles and Leather Goods	0	0	0	20.4	22.8	25.1	68.3
Wood Products, Furniture and Paper	5	5.3	5.6	19.1	25.3	30.4	90.7
Chemical and Plastic Products	0.9	1	1.1	5	7.2	9.5	24.7
Building Materials	4.8	5.2	5.6	12.8	17	21.3	66.7
Metal Products	0.8	0.9	0.9	17.1	19.9	22.7	62.3
Machinery, Electronic Products and Cars	3	3.2	3.4	12	16.7	21	59.3
Electricity Water and Gas	2.5	2.7	2.9	10.2	17.4	24.4	60.1
Construction	10.2	10.9	11.6	17.4	25.5	32.4	108
Trade	0.9	0.9	0.9	17.3	25.5	33	78.5
Hotels and Catering	0.2	0.2	0.2	-1	-0.4	0.1	-0.7
Transports and Communication	15.9	17	18.1	39.8	56.4	70	217.2
Banking and Real Estate	1.1	1.1	1.1	0.1	2.1	3.1	8.6
Public Administration and Defence	0.5	0.5	0.5	0.5	1.2	1.6	4.8
Community, social and personal services	3.6	3.6	3.6	2.5	7.9	10.2	31.4
TOTAL	56.3	59.4	62.4	285.8	401.2	478.5	1,343.6

Source: Authors' elaboration

Tab. A12 – Matrix of final demand, North-West region (Romania), Scenario 4b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	4.8	4.8	4.8	37.5	73.6	84.5	210
Mining	0	0	0	3.8	5.6	7.3	16.7
Food Industry	2.1	2.1	2.1	20.1	26.3	30.6	83.3
Textiles and Leather Goods	0	0	0	24.2	26.6	29	79.8
Wood Products, Furniture and Paper	5	5.3	5.6	24.4	30.6	35.6	106.5
Chemical and Plastic Products	0.9	1	1.1	5.9	8.2	10.4	27.5
Building Materials	4.8	5.2	5.6	15.3	19.6	23.8	74.3
Metal Products	0.8	0.9	0.9	17.2	20	22.8	62.6
Machinery, Electronic Products and Cars	3	3.2	3.4	13.2	17.8	22.1	62.7
Electricity Water and Gas	2.5	2.7	2.9	12.7	19.9	26.9	67.6
Construction	10.2	10.9	11.6	17.9	26.1	32.9	109.6
Trade	0.9	0.9	0.9	25.9	34.2	41.6	104.4
Hotels and Catering	0.2	0.2	0.2	3	3.6	4	11.2
Transports and Communication	15.9	17	18.1	47.1	63.6	77.3	239
Banking and Real Estate	1.1	1.1	1.1	9	10.9	11.9	35.1
Public Administration and Defence	0.5	0.5	0.5	2.7	3.4	3.8	11.4
Community, social and personal services	3.6	3.6	3.6	5.9	11.3	13.6	41.6
TOTAL	56.3	59.4	62.4	285.8	401.3	478.1	1,343.3

Source: Authors' elaboration

Tab. A13 – Matrix of final demand, Bulgaria, Scenario 1 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007-09	TOTAL
Agriculture	36.7	39.8	42.9	0	119.4
Mining	0	0	0	0	0
Food Industry	19.4	21	22.7	0	63.1
Chemical and Plastic Products	0	0	0	0	0
Other non-metallic mineral products	0	0	0	0	0
Transport equipment	0	0	0	0	0
Other products of manufacturing	0	0	0	0	0
Electricity Water and Gas	35.8	38.8	41.8	0	116.4
Construction	36.3	39.3	42.4	0	118
Trade	0	0	0	0	0
Hotels and Catering	0	0	0	0	0
Transports and Communication	72.4	78.5	84.6	0	235.5
Financial intermediation	0	0	0	0	0
Estate and business activities	0	0	0	0	0
Public Administration and Defense	0	0	0	0	0
Education	1.8	2	2.1	0	5.9
Health and social work	0	0	0	0	0
Other activities	0	0	0	0	0
TOTAL	202.4	219.4	236.5	0	658.3

Source: Authors' elaboration

Tab. A14 – Matrix of final demand, Bulgaria, Scenario 2 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.7	39.8	42.9	12.3	12.4	12.6	156.7
Mining	0	0	0	0.8	0.8	0.9	2.5
Food Industry	19.4	21	22.7	1.9	1.7	1.5	68.2
Chemical and Plastic Products	0	0	0	41.8	43.4	45	130.2
Other non-metallic mineral products	0	0	0	11.8	12.2	12.6	36.6
Transport equipment	0	0	0	11	11.3	11.7	34
Other products of manufacturing	0	0	0	99.7	102.5	105.4	307.6
Electricity Water and Gas	35.8	38.8	41.8	-37.2	-38.6	-39.9	0.7
Construction	36.3	39.3	42.4	6.5	6.9	7.2	138.6
Trade	0	0	0	42.8	44.9	47	134.7
Hotels and Catering	0	0	0	8.9	9.3	9.7	27.9
Transports and Communication	72.4	78.5	84.6	100.2	105.1	109.9	550.7
Financial intermediation	0	0	0	17	18.2	19.3	54.5
Estate and business activities	0	0	0	-3.2	-3.4	-3.5	-10.1
Public Administration and Defense	0	0	0	-17.8	-18.6	-19.4	-55.8
Education	1.8	2	2.1	-0.4	-0.3	-0.3	4.9
Health and social work	0	0	0	-15.7	-16.4	-17.1	-49.2
Other activities	0	0	0	-3.1	-3.3	-3.4	-9.8
TOTAL	202.4	219.4	236.5	277.3	288.1	299.2	1,522.9

Source: Authors' elaboration

Tab. A15 – Matrix of final demand, Bulgaria, Scenario 3a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.7	39.8	42.9	235.7	448.3	534.5	1,338.0
Mining	0.0	0.0	0.0	0.8	0.8	0.9	2.5
Food Industry	19.4	21.0	22.7	43.9	63.7	72.8	243.5
Chemical and Plastic Products	0.0	0.0	0.0	41.8	43.4	45.0	130.2
Other non-metallic mineral products	0.0	0.0	0.0	11.8	12.2	12.6	36.5
Transport equipment	0.0	0.0	0.0	19.9	26.1	34.0	80.0
Other products of manufacturing	0.0	0.0	0.0	105.6	112.4	120.2	338.2
Electricity Water and Gas	35.8	38.8	41.8	4.7	30.3	61.4	212.8
Construction	36.3	39.3	42.4	215.6	353.7	527.2	1,214.5
Trade	0.0	0.0	0.0	45.7	49.8	54.4	150.0
Hotels and Catering	0.0	0.0	0.0	8.9	9.3	9.7	28.0
Transports and Communication	72.4	78.5	84.6	185.9	245.5	315.7	982.5
Financial intermediation	0.0	0.0	0.0	17.0	18.2	19.3	54.5
Estate and business activities	0.0	0.0	0.0	44.2	75.6	115.6	235.4
Public Administration and Defense	0.0	0.0	0.0	-17.8	-18.6	-19.4	-55.8
Education	1.8	2.0	2.1	45.0	74.5	110.5	236.0
Health and social work	0.0	0.0	0.0	2.1	13.2	27.5	42.8
Other activities	0.0	0.0	0.0	-3.1	-3.3	-3.4	-9.9
TOTAL	202.4	219.4	236.4	1,007.6	1,555.1	2,038.6	5,259.5

Source: Authors' elaboration

Tab. A16 – Matrix of final demand, Bulgaria, Scenario 3b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.7	39.8	42.9	154.5	315.1	362.4	951.4
Mining	0	0	0	1.2	1.5	1.8	4.5
Food Industry	19.4	21	22.7	56.1	83.6	98.4	301.2
Chemical and Plastic Products	0	0	0	42.1	43.9	45.6	131.6
Other non-metallic mineral products	0	0	0	12	12.5	13	37.5
Transport equipment	0	0	0	19.9	26.2	34.1	80.2
Other products of manufacturing	0	0	0	108.6	117.2	126.4	352.2
Electricity Water and Gas	35.8	38.8	41.8	7.9	35.5	68	227.8
Construction	36.3	39.3	42.4	215.7	353.8	527.4	1,214.9
Trade	0	0	0	60.7	74.5	86.4	221.6
Hotels and Catering	0	0	0	12.6	15.4	17.6	45.6
Transports and Communication	72.4	78.5	84.6	196.2	262.4	337.6	1,031.7
Financial intermediation	0	0	0	17.2	18.4	19.7	55.3
Estate and business activities	0	0	0	70.8	119.2	172	362
Public Administration and Defense	0	0	0	-17.1	-17.5	-18	-52.6
Education	1.8	2	2.1	46.3	76.6	113.3	242.1
Health and social work	0	0	0	2.9	14.5	29.3	46.7
Other activities	0	0	0	0.1	2.1	3.6	5.8
TOTAL	202.4	219.4	236.5	1,007.7	1,554.9	2,038.6	5,259.5

Source: Authors' elaboration

Tab. A17 – Matrix of final demand, Bulgaria, Scenario 4a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.7	39.8	42.9	508.6	663.5	706.9	1998.4
Mining	0	0	0	0.8	0.8	0.9	2.5
Food Industry	19.4	21	22.7	43.9	63.7	72.8	243.5
Chemical and Plastic Products	0	0	0	41.8	43.4	45	130.2
Other non-metallic mineral products	0	0	0	11.8	12.2	12.6	36.6
Transport equipment	0	0	0	19.9	26.1	34	80
Other products of manufacturing	0	0	0	105.6	112.4	120.2	338.2
Electricity Water and Gas	35.8	38.8	41.8	4.7	30.3	61.4	212.8
Construction	36.3	39.3	42.4	215.6	353.7	527.2	1214.5
Trade	0	0	0	45.7	49.8	54.4	149.9
Hotels and Catering	0	0	0	8.9	9.3	9.7	27.9
Transports and Communication	72.4	78.5	84.6	185.9	245.5	315.7	982.6
Financial intermediation	0	0	0	17	18.2	19.3	54.5
Estate and business activities	0	0	0	44.2	75.6	115.6	235.4
Public Administration and Defense	0	0	0	-17.8	-18.6	-19.4	-55.8
Education	1.8	2	2.1	45	74.5	110.5	235.9
Health and social work	0	0	0	2.1	13.2	27.5	42.8
Other activities	0	0	0	-3.1	-3.3	-3.4	-9.8
TOTAL	202.4	219.4	236.5	1,280.6	1,770.3	2,210.9	5,920.1

Source: Authors' elaboration

Tab. A18 – Matrix of final demand, Bulgaria, Scenario 4b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	36.7	39.8	42.9	183.8	338.7	382.1	1,024
Mining	0	0	0	2.5	2.5	2.6	7.6
Food Industry	19.4	21	22.7	93	112.8	121.9	390.8
Chemical and Plastic Products	0	0	0	43	44.6	46.2	133.8
Other non-metallic mineral products	0	0	0	12.6	13.1	13.5	39.2
Transport equipment	0	0	0	20	26.2	34.1	80.3
Other products of manufacturing	0	0	0	117.5	124.3	132.2	374
Electricity Water and Gas	35.8	38.8	41.8	17.4	43	74.1	250.9
Construction	36.3	39.3	42.4	216	354.1	527.6	1,215.7
Trade	0	0	0	105.7	109.8	114.4	329.9
Hotels and Catering	0	0	0	23.8	24.2	24.6	72.6
Transports and Communication	72.4	78.5	84.6	227	286.7	356.8	1,106
Financial intermediation	0	0	0	17.7	18.8	20	56.5
Estate and business activities	0	0	0	150.4	181.7	221.7	553.8
Public Administration and Defense	0	0	0	-15.1	-16	-16.8	-47.9
Education	1.8	2	2.1	50.1	79.5	115.6	251.1
Health and social work	0	0	0	5.3	16.4	30.7	52.4
Other activities	0	0	0	9.9	9.8	9.6	29.3
TOTAL	202.4	219.4	236.5	1,280.6	1,770.2	2,210.9	5,920

Source: Authors' elaboration

Tab. A19 – Matrix of final demand, North-East region, Scenario 1 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007-09	TOTAL
Agriculture	6	6.5	7	0	19.5
Mining	0	0	0	0	0
Food Industry	3.2	3.4	3.7	0	10.3
Chemical and Plastic Products	0	0	0	0	0
Other non-metallic mineral products	0	0	0	0	0
Transport equipment	0	0	0	0	0
Other products of manufacturing	0	0	0	0	0
Electricity Water and Gas	5.9	6.3	6.8	0	19
Construction	5.9	6.4	6.9	0	19.2
Trade	0	0	0	0	0
Hotels and Catering	0	0	0	0	0
Transports and Communication	11.8	12.8	13.8	0	38.4
Financial intermediation	0	0	0	0	0
Estate and business activities	0	0	0	0	0
Public Administration and Defense	0	0	0	0	0
Education	0.3	0.3	0.3	0	0.9
Health and social work	0	0	0	0	0
Other activities	0	0	0	0	0
TOTAL	33.1	35.7	38.5	0	107.3

Source: Authors' elaboration

Tab. A20 – Matrix of final demand, North-East region, Scenario 2 (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	6	6.5	7	-7	-6.9	-6.8	-1.2
Mining	0	0	0	0	0	0	0
Food Industry	3.2	3.4	3.7	-3.8	-4	-4.1	-1.6
Chemical and Plastic Products	0	0	0	8.4	8.7	9	26.1
Other non-metallic mineral products	0	0	0	0.2	0.2	0.2	0.6
Transport equipment	0	0	0	1.7	1.7	1.8	5.2
Other products of manufacturing	0	0	0	5.7	5.8	6	17.5
Electricity Water and Gas	5.9	6.3	6.8	-9.9	-10.3	-10.6	-11.8
Construction	5.9	6.4	6.9	-3.1	-3.2	-3.3	9.6
Trade	0	0	0	3.8	4	4.2	12
Hotels and Catering	0	0	0	-2.3	-2.4	-2.5	-7.2
Transports and Communication	11.8	12.8	13.8	13.3	13.9	14.6	80.2
Financial intermediation	0	0	0	2.5	2.6	2.8	7.9
Estate and business activities	0	0	0	-0.1	-0.1	-0.1	-0.3
Public Administration and Defense	0	0	0	-5.6	-5.8	-6.1	-17.5
Education	0.3	0.3	0.3	-3.6	-3.8	-3.9	-10.4
Health and social work	0	0	0	-3.2	-3.4	-3.5	-10.1
Other activities	0	0	0	-1.3	-1.4	-1.4	-4.1
TOTAL	33.1	35.7	38.5	-4.3	-4.4	-3.7	94.9

Source: Authors' elaboration

Tab. A21 – Matrix of final demand, North-East region, Scenario 3a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	6	6.5	7	40	87.8	106.8	254.1
Mining	0	0	0	0	0	0	0
Food Industry	3.2	3.4	3.7	3.1	6.2	7.6	27.2
Chemical and Plastic Products	0	0	0	8.4	8.7	9	26.1
Other non-metallic mineral products	0	0	0	0.2	0.2	0.2	0.6
Transport equipment	0	0	0	3.1	4.1	5.4	12.6
Other products of manufacturing	0	0	0	6.7	7.5	8.4	22.6
Electricity Water and Gas	5.9	6.3	6.8	-3.1	1	5.9	22.8
Construction	5.9	6.4	6.9	31.1	53.5	81.8	185.6
Trade	0	0	0	4.3	4.8	5.4	14.5
Hotels and Catering	0	0	0	-2.3	-2.4	-2.5	-7.2
Transports and Communication	11.8	12.8	13.8	27.3	36.9	48.3	150.9
Financial intermediation	0	0	0	2.5	2.6	2.8	7.9
Estate and business activities	0	0	0	7.6	12.8	19.3	39.7
Public Administration and Defense	0	0	0	-5.6	-5.8	-6.1	-17.5
Education	0.3	0.3	0.3	3.8	8.5	14.2	27.4
Health and social work	0	0	0	-0.3	1.5	3.8	5
Other activities	0	0	0	-1.3	-1.4	-1.4	-4.1
TOTAL	33.1	35.7	38.5	125.5	226.5	308.9	768.2

Source: Authors' elaboration

Tab. A22 – Matrix of final demand, North-East region, Scenario 3b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	6	6.5	7	23.3	60.2	71	174
Mining	0	0	0	0	0	0	0
Food Industry	3.2	3.4	3.7	6.1	11.1	13.8	41.3
Chemical and Plastic Products	0	0	0	8.5	8.9	9.2	26.6
Other non-metallic mineral products	0	0	0	0.4	0.5	0.6	1.5
Transport equipment	0	0	0	3.2	4.2	5.5	12.9
Other products of manufacturing	0	0	0	6.8	7.7	8.8	23.3
Electricity Water and Gas	5.9	6.3	6.8	-2.3	2.2	7.5	26.4
Construction	5.9	6.4	6.9	31.1	53.6	81.8	185.7
Trade	0	0	0	8.1	11.1	13.6	32.8
Hotels and Catering	0	0	0	-0.8	0	0.7	-0.1
Transports and Communication	11.8	12.8	13.8	30.9	42.9	56.1	168.3
Financial intermediation	0	0	0	2.5	2.7	2.9	8.1
Estate and business activities	0	0	0	9.9	16.5	24.2	50.6
Public Administration and Defense	0	0	0	-5.4	-5.6	-5.8	-16.8
Education	0.3	0.3	0.3	4.2	9.1	15	29.2
Health and social work	0	0	0	-0.1	1.8	4.3	6
Other activities	0	0	0	-0.8	-0.5	-0.2	-1.5
TOTAL	33.1	35.7	38.5	125.6	226.4	309	768.3

Source: Authors' elaboration

Tab. A23 – Matrix of final demand, North-East region, Scenario 4a (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	6	6.5	7	105.3	139.3	148.1	412.2
Mining	0	0	0	0	0	0	0
Food Industry	3.2	3.4	3.7	3.1	6.2	7.6	27.2
Chemical and Plastic Products	0	0	0	8.4	8.7	9	26.1
Other non-metallic mineral products	0	0	0	0.2	0.2	0.2	0.6
Transport equipment	0	0	0	3.1	4.1	5.4	12.6
Other products of manufacturing	0	0	0	6.7	7.5	8.4	22.6
Electricity Water and Gas	5.9	6.3	6.8	-3.1	1	5.9	22.8
Construction	5.9	6.4	6.9	31.1	53.5	81.8	185.6
Trade	0	0	0	4.3	4.8	5.4	14.5
Hotels and Catering	0	0	0	-2.3	-2.4	-2.5	-7.2
Transports and Communication	11.8	12.8	13.8	27.3	36.9	48.3	150.9
Financial intermediation	0	0	0	2.5	2.6	2.8	7.9
Estate and business activities	0	0	0	7.6	12.8	19.3	39.7
Public Administration and Defense	0	0	0	-5.6	-5.8	-6.1	-17.5
Education	0.3	0.3	0.3	3.8	8.5	14.2	27.4
Health and social work	0	0	0	-0.3	1.5	3.8	5
Other activities	0	0	0	-1.3	-1.4	-1.4	-4.1
TOTAL	33.1	35.7	38.5	190.8	278	350.2	926.3

Source: Authors' elaboration

Tab. A24 – Matrix of final demand, North-East region, Scenario 4b (million euro, 2004 prices)

Sectors	2004	2005	2006	2007	2008	2009	TOTAL
Agriculture	6	6.5	7	38.3	72.3	81.1	211.2
Mining	0	0	0	0	0	0	0
Food Industry	3.2	3.4	3.7	15	18.1	19.5	62.9
Chemical and Plastic Products	0	0	0	8.8	9.1	9.4	27.3
Other non-metallic mineral products	0	0	0	1	1	1	3
Transport equipment	0	0	0	3.2	4.2	5.5	12.9
Other products of manufacturing	0	0	0	7.3	8.1	9.1	24.5
Electricity Water and Gas	5.9	6.3	6.8	0	4.1	9	32.1
Construction	5.9	6.4	6.9	31.2	53.6	81.9	185.9
Trade	0	0	0	19.6	20.1	20.7	60.4
Hotels and Catering	0	0	0	3.6	3.5	3.4	10.5
Transports and Communication	11.8	12.8	13.8	41.8	51.4	62.7	194.3
Financial intermediation	0	0	0	2.6	2.7	2.9	8.2
Estate and business activities	0	0	0	16.7	21.9	28.4	67
Public Administration and Defence	0	0	0	-5	-5.2	-5.5	-15.7
Education	0.3	0.3	0.3	5.3	9.9	15.6	31.7
Health and social work	0	0	0	0.6	2.3	4.7	7.6
Other activities	0	0	0	0.9	0.8	0.8	2.5
TOTAL	33.1	35.7	38.5	190.9	277.9	350.2	926.3

Source: Authors' elaboration

Appendix B – Multipliers

Tab. B1 – Multipliers per kind of impact, Romania

	Output			Income			Employment (x 1000)		
	2004	2009	% Var	2004	2009	% Var	2004	2009	% Var
Agriculture	1.785	1.732	-3.0	0.143	0.139	-2.6	0.528	0.454	-14.0
Mining	1.793	1.761	-1.8	0.196	0.191	-2.9	0.067	0.053	-20.8
Food Industry	1.909	1.846	-3.3	0.115	0.111	-3.4	0.198	0.157	-20.7
Textiles and Leather Goods	1.401	1.372	-2.0	0.165	0.160	-3.0	0.061	0.049	-20.9
Wood Products, Furniture and Paper	1.725	1.687	-2.2	0.184	0.179	-2.4	0.108	0.086	-20.6
Chemical and Plastic Products	1.717	1.682	-2.0	0.142	0.138	-3.3	0.053	0.042	-20.8
Building Materials	1.864	1.828	-1.9	0.238	0.233	-2.1	0.103	0.083	-19.9
Metal Products	2.103	2.068	-1.7	0.229	0.224	-1.9	0.069	0.055	-20.6
Machinery, Electronic Products and Cars	1.599	1.569	-1.9	0.185	0.180	-2.7	0.064	0.051	-20.5
Electricity Water and Gas	2.524	2.482	-1.7	0.293	0.288	-1.5	0.086	0.068	-20.5
Construction	1.996	1.963	-1.7	0.299	0.294	-1.5	0.121	0.097	-20.0
Trade	2.073	2.044	-1.4	0.516	0.517	+0.3	0.310	0.232	-25.2
Hotels and Catering	1.829	1.790	-2.1	0.199	0.195	-1.8	0.113	0.085	-24.8
Transports and Communication	1.759	1.739	-1.1	0.272	0.267	-1.9	0.098	0.074	-25.1
Banking and Real Estate	1.716	1.694	-1.3	0.195	0.190	-2.6	0.072	0.054	-24.9
Public Administration and Defence	1.767	1.713	-3.1	0.737	0.716	-2.9	0.130	0.096	-25.8
Community, social and personal services	1.905	1.878	-1.4	0.525	0.526	+0.2	0.230	0.172	-25.2
AVERAGE	1.851	1.815	-2.0	0.273	0.268	-2.1	0.142	0.112	-21.8

Source: Authors' elaboration

Tab. B2 – Sector Ranking based on multipliers distinguished per kind of impact, Romania

	Output		Income		Employment	
	2004	2009	2004	2009	2004	2009
Agriculture	10	11	15	15	1	1
Mining	9	9	10	10	14	14
Food Industry	5	6	17	17	4	4
Textiles and Leather Goods	17	17	14	14	16	16
Wood Products, Furniture and Paper	13	14	13	13	8	7
Chemical and Plastic Products	14	15	16	16	17	17
Building Materials	7	7	7	7	9	9
Metal Products	2	2	8	8	13	12
Machinery, Electronic Products and Cars	16	16	12	12	15	15
Electricity Water and Gas	1	1	5	5	11	11
Construction	4	4	4	4	6	5
Trade	3	3	3	3	2	2
Hotels and Catering	8	8	9	9	7	8
Transports and Communication	12	10	6	6	10	10
Banking and Real Estate	15	13	11	11	12	13
Public Administration and Defence	11	12	1	1	5	6
Community, social and personal services	6	5	2	2	3	3

Source: Authors' elaboration

Tab. B3 – Multipliers per kind of impact, North-West region, Romania

	Output			Income			Employment (x 1000)		
	2004	2009	% Var	2004	2009	% Var	2004	2009	% Var
Agriculture	1.310	1.292	-1.4	0.098	0.098	-0.8	0.458	0.400	-12.7
Mining	1.419	1.416	-0.2	0.234	0.229	-2.2	0.081	0.066	-18.8
Food Industry	1.502	1.478	-1.5	0.079	0.078	-1.1	0.141	0.114	-19.3
Textiles and Leather Goods	1.454	1.449	-0.4	0.172	0.169	-1.6	0.055	0.045	-19.0
Wood Products, Furniture and Paper	1.337	1.328	-0.7	0.143	0.141	-1.0	0.082	0.067	-19.1
Chemical and Plastic Products	1.569	1.565	-0.3	0.131	0.129	-1.2	0.067	0.054	-18.6
Building Materials	1.293	1.288	-0.4	0.177	0.176	-0.9	0.082	0.067	-18.6
Metal Products	1.677	1.677	0.0	0.195	0.194	-0.4	0.060	0.049	-18.5
Machinery, Electronic Products and Cars	1.738	1.734	-0.3	0.222	0.219	-1.3	0.102	0.083	-18.8
Electricity Water and Gas	1.522	1.515	-0.5	0.184	0.184	-0.2	0.062	0.050	-19.1
Construction	1.531	1.518	-0.8	0.247	0.245	-0.9	0.119	0.096	-19.2
Trade	1.523	1.513	-0.6	0.459	0.462	+0.7	0.289	0.216	-25.4
Hotels and Catering	1.471	1.458	-0.9	0.163	0.161	-1.0	0.094	0.071	-24.4
Transports and Communication	1.391	1.390	-0.1	0.229	0.225	-1.5	0.093	0.070	-24.9
Banking and Real Estate	1.465	1.458	-0.4	0.188	0.184	-2.0	0.079	0.060	-24.7
Public Administration and Defence	1.552	1.524	-1.9	0.712	0.693	-2.7	0.136	0.102	-25.4
Community, social and personal services	1.419	1.410	-0.7	0.468	0.470	+0.5	0.204	0.152	-25.5
AVERAGE	1.481	1.471	-0.7	0.241	0.239	-1.0	0.130	0.104	-20.7

Source: Authors' elaboration

Tab. B4 – Sector Ranking based on multipliers distinguished per kind of impact, North-West region, Romania

	Output		Income		Employment	
	2004	2009	2004	2009	2004	2009
Agriculture	16	16	16	16	1	1
Mining	12	12	5	5	12	12
Food Industry	8	8	17	17	4	4
Textiles and Leather Goods	11	11	12	12	17	17
Wood Products, Furniture and Paper	15	15	14	14	10	10
Chemical and Plastic Products	3	3	15	15	14	14
Building Materials	17	17	11	11	11	11
Metal Products	2	2	8	8	16	16
Machinery, Electronic Products and Cars	1	1	7	7	7	7
Electricity Water and Gas	7	6	10	9	15	15
Construction	5	5	4	4	6	6
Trade	6	7	3	3	2	2
Hotels and Catering	9	9	13	13	8	8
Transports and Communication	14	14	6	6	9	9
Banking and Real Estate	10	10	9	10	13	13
Public Administration and Defence	4	4	1	1	5	5
Community, social and personal services	13	13	2	2	3	3

Source: Authors' elaboration

Tab. B5 – Multipliers per kind of impact, Bulgaria

	Output			Income			Employment (x 1000)		
	2004	2009	% Var	2004	2009	% Var	2004	2009	% Var
Agriculture	1.627	1.576	-3.1	0.094	0.094	-0.3	0.489	0.466	-4.6
Mining	1.674	1.681	+0.4	0.344	0.344	0.0	0.168	0.141	-16.0
Food Industry	1.916	1.882	-1.7	0.205	0.207	+0.8	0.221	0.185	-16.2
Chemical and Plastic Products	1.534	1.533	0.0	0.190	0.188	-0.8	0.095	0.079	-16.8
Other non-metallic mineral products	2.010	2.013	+0.1	0.319	0.319	-0.2	0.208	0.174	-16.5
Transport equipment	1.869	1.867	-0.1	0.426	0.422	-0.8	0.235	0.195	-16.8
Other products of manufacturing	1.590	1.596	+0.4	0.234	0.235	+0.4	0.162	0.137	-15.9
Electricity Water and Gas	1.569	1.567	-0.1	0.208	0.206	-1.0	0.104	0.086	-16.8
Construction	2.031	2.032	0.0	0.411	0.409	-0.5	0.268	0.223	-16.6
Trade	1.570	1.557	-0.9	0.185	0.184	-0.6	0.198	0.159	-20.0
Hotels and Catering	1.762	1.748	-0.8	0.309	0.309	-0.2	0.237	0.190	-19.7
Transports and Communication	1.612	1.616	+0.3	0.259	0.257	-0.9	0.133	0.107	-19.6
Financial intermediation	1.307	1.311	+0.3	0.220	0.218	-1.2	0.090	0.072	-20.0
Estate and business activities	1.215	1.216	+0.1	0.081	0.080	-1.1	0.058	0.047	-19.8
Public Administration and Defense	1.723	1.724	+0.1	0.524	0.523	-0.2	0.157	0.127	-19.0
Education	1.670	1.674	+0.3	0.611	0.609	-0.2	0.467	0.371	-20.6
Health and social work	1.597	1.602	+0.3	0.497	0.496	-0.3	0.383	0.305	-20.3
Other activities	1.934	1.940	+0.4	0.399	0.396	-0.7	0.398	0.317	-20.4
AVERAGE	1.678	1.674	-0.2	0.306	0.305	-0.4	0.226	0.188	-17.5

Source: Authors' elaboration

Tab. B6 – Sector Ranking based on multipliers distinguished per kind of impact, Bulgaria

	Output		Income		Employment	
	2004	2009	2004	2009	2004	2009
Agriculture	10	13	17	17	1	1
Mining	8	8	7	7	11	11
Food Industry	4	4	14	13	8	8
Chemical and Plastic Products	16	16	15	15	16	16
Other non-metallic mineral products	2	2	8	8	9	9
Transport equipment	5	5	4	4	7	6
Other products of manufacturing	13	12	11	11	12	12
Electricity Water and Gas	15	14	13	14	15	15
Construction	1	1	5	5	5	5
Trade	14	15	16	16	10	10
Hotels and Catering	6	6	9	9	6	7
Transports and Communication	11	10	10	10	14	14
Financial intermediation	17	17	12	12	17	17
Estate and business activities	18	18	18	18	18	18
Public Administration and Defense	7	7	2	2	13	13
Education	9	9	1	1	2	2
Health and social work	12	11	3	3	4	4
Other activities	3	3	6	6	3	3

Source: Authors' elaboration

Tab. B7 – Multipliers per kind of impact, North-East region, Bulgaria

	Output			Income			Employment (x 1000)		
	2004	2009	% Var	2004	2009	% Var	2004	2009	% Var
Agriculture	1.294	1.270	-1.8	0.061	0.062	+0.7	0.421	0.411	-2.5
Mining	1.515	1.522	+0.5	0.319	0.318	-0.1	0.648	0.545	-15.9
Food Industry	1.669	1.652	-1.0	0.179	0.181	+1.4	0.190	0.161	-15.3
Chemical and Plastic Products	1.400	1.402	+0.1	0.169	0.168	-0.9	0.084	0.070	-16.5
Other non-metallic mineral products	1.263	1.265	+0.2	0.204	0.204	-0.3	0.139	0.117	-16.2
Transport equipment	1.141	1.142	+0.1	0.324	0.320	-1.0	0.170	0.142	-16.5
Other products of manufacturing	1.507	1.513	+0.4	0.323	0.324	+0.1	0.362	0.304	-16.0
Electricity Water and Gas	1.246	1.247	+0.1	0.151	0.149	-0.9	0.086	0.071	-16.6
Construction	1.543	1.546	+0.2	0.345	0.344	-0.5	0.250	0.209	-16.5
Trade	1.400	1.390	-0.7	0.169	0.168	-0.5	0.202	0.162	-19.9
Hotels and Catering	1.310	1.304	-0.4	0.254	0.253	-0.1	0.189	0.151	-20.2
Transports and Communication	1.318	1.323	+0.4	0.220	0.218	-1.2	0.113	0.090	-19.9
Financial intermediation	1.363	1.367	+0.3	0.236	0.234	-1.1	0.131	0.106	-19.6
Estate and business activities	1.184	1.186	+0.1	0.080	0.080	-1.1	0.090	0.072	-20.2
Public Administration and Defense	1.422	1.424	+0.2	0.488	0.486	-0.4	0.155	0.125	-19.3
Education	1.308	1.311	+0.2	0.555	0.552	-0.5	0.432	0.342	-20.9
Health and social work	1.429	1.432	+0.2	0.470	0.467	-0.6	0.382	0.304	-20.5
Other activities	1.565	1.572	+0.4	0.353	0.349	-0.9	0.465	0.368	-20.7
AVERAGE	1.382	1.382	0.0	0.272	0.271	-0.4	0.251	0.208	-17.4

Source: Authors' elaboration

Tab. B8 – Sector Ranking based on multipliers distinguished per kind of impact, North-East region, Bulgaria

	Output		Income		Employment	
	2004	2009	2004	2009	2004	2009
Agriculture	14	14	18	18	4	2
Mining	4	4	8	8	1	1
Food Industry	1	1	13	13	9	9
Chemical and Plastic Products	8	8	14	14	18	18
Other non-metallic mineral products	15	15	12	12	13	13
Transport equipment	18	18	6	7	11	11
Other products of manufacturing	5	5	7	6	6	5
Electricity Water and Gas	16	16	16	16	17	17
Construction	3	3	5	5	7	7
Trade	9	9	15	15	8	8
Hotels and Catering	12	13	9	9	10	10
Transports and Communication	11	11	11	11	15	15
Financial intermediation	10	10	10	10	14	14
Estate and business activities	17	17	17	17	16	16
Public Administration and Defense	7	7	2	2	12	12
Education	13	12	1	1	3	4
Health and social work	6	6	3	3	5	6
Other activities	2	2	4	4	2	3

Source: Authors' elaboration

Appendix C – Impacts

Tab. C1 – Impact per kind of scenario and macro-sector, Romania, 2004-2009

Impact	Scenario	Macro-sectors (% on total)			TOTAL	(I / FD)[1]	D – S (%)[2]	Var % 2004-09[3]
		Agriculture	Industry	Services				
Output (€ Mio)	1	6.3	62.5	31.2	2,793	186.8	-0.4	+6.8
	2	11.4	52.6	36.0	1,933	199.6	0.3	+4.7
	3a	17.9	52.5	29.6	20,198	184.0	-1.6	+48.9
	3b	13.3	55.0	31.7	20,248	184.4	-1.5	+49.1
	4a	23.8	49.0	27.2	22,550	182.9	-1.6	+54.6
	4b	13.3	54.7	32.0	22,675	183.9	-1.5	+54.9
Income (€ Mio)	1	3.1	52.2	44.7	400	26.8	-0.2	+6.9
	2	4.9	48.8	46.3	311	32.1	0.3	+5.4
	3a	9.1	42.7	48.2	2,798	25.5	-1.3	+48.4
	3b	6.5	42.9	50.5	2,886	26.3	-1.3	+49.9
	4a	12.6	41.4	46.1	2,987	24.2	-1.3	+51.6
	4b	6.1	42.0	51.4	3,207	26.0	-1.2	+55.4
Employment	1	32.1	37.7	30.2	207,086	139	-4.8	+2.5
	2	41.8	29.4	28.8	195,346	202	-2.8	+2.3
	3a	61.3	19.5	19.2	2,071,434	189	-14.2	+24.6
	3b	52.5	23.5	24.0	1,800,469	164	-15.0	+21.4
	4a	69.6	15.4	15.0	2,704,808	219	-13.5	+32.1
	4b	52.4	23.2	24.4	2,016,884	164	-15.1	+24.0

Note: [1] Ratio between impacts and final demands. Output and income are expressed as impacts for every € 100 of final demand; employment is expressed as impact for every € mio. [2] Percent ratio obtained dividing the difference between impact derived from dynamic analysis and impact derived from static analysis by this latter impact. It is a measure of underestimation or overestimation of impact measured by a dynamic approach in comparison with impact estimated by a traditional static approach. [3] As for employment, variation refers to the period 1999-2009
Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C2 – Effects due to accession only, Romania

Impact	Scenario	Macro-sectors (% on total)			Difference
		Agriculture	Industry	Services	
Output (€ Mio)	2-1	5.1	-9.9	4.8	-860
Income (€ Mio)	2-1	1.8	-3.4	1.6	-89
Employment	2-1	9.7	-8.3	-1.4	-11,740

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C3 – Differences between partial and full integration, Romania

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss
		Agriculture	Industry	Services		
Output (€ Mio)	3a-4a	-5.9	3.5	2.4	-2352	-10.4
	3b-4b	0	0.3	-0.3	-2427	-10.7

Tab. C3 – Differences between partial and full integration, Romania (continued)

Income (€ Mio)	3a-4a	-3.5	1.3	2.1	-189	-6.8
	3b-4b	0.4	0.9	-0.9	-321	-10.0
Employment	3a-4a	-8.3	4.1	4.2	-633,374	-23.4
	3b-4b	0.1	0.3	-0.4	-216,415	-10.7

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C4 – Differences between decoupling and coupling, Romania

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss/Benefit
		Agriculture	Industry	Services		
Output (€ Mio)	3b-3a	-4.6	2.5	2.1	50	0.2
	4b-4a	-10.5	5.7	4.8	125	0.6
Income (€ Mio)	3b-3a	-2.6	0.2	2.3	88	3.1
	4b-4a	-6.5	0.6	5.3	220	7.4
Employment	3b-3a	-8.8	4	4.8	-270,965	-13.1
	4b-4a	-17.2	7.8	9.4	-687,924	-25.4

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C5 – Impact per kind of scenario and macro-sector, North-West region, Romania, 2004-2009

Impact	Scenario	Macro-sectors (% on total)			TOTAL	(I / FD)[1]	D – S (%)[2]	Var % 2004-09[3]	% on national impact
		Agriculture	Industry	Services					
Output (€ Mio)	1	7.3	59.2	33.4	256	143.7	0.0	5.6	9.2
	2	463.4	-737.2	373.8	-9	-	-25.0	-0.2	-0.5
	3a	18.7	55.9	25.4	1,689	142.8	-0.5	37.2	8.4
	3b	13.1	59.2	27.8	1,703	144.0	-0.5	37.5	8.4
	4a	29.6	48.5	21.9	1,897	141.2	-0.6	41.8	8.4
	4b	14.0	57.5	28.5	1,932	143.8	-0.5	42.5	8.5
Income (€ Mio)	1	3.3	49.4	47.2	39	21.9	0.0	5.9	9.8
	2	49.4	-213.8	264.4	-6	-	0.0	-0.9	-1.9
	3a	9.3	48.2	42.6	238	20.1	-0.4	35.9	8.5
	3b	6.3	48.3	45.5	248	21.0	-0.8	37.4	8.6
	4a	13.8	45.8	40.4	254	18.9	-0.8	38.2	8.5
	4b	6.6	46.4	47.0	280	20.8	-0.4	42.1	8.7
Employment	1	30.9	38.3	30.8	22,938	129	-4.6	2.0	11.1
	2	89.6	-22.1	32.5	-16,514	-	-27.0	-1.4	-8.5
	3a	57.8	22.5	19.8	191,549	162	-13.4	16.7	9.2
	3b	47.1	27.5	25.3	165,653	140	-14.2	14.4	9.2
	4a	68.2	16.9	14.8	257,805	192	-12.6	22.5	9.5
	4b	48.5	26.2	25.3	192,204	143	-14.3	16.7	9.5

Note: [1] Ratio between impacts and final demands. Output and income are expressed as impacts for every € 100 of final demand; employment is expressed as impact for every € mio [2] Percent ratio obtained dividing the difference between impact derived from dynamic analysis and impact derived from static analysis by this latter impact. It is a measure of underestimation or overestimation of impact measured by a dynamic approach in comparison with impact estimated by a traditional static approach. [3] As for employment, variation refers to the period 1999-2009

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Tab. C6 – Effects due to accession only, North-West region, Romania

Impact	Scenario	Macro-sectors (% on total)			Difference
		Agriculture	Industry	Services	
Output (€ Mio)	2-1	456.1	-796.4	340.4	-265
Income (€ Mio)	2-1	46.1	-263.2	217.2	-45
Employment	2-1	58.7	-60.4	1.7	-39,452

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C7 – Differences between partial and full integration, North-West region, Romania

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss
		Agriculture	Industry	Services		
Output (€ Mio)	3a-4a	-10.9	7.4	3.5	-208	-11.0
	3b-4b	-0.9	1.7	-0.7	-229	-11.9
Income (€ Mio)	3a-4a	-4.5	2.4	2.2	-16	-6.7
	3b-4b	-0.3	1.9	-1.5	-32	-11.4
Employment	3a-4a	-10.4	5.6	5	-66,256	-25.7
	3b-4b	-1.4	1.3	0	-26,551	-13.8

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C8 – Differences between decoupling and coupling, North-West region, Romania

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss/Benefit
		Agriculture	Industry	Services		
Output (€ Mio)	3b-3a	-5.6	3.3	2.4	14	0.8
	4b-4a	-15.6	9	6.6	35	1.8
Income (€ Mio)	3b-3a	-3	0.1	2.9	10	4.2
	4b-4a	-7.2	0.6	6.6	26	10.2
Employment	3b-3a	-10.7	5	5.5	-25,896	-13.5
	4b-4a	-19.7	9.3	10.5	-65,601	-25.4

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C9 – Impact per kind of scenario and macro-sector, Bulgaria, 2004-2009

Impact	Scenario	Macro-sectors (% on total)			TOTAL	(I / FD)[1]	D – S (%)[2]	Var % 2004-2009[3]
		Agriculture	Industry	Services				
Output (€ Mio)	1	16.5	48.4	35.1	1,125	170.9	-0.2	4.3
	2	10.3	49.4	40.3	2,517	165.3	-0.1	9.7
	3a	21.3	46.5	32.2	8,925	169.7	-0.6	34.5
	3b	16.0	48.0	35.9	8,906	169.3	-0.5	34.4
	4a	27.7	42.6	29.7	9,972	168.4	-0.8	38.5
	4b	15.8	46.2	38.0	9,924	167.6	-0.5	38.3

Tab. C9 – Impact per kind of scenario and macro-sector, Bulgaria, 2004-2009 (continued)

Income (€ Mio)	1	4.4	55.3	40.4	161	24.5	-0.6	4.0
	2	2.9	58.2	38.9	342	22.5	-0.3	8.4
	3a	5.5	56.6	37.9	1,320	25.1	-0.4	32.4
	3b	4.0	56.3	39.7	1,359	25.8	-0.4	33.3
	4a	7.6	55.1	37.3	1,382	23.3	-0.4	33.9
	4b	4.0	54.6	41.4	1,480	25.0	-0.3	36.3
Employment	1	44.1	34.4	21.6	145,626	221	-3.0	4.6
	2	33.7	41.8	24.4	266,226	175	-7.8	8.4
	3a	50.0	30.4	19.6	1,311,940	249	-9.5	41.6
	3b	41.7	34.5	23.8	1,181,388	225	-10.6	37.4
	4a	58.7	25.0	16.3	1,623,092	274	-8.4	51.4
	4b	41.7	33.2	25.1	1,294,172	219	-10.7	41.0

Note: [1] Ratio between impacts and final demands. Output and income are expressed as impacts for every € 100 of final demand; employment is expressed as impact for every € mio

[2] Percent ratio obtained dividing the difference between impact derived from dynamic analysis and impact derived from static analysis by this latter impact. It is a measure of underestimation or overestimation of impact measured by a dynamic approach in comparison with impact estimated by a traditional static approach.

[3] As for employment, variation refers to the period 1999-2009

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C10 – Effects due to accession only, Bulgaria

Impact	Scenario	Macro-sectors (% on total)			Difference
		Agriculture	Industry	Services	
Output (€ Mio)	2-1	-6.2	1	5.2	1,392
Income (€ Mio)	2-1	-1.5	2.9	-1.5	181
Employment	2-1	-10.4	7.4	2.8	120,600

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C11 – Differences between partial and full integration, Bulgaria

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss
		Agriculture	Industry	Services		
Output (€ Mio)	3a-4a	-6.4	3.9	2.5	-1,047	-10.5
	3b-4b	0.2	1.8	-2.1	-1,018	-10.3
Income (€ Mio)	3a-4a	-2.1	1.5	0.6	-62	-4.7
	3b-4b	0	1.7	-1.7	-121	-8.2
Employment	3a-4a	-8.7	5.4	3.3	-311,152	-19.2
	3b-4b	0	1.3	-1.3	-112,784	-8.7

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C12 – Differences between decoupling and coupling, Bulgaria

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss/Benefit
		Agriculture	Industry	Services		
Output (€ Mio)	3b-3a	-5.3	1.5	3.7	-19	-0.2
	4b-4a	-11.9	3.6	8.3	-48	-0.5
Income (€ Mio)	3b-3a	-1.5	-0.3	1.8	39	3.0
	4b-4a	-3.6	-0.5	4.1	98	7.1
Employment	3b-3a	-8.3	4.1	4.2	-130,552	-10.0
	4b-4a	-17	8.2	8.8	-328,920	-20.3

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C13 – Impact per kind of scenario and macro-sector, North-East region, Bulgaria, 2004-2009

Impact	Scenario	Macro-sectors (% on total)			TOTAL	(I/FD)[1]	D – S (%)[2]	Var% 2004-2009[3]	% on national impact
		Agriculture	Industry	Services					
Output (€ Mio)	1	17.7	47.6	34.7	148	137.9	0.0	4.5	13.2
	2	-0.4	52.2	48.2	131	138.0	0.8	4.0	5.2
	3a	29.5	42.4	28.1	1,051	136.8	-0.4	32.2	11.8
	3b	20.9	45.0	34.1	1,060	138.0	-0.2	32.5	11.9
	4a	39.5	36.3	24.2	1,252	135.2	-0.6	38.4	12.6
	4b	21.4	41.9	36.7	1,274	137.5	-0.3	39.1	12.8
Income (€ Mio)	1	4.6	55.2	40.2	22	20.5	0.0	4.0	13.7
	2	-0.2	111.1	-10.8	12	12.6	0.0	2.3	3.5
	3a	7.9	60.2	31.9	150	19.5	-0.7	27.7	11.4
	3b	5.3	58.7	36.0	161	21.0	-0.6	29.8	11.8
	4a	11.9	57.4	30.3	160	17.3	0.0	29.5	11.6
	4b	5.6	54.7	39.7	187	20.2	-0.5	34.6	12.6
Employment	1	43.4	36.9	19.7	20,829	194	-2.8	4.1	14.3
	2	-1.9	116.2	-14.2	8,762	92	5.5	1.7	3.3
	3a	56.4	29.7	14.0	189,690	247	-7.7	37.0	14.5
	3b	45.4	35.0	19.6	168,350	219	-9.4	32.8	14.3
	4a	70.4	20.0	9.6	254,991	275	-6.3	49.7	15.7
	4b	46.7	31.6	21.6	201,656	218	-9.4	39.3	15.6

Note: [1] Ratio between impacts and final demands. Output and income are expressed as impacts for every € 100 of final demand; employment is expressed as impact for every € mio. [2] Percent ratio obtained dividing the difference between impact derived from dynamic analysis and impact derived from static analysis by this latter impact. It is a measure of underestimation or overestimation of impact measured by a dynamic approach in comparison with impact estimated by a traditional static approach. [3] As for employment, variation refers to the period 1999-2009.
Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C14 – Effects due to accession only, North-East region, Bulgaria

Impact	Scenario	Macro-sectors (% on total)			Difference
		Agriculture	Industry	Services	
Output (€ Mio)	2-1	-18.1	4.6	13.5	-17
Income (€ Mio)	2-1	-4.8	55.9	-51	-10
Employment	2-1	-45.3	79.3	-33.9	-12,067

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C15 – Differences between partial and full integration, North-East region, Bulgaria

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss
		Agriculture	Industry	Services		
Output (€ Mio)	3a-4a	-10	6.1	3.9	-201	-16.1
	3b-4b	-0.5	3.1	-2.6	-214	-16.8
Income (€ Mio)	3a-4a	-4	2.8	1.6	-10	-6.7
	3b-4b	-0.3	4	-3.7	-26	-13.9
Employment	3a-4a	-14	9.7	4.4	-65,301	-25.6
	3b-4b	-1.3	3.4	-2	-33,306	-16.5

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

Tab. C16 – Differences between decoupling and coupling, North-East region, Bulgaria

Impact	Scenario	Macro-sectors (% on total)			Difference	% Loss/Benefit
		Agriculture	Industry	Services		
Output (€ Mio)	3b-3a	-8.6	2.6	6	9	0.9
	4b-4a	-18.1	5.6	12.5	22	1.8
Income (€ Mio)	3b-3a	-2.6	-1.5	4.1	11	7.3
	4b-4a	-6.3	-2.7	9.4	27	16.9
Employment	3b-3a	-11	5.3	5.6	-21,340	-11.2
	4b-4a	-23.7	11.6	12	-53,335	-20.9

Legend: Scenario 1 - pre-accession; Scenario 2 - only accession; Scenario 3a - partial integration and coupling; Scenario 3b – partial integration and decoupling; Scenario 4a - full integration and coupling; Scenario 4b - full integration and decoupling

Source: Authors' elaboration

13. THE MEDIUM-TERM PERSPECTIVES: A FINAL COMPARISON

Alistair Bailey, Sophia Davidova, Alberto Zanni

1. Introduction

The aim of this chapter is to provide a summary of the medium-term perspectives of the five case study regions based on the results of the impact analysis carried out for each region.

Chapter 4 illustrates the application of a common I-O methodology. This methodology, discussed in detail in chapter 5, has been developed and agreed upon in order to allow the impact assessment of different policy scenarios (chapter 6) on the selected rural economies, employment patterns and the agricultural sector. In addition, the methodology attempts to provide a comparison between national and regional policy impact, with a special emphasis placed on these intersectoral employment adjustments likely to occur as a consequence of the applied policy schemes after the accession to the EU.

The analysis covers the period 2004-2013 both with a static and a time varying coefficients approaches. The static analysis, which assumes an unchanging structure of the economy over time[1], has been implemented by the individual partners, while the analysis with time varying coefficients, which works under the assumption that the structure of the regional economies is subjected to variation over time[2], has been carried out in a centralised way by the project coordinator. Results from both approaches are presented and compared in the present summary chapter. The presentation of the impact analysis results in this chapter underlines two main issues: the comparison between national and regional levels in terms

[1] See chapter 6 for more information on the static approach.
[2] See chapters 6 and 12 for more information on the time varying coefficients approach.

of the impact of different policy schemes, and the differences in impact resulting from the treatment of direct payments as coupled or decoupled.

It is useful to recall that the main geographic and economic characteristics of the five case study regions have been presented in chapters 3 and 7-11, which focused on the nature of rurality, on employment perspectives and the agricultural sector in the regions.

The structure of the present chapter is as follows: the second section introduces the regions' economies and illustrates the different policy frameworks in each country, and the corresponding case study region. The following section presents the methodology, the data sources and the methods used for allocation of policy induced transfers to the regions and to different sectors of economic activity. Section four details the policy scenarios used for the analysis. Section five presents the main results from the impact analysis. Sections six and seven are devoted to the results from the time varying coefficients analysis and to the agricultural sectors in the regions, respectively.

It is worth noting that the different policy environments, situations and data availability in the five case study regions do not allow a complete and direct cross-country comparison of results. For this reason, the present chapter attempts only to outline the broad comparative picture across the study area.

2. Main characteristics of the case study regions

Five regions located in five countries across the Balkans area were selected for case studies. The North-West Region was selected as the case study in Romania. In Bulgaria, the selected case study area was the North-East Region while Thessalia, in central Greece, was selected by the Greek partners. The lack of NUTS (National Units of Territorial Statistics) classification in Croatia resulted in the choice of the county of Bjelovar-Bilogora as the Croatian case study region, even though the county is considerably smaller, in terms of population and area, than the other selected regions. A similar problem, concerning the NUTS classification, resulted in the selection of Peripheral Slovenia as a case study region in the former Yugoslav republic. Slovenia as a whole has been classified as one NUTS 2 region, but considering the entire country would have being in contrast with one of the main interests of the project, namely the regionalisation of I-O methodology and in comparison between regions and nations and among regions. Peripheral Slovenia is an artificial region constructed by the elimination of the urban area of the Slovenian capital Ljubljana.

The five regions, even though different, were selected because they complied with the selection criteria detailed in chapter 3. The regions are rural and have experienced significant employment dynamics in the last decade. These characteristics made them suitable case studies areas for the project.

Regional economies will be briefly illustrated in this section. This description will be introductory to the presentation of the policy frameworks in which the regions are currently situated. These policy frameworks take into consideration the different positions of the five regions in relation to the process of accession to the EU and, therefore, outline the policy schemes that have been included in the analysis. It is expected that the most important policy changes in the selected regions will be a direct consequence of the process of EU enlargement, therefore, the policy environments that have been considered substantially differ among the five case study regions. This is mainly due to the fact that the regions belong to countries that are at a different stage in their accession process to the EU, and to Greece, which is a current member of the EU.

2.1 Bulgaria

The structure of the economy of North-East Bulgaria experienced significant dynamics during the 1990s. Agriculture remains very important and its weight, both in terms of GDP (21% of the total regional GDP in 2000) and employment (34.7% of total regional employment in 2000) exceeds the country and, significantly, the EU's averages. The share of industry and services in GDP in 2000 was 24% and 50%, respectively, while 29% and 41% were the figures for employment. A high rate of unemployment is also observed (24% in 2000) and, during the 1990s it was mainly caused by the closing down of large industrial plants. The region has significant potential in tourism and in trade due to the development of the port of Varna.

In the case of North-East Bulgaria the policy framework considered in the analysis included the funds allocated trough the PHARE programme, ISPA and SAPARD schemes. The planned date of accession of Bulgaria to the EU is 2007 and this was taken into account in the analysis. Therefore, after that date, EAAGF, Structural and Cohesion funds were also considered together with various national development measures specifically aimed at regional and rural development.

2.2 Croatia

Industry and agriculture are the most important activities in the Bjelovar - Bilogora region. However, the industrial sector has been experiencing a deep recession and is loosing its relative importance in the regional economy, while the importance of agriculture has been growing. In 1997, the contribution of agriculture to the regional GDP accounted for 28%, of industry for 27% and of services for 42%. In employment terms, the importance of the agricultural sector is shown by the high percentage of people engaged in the sector, 36% according to the 2001 Census Data.

Croatia, and the case study region of Bjelovar-Bilogora, represents a special case in the REAPBALK project. Croatia has only recently got (in June 18th, 2004) the official status of a candidate country to join the EU. The Community Assistance for Reconstruction, Development and Stabilisation (CARDS) was the only form of EU funding underway in Croatia at the time when the present research was carried on, while the pre-accession programmes had not been introduced yet. In order to identify the possible amount of funding from these programmes, and therefore consider them in the formulation of the relevant policy scenarios, data concerning the Slovak Republic was used as a reference point and then adjusted to the Croatian situation. Among all EU new member states, the Slovak Republic is the most similar to Croatia, in terms of population, area and main economic variables. Croatia was then treated like Bulgaria and Romania in the analysis as the same EU pre- and post-accession schemes were considered.

2.3 Greece

The economic structure of the region of Thessalia is characterized by the predominant role of the agricultural sector both in term of GDP and employment. At the end of the decade of the 1990s, during which a downward trend was observed, the contribution of the primary sector to the regional GDP accounted for 16% compared to 22% in 1991. The same downward trend was observed over the same period in relation to the secondary sector, while the contribution of the service sector increased (in 1999, industry contributed 22% to GDP and services 62%, while in 1991 the corresponding figures were 26% and 52%). In terms of employment, the share of agriculture in Thessalia’s total employment was constant over the 1991-1999 period but decreased in 2000 to slightly below 35%. For the remaining sectors, no significant shifts were observed during the 1990s and in 2000 about 23% of the regional labour force was employed in industry, while approximately 35% were employed in the service sector.

An upward trend has been observed in the unemployment rate (from 6% in 1991 to 12% in 2000) with high percentages of long-term, women and youth unemployment. The high unemployment rate, the excessive dependence on the agricultural sector and the lack of adequate infrastructure have been identified as the main development constraints in the region.

As Greece is a member of the EU-15, the main policy framework that was taken into consideration was the 3rd Community Support Framework (CSF). This programme has a wide range of targets but the analysis carried out by the Greek partner has focused on those measures directly targeting the development of rural regions and agricultural sector. The main instruments of the CSF considered are the Regional Operational Programme (ROP) and the Operational Programme Countryside Development – Restructuring of Rural Areas (OPCDRRA). Furthermore, the Agricultural Development Programme (ADP) has been taken into account.

2.4 Romania

The region of North-West Romania is important in the country's economy due to its favourable geographical position and human capital. Agriculture remains a very important sector but with decreasing share in terms of contribution to the total GDP, which is identical to the trend observed at national level. However, in employment terms, agriculture seems to absorb the excessive labour force from the other sectors and its share in the total employment was almost 46% in 2000. In the same year, the industry contributed 30% of the regional GDP and 26% of the regional employment, while the corresponding figures for the service sector were 42% and 29%.

Romania shares with Bulgaria the same status in relation to the process of accession to the EU and, as a consequence, the considered policy environment has been very similar. Funds allocated trough the PHARE programme, ISPA and SAPARD schemes were considered, and, after 2007, the planned date of accession, EAAGF, Structural and Cohesion funds were also considered together with various national development measures specifically aimed at regional and rural development.

2.5 Slovenia

The structure of the economy of Peripheral Slovenia does not differ significantly from the structure in EU-15, although at a lower level of development. The relative low importance of agriculture, both in terms of

GDP and employment, less than 5% in 1999, made Slovenia in general, and Peripheral Slovenia in particular, a special case among the candidates countries and this project's case study regions. In 1999, the other sectors, industry and services, had a share of 42% and 54% in GDP, and 44% and 51% in employment, respectively. However, the unemployment rate was high during 1990s and continued to be so in 2000s (13% in 2001), even though showing a downward trend. The unemployment rate in the region exceeded the national average in the considered period. This, along with a low educated labour force, represents one of the main constraints to the development of the region.

Slovenia joined the EU in May 2004 and the analysis considered both the pre-accession and the post-accession periods. Funds allocated to the case study region of Peripheral Slovenia from the pre-accession programmes ISPA and SAPARD were included. For the accession period, various measures have been taken into account: Structural Funds, Cohesion Funds, INTERREG and EQUAL Community Initiatives, and the Schengen facility together with the EAGGF measures (direct payments, market interventions and rural development measures).

2.6 Comparison among the main characteristics of the regions

The comparative picture of the five case study regions showed a lower degree of economic development in comparison with the EU average and a high relative importance of the contribution of the agricultural sector to the regional GDP (for all the region but Peripheral Slovenia). On the other hand, agriculture showed worst performances, in terms of productivity, in comparison with the national averages.

In terms of employment, over the decade of the 1990s, it appeared that the expected outflow of labour force from agriculture had not yet materialised. However, services appeared to be the most promising to absorb the surplus of labour. A high unemployment rate affects most of the regions and, even though a downward trend is projected, youth and female unemployment figures are particularly worrying.

The following table summarises the main characteristics of the case study regions given above.

Tab. 1 - Main indicators in the five regions (data may refer to different years according to what indicated in previous chapters)

	Bjelovar-Bilogora	North-East Bulgaria	Thessalia	North-West Romania	Peripheral Slovenia
GDP p.c. PPS 2001 EU 15=100	N.A.	22	60	22	59
GDP in Agriculture %	30	26	17	16	5
Employment in Agriculture %	36	35	38	46	5
Unemployment Rate %	28	23	13	9	13

Source: European Commission; own calculations; previous chapters

3. Methodology, data sources and policy induced transfers

As stated in the introduction, the main objective of the project is to "assess the implication for intersectoral rural employment patterns of policy changes at domestic and EU level". Therefore, the agreed methodology needed to be an adequate tool of estimating the effects of different policy funding schemes in the regional economies in general, and in the employment structure in particular.

In the previous subsections of this chapter the different policy frameworks have been presented in order to identify the main programmes from which these funds will be generated. In this sub-section, the methodology is briefly presented focusing on its main steps. A precise account of data source and the methods used to allocate funds to the regions and the economic sectors is also presented.

3.1 Methodology

3.1.1 I-0 Model

The Input-Output model was developed by Wassilly Leontief in the late 1930s with the purpose of analysing the interdependence of different sectors of economic activities in a national economy. The model works under four main assumptions: homogeneity of products, absence of externalities, absence of constraints in the capacity of production factors and fixed coefficients of production. A vector describing the relation between the input used by each sector and the final product of that sector is the tool that allows the representation of the activity of each sector of the economy.

Given the abovementioned assumptions, the I-O model enables the analyst to represent the intersectoral economic transactions among the different sectors of activity in an economy. The model does so by the use of different matrixes which describe the distribution of products from every sector to the other sectors (Transaction matrix), the production function of each sector (Direct requirement or Techinical coefficient matrix) and the sectors' requirements in order to generate a unit of products (Total requirement matrix). The different matrixes form then the I-O model that enables the analyst to measure the impact in an economy generated by exogenous changes.

3.1.2 The common I-O model and the regionalisation procedure

In the framework of the project, the different research teams attempted to build a common I-O model in order to analyse different economies using the same approach. The common model consisted of national matrixes of the research partners countries'. These matrixes were symmetric, based on the industry technology assumption and report basic values at current prices. Tables were built in accordance with EUROSTAT, ESA 1995 (European System of Accounts) and SIC (Standard Industrial Classification) guidelines and requirements. Depending on the data availability, some minor differences were encountered among the matrixes, however, these were not considered to be a constraint to the development of the common model.

Although national matrixes can be used to analyse the impact of different policies at regional level, their capacity to adequately reproduce the particularities of a regional economy is considerably limited. For this reason the application of a regionalisation procedure appeared to be necessary in order to use the model as a tool to assess the impact of different policy schemes in the economies of the selected regions. The GRIT (Generation of Regional Input-Output) regionalisation procedure was the agreed methodologies used to build the I-O models for the five case study regions. GRIT is a non-survey method which still leaves the possibility of inserting external data into the matrix. The regional tables were then constructed and they had the following characteristics:

- in the case of the North-East region of Bulgaria, the 1997 national 59 sectors I-O table was used. The regionalized table had 18 sectors and maintained the same technical characteristics of the national one. The Bulgarian national I-O table was the only one that was classified by economic units and not by products. This classification is called industry-by-industry. The matrixes of the remaining countries were classified product-by-product.
- the 1997 national 60 sectors I-O table, built applying the RAS technique based on the 1987 table, has been used in order to assess the impact of the different policy programmes in the Croatian region of Bjelovar-

Bilogora. The regionalized table had 15 sectors, and the Croatian Central Bureau of Statistics provided superior employment data.

- for the analysis concerning the Greek region of Thessalia, the 1998 national 29 sectors I-O table was regionalized. The regional table had 18 sectors.
- In the Romanian case, the 1999 national 28 sectors I-O table was regionalized. The regionalized table had 17 sectors.
- The national 2000 59 sectors I-O Slovenian table, and its regionalized version (28 sectors), were the main sources of data for the analysis applied to Peripheral Slovenia. The Agricultural Census and National Statistics Services provided superior data.

3.1.3 Policy induced transfers[3]

Once regional tables were obtained, the following step was to use them as a tool to estimate the impact of different policy schemes. As a consequence, the practical application of the methodology consisted of an injection of respective funds into the appropriate vectors of the I-O table.

The sources of funds will be identified in the following section where the relevant policy scenarios will be described. From the point of view of the methodology, two main problems appear at this stage of the analysis: the allocation of those funds targeting the entire nation to the specific regions and the allocations of these funds to the different sectors of the regional economies. General guidelines were provided to the participating research teams in order to solve these problems and properly allocate funds to regions and sectors. However, in practice, different countries deviated from the general rules. For this reason it is necessary to summarise the specifics applied to different regions:

- In the case of Bulgaria funds were equally distributed among the six Bulgarian regions, while a specific figure for the North-East region was not given. The sectoral allocation of funds was based on different programmes' development priorities and targets, as well as on the structure of the regional economy. Development plans were analysed and funds were distributed, in different proportions, to those sectors which were included into the plans.
- As mentioned, data on the allocation of funds for the Slovak Republic were used to project the likely amount of funds for Croatia and for the county of Bjelovar-Bilogora, based on population ratio. The sectoral

[3] The practical application of the methodology is extensively treated in chapter 11.

distribution of funds was defined following the main programmes' priorities. Funds were distributed to those sectors targeted by the plans

- Funds were allocated to the Greek region of Thessalia, when the regional figure was not already available, using a population and area ratio between the region and the nation. The sector allocation was based on information provided by the involved Ministries and regional authorities, as well as on a capital flow matrix built for the purpose.
- The projected distribution of funds to the case study North-West Romania region was based on an index that took into account per capita income, unemployment rate and infrastructure availability figures, as outlined in the National Development Plan for Romania. Allocation among sectors followed the observed distribution of ISPA and SAPARD funds, and the weight of the regional economy in the national one. The allocation of structural funds followed the methodology outlined in Morillas *et al.* (2000) and briefly presented in chapter 6.
- Funds were allocated to the region of Peripheral Slovenia considering various indicators (share of active population, GDP, ESU) and to the sectors taking into account the observed current distribution and the different programmes' priorities.

These funds were used in the policy scenarios, illustrated in the next section.

4. Formulation of policy scenarios

The different common policy scenarios to be used in the impact analysis have been carefully detailed in chapter 6. They have been formulated in view of the available and predicted policy frameworks, the specific characteristics of the region as identified in the previous chapters and the objectives of the project research. The scenarios are summarized below. It is worth recalling that the analysis, overall, covers the period 2004-2013. The different scenarios, depending on the policy scheme they consider, refer to different periods of this time interval.

Although the scenarios in this analysis consider the 'integration' to the EU, their purpose is not to estimate the whole range of effect likely to be produced by the integration of the regional and national economies into the EU. These scenarios simply consider different policy schemes and their effect on the intersectoral transaction within selected economies.

The 'baseline' scenario describes the situation as it was before the pre-accession period in Bulgaria, Croatia and Romania. For Croatia, the baseline scenario only considers the national and regional funds from the programme CARDS. In the case of North-East Bulgaria and North-West Romania funds from the PHARE programmes are taken into account. The baseline scenario for Peripheral Slovenia implies a situation previous to the accession, with funds generated from SAPARD and ISPA, whereas in the case of Greece, it considers the same amount of transfers from national and European programmes currently in place. The baseline scenario was designed as a reference for comparison with the alternatives scenarios, which have been formulated in order to assess the impact of pre-accession and post-accession EU funds.

The alternative scenarios consider the accumulated pre-accession measures (for all the regions up to 2006 with the exception of Peripheral Slovenia and Thessalia). In the subsequent period of time (2004 onwards for Slovenia, 2007 onwards for Bulgaria, Croatia and Romania), the different European funds, under different levels of absorption, 'partial' or 'full' integration are simulated. 'Partial' and 'full' integration mainly considers the different amount of direct payments to be transferred to the countries. While 'partial' integration considers the agreed phasing in scheme for direct payments, 'full' integration considers direct payments to be at the same level as in the other EU-15 countries from the first year of accession This scenario, even though unrealistic, is used as a reference, in order to underline differences.

The emphasis on direct payments not only consider the different amount but also the two extreme forms of 'fully coupled' (all payments are channelled to investments in the agricultural sector) and 'fully decoupled' (all funds are addressed to agricultural households' incomes and, consequently, transformed into consumption).

Alternative scenarios also consider national and regional policy programmes. For the Greek region of Thessalia, alternative scenarios take into account the forecasted reduction in the European transfer to the country, mainly due to the enlargement of the European Union to 25 countries.

The scenarios were not only applied to the regional I-O matrixes but to the national ones as well. This was done in order to explore the possible differences in terms of impact between regions and nations, and to discuss the performances of the different funding programmes in targeting rural regions.

5. Summary of impact analysis results

As explained in the methodology, funds were injected into the different I-O tables, national and regional, in order to quantify the effects in terms of income, production and employment, overall and for each sector of the economy. Here, the impact effects of funds are presented by the percentage change that refers to the increase in output, income and employment, over the period considered, in comparison with the situation without the policy transfer. Results are presented below country by country across the different policy scenarios. More detailed results are contained in chapters from 7 to 11.

5.1 Bulgaria

5.1.1 Pre-accession funds

No significant impacts, were detected in North-East Bulgaria when SAPARD and ISPA funds were injected into the matrix (see Table 2). 'Hotel and restaurant' is one of the most positively affected sectors in North-East Bulgaria after 'Construction' and 'Other activities'. These results seem to be reflecting the current structure of the regional economy and those sectors that are, at present, the most important ones seem to be also the potential drivers of the changes in the economy after the introduction of pre-accession programmes. The abovementioned sectors are, in fact, the ones whose weight is the highest, in terms of output and employment within the regional economy. Impacts for the three variables are around 80-90%, 35-45% and 24-26% for 'Hotel and restaurant', 'Other activities' and 'Construction', respectively. Despite the high relative importance of agriculture in the economy of North-East region, the impact on its output, income and employment is significantly low (around 2%) in comparison to the effect remaining sectors of the regional economy[4].

5.1.2 Post-accession funds

The injection of European funds into the regional matrix has produced strong effects on the output, income and employment both at national and regional level (impact figures reach 23% for income in the case of 'full integration'). Impact figures at national level exceed those observed at regional level. Under the partial integration assumptions the regional impacts are 8%, 12% and 10% for output, income and employment, respectively (Coupled direct payments). At the national level instead, the corresponding figures are 15%, 20% and 16% (Table 2).

The most positively affected sectors in terms of output, income and employment in the North-East Region remain the 'Hotel and restaurants'

[4] Pre-accession scenario was not run at national level in the Bulgarian case.

(impact figures ranging from 78% to 94% across the different variables and scenarios), ‘Construction’ (73-84%), and ‘Education’ (23-29%). Funds have much more modest impact on the sector ‘Agriculture’ from the point of view of output, income and employment (4 to 6%). These sectors are, therefore, supposed to be the main drivers of changes in the regional economies after the application of European policy schemes.

The analysis carried out at national level shows a different picture. The most implicated sectors are ‘Construction’, ‘Other non-metallic mineral products’, ‘Transport equipment’ and ‘Other activities’, with the highest percentages increases in output, income and employment. Percentage of changes in agriculture at national level exceed (by 1 percentage point) the corresponding figures observed at regional level.

Decoupled direct payments imply a slightly lower overall impact both at national and regional levels, for income and employment while output impact appear to remain the same[5]. The same applies to both partial and full integration assumptions (Table 2).

Impact figures in the national agricultural sector, when direct payments are coupled, slightly exceed the figures in the decoupled case. There are no significant differences at regional level apart from a slightly lower impact in income terms when full integration assumptions are considered.

Among the remaining sectors, both at national and regional levels, the sectors that receive a particular positive impact by the transformation of direct payments into agricultural households’ consumption (as implied by the methodology in the decoupled payments) are ‘Food, beverages and tobacco’, ‘Hotels and restaurants’ and ‘Trade and repair activities’. Considerably lower impacts are observed for ‘Other non-metallic mineral products’, ‘Construction’ and ‘Transport equipments’ in comparison to the coupled payments. The remaining sectors are not considerably affected by the change in the nature of the direct payments.

The following table summarises the Bulgarian results.

[5] These are the results when Augustinovics forward linkage coefficients are considered. There are no differences between overall impact rates under coupled or decoupled direct payments when Rasmussen & Hirshman backward linkages coefficients are considered.

Tab. 2 - Impact on total output, income and employment in North-East Bulgaria and Bulgaria (% of increase)

SCENARIOS	OUTPUT		INCOME		EMPLOYMENT	
	Region	Nation	Region	Nation	Region	Nation
Pre – Accession	5.8	n.a.	9.00	n.a.	7.5	n.a.
Partial Integration Coupled Direct Payments	8.0	15.0	12.0	20.0	10.0	16.0
Partial Accession Decoupled Direct Payments	8.0	15.0	12.0	19.0	10.0	16.0
Full Integration Coupled Direct Payments	11.0	18.0	15.0	23.0	13.0	19.0
Full Accession Decoupled Direct Payments	11.0	18.0	15.0	23.0	13.0	19.0

5.2 Croatia

5.2.1 Pre–accession funds

The insertion of SAPARD and ISPA funds into the Croatian national and regional matrixes results in 'Public administration', 'Electricity', 'Other manufacturing' and 'Construction' being the sectors presenting the highest output, income and employment impact at both regional and national level, but with smaller impacts at regional level. Impact figures do not exceed 1%. These sectors are then identified to be as the main drivers in the development of both the national and regional economies when funds are simulated. Results are considerably similar both at regional and national levels when SAPARD and ISPA funds are considered.

5.2.2 Post-accession funds

After accession, a difference in the output effects is observed between the national and regional levels. The total impact is higher at regional level (the impact at regional level is around 2.2%, while it is 1.6% for the whole, Table 3). Impacts are different in magnitude, but almost the same sectoral ranking is observed both at national and regional level. 'Construction' is the sector where the impact is the highest (9% with coupled direct payments, 7.4% with decoupled payments, at regional level). This sector appears to represent the main driver with the funds coming from accession to the EU. Agriculture has a more modest impact. This impact is more significant at regional level (2.6% with coupled direct payment, 1.6% with decoupled payment compared to 1.5% and 1.3% observed at national level, respectively). 'Food manufacturing' 'Machinery and motor vehicles', 'Electricity, water and gas' and 'Financial services and real estate' have also a stronger impact at regional level than at national level. A very similar situation is observed for income and employment, where 'Construction' remains the most affected sector and, therefore, the sector which can pull the change in the economy after the injection of funds (with impact figures from around 7.5% to 9% for the two variables and two scenarios, full and partial integration).

Considering the direct payments as fully decoupled results in a slightly higher total impact at regional level for output, income and employment. At national level the differences in effects of coupled and decoupled payments are insignificant (Table 3). In disaggregated terms, the impact in the agricultural sector is lower when payments are decoupled, and this is especially the case at regional level. The national sectors that are particularly affected by decoupled payments are ‘Furniture’, ‘Electricity, water and gas’, ‘Financial services and real estate’, ‘Transportation’ and ‘Other manufacture’. In the former three the impacts are considerably higher when direct payments are decoupled, whereas in the latter two impact figures are significantly lower. The same applies for all the considered variables.

The situation at regional level is different. ‘Transportation’ and ‘Other manufacturing’ are positively affected by decoupled payments as well as ‘Chemical and other products’, ‘Textile and dressing’ and ‘Machinery and motor vehicles’. The sectors whose output, income and employment impacts diminish when direct payments are decoupled, are ‘Agriculture’ and ‘Construction’. All the remaining sectors receive positive impacts from the decoupled direct payments.

The following table summarises the main results for Croatia.

Tab. 3 - Impact on total output, income and employment in Bjelovar-Bilogora and Croatia (% of increase)

SCENARIOS	OUTPUT		INCOME		EMPLOYMENT	
	Region	Nation	Region	Nation	Region	Nation
Pre – Accession (ISPA and SAPARD)	0.37	0.42	0.66	0.74	0.50	0.65
Partial Integration Coupled Direct Payments	1.45	0.97	1.28	0.87	1.30	1.01
Partial Integration Decoupled Direct Payments	1.49	0.97	1.39	0.89	1.45	1.01
Full Integration Coupled Direct Payments	2.15	1.61	2.00	1.49	2.01	1.72
Full Integration Decoupled Direct Payments	2.20	1.61	2.13	1.52	2.18	1.71

5.3 Greece

As it was already mentioned, a different approach was applied to the region of Thessalia and to Greece. The impact analysis for Thessalia and Greece concentrates on the funds allocated to the region and the country from different European and national ongoing policy schemes. The scenarios consider three different programmes and two different programming periods, 2004-2006 and 2007-2013. In the sub-period 2007-2013, the analysis take into account the diminishing amount of available financial resources within the EU-15 countries caused by in reason of the enlargement of the EU to the 25 members and the consequent redistribution of funds among the new relatively ‘poor’ European regions. The alternative scenarios for Thessalia and Greece are then described by this diminishing amount of funds. These scenarios only refer to the sub-period 2007-2013.

The amount of funds for the sub-period 2007-2013 equals to 65% of the current programming period (2000-2006). This amount was calculated on the base of information taken from the authority managing the funds from the Community Support Framework in Greece. It was assumed that the different programmes will have the same current target and priorities.

The first considered programme is the Regional Operation Programme (ROP). This programme has three main types of actions, those aimed at the diffusion of innovations, those targeting unfavourable urban areas, and those assisting the development of rural and mountainous areas. Funds generated by the ROP for the period 2007-2013 should result in a positive impact in terms of output, income and employment of around 7-8% (Table 4). These impacts represent the 65% of the impact that would be observed if the same current amount of funds is on place.

The remaining two considered programmes are the Operation Programme Countryside Development - Restructuring of Rural Areas (OPCDRRA) and the Agricultural Development Plans (ADP). These two programmes specifically target the agricultural sector. The OPCDRRA aims at the improvement of the competitiveness of the agricultural sector taking into consideration the sustainable and integrated development of rural areas. The ADP’s main purpose is to support the technical improvement in the agricultural sector. Impact figures following the injection of funds from these two programmes are around 2-2.5% for the three different variables, output, income and employment. As for the ROP these impacts represent the 65% of the figure that would be observed without the simulated decrease in the funds. In total, the percentage of variation for output, income and employment for the three programmes over the period 2007-2013 are around 11-12%.

Even though these three programmes mainly target rural areas and the agricultural sector in particular, their positive effects are expected to spread to the other sectors of the economy as well. In employment terms, for example, where the effect on the agricultural sector is the highest, compared to the other two variables, the total increase will be mostly generated in the manufacturing and services sectors. Manufacturing and services sectors appear then to be the main drivers of changes after the injection of funds and they will absorb the most of the increase in output, income and employment.

The analysis carried out at national level shows lower impact figures than at regional level. Impact figures for the total of the three programmes are below 1% in output, income and employment respectively. The three considered development programmes appear then to perform better at regional than at national level.

The following table summarises the information given above.

Tab. 4 - Impact on total output, income and employment in Thessalia and Greece (% of increase)

SCENARIOS	OUTPUT		INCOME		EMPLOYMENT	
	Region	Nation	Region	Nation	Region	Nation
ROP	8.08	5.07	7.00	4.81	7.26	5.09
OPCD-RRA	2.62	0.15	2.09	0.13	2.55	0.15
ADP	2.23	0.14	2.16	0.14	2.72	0.18
TOTAL 3 PROGR.	12.92	5.36	11.26	5.07	12.52	5.42

5.4 Romania

5.4.1 Pre-accession funds

Pre-accession funds are likely to have a minor impact on the North-West Romania, as well as on the national economic structure in terms of output, income and employment. Overall impact is 0.8% at regional level, and 1.1% at national level (Table 5).

In the region, the most affected sectors are ‘Construction’, and ‘Transport and communication’. Impact figures for these two sectors are around 3-4% for the three variables. In terms of employment, the results are similar and the two above sectors are in the first two places in the sectoral ranking based on impact figures. These two sectors are then identified as the main drivers of the changes in the regional economy and they will absorb most of the positive impact from the pre-accession funds.

At national level, the results are similar with ‘Construction’ being the most affected sector, followed by ‘Trade’ when output effects are considered and by ‘Transport and Communication’ when income and employment are considered. Impact figures are higher than at regional level.

5.4.2 Post-accession funds

Post-accession are expected to have a significant impact in the regional output, income and employment, over 5%. 'Transport and communication' (around 13% for the three variables in the different scenarios), 'Construction' (12%) and 'Electricity' (11%) are the sectors where this impact is expected to be the highest and they will therefore absorb most of the increase in the three variables.

At national level, the overall impacts are higher than at regional level, being above 6% for the three variables across the different. 'Trade', followed by 'Construction' and 'Transport and communication' are the sectors that appeared to be the drivers of the changes in the national economy. It is worth noting that the impact percentages in terms of output of the top three sectors at national level are considerably higher than the figures observed at regional level, being around 55%, 18% and 17% for 'Trade', 'Construction' and 'Transport and communication', respectively. In income and employment terms, instead, 'Construction' and 'Transport and communication' are the most affected sectors, with impact figures around 15%. They are followed by 'Building materials' when income impact percentages are considered. In employment terms 'Agriculture' is the third most affected sector. Particularly surprising is the income impact for the sector 'Trade', around 2%, which is considerably lower than the simulate impact rate observed at output level, around 55%.

The agricultural sector would be negatively affected, both at regional and national level, in the case of decoupled direct payments, while overall, impacts are lower in output terms and employment terms, and higher in income terms. At national level, especially, decoupled direct payments result in a considerable loss, overall, in terms of employment effects (6.2% against 7.6%).

At regional level, no major differences between the two types of payments can be observed in output terms. Differences in income effects appear to be generated by the modified impact in the agricultural sector and by the slightly increased impacts in those sector likely to be affected by the agricultural' household consumption like 'Food industry' and 'Hotels and catering'. The diminishing impact in employment terms due to decoupled direct payments is mainly generated by the decreased impact in the agricultural sector, while for all the remaining sectors of the economy the corresponding impact percentages are positively affected by the decoupled direct payments. The same applies when the national level is analysed.

The Romanian team also considered an alternative scenario in which direct payments are treated as 50% coupled and 50% decoupled. This assumption results in the lowest output and income impact figures, at regional level, in comparison with the two extreme scenarios (100% coupled or 100% decoupled). In employment terms, the overall impact of this mixed scenario is slightly higher than in the decoupled payments case. At national level, instead, this alternative scenario simulates a better performance of funds than the coupled direct payment case, in output and employment terms. On the contrary, when the income effects are considered, this scenario shows higher impact than in the decoupled direct payments case. The main differences in disaggregated terms are similar to those observed for the previous two scenarios, where payments were considered as fully coupled or fully decoupled (Table 5).

The following table summarises the main results for Romania.

Tab. 5 - Impact on total output, income and employment in North-West Romania and Romania (% of increase)

SCENARIOS	OUTPUT		INCOME		EMPLOYMENT	
	Region	Nation	Region	Nation	Region	Nation
Pre – Accession	0.95	1.10	0.98	1.07	0.80	0.92
Partial Integration Coupled Direct Payments	6.07	7.01	5.69	6.55	6.36	7.58
Partial Integration Decoupled Direct Payments	6.03	6.91	5.84	6.63	5.36	6.23
Partial Integration 50% Coupled 50% Decoupled	5.89	6.96	5.68	6.59	5.38	6.91

5.5 Slovenia

5.5.1 Pre-accession funds

The first simulated scenario for Peripheral Slovenia and Slovenia considered the funds made available by SAPARD and ISPA measures. After the injection of these funds into the matrixes, no significant differences can be observed between the national and regional levels in terms of output effects. Overall impact figures are around 0.3% for the region and Slovenia (Table 6). At both levels, 'Construction' is the sector where the output impact is likely to be the highest (around 2%), followed by 'Manufacture of non-metallic mineral products' (0.6%) and 'Mining and quarrying' (0.5%). These sectors are then identified as the main drivers of changes in both the regional and national economy with the pre-accession funds.

In employment terms, the overall impact in the region equals to 0.25%, and this figure slightly exceeds the impact figure at country level. The macro-sector where the effects will be the highest both at national and regional level is industry, which is simulated to absorb about 80% of the new labour force. When the single sectors are considered, the impact of the pre-accession funds is the highest in 'Construction' (2%) followed by 'Manufacturing of other non-metallic mineral products' (0.7%) and 'Mining and quarrying' (0.6%). The same ranking is observed at national level, with slightly lower percentages. These sectors represent the main drivers of the regional and national employment with the pre-accession funds.

5.5.2 Post-accession funds

Over the period 2004-2006, the overall output impact percentage from post-accession funds at national level exceeds the corresponding percentage observed at regional level, whereas the situation changes over the period 2007-2013. The highest impact in the region is detected in the 'Construction' sector (from 2% to 6% over the period 2004-2006 and from 8% to 15% over the period 2007-2013) in both considered periods, 2004-2006 and 2007-2013. The effect in 'Construction' is generally leading and is followed by 'Agriculture, hunting and forestry' and 'Real Estate, renting and business activity' in the period 2004-2006 and by 'Real Estate' and 'Education' in the subsequent sub-period. Approximately the same ranking of sectors is observed at national level but with higher impact figures. When direct payments are assumed to be decoupled no significant difference in the results can be observed, in comparison to the coupled payments case. The output impact is slightly higher than in the coupled payments scenarios overall and in all sectors but 'Agriculture' and 'Construction'. The same situation is observed at national level.

In the period 2007-2013 the total output level increases at a higher percentage both at regional and national level but differently from the previous period, regional impact figures exceed national ones. However, the same ranking of sectors is observed at both levels, and overall and sectoral impact figures behave similarly when payments are considered as decoupled.

Funds originated by EU policies have a positive impact on the national and regional employment. The impact at regional level slightly exceed the national level one. Overall, impact figures are slightly higher when payments are considered to be decoupled, and in the subsequent analysed sub-period, 2007-2013. As previously noted, decoupled direct payment generally affect, in positive, the sectors 'Agriculture, hunting and forestry' and 'Construction' only.

'Construction' is the most positively affected activity sector in the region, in terms of employment, under all assumptions. The impact figures for this sector range from 2.3% (partial Integration, decoupled direct payments, 2004-2006 period) to 14.5% (full Integration, coupled direct payments, 2007-2013 period). In the period 2004-2006 'Construction' is generally followed by 'Agriculture, hunting and forestry' and 'Real estate, renting and business activities'. In the subsequent period, 2007-2013, 'Construction' remains the sector where the impact is simulated to be the highest, 'Real estate, renting and business activities' is the second, and 'Education' becomes the third. Although the same ranking of sector is observed at national level, over the two different periods, impact figures are slightly lower.

Decoupled direct payments normally results in higher impacts, overall, with respect to the scenarios considering the payments as fully coupled, both at national and regional levels. 'Agriculture, hunting and forestry', and 'Construction' are negatively affected by decoupling, showing lower impact figures than under the fully coupled direct payments assumptions. The same applies to some manufacturing sectors and to 'Mining and quarrying', but differences are less significant than for 'Agriculture, hunting and forestry' and 'Construction'.

The following table summarises the main results for Slovenia.

Tab. 6 - Impact on total output, income and employment in Peripheral Slovenia and Slovenia (% of increase)

SCENARIOS	OUTPUT				EMPLOYMENT			
	Region		Nation		Region		Nation	
	2004-2006	2007-2013	2004-2006	2007-2013	2004-2006	2007-2013	2004-2006	2007-2013
Pre – Accession	0.28		0.29		0.25		0.18	
Partial Integration Coupled Direct Payments	1.11	2.06	1.39	1.85	1.11	2.05	0.99	1.85
Partial Integration Decoupled Direct Payments	1.11	2.13	1.46	1.91	1.19	2.16	1.06	1.94
Full Integration Coupled Direct Payments	1.65	3.42	2.09	3.13	1.65	3.41	1.48	3.12
Full Integration Decoupled Direct Payments	1.72	3.50	2.18	3.21	1.75	3.54	1.57	3.24

5.6 Conclusions

When national and regional impact figures are compared, it can be observed that pre-accession funds tend to have a higher effect at national level in Croatia and Romania (in the latter case the differences are more marked). The same applies for Slovenia but only at output terms, even though the difference is extremely small. In employment terms, in fact, pre-accession funds show a higher impact at regional level in Slovenia. In terms of most affected sectors, no significant differences can be detected between the two levels of the analysis in the considered countries.

Two comparative tables are now presented. They concern three of the regions. The results from the Bulgarian case can not be directly comparable with the remaining cases because of a different technology assumption in the Bulgarian I-O table. This table was classified industry-by-industry and not product-by-product as the remaining ones. The results for the Greek region of Thessalia can not be compared because of the difference in the policy scenarios.

Tab. 7 – Pre Accession Funds, Impact in three regions (% of increase in total output, income and employment)

REGION	OVERALL IMPACT		
	OUTPUT	INCOME	EMPLOYMENT
Bjelovar-Bilogora	0.23	0.40	0.30
North-West Romania	0.95	0.98	0.80
Peripheral Slovenia	0.28	n.a.	0.25

This comparative table concerning the impact figures after the injection of pre-accession funds shows similar results in Bjelovar-Bilogora and

Peripheral Slovenia. The impact of Pre-Accession funds is slightly more significant in North-West Romania but does not reach the 1%. The case of Bulgaria is not considered as

Tab. 8 - Impact in three regions across the different scenarios (% of increase in total output, income and employment)[6]

REGION	SCENARIO Eu Funds 'Full' – Decoupled DP			SCENARIO Eu Funds 'Full' – Coupled DP			SCENARIO Eu Funds 'Partial' – Decoupled DP			SCENARIO Eu Funds 'Partial' – Coupled DP		
	O	**I**	**E**	**O**	**I**	**E**	**O**	**I**	**E**	**O**	**I**	**E**
Bjelovar-Bilogora	2.20	2.13	2.18	2.15	2.00	2.01	1.49	1.39	1.45	1.45	1.28	1.30
North-West Romania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	6.03	5.84	5.36	6.07	5.69	6.36
Peripheral Slovenia 2004-2006 2007-2013	1.72 3.50	n.a.	1.75 3.54	1.65 3.42	n.a.	1.65 3.41	1.16 2.13	n.a.	1.19 2.16	1.11 2.06	n.a.	1.10 2.05

Table 8 illustrates the results across the scenarios for the same regions. It can be observed that the impacts are significantly higher in North-West Romania than in the two remaining regions.

Across all scenarios, pre- and post-accession, when the sectoral impact is analysed, it can be observed that the sectoral ranking based within the regions is the same irrespective of whether output, income or employment are taken into consideration. The performance of each sector within a regional or national economy, in terms of impact, strongly depends on the economic structure of that economy. It is worth noting, though, that the sector 'Construction' and, generally, those sectors more linked to infrastructure development appear to be the most affected by the pre-accession funds. This is a direct consequence of the nature of the considered policy programmes, which often target infrastructure development in the recipient regions.

To sum up, funds generated by the considered policy schemes seem to perform better at national level in Bulgaria and Romania, under all or almost all scenarios. The same applies to the Slovenian case but only when the variable output is considered and only over the sub-period 2004-2006. On the other hand, post-accession funds appear to show higher impacts in the region of Bjelovar-Bilogora than at national level in Croatia. The same applies to the case of Thessalia for the different development programmes considered and for Peripheral Slovenia. In the latter case, funds perform

[6] Full Integration was not simulated in North West Romania.

better in the region in terms of output in the sub-period 2007-2013, and in terms of employment in both considered sub-periods.

The nature of direct payments, fully coupled or fully decoupled, has very different results across regions, countries and scenarios. Decoupled direct payments generally results in lower impact figures in Bulgaria and Romania, and in higher impact figures in Croatia and Slovenia. Nevertheless, it can be observed that, in general, the overall effects are small. The situation is different at disaggregated terms. As expected, the agricultural sector is strongly affected by the change in the nature of the direct payments. The impacts in the primary sectors are lower when payments are injected into the matrix as decoupled, but the difference between this and the fully coupled case varies significantly across the countries. Decoupled direct payments generally generate increased impact percentages in those sectors which are positively affected by the modified consumption of the agricultural households. This is a direct consequence of the agreed methodology which implies the distribution of decoupled direct payments to agricultural household under the form of increased funds for consumption.

6. The agricultural sector

6.1 North-East Bulgaria

North-East Bulgaria is the main agricultural producer in the country. The region covers 24% of the total Bulgarian agricultural land. The structure of agriculture has changed considerably over the last years and is marked by the importance of small farms (51% of total farms have an area below 0.5 ha, 46% between 0.5 and 5 ha., in 2000). Labour in agriculture has also been subject to considerable changes in the last decade showing a significant increase in the share of self-employed and unpaid family workers (the latter represented, in 2000, 49% of the regional agricultural labour force). The region has favourable natural conditions but a deep restructuring is necessary in order to maintain the competitiveness of the agricultural sector and its leading role in Bulgarian agriculture.

In North-East Bulgaria the impact of the simulated funds on agriculture sector is overall small in comparison with the remaining sectors. This result is surprising taking into consideration the importance of agriculture in the regional economy. This appears mainly to be a consequence of low salaries and low productivity observed in the sector and, therefore, the potential of agriculture in terms of creation of output, income and employment appears to be smaller than the one in the other sectors of the economy. The percentage of increase in the agricultural sector is around 2 for the three considered variables when pre-accession funds are considered. The figure increases to 4-5% (coupled direct payments) and 5-6% (decoupled direct payment) where the different European post-accession policy schemes are taken into account.

There are no major differences in the impact figures when direct payments are treated as decoupled. Nevertheless, the figures appear to be slightly higher than in the fully coupled payments case, especially in income terms. At national level, where impacts are higher, decoupled direct payments appear to result, instead, in slightly decreased impact figures.

6.2 Bjelovar-Bilogora

Agricultural land in Bjelovar-Bilogora represents the 4.7% of the total Croatian agricultural area. The sector has been experiencing a difficult period characterised by a lack of investment in modern machinery, processes and education. Most of the agricultural land is cultivated by small family farms, most of them with an average area of 1 to 3 ha. Labour in agriculture is mostly self-employed. Analysts agree that the agricultural sector in the Croatian region should undertake a restructuring process in order to improve its competitiveness. However, natural conditions are favourable and the well performing food processing sub-sector may help the development of the sector.

In Bjelovar-Bilogora, the overall impact in agriculture, in the different policy scenarios, is more significant at regional than at national level. The impact in terms of output, income and employment is minimal (around 0.02%) for the pre-accession scenario, while it increases in the alternative scenarios considering post-accession funds. When the direct payments are considered to be fully coupled, the impact of agriculture is 2.6%, 3.2% and 3.3%, in output, income and employment, respectively. Observed figures are lower (0.8-1% less than the corresponding figures for coupled) when direct payments are inserted in the matrix as fully decoupled.

There are no major differences between region and nation when pre-accession funds are considered while these differences are more substantial in the remaining scenarios. In output terms, the impact percentages observed at regional level are higher than the corresponding figures at national level. When the income impacts are analysed, regional agriculture performs better than the national one with decoupled direct payments, while the regional impact percentages are lower than the national ones when direct payments are treated as coupled. The regional agriculture employment impact figures are instead significantly higher, under all assumptions, than the national ones.

6.3 *Thessalia*

Thessalia is one of the EU-15 regions where the share of employment in agriculture is the highest. The region accounts for 12% of the total cultivated agricultural area in Greece and cotton is the main crop. Agriculture was markedly affected by the 1981 land reform and the introduction of the CAP in the same year. The labour force engaged in agriculture increased immediately after the reform but subsequently decreased resulting in a upward trend in the average farm size (the average farm size in 1999 was 3.5 ha.). Over 95% of farms are individually owned. Agriculture in Thessalia has been strongly affected by the entrance of Greece in the EU in 1981 and this resulted in stronger dependence of the sector on subsidies. Land prices have been maintained high and this has affected the enlargement of farms.

As previously stated, alternative scenarios for Greece consider the sub-period 2007-2013 during which a diminishing amount of European funds is expected due to the enlargement to EU-25. Among the different funding schemes that have been considered in order to define the relevant policy scenarios for Thessalia, the Operation Programme Countryside Development - Restructuring of Rural Areas (OPCDRRA) and the Agricultural Development Plan (ADP) specifically targeted the agricultural sector in the framework of a more general regional development, while the Regional Operational Programmes (ROP) has a wider target. The amount of funds allocated to the region and to the nation by the above programmes in the programming period 2000-2006 was used as reference in order to define the amount of funds to be allocated in the sub-period 2007-2013. The 65% of the current amount was allocated to the sub-period 2007-2013.

The impact percentages on agriculture are modest, both at regional and national level. The same applies to the three considered policy programmes. Figures are slightly more significant in employment terms than for the other two variables. Impact percentages are shown in Table 9 and they represent the 65% of the figures that would be observed without considering the diminishing amount of funds. Impacts are lower at national level. It is worth noting that, even though most of the mentioned programmes target the agricultural sector, their positive effects appear to be distributed across the entire regional economy.

6.4 North-West Romania

As mentioned, agricultural is a very important activity in North-West Romania, whose natural conditions are very favourable for livestock production. The regional farm structure shows the prevalence of small farms within the size group of 1-5 ha. The sector worked as a buffer during the transition period and absorbed the exceess labour force from the other sectors of the economy. The development of commercial agriculture is one the main development priorities, but in any case the importance of the sector in the regional economy and employment is expected to decrease

The impact of pre-accession funds in terms of output in the agricultural sector of North-West Romania, 0.5%, is significantly lower than in the case of post-accession funds, 4.4% and 7.3% for the two cases, decoupled and coupled direct payments, respectively. The same differences are observed in terms of income and employment. The impact generated in the sector is also lower when compared to the other sectors' performances.

Treating direct payments as decoupled results in a considerably lower impact on the farms output, income and employment than in the case of payment coupled to production. The same situation is observed at national level, although there the impact on output, income and employment is, overall, considerably higher than at regional level.

6.5 Peripheral Slovenia

Agriculture in Peripheral Slovenia has been restructured during the transition period but the changes were not as significant as in the other central and eastern European countries. As it was mentioned, the contribution of this sector to both total GDP and employment is significantly lower than in the other case study regions and has been declining over the last decade. Natural conditions are not very favourable for the development of agricultural activities which are mainly carried out by small farm holdings (between 2 and 5 ha). Often, agriculture is not the main source of income of the household but it is run part-time as a supplementary activity (in 2000, only 23% of farms were run on a full-time basis).

The percentage change of total agricultural output ranges from a minimum of 0.1% for the scenario that considers the pre-accession support for the period sub-period 2004-2006 up to a maximum of 4.4% for the optimistic scenario 'full integration' with coupled direct payments for the sub-period 2007-2013. Treating direct payments as decoupled results in lower impact percentages. The same applies to the national level where agriculture impact figures are generally higher than at regional level in the sub-period 2004-2006, and slightly lower in the sub-period 2007-2013.

When the employment effects in the agricultural sectors (Agriculture, hunting and forestry) are taken into consideration, the impact figures range from 1.4% in the scenario partial integration and decoupled direct payments, during the 2004-2006 sub-period, to 3.5%, during 2007-2013 in the scenario full integration and coupled direct payments. In general, across the scenarios and periods, decoupled direct payments generate an impact in the employment that is by a 20-25% lower than in the case of coupled direct payments. In addition, during 2004-2006, when direct payments are injected as coupled, 'Agriculture, hunting and forestry' becomes the second most affected sector in the region, after 'Construction', under the partial integration assumptions (impact of 1.9%) and the third most affected sector, after 'Construction' and 'Real estate, renting and business activities', under the full Integration assumptions (impact of 2.4%).

Employment impact percentages at national level are generally higher during 2004-2006 but lower during the subsequent sub-period 2007-2013. Similarly to what it is observed at regional level, decoupled direct payments generate a lower impact in agriculture.

6.6 Conclusions

Table 9 presents a broad comparative picture of the performance of the agricultural sector in the five case study regions. The purpose of the table is informative as data for the Bulgarian case are constructed from a different matrix and therefore not comparable with the remaining ones. The issues of comparability also stands for Greece as policy scenarios in this case considered different programmes.

Tab. 9 - Impact in output, income and employment in agriculture (% of increase)

REGION	SCENARIO Pre Accession Funds			SCENARIO Eu Funds 'Full' – Decoupled DP			SCENARIO Eu Funds 'Full' – Coupled DP			SCENARIO Eu Funds 'Partial' – Decoupled DP			SCENARIO Eu Funds 'Partial' – Coupled DP		
	O	I	E	O	I	E	O	I	E	O	I	E	O	I	E
Bjelovar-Bilogora	0.02	0.02	0.02	2.61	2.23	2.28	1.81	3.22	3.28						
North-East Bulgaria	2.20	2.60	2.20	5.00	6.00	5.00	4.00	5.00	4.00	4.00	5.00	4.00	4.00	5.00	4.00
North-West Romania	0.54	0.58	0.49							4.37	4.72	4.00	7.30	7.89	6.69
Peripheral Slovenia															
2004-2006	0.12		0.12	1.84		1.84	2.41		2.41	1.40		1.40	1.86		1.86
2007-2013				2.80		2.80	3.53		3.53	2.04		2.04	2.63		2.63
	SCENARIO ROP			SCENARIO OPCDRRA			SCENARIO ADP			TOTAL					
	O	I	E	O	I	E	O	I	E	O	I	E			
Thessalia 2007-2013	0.42	0.56	0.66	0.28	0.42	0.63	0.63	0.84	1.19	1.33	1.82	2.59			

Note: O = output; I = income; E = employment

From the table it can be asserted that the incoming funds distributed under the assumptions of the different scenarios are likely to have a relative low impact on the agricultural sector. In all regions the impact on the agricultural sector is often considerably lower than the impact observed in the other sectors of the economy. In addition, it is worth noting that the impact generated by the pre-accession policy schemes is considerably lower than the impact of the post-accession programmes, even when the partial absorption of funds is considered.

Simulated funds provide higher positive changes better at regional level in Croatia, Greece and Slovenia, whereas in Bulgaria and Romania the impacts in the primary sector are generally higher at national than at regional level.

When the dichotomy 'coupled/decoupled' direct payments is considered in the analysis, results differ across the regions and variables. It is then useful to remind that when the payments are coupled, funds are injected into the matrix as investments in the agricultural sector, while when payments are decoupled, their effect is distributed to the income of agricultural households, and therefore, to consumption. As seen in the previous section, coupled payments generally tend to result in a decreased total input, output and employment compared to the decoupled payments case. When the focus is on the agricultural sector, conclusions differ significantly across the regions. If the output impact diminishes in North-East Bulgaria and Bjelovar-Bilogora, it increases in Peripheral Slovenia and North-West Romania. The impact on incomes and employment increases in Bjelovar-Bilogora and North-West Romania while it decreases in North-East Bulgaria.

A mixed picture has, therefore, emerged from the comparison of those results that refer to the agricultural sector. The capacity of the different policy schemes to create output, income or employment in the agricultural sectors of the five case study regions cannot be easily assessed in general terms but only in interaction with the specific characteristics of this sector and the rest of economy in each region.

7. Time varying coefficients analysis

As it was mentioned at the beginning of this chapter, the impact analysis of relevant policy scenarios not only included the static approach, whose results have been presented and discussed in the previous subsections, but also the time varying coefficients analysis, which is in fact a comparative static. This analysis was carried out by the project's coordinator, at regional and national level for North-East Bulgaria and North-West Romania. The methodology for this approach is detailed in chapter 12. The main difference between the two approaches, static and time varying, is that the latter allows the matrix coefficients and multipliers to change over time. By doing so, it becomes possible to isolate the impact of specific policy schemes from other types of impacts that have occurred over the considered period.

Some additional differences between the two approaches can be identified in the data sources. The most recently available national tables were regionalised through a methodology which differed form the common approaches used to regionalise the national tables for the static approach. Here, Flegg's Location Coefficient was used. Another difference in relation to the regionalised table used for the static analysis was the non-inclusion of 'superior' data into the matrix. No data from additional survey sources were inserted in the matrix.

Once the regional matrixes were obtained, as for the static analysis, two main steps had to be undertaken in order to apply the methodology. First, it was necessary to allocate the incoming funds at national level from the policy schemes considered to the regions. Data are normally available at national level but this is not always the case for the specific regions. Secondly, once funds were distributed to the region, it was necessary to allocate them to the different sectors of the economy.

Funds were allocated to North-East Bulgaria according to the relative importance of the agricultural sector in the region in comparison to the remaining regions in the country. Funds were allocated to North-West Romania region trough a criteria which took into account population size, income, unemployment and infrastructures in the regions. The same distribution of funds to the different sectors of the economy outlined by the research partners in the regional impact analysis and briefly reported in the previous sections of this chapter was used for the time varying approach as well.

The relevant policy scenarios used in the application of the time varying coefficients approach do not significantly differ from the scenarios used in the static analysis, which have been outlined in the previous subsection of this chapter. Nevertheless, the time varying coeffecients analysis considers the 'integration effects', which were not taken into account in the static approach. The integration effects are those effects resulting from the market enlargement following the accession to the EU and the common market. These effects were quantified through a methodology presented in chapter 12. This methodology considers the consequences, in terms of import and export, of the abolishment of export subsidies and previous bilateral agreements as well as the application of the EU common external tariff. Furthermore, the impact at internal market level, resulting from the progressive liberalisation of administrative and technical barriers, is also considered. The 'integration effects' were estimated to be an increase in the imports of 14.9% and an increase in exports of 14.5%[7]. As previously stated, this analysis, as well as the static one does not intend to estimate all the possible effects that are likely to be generated by the accession of the considered economies in the EU.

The results of this analysis will now be briefly summarised. They will then be compared with the results from the static analysis. As for the static analysis, results are presented as impact percentages which describe the positive (or negative) change in the considered variables after the injection of funds.

7.1 Bulgaria

The time varying coefficients model allows the projected tracking of sectoral multipliers over the period considered. In this way the analysis tracks explicitly the impact of structural changes. The results suggest that sectors' multipliers do change over the period 2004-2009. This is more pronounced at the regional (North-East Region Matrix) than at the national level. In 2004, the sectors that are likely to create the highest impact at national level are: 'Construction', in output terms, 'Education', in income terms, and 'Agriculture', in employment terms. At the regional level, the 'Food industry' is the sector most likely to be affected in terms of output,

[7] See chapter 6 for information about the 'integration effects'.

while 'Education' and 'Mining' are at the top positions for income and employment, respectively.

When pre-accession funds are injected into the matrixes, the percentages of impact over the national economy are 4.3% on output, 4% on income, and 4.6% on employment. Figures at the regional level are similar, 4.5%, 4% and 4.1%, for output, income and employment, respectively. When the different sectors of the regional and national economies are aggregated into three main categories: agriculture, industry and services, industry is the most affected macro-sector, for the three variables considered, both at national and regional level.

The integration effects likely to be generated by the accession to the EU are expected to have a positive effect at national level over the period 2007-2009. With respect to the departing situation in 2004, the impact percentages over the period will be 9.7% for output, and 8.4% for income and employment. The effect of integration into the EU would, however, be negative for the North-East region over the period 2007-2009. The total regional impact resulting from the integration would, in fact, be lower than the impact computed without taking into consideration the integration effects. The figures after the consideration of integration effects are 4% for output, 2.3% for income, and 1.7% for employment. These impact figures are considerably lower than the corresponding figures observed at national level.

Under the assumption of partial integration, the injected funds will produce, over the period 2004-2009, a positive effect on output, income and employment. At regional level, this total effect is quantified as 32.2% for output, 27.7% for income, and 37% for employment. Figures are higher at national level. At both national and regional levels, decoupled direct payments would be expected to affect, positively, both output and income, while the effect is expected to be negative for the employment. The impact figures for the decoupled direct payments case are some 0.9% and 7.3% higher than the corresponding effects for coupled, in output and income, respectively. In terms of employment, on the other hand, decoupling affects negatively the impact percentages, which are by 11.2% lower. At national level, however, decoupling produces a positive effect for output (+3%), and negative effects for income and employment (-0.2% and -10% respectively).

As observed earlier in this paper, the full integration scenario assumptions represent a very optimistic situation, which is unlikely to occur, at least within the time frame considered here. However, full integration scenarios can be useful in order to quantify the best possible situation and compare it with the more realistic situation. In this case, it was possible to quantify the negative effect implied by the acceptance of the phasing-in scheme for direct payment, considered in the partial integration scenarios. With coupled direct payments, the price of accepting the phasing-in scheme is quantified as -16.1%, -6.7% and -25.6% for output, income and employment, respectively. With decoupled direct payments, the price of accepting the phasing in scheme would be -16.8% for output, -13.9% for income, and -16.5% for employment. These percentages refer to the differences between the impacts in the two scenarios partial and full integration. These are the figures at regional level, while differences between phasing-in and full payments at national level are considerably lower.

Considering the difference between coupled and decoupled payments in the full integration scenario, the output impact remains approximately the same both at national and regional levels. Differences are instead more marked in terms of income and employment. The former receives a positive impact from the decoupled payment, with respect to the coupled version, which accounts for 7.1% and 16.9% at national and regional level, respectively. In terms of employment, the impact of decoupled payments is negative, with respect to the coupled version, being around -20% both at national and regional levels. These percentages refer to the differences between the impacts in the two versions, coupled and decoupled direct payments.

7.2 Romania

Sectoral output multipliers do also appear to change over the period 2004-2009. However, the extent of these changes is much greater than in the Bulgarian case and all sectors seems to loose their importance in the national and regional economies. The most affected sectors by these changes in the multipliers are ‘Agriculture’, ‘Food Industry’ and ‘Public Administration’. The same loss in relative importance applies when income multipliers are considered, apart for the sectors ‘Trade’ and ‘Community, social and personal services’, and when employment effects are taken into consideration. The diminishing impact of all the sectors of the national and regional economy in terms of employment is likely to be the consequence of an increasing labour productivity, especially in the tertiary sectors.

When pre-accession funds are injected into the matrixes, the percentage of impact in the regional economy is 5.6% on output, 5.9% on income, and 2.5% on employment. Figures at national level are slightly higher. Industry is the most affected macro-sector, for the three considered variables, both at national and regional level.

The simulation of the process of accession to the EU termed here ‘integration effects’, generates an overall loss in output, income and employment terms, at national level, in the period 2007-2009. This seems to be especially due to the increase in net imports. Over the period 2004-2007, however, the simulated accession should produce a positive impact at national level in output (4.7%), income (5.4%) and employment (2.3%). However, these figures are lower than those observed in the case of pre-accession funds. At the regional level, a negative effect of the integration is observed over the period 2007-2009. With reference to the baseline (2004) a decrease would be detected in output (-0.2%), income (-0.9%) and employment (-1.4%).

When the different EU accession policy schemes are taken into consideration, significant positive effects can be observed when the corresponding funds are injected into the matrix. For the partial integration scenario, total impacts in the region over the period 2004-2009 are 37.2% for output, 35.9% for income, and 16.7% for employment. Figures are considerably higher at the national level.

When direct payments are considered to be decoupled, a slightly higher impact percentage is observed for output and income, both at national and regional level. A lower impact percentage is instead detected in employment terms, at both levels. In general, differences in output and income are very modest while differences in employment terms are slightly more significant.

The application of the full integration scenario enables the analyst to assess the impact of the full direct payment option with respect to the agreed phasing-in scheme. At the regional level, this loss is quantified for output in -11%, -6.7% for income and -25.7% for employment. When payments are inserted into the matrix as decoupled, negative effects account for -11.9% for output, -11.4% for income, and -13.8% for employment. At the national level, slightly lower absolute figures are observed for the three variables and both type of payments.

Under the full integration scenario assumptions, impact over the three considered variable is significantly higher than in the previous scenarios both at national and regional level. When the dichotomy coupled-decoupled payments is considered, the same differences and dynamics observed in the partial integration scenario are observed in this occasion. Decoupled payments increase the impact in terms of output and income while they decrease the impact in terms of employment.

7.3 Comparison between the two regions and the static analysis results

In both regions and countries, sectoral multipliers decrease over the period 2004-2009. As a consequence, the time varying coefficient approach seems to show lower impact than does the static approach. The dynamic approach remains a better option when the analysis considers a sufficiently long period (over 5 years) but the static approach seems to produce reasonable results within a short-term period.

Tab. 10 - Impact rates on output, income and employment in the two regions under different policy scenarios (% of variation of total for the three variables with respect to the value prior to the injection of funds, baseline 2004)

REGION	Scenario Pre-Accession			Scenario 'Integration Effects'			Scenario Partial Coupled			Scenario Partial Decoupled		
	O	I	E	O	I	E	O	I	E	O	I	E
North-East Bulgaria	4.5	4.0	4.1	4.0	2.3	1.7	32.2	27.7	37.0	32.5	29.8	32.8
North-West Romania	5.6	5.9	2.0	-0.2	-0.9	-1.4	37.2	35.9	16.7	37.5	37.4	14.4

Table 10 illustrates the impact percentages in the two regions in which the dynamic analysis was applied, under the assumptions of different policy scenarios. The table gives a broad comparative picture between the two regions. It is useful to remind that the bulgarian table had a different classification, industry-by-industry instead that product-by-product. It is useful to observe that the simulated policy schemes seem to generate a higher impact in the economy of North-West Romania than in North-East Bulgaria. However, there are important exceptions. First, the effect on the North-West Romania employment is significantly lower that what it is observed in North-East Bulgaria under all circumstances. Second, the consideration of the 'integration effects' create negative impact over the economy of North-West Romania while the impact in the Bulgarian region is positive.

In addition, in both regions, decoupled direct payments generate an increase in the impact on output, to a lesser extent on employment. In terms of national/regional comparison, in both regions, the simulated funds have a higher impact at national than at regional level.

8. Conclusions

This summary chapter attempted to summarise the medium-term perspectives of the five case study regions on the basis of the results of the impact analysis under different policy scenarios, both in static and time varying coefficients approaches (the latter run for Bulgaria and Romania only).

Similarities and differences among the regions have been underlined and can be summarised in the following points:

- The pre-accession funds have a higher effect at national level than at regional level in Croatia and Romania, for all the variables namely output, income and employment, and in Slovenia in output terms.
- The post-accession funds have higher impact on the region than at national level in Croatia, Greece and Slovenia.
- Across the five regions, results do not considerably differ when the different variables, output, income and employment, are analysed. Results for the three variables differ more significantly in North-East Bulgaria and North-West Romania when the time varying coefficients are applied.
- The sectoral ranking, across scenarios, does not differ substantially between the national and regional levels. Percentages of variation in output, income and employment are often different but the same sectors are generally identified as the main drivers of the change in the economy at the two geographic levels.
- The highest impact of the simulated policy transfers is observed for those sectors linked to the potential infrastructural development in the five case study regions. This is a direct consequence of the fact that different policy schemes' are generally targeted at infrastructure in rural areas and, therefore, result in positive effects for the related sectors.
- The different regional and national economies react differently to the two forms of agricultural direct payments, coupled and decoupled. Treating direct payments as decoupled generally results in lower impact percentages for the agricultural sector and in higher impact percentages for those sectors supplying the consumption of goods and services to agricultural households. This effect is especially important in the case study regions (with the exception of Peripheral Slovenia) where the agricultural population represents an important proportion of the total population.
- Even though some of the considered policy programmes are directly aimed at the development of the agricultural sector, the positive effects of the incoming funds seem not to be effectively captured by the agricultural sector alone but are themselves across the entire regional economy. This can be seen as an evidence of the achievements towards

the implementation of a broader concept of rural development, which is taken into account in the different policy programmes' objectives.

The last two points are particularly important in consideration of the fact that a lack of proper infrastructure was identified as one of the main obstacles to the development in at least four of the regions (with the exception of Peripheral Slovenia). In addition, the analysis of the agricultural sector in the five regions showed a need for a deep restructuring with the aim of targeting the entire complexity of rural economies and societies.

A mixed picture has emerged from this comparison as a consequence of the differences among the regions as well as the limitations of the methodology applied. Therefore the results should be interpreted with caution. Nevertheless, this chapter allowed to identify similarities and differences amongst the regions to outline the medium-terms development perspectives.