II. EVOLUTION OF REGIONAL AND SUB-REGIONAL DISPARITIES IN ROMANIA – A SECTORAL SHIFT-SHARE ANALYSIS[1]

Mihaela-Nona CHILIAN[2]

Abstract

The paper aims to assess the evolution of sectoral development disparities (as regards value-added and employment, for the main sectors of the economy) in the regions and counties of Romania. Using classical shift-share analysis tools, we investigate the extent to which the existing interregional and, especially, intra-regional and inter-county inequalities can be attributed to different factors, such as industry mix, and to regional specific factors. The results reveal a diverse milieu and offer useful insights for both general and specifically targeted policies in the area of regional development.

Keywords: Romanian regions, regional disparities, shift-share analysis, regional development
JEL Classification: O18, R11, R12, R15

1. Introduction

The shift-share analysis is a methodology frequently used to obtain insights into the determinants of regional growth processes, which can address many issues, such as output growth, employment growth and productivity growth[3], since the levels of Gross Value Added (GVA), employment and labor productivity and their changes by industry and region are key elements to analyze how a region is performing[4]. In its "classical"

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[2] Institute for Economic Forecasting, Bucharest, Romania, E-mail: cnona@ipe.ro
[3] Esteban Fernández Vázquez, Bart Los and Carmen Ramos Carvajal, *Path Based Shift-Share Analysis: Using Additional Information in Decomposing Regional Economic Changes*, University of Oviedo, Department of Applied Economics, Spain and University of Groningen, Growth and Development Center and SOM Research School, The Netherlands.
[4] José Luis Iparraguirre D'Elia, Labour Productivity, *Gross Value Added and Employment by Industry in Northern Ireland. A Structural and Shift-Share Analysis*, Economic Research Institute of Northern Ireland ERINI Monograph 6, December 2005.

form, such analysis proposes to "split" the evolution of a certain growth determinant in a given region according to three components: i) a *national* component, which expresses how much a variable in each industry and region would have changed if they had undergone the same global average rate of growth nationwide (or EU, in case of a broader analysis), ii) a *share* component (also called *industry-mix*), which expresses what the variable situation would have been if each of the sectors had known the same rate of growth as it had on national basis, minus the precedent global component; and iii) a *shift* component (also called *regional-shift* or *competitive effect*), resulting from the difference between the evolutions actually observed and the evolutions calculated thereby in proportion of national evolutions, capturing those dynamic elements that are unique to each region. This component may be interpreted as the global result of a balance between the 'attractiveness' and the 'repulsiveness' of a region for different sectors of activity[5]. Employing the tools of classical shift-share analysis, the paper attempts to assess the sectoral development disparities (as regards value-added and employment, for the main sectors of economy) in the regions and counties of Romania, attempting to answer questions such as[6]:

- How much of the change in GVA and employment in the main sectors in a region over a given period was due to changes in the Romanian economy as a whole over that same period?
- How much of the change in GVA and employment in the main sectors in a region over a given period was due to changes in GVA and employment, respectively, in that sector across Romania over that same period?
- How much of the change in GVA and employment in the main sectors over a given period in the Romanian regions was due to changes primarily in a region's economy as a whole over that same period?

Due to data availability, the shift-share analysis of employment will encompass the years 2000 to 2008, while that of GVA will cover the period 2002-2008[7]. The computations have been done for the Romanian NUTS-1, NUTS-2 and NUTS-3 regions[8].

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[5] Pierre-Yves Leo and Jean Philippe, "Business Services, the New Engine of French Regional Growth", *The Service Industries Journal*, Vol. 25, No. 2, March 2005, pp. 141–161.

[6] *Adapted from José Luis Iparraguirre D'Elia, Labour Productivity,* Gross Value Added and Employment by Industry in Northern Ireland. A Structural and Shift-Share Analysis*, Economic Research Institute of Northern Ireland ERINI Monograph 6, December 2005.*

[7] *Traditional shift-share static comparative analysis contrasts two points in time, but such an exercise is ridden with limitations. The main problem is that it does not take into account changes that might have occurred in the industrial structure within the region under study or the reference geographical unit. Dynamic shift-share studies of the evolution of the components over time help overcome these pitfalls, allowing for period-to-period changes in the components, thus capturing any structural changes which might have occurred, either in the regions/counties or Romania as a whole – see José Luis Iparraguirre D'Elia, Labour Productivity,* Gross Value Added and Employment by Industry in Northern Ireland. A Structural and Shift-Share Analysis*, Economic Research Institute of Northern Ireland ERINI Monograph 6, December 2005. However, for reasons of space, such an analysis will not be presented in this paper.*

[8] *Namely, macroregions, development regions and counties. However, currently the macroregions are more statistical aggregations and not administrative or operational units, while the*

2. The Shift-Share Method

The shift-share analysis (introduced by Dunn, in 1960) was a tool much used in regional analysis, due to its simplicity in capturing the underlining changes in the variables under consideration. It requires only relatively modest amounts of data that are generally accessible, making the resulting analysis fast and reasonably accurate[9].

However, despite its popularity, the shift-share analysis has also attracted severe criticism for many different reasons, such as the absence of theoretical content; sensitivity to the level of industry aggregation, to the degree of regional disaggregation and to the considered period (initial and/or final observation could influence the results[10]); and the omission of the impact of intra-regional sectoral linkages[11]. In response to the critics of the many limitations of the shift-share method, many modifications and extensions were developed, especially in regional analysis. Thus, Rosenfeld (1959) raised the problem that the regional shift (competitive) effect was not only affected by the special dynamism of the sector, but also affected by the specialization of the regional employment in the activity. Esteban-Marquillas (1972) proposed the use of a homothetic employment in a certain sector and region, leading to the identification of the allocation effect, issues also emphasized by Arcelus (1984) and Haynes and Machunda (1987). Other theoretical advancements of the shift-share analysis include Klaasen and Paelinck (1972), Sakashita (1973), Theil and Gosh (1980), Haynes and Dinc (1997), Dinc and Haynes (1999), while attempts to put the analysis in a probabilistic framework were made by, among others, Buck and Atkins (1976), Berzeg (1978, 1982), and Patterson (1991). Nazara and Hewings (2003) proposed an extension of shift-share analysis to include the spatial structure of regions, proposing also taxonomy of regional growth decompositions[12], Ramajo-Márquez (2007) decomposed economic change in a region into three additive spatial

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regions are not administrative units de jure, but entities in charge with regional policy in territory, and the counties are truly administrative units. This is about to change, since a territorial administration reform is envisaged by the Romanian government until the end of 2012.

[9] Suahasil Nazara and Geoffrey J.D. Hewings, *Towards Regional Growth Decomposition with Neighbor's Effect: A New Perspective on Shift-Share Analysis*, Regional Economics Application Laboratory (REAL), University of Illinois at Urbana-Champaign, REAL 03-T-21 June, 2003.

[10] Esteban Fernández Vázquez, Bart Los and Carmen Ramos Carvajal, *Path Based Shift-Share Analysis: Using Additional Information in Decomposing Regional Economic Changes*, University of Oviedo, Department of Applied Economics, Spain and University of Groningen, Growth and Development Center and SOM Research School, The Netherlands.

[11] See, for instance, Yiannis Kamarianakis, Julie Le Gallo, "The evolution of regional productivity disparities in the European Union", 1975-2000, Groupement de Recherches Economiques et Sociales (GRES), *Cahiers du GRES* 2003-15, Décembre 2003, David Wadley, Phillip Smith, "Straightening up shift-share analysis", *The Annals of Regional Science* (2003) 37:259–261 and Gordon F. Mulligan, Andreas Molin, "Estimating population change with a two-category shift-share model", *The Annals of Regional Science* (2004) 38:113–130.

[12] Suahasil Nazara and Geoffrey J.D. Hewings, *Towards Regional Growth Decomposition with Neighbor's Effect: A New Perspective on Shift-Share Analysis*, Regional Economics Application Laboratory (REAL), University of Illinois at Urbana-Champaign, REAL 03-T-21 June, 2003.

components, and Kamarianakis and Gallo (2003) substituted the traditional shift-share formulation by an analogue based on the intra-regional inter-sector interactions.

Basically, the main idea of the shift-share analysis is that the temporal variations in a certain variable z_{ij} (where *i* refers to the economic sector and *j* to the region) depend on three factors or effects: a *national* effect, which estimate the influence of the national economic growth process, a *sectoral* (*industry-mix*) effect, reflecting the differences between regions in the industry mix and, a *regional* or *competitive* effect measuring the regional differences in the dynamics of sector *i*. Such analysis can provide useful information to policy makers: for the design of policies for a region it could be interesting to know, for instance, what is the influence of its specific sectoral specialization on the economic growth[13].

In this paper, both *employment* and gross *value-added* will be used as variables of interest to compute the shift-share decomposition, but the focus will be not on the overall growth, but on the changes in the main sectors, in order to highlight the structural changes undergone both by the Romanian economy as a whole, and by the regional/sub-regional economies as well[14]. A point of departure for the shift-share analysis is the following equation[15]:

$$\text{Total Change} = NS + IM + RS \quad (1)$$

where: NS is the national effect (national share by industry in case of analysis of the main sectors), IM is the share (industry-mix effect) and RS is the regional effect. The calculation of the three components for each sector is the following[16]:

1. National share by industry

$$NS = NI^{s}_{t-1} * [(RO_t/RO_{t-1} - 1)] \quad (2)$$

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[13] *Esteban Fernández Vázquez, Bart Los and Carmen Ramos Carvajal,* Path Based Shift-Share Analysis: Using Additional Information in Decomposing Regional Economic Changes*, University of Oviedo, Department of Applied Economics, Spain and University of Groningen, Growth and Development Center and SOM Research School, The Netherlands.*

[14] *The overall regional development was previously analyzed in Romania by other methods – see, for instance, C. Mereuță, L.L. Albu, M. Iordan, M.N. Chilian, "A Model to Evaluate the Regional Competitiveness of the EU Regions",* Romanian Journal of Economic Forecasting*, No. 3, 2007, pp. 81-102 and D. Miron, A.M. Dima, S. Vasilache, "Indexes of Regional economic Growth in Post-Accession Romania",* Romanian Journal of Economic Forecasting*, No. 3, 2009, pp. 138-152. At the same time, sectoral evolutions were approached mostly at national level, though specific sectoral developments were studied also at regional level (see, for instance, C. Scutaru, P. Fomin, C. Stănică, "Prospects for the Evolution of the Economic Sectors Behavior",* Romanian Journal of Economic Forecasting*, Supplement 2010, pp. 120-142 and D. Jula, N. Jula, "Productivity and the Regional Employment in Services. Econometric Estimations for Romania",* Romanian Journal of Economic Forecasting*, No. 3, 2009, pp. 129-137.*

[15] *For reasons of data availability, six main sectors were considered for the analysis: A01 - agriculture, forestry, hunting and fishery; A02 – industry; A03 – constructions; A04 – trade, hotels and restaurants, transport and communications; A05 – financial intermediations, real estate and other services for companies; A06 – public administration, education, health and social welfare.*

[16] *Adapted from José Luis Iparraguirre D'Elia, Labour Productivity,* Gross Value Added and Employment by Industry in Northern Ireland. A Structural and Shift-Share Analysis*, Economic Research Institute of Northern Ireland ERINI Monograph 6, December 2005.*

where: s refers to each sector and t and t-1 to the end and beginning period, respectively, and NI refers to employment (GVA) levels in a certain region/county and Romania to employment (GVA) levels in Romania as a whole.

Thus, the national share by sector is the number of jobs (million lei) in a certain region/county by sector at the beginning of the period under analysis multiplied by the growth rate in total employment (GVA) levels that took place in Romania as a whole over that same period. It reflects how much the GVA/employment in each industry and region/county would have changed if they had experienced the same behavior as the overall development in Romania.

2. *Industry Mix*

$$IM = NI^{s}_{t-1}*[((RO^{s}_{t}/RO^{s}_{t-1}) - 1) – ((RO_{t}/RO_{t-1}) – 1)] \quad (3)$$

The industry mix component measures the influence of the mix of fast/slow growing industries in a certain region/county compared to that in Romania as a whole net of any Romanian-wide economic effects. A sector with a larger share in total employment (GVA) in a certain region/county than in Romania as a whole will show a positive industry mix if the nation-wide employment (GVA) level in the sector has increased more than employment (GVA) levels have across sectors. On the contrary, if the sector has experienced a higher increase in its employment (GVA) levels than employment (GVA) levels have throughout the economy, an under-represented industry in a certain region/county (compared to its share across Romania) will show a negative structural or industry mix.

3. *Regional Shift*

$$RS = NI^{s}_{t-1}*[((NI^{s}_{t}/NI^{s}_{t-1}) – 1) - ((RO^{s}_{t}/RO^{s}_{t-1}) - 1)] \quad (4)$$

The regional shift reflects the *competitive* component within a region, namely the dynamic elements unique to the region contributing to its employment and GVA performance. This indicator shows the regions and counties lagging and leading sectors in terms of net employment (GVA) creation as compared to their national counterparts. The regional shift factor can be further decomposed into a *regional comparative advantage component* (CAC) and an *allocation component* (AC). This decomposition is important to count for any scale effects that may be in place if regions are very different in size[17].

[17] *José Luis Iparraguirre D'Elia, Labour Productivity,* Gross Value Added and Employment by Industry in Northern Ireland. A Structural and Shift-Share Analysis*, Economic Research Institute of Northern Ireland ERINI Monograph 6, December 2005.*

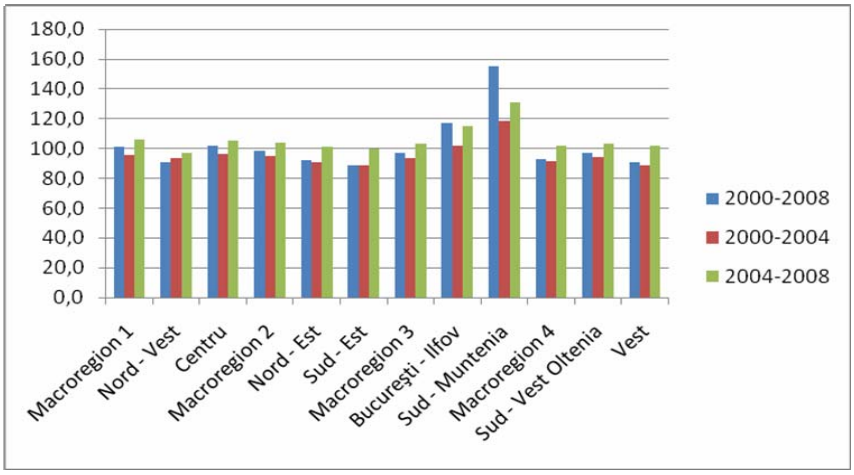
3. Results

3.1 Employment Developments

The *overall employment*[18] grew slightly over the period 2000-2008, but only three regions experienced a similar growth of overall employment. However, when analyzing further, one may notice two separate periods of employment change, namely 2000-2004 (when only two regions experienced employment growth) and 2004-2008 (when all but two regions experienced employment growth – see Figure 1). Consequently, the shift-share analysis was conducted for employment change also in the two above-mentioned intervals.

Figure 1

Overall Employment Change in Romania in 2000-2008, by Macroregions and Regions, %



Appendix 1 presents the total change in employment for the main sectors of the Romanian economy, by macroregions, regions and counties. As one may see, there were sectors where virtually all the regions and counties experienced negative changes as compared to employment levels in 2000 (*agriculture, forestry, hunting and fishery*), but also sectors where all the regions and counties experienced positive changes (*constructions* and *financial intermediations and real estate transactions*). Good performance in terms of employment change was also recorded by most of the regions and counties in the case of *trade, hotels and restaurants and transports and telecommunications* (better in the second analyzed subinterval) and *public administra-*

[18] *In this case, employment is considered, in a broader sense, to refer to the employed population and not to the number of employees. The reason is that in agriculture and, partially, in trade, there are many self-employed people or outside formal employment. A separate analysis was conducted for the number of employees, in connection with labor productivity, the results of which are available upon request.*

tion, education and health and social welfare (however, with lower performance in the interval 2004-2008 in some counties). In the case of *industry*, many counties experienced negative changes in employment (pointing towards a deindustrialization/industry restructuring process) and slightly better performance in the first analyzed subinterval, but there were also counties that revealed positive changes. On the whole, all these indicate *deep changes under way in the economic structures* and the *progressive migration from an industrial society to a tertiary society*, which was much delayed in Romania, even in its most advanced regions and counties[19].

Considering the shift-share decomposition, over the period 2000-2008 the *national effect* was positive in all regions and counties, though of different magnitudes, signaling that the overall economic environment had a global positive influence[20]. However, similar to employment changes, when detailing by the two sub-periods mentioned above, the national effect revealed significant differences, suggesting different exposures of sectors and regions/counties to the employment changes that occurred in the Romanian economy. Thus, over the interval 2000-2004 it was negative in all the sectors and regions and counties, (the highest in *agriculture* and in regions and counties with higher employment in agriculture – Nord-Est (with counties Iasi, Suceava, Neamt and Botosani), Sud Muntenia (with counties Teleorman, Arges, Dambovita and Prahova) and Nord-Vest (with counties Bihor, Cluj and Maramures), while over the interval 2004-2008 it was positive in all the sectors and regions and counties, offsetting the previous negative impacts[21].

In order to compare the *share* and *shift* employment effects on the regions[22] and sectors studied over the period 2000-2008, we consider the classification used by D'Elia (2005) (see Table 1).

Table 1

Typology of Regions According to the Employment Industry Mix and Regional Shift, by Sectors, 2000-2008

			Industry Mix (IM) – A01	
			Positive	Negative
Regional Shift (RS) – A01	Positive	IM better than RS		
		RS better than IM		**NE, B, S, V**
	Negative	IM better than RS		
		RS better than IM		**NV, C, SE, SV**

[19] For a detailed discussion of such an issue, see Pierre-Yves Leo and Jean Philippe, "Business Services, the New Engine of French Regional Growth", *The Service Industries Journal*, Vol. 25, No. 2, March 2005, pp. 141–161.

[20] *Detailed results are available upon request; they could not be presented in the paper due to space constraints.*

[21] *2000-2004 was an interval of slow economic growth, but with significant structural shifts induced by the prospects for accession to the EU, while 2004-2008 was an interval of accelerated economic growth and relative prosperity, when the previous sectoral shifts were consolidated. However, future research might tell us what happened in 2009-2010, when a serious contraction in the overall economic activity occurred.*

[22] *A detailed analysis for the Romanian counties is also available upon request; it could not be presented in the paper due to space constraints.*

			Industry Mix (IM) – A02	
			Positive	Negative
Regional Shift (RS) – A02	Positive	IM better than RS		
		RS better than IM		**NV, SE, SV, V**
	Negative	IM better than RS		**C, NE, B**
		RS better than IM		**S**
			Industry Mix (IM) – A03	
			Positive	Negative
Regional Shift (RS) – A03	Positive	IM better than RS	**NV, C, B**	
		RS better than IM		
	Negative	IM better than RS	**NE, SE, S, SV, V**	
		RS better than IM		
			Industry Mix (IM) – A04	
			Positive	Negative
Regional Shift (RS) – A04	Positive	IM better than RS	**NV**	
		RS better than IM	**B**	
	Negative	IM better than RS	**C, NE, SE, S, SV, V**	
		RS better than IM		
			Industry Mix (IM) – A05	
			Positive	Negative
Regional Shift (RS) – A05	Positive	IM better than RS	**B**	
		RS better than IM		
	Negative	IM better than RS	**NV, C, NE, SE, S, SV, V**	
		RS better than IM		
			Industry Mix (IM) – A06	
			Positive	Negative
Regional Shift (RS) – A06	Positive	IM better than RS	**S**	
		RS better than IM	**B**	
	Negative	IM better than RS	**NV, C, NE, SE, SV, V**	
		RS better than IM		

Note: A01 - agriculture, forestry, hunting and fishery; A02 – industry; A03 – constructions; A04 – trade, hotels and restaurants, transport and communications; A05 – financial intermediations, real estate and other services for companies; A06 – public administration, education, health and social welfare, and NV – Nord-Vest; C – Centru; NE – Nord-Est; SE – Sud-Est; B – Bucuresti-Ilfov; S – Sud Muntenia; SV – Sud-Vest Oltenia and V – Vest regions.
Source: Author's computations, following D'Elia (2005).

The results show that in the case of *agriculture* and *industry* the industry mix had negative impacts, but they were offset in some regions and counties by specific combinations of factors which contributed to a better performance: Nord-Est (also in Bacau, Botosani, Iasi and Vaslui counties), Bucuresti-Ilfov (in all its counties, namely Ilfov and Bucuresti), Sud Muntenia (also in Dambovita, Ialomita, Prahova and

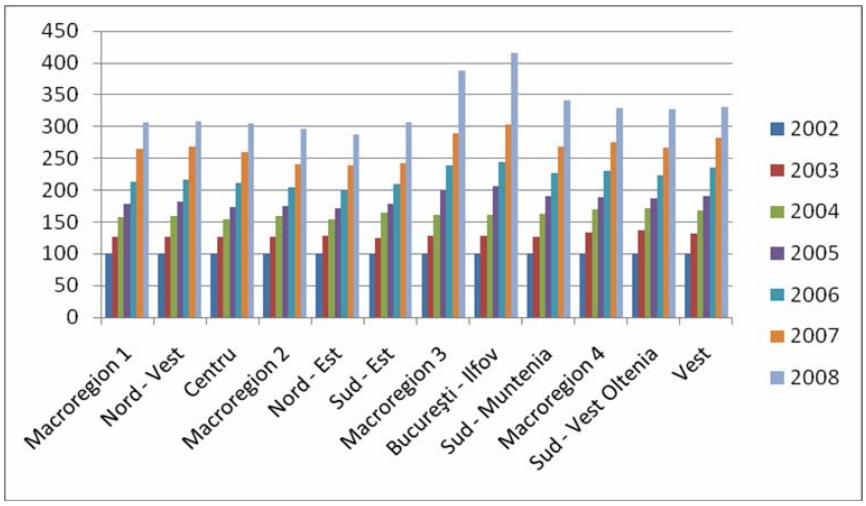
Teleorman counties) and Vest (also in Arad, Hunedoara and Timis counties) in the case of *agriculture* and Nord-Vest (in all its counties), Sud-Est (also in Buzau, Constanta, Tulcea and Vrancea counties), Sud-Vest (in all its counties, except for Gorj) and Vest (also in counties Arad and Timis) in the case of *industry*. In the case of *constructions*, the Nord-Vest (also in Bihor, Bistrita, Maramures and Salaj counties), Centru (also in Brasov, Covasna and Harghita counties) and Bucuresti-Ilfov (in all its counties) regions experienced a positive employment shift, but lower than the industry mix component. Positive shift effects higher than the positive industry mix (*pointing towards significant competitive regional features*) were recorded only by the Bucuresti-Ilfov region in the case of *trade, hotels and restaurants, transport and communications* and *public administration, education and health and social welfare*, while positive share effects higher than the shift ones (pointing towards competitive regional and sectoral features not fully exploited) were also recorded by the Bucuresti -Ilfov region in the case of *financial intermediations and real estate transactions*, the Nord-Vest region in the case of *trade, hotels and restaurants, transport and communications* and by the Sud Muntenia region in the case of *public administration, education and health and social welfare.* However, the importance of shift effects (both positive and negative) shows an undergoing period of mobility of activities.

3.2 Gross Value-Added Developments

The overall *gross value-added* (GVA) grew steadily over the analyzed period (2002-2008), the Bucuresti-Ilfov, Sud Muntenia and Vest regions experiencing the highest growth (see Figure 2). In this case, a single shift-share decomposition was conducted for the entire period under study.

Figure 2

Overall Gross Value-Added Change in Romania in 2002-2008, by Macroregions and Regions, 2002=100%



Appendix 2 presents the total change in GVA for the main sectors of the Romanian economy, by macroregions, regions and counties. Different from employment, in all sectors all the regions and counties experienced positive changes as compared to the GVA levels in 2002, but with significant differences in magnitude (lowest in the case of *agriculture, forestry, hunting and fishery* and highest in *constructions*). Good performance in terms of GVA change was also recorded by the regions and counties in the case of *trade, hotels and restaurants and transports and telecommunications* and *public administration, education and health and social welfare*. In the case of *industry*, some counties[23] experienced lower changes in GVA growth (pointing towards a deindustrialization/industry restructuring process and/or temporary difficulties). These also indicate *deep changes under way in the economic structures* and the *progressive "tertialization"* of the regional/sub-regional economies as well.

Similar to employment, when considering the shift-share decomposition over the period 2002-2008 the *national effect* was positive for all the sectors in all regions and counties, and also better correlated with the productive endowment, especially at county level[24]. The *share and shift* GVA effects on the regions, counties and sectors studied over the period 2002-2008 (Table 2) showed some differences as compared to employment decomposition.

Table 2

Typology of Regions According to the GVA Industry Mix and Regional Shift, by Sectors, 2000-2008

			Industry Mix (IM) – A01	
			Positive	Negative
Regional Shift (RS) – A01	Positive	IM better than RS		
		RS better than IM		**SE, S, SV**
	Negative	IM better than RS		
		RS better than IM		**NV, C, NE, B, V**
			Industry Mix (IM) – A02	
			Positive	Negative
Regional Shift (RS) – A02	Positive	IM better than RS		
		RS better than IM		**S, SV, V**
	Negative	IM better than RS		**NE**
		RS better than IM		**NV, C, SE, B**
			Industry Mix (IM) – A03	
			Positive	Negative
Regional Shift (RS) – A03	Positive	IM better than RS	**NV, B**	
		RS better than IM		
	Negative	IM better than RS	**C, NE, SE, S, SV, V**	
		RS better than IM		

[23] *Bacau, Iasi, Neamt and Suceava in the Nord-Est region, Galati in the Sud-Est region, Brasov and Covasna in the Centru region, and Ialomita in the Sud Muntenia region.*

[24] *Detailed analysis is available upon request; it could not be presented in the paper due to space constraints.*

			Industry Mix (IM) – A04	
			Positive	Negative
Regional Shift (RS) – A04	Positive	IM better than RS		
		RS better than IM	**B**	
	Negative	IM better than RS	**NV, C, NE, SE, S, SV, V**	
		RS better than IM		
			Industry Mix (IM) – A05	
			Positive	Negative
Regional Shift (RS) – A05	Positive	IM better than RS		
		RS better than IM		**C, B, S, NE**
	Negative	IM better than RS		**NV, V**
		RS better than IM		**SE, SV**
			Industry Mix (IM) – A06	
			Positive	Negative
Regional Shift (RS) – A06	Positive	IM better than RS	**SE**	
		RS better than IM	**B**	
	Negative	IM better than RS	**NV, C, NE, S, SV, V**	
		RS better than IM		

Note: A01 - agriculture, forestry, hunting and fishery; A02 – industry; A03 – constructions; A04 – trade, hotels and restaurants, transport and communications; A05 – financial intermediations, real estate and other services for companies; A06 – public administration, education, health and social welfare, and NV – Nord-Vest; C – Centru; NE – Nord-Est; SE – Sud-Est; B – Bucuresti-Ilfov; S – Sud Muntenia; SV – Sud-Vest Oltenia and V – Vest regions.
Source: Author's computations, following D'Elia (2005).

Thus, contrary to employment, the industry mix had negative impact in the case of *financial intermediations and real estate transactions*, but there were also regions where specific factors determined a better performance: - Centru (also in Alba, Brasov and Covasna counties), Bucuresti-Ilfov (in both its counties), Nord-Est (also in Botosani, Iasi, Neamt and Vaslui counties) and Sud Muntenia (also in Arges, Calarasi, Dambovita and Teleorman counties). The specific regional factors played also an important part in better performance of some regions and counties in *agriculture*, also better correlated with their productive endowment - Sud-Est (in all its counties, except for Vrancea County), Sud Muntenia (in all its counties, except for Teleorman County) and Sud-Vest Oltenia (also in Dolj, Mehedinti and Olt counties) - and in *industry* - Sud Muntenia (also in Arges, Prahova, Calarasi and Dambovita counties), Sud-Vest Oltenia (also in Dolj, Olt and Valcea counties) and Vest (in all its counties). The region with the best performance regarding GVA growth in the *tertiary sectors* was Bucuresti-Ilfov, while in *constructions* the best performance due to regional specific features were accounted for by the Bucuresti-Ilfov (in both its counties) and Nord-Vest (in all its counties, except for Salaj County) regions. Obviously, further analysis, especially that of labor productivity, is needed, for new insights into the economic growth processes at work in the regional/sub-regional economies, which otherwise might be overlooked.

4. Conclusions

Using classical shift-share analysis, the paper is an attempt to evaluate the employment and gross value-added disparities for the main sectors of economy in the regions and counties of Romania, by answering questions on how much of the change in the variables was due to changes in the Romanian economy as a whole, to changes in the sectors across Romania or to specific features of a region's economy.

In case of both employment and GVA, the results indicate ongoing changes in the economic structures in favor of progressive "tertialization" of the regional/sub-regional economies, lagging much behind in Romania, even in the most developed regions/counties. However, the best performance in this respect is still accounted for by the Bucharest-Ilfov region, whose sectoral structure is closest in Romania to that of a developed regional market economy.

Considering the shift-share decomposition, the national effect was positive over the entire analyzed period for all the sectors in all regions and counties, with different magnitudes and correlated with the productive endowment, signaling that the overall economic environment had a positive influence on both employment and GVA. One should also mentioned that in terms of employment the national effect was negative over the interval 2000-2004, when significant structural shifts induced by the prospects of accession to the EU happened, especially in the most developed regions/counties, better connected to the developments in the EU markets.

In terms of shift and share effects, the latter prevailed in agriculture and industry, correlated with the productive endowments of regions/counties. The magnitude of shift employment and GVA effects (both positive and negative) in nearly all the studied sectors shows also an undergoing period of mobility of activities, reinforcing the above-mentioned idea of significant structural changes in the regional/sub-regional economies.

Further analysis, especially that of labor productivity, is needed to bring new insights in the economic growth processes at work in the regional/sub-regional economies of Romania and to provide useful ideas both for general and specifically targeted policies, such as the social cohesion policy, the agricultural policy (with focus on rural development policy), the territorial cohesion policy, the competitiveness policy (with specific focus on cluster development and sustainability, for instance), the education and R&D policy, etc.

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Appendix 1

Total Change in Employment in Romania, in % of 2000 Employment, by Main Sectors of the Economy, Macroregions, Regions and Counties

	A01			A02			A03		
	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008
Macroregion 1	-32.6	-23.9	-7.3	-1.9	0.3	-4.2	99.2	29.0	80.6
Nord - Vest	-32.4	-24.0	-7.1	9.2	7.9	-3.6	102.5	26.0	86.6
Bihor	-32.7	-24.1	-7.2	3.6	10.2	-8.7	123.3	27.0	75.9
Bistrița-Năsăud	-32.5	-24.0	-7.2	52.9	22.2	15.3	158.8	14.2	146.9
Cluj	-32.4	-24.0	-7.3	5.0	7.5	-5.7	84.2	34.8	61.0
Maramureş	-32.6	-24.0	-7.4	10.2	15.9	-9.2	114.5	19.1	111.3
Satu Mare	-32.6	-24.5	-6.3	4.2	-3.1	-1.9	75.9	16.2	176.9
Sălaj	-31.1	-23.3	-6.8	5.0	-6.3	9.7	115.0	17.7	65.2
Centru	-32.9	-23.7	-7.6	-10.6	-6.3	-4.7	95.8	32.4	74.9
Alba	-29.4	-22.9	-5.1	-10.4	-5.4	-0.5	88.6	75.1	112.9
Braşov	-36.1	-22.9	-11.4	-29.8	-17.4	-13.7	122.4	29.0	91.7
Covasna	-33.1	-22.4	-7.8	9.2	13.3	-5.1	156.3	10.8	81.8
Harghita	-34.4	-25.7	-6.9	-2.7	-4.9	0.5	123.3	16.2	186.4
Mureş	-33.2	-23.4	-8.1	-4.3	-0.9	-7.9	62.5	36.7	44.0
Sibiu	-32.4	-24.5	-6.8	-0.8	-4.4	5.3	71.4	30.7	44.2
Macroregion 2	-32.4	-23.6	-7.3	-10.5	-1.6	-9.5	70.4	24.4	56.0
Nord - Est	-32.0	-23.8	-6.7	-17.4	-6.5	-14.0	71.7	22.4	63.4
Bacău	-31.7	-24.1	-5.7	-26.5	-12.3	-20.2	91.7	12.9	57.8
Botoşani	-32.1	-24.1	-6.3	-8.9	-4.9	-9.1	68.4	85.4	72.7
Iaşi	-31.8	-24.0	-6.6	-22.0	-5.6	-14.0	96.1	6.9	91.0
Neamț	-32.1	-23.2	-7.5	-12.4	-11.3	-9.0	28.2	26.1	18.2
Suceava	-32.4	-23.9	-6.9	-9.2	3.0	-13.4	43.2	46.7	64.4
Vaslui	-31.8	-23.3	-7.0	-12.1	-1.0	-13.0	70.0	58.3	55.6
Sud - Est	-32.9	-23.4	-8.1	-2.2	5.4	-3.7	69.2	26.0	49.2
Brăila	-32.6	-22.1	-8.6	-27.5	13.6	-11.3	83.6	33.3	93.1
Buzău	-31.5	-21.8	-8.4	16.2	18.7	-5.1	74.5	59.2	10.6
Constanța	-33.7	-26.0	-6.6	23.0	16.4	7.9	76.4	24.8	47.2
Galați	-34.8	-24.0	-8.5	-17.6	-14.2	-5.7	42.5	11.9	35.7
Tulcea	-33.5	-22.0	-11.5	3.4	9.5	-13.0	35.9	18.8	44.1
Vrancea	-31.8	-23.3	-6.9	1.8	1.5	-2.0	135.5	32.8	90.9
Macroregion 3	-31.5	-22.7	-7.6	-7.7	1.1	-8.0	125.8	39.1	84.1
Bucureşti - Ilfov	-24.8	-16.6	-9.5	-11.1	0.8	-10.9	156.7	48.9	98.5
Ilfov	-31.7	-24.7	-6.1	73.9	16.4	33.3	320.0	29.3	182.1
Municipiul Bucureşti	45.8	26.0	-27.8	-19.8	-1.3	-16.3	151.3	49.8	95.3
Sud - Muntenia	-32.1	-23.3	-7.4	-5.1	1.4	-5.7	80.9	25.6	59.7
Argeş	-32.4	-24.0	-7.4	-21.3	-12.2	-5.3	94.5	51.4	72.0
Călăraşi	-33.9	-25.5	-6.4	15.1	24.7	-12.8	50.0	48.5	72.7
Dâmbovița	-32.0	-24.2	-6.5	4.0	10.3	-3.7	52.9	38.9	37.5
Giurgiu	-32.3	-22.9	-8.6	15.2	6.9	-2.2	214.3	38.3	104.2
Ialomița	-30.8	-20.7	-7.9	43.9	18.0	-0.7	110.3	12.2	96.9
Prahova	-31.1	-22.4	-7.8	0.0	3.9	-5.3	68.1	12.7	44.7

	A01			A02			A03		
	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008
Teleorman	-32.1	-22.9	-7.6	-16.2	-4.0	-11.5	53.8	-2.1	61.9
Macroregion 4	-32.4	-24.0	-6.7	4.5	5.4	-3.1	66.6	20.0	59.5
Sud - Vest Oltenia	-32.9	-24.4	-7.2	-2.7	1.4	-5.5	61.6	16.3	66.4
Dolj	-32.3	-24.3	-6.7	-3.4	4.7	-3.0	86.5	18.4	70.8
Gorj	-31.9	-23.3	-7.1	-21.1	-9.1	-15.5	61.9	18.8	60.8
Mehedinţi	-32.6	-23.4	-7.9	-0.5	-3.4	-5.9	72.3	2.4	66.7
Olt	-33.4	-24.5	-7.8	6.3	5.4	0.3	100.0	6.9	76.4
Vâlcea	-34.2	-26.0	-6.5	14.9	12.4	-0.9	18.4	34.2	59.3
Vest	-31.4	-23.3	-5.9	10.5	8.6	-1.1	72.6	23.7	52.3
Arad	-32.0	-21.6	-7.4	52.0	16.9	8.8	63.6	24.1	42.0
Caraş-Severin	-34.0	-25.1	-6.6	-14.9	-9.2	-5.1	77.8	30.3	53.2
Hunedoara	-31.1	-23.5	-5.5	-12.7	0.8	-9.9	43.4	7.5	48.5
Timiş	-29.7	-23.2	-4.6	17.6	15.2	0.6	102.7	31.4	62.4

	A04			A05			A06		
	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008
Macroregion 1	42.6	20.4	20.8	75.1	31.3	43.0	11.8	1.5	9.9
Nord - Vest	50.8	16.8	23.2	73.4	37.6	47.2	14.0	1.4	13.0
Bihor	34.2	14.0	14.7	84.7	33.1	57.9	16.7	3.0	14.3
Bistriţa-Năsăud	75.4	32.9	36.0	41.2	67.4	17.6	16.0	-0.2	10.4
Cluj	67.8	25.3	29.0	118.5	44.3	75.0	17.5	3.3	15.3
Maramureş	26.0	12.9	10.1	53.2	26.8	29.5	0.9	-1.1	4.2
Satu Mare	68.1	-0.2	28.2	41.5	31.1	27.7	17.5	-0.9	20.1
Sălaj	50.4	15.5	33.1	2.3	20.8	2.5	14.7	0.8	13.0
Centru	35.1	24.3	18.4	76.8	25.8	38.9	9.4	1.6	6.5
Alba	40.8	38.5	11.8	40.4	60.4	-8.3	11.2	-0.7	4.0
Braşov	43.4	22.7	23.4	82.7	15.0	45.1	11.0	5.3	3.3
Covasna	15.8	21.2	15.6	64.0	16.1	21.4	-0.9	-3.1	4.8
Harghita	9.1	0.4	36.2	72.7	11.6	48.6	11.3	-0.2	9.4
Mureş	34.7	41.6	12.6	84.5	39.0	49.1	13.6	5.7	10.5
Sibiu	48.8	15.0	15.0	100.0	20.8	72.7	4.4	-2.6	6.7
Macroregion 2	26.8	10.7	18.3	56.0	27.0	23.9	14.8	3.0	10.8
Nord - Est	25.8	7.2	18.8	44.6	30.4	20.4	15.1	3.9	10.3
Bacău	19.3	-0.7	13.6	18.3	58.8	25.0	16.7	0.6	13.9
Botoşani	31.8	19.1	24.5	57.6	42.5	21.6	10.0	4.9	2.3
Iaşi	19.1	3.3	18.3	78.6	27.8	27.4	11.4	7.2	2.3
Neamţ	24.9	29.5	9.1	41.8	28.1	16.7	8.5	3.0	9.7
Suceava	42.1	8.3	22.1	30.6	25.5	11.8	15.9	1.8	13.8
Vaslui	23.0	-9.8	41.5	32.4	4.5	10.3	35.8	3.9	32.4
Sud - Est	27.8	14.4	17.7	68.7	23.8	27.4	14.5	1.8	11.5
Brăila	35.8	-5.5	57.5	82.1	32.9	30.6	19.1	-5.2	21.8
Buzău	56.8	14.0	19.8	58.5	30.6	19.1	5.4	-7.7	9.6
Constanţa	28.4	18.3	10.9	108.5	29.6	25.7	13.2	8.7	6.4
Galaţi	8.0	19.0	6.6	48.3	5.6	39.1	14.9	1.1	11.8

	A04			A05			A06		
	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008	2000-2008	2000-2004	2004-2008
Tulcea	0.8	-20.1	29.2	44.4	31.3	10.3	23.2	8.6	19.2
Vrancea	52.0	38.0	26.3	22.5	14.0	25.7	18.0	4.5	9.0
Macroregion 3	57.2	17.6	36.2	111.0	29.6	63.6	27.2	11.0	15.1
Bucureşti - Ilfov	78.9	17.2	49.2	132.1	31.8	76.9	35.2	16.8	19.3
Ilfov	201.3	44.4	117.5	179.2	47.1	106.3	18.4	7.3	16.0
Municipiul Bucureşti	69.5	15.2	43.1	129.6	31.0	75.4	36.8	17.6	19.6
Sud - Muntenia	27.7	18.0	17.5	53.9	23.6	23.1	18.5	5.2	10.4
Argeş	19.3	23.3	12.1	60.0	16.1	28.2	13.0	1.9	10.5
Călăraşi	35.4	20.8	18.6	59.3	35.0	22.2	31.3	16.3	20.8
Dâmboviţa	47.8	42.9	13.0	47.5	47.9	19.4	20.6	-1.0	8.5
Giurgiu	0.0	0.4	17.7	54.2	62.3	7.1	13.2	4.3	9.8
Ialomiţa	31.5	10.8	24.0	69.6	54.9	20.0	32.5	21.0	8.7
Prahova	35.9	11.8	21.9	54.3	12.5	29.9	18.4	4.5	7.7
Teleorman	5.1	1.1	18.4	33.3	11.7	5.3	11.8	7.0	12.9
Macroregion 4	28.3	10.9	18.3	67.5	35.2	24.1	12.7	3.3	9.9
Sud - Vest Oltenia	26.9	2.5	22.1	67.5	28.6	28.1	13.9	1.2	11.7
Dolj	34.4	4.8	23.6	65.4	11.8	50.0	15.9	5.5	12.4
Gorj	3.0	-2.4	0.5	74.5	39.5	25.4	12.8	1.8	11.6
Mehedinţi	26.7	-15.2	31.0	62.9	29.7	15.4	9.5	-4.3	11.3
Olt	12.2	3.0	15.6	42.9	22.0	4.5	14.5	0.4	9.6
Vâlcea	21.0	16.2	13.8	87.8	49.0	27.6	13.6	-1.3	13.1
Vest	33.8	18.7	19.4	67.5	41.2	21.1	11.6	5.4	8.1
Arad	15.7	9.9	8.4	67.1	58.5	12.3	14.6	-1.2	13.8
Caraş-Severin	14.0	-7.5	15.6	42.1	19.1	19.5	2.5	7.8	9.1
Hunedoara	34.7	29.6	13.8	26.8	29.7	4.1	14.1	3.8	11.0
Timiş	55.8	32.9	33.0	105.2	45.2	36.9	12.7	9.2	3.2

Note: A01 - agriculture, forestry, hunting and fishery, A02 – industry, A03 – constructions, A04 – trade, hotels and restaurants, transport and communications, A05 – financial intermediations, real estate and other services for companies, A06 – public administration, education, health and social welfare.

Source: Author's computations, on the basis of Romanian territorial statistics.

Appendix 2

Total Change in Gross Value-Added in Romania, in % of 2002 GVA, by Main Sectors of the Economy, Macroregions, Regions and Counties

	A01	A02	A03	A04	A05	A06
	2002-2008	2002-2008	2002-2008	2002-2008	2002-2008	2002-2008
Macroregion 1	73.4	179.2	500.2	260.1	185.8	247.5
Nord - Vest	69.1	188.5	567.2	279.3	157.4	245.6
Bihor	115.9	155.9	567.2	228.7	127.2	240.9
Bistrița-Năsăud	50.0	344.2	582.9	274.3	192.3	223.2
Cluj	38.0	176.7	540.2	343.3	191.6	263.3
Maramureş	77.5	154.9	569.6	294.7	142.8	210.4
Satu Mare	43.7	190.9	844.5	215.6	66.7	271.7
Sălaj	82.4	280.6	418.3	270.8	271.2	252.7
Centru	78.5	172.0	442.5	240.3	221.8	249.5
Alba	85.5	310.6	567.3	259.5	429.6	211.1
Braşov	76.4	121.6	586.0	264.5	221.6	264.5
Covasna	47.4	133.3	380.1	168.5	252.8	255.2
Harghita	63.5	181.7	793.6	200.3	165.9	273.5
Mureş	111.8	140.3	227.3	207.1	173.2	228.2
Sibiu	66.0	221.7	412.2	278.9	183.8	276.8
Macroregion 2	94.2	143.7	431.5	222.5	224.8	270.6
Nord - Est	64.8	118.7	469.2	244.0	238.1	264.9
Bacău	40.7	84.6	457.7	203.8	176.2	272.9
Botoşani	69.3	175.1	527.1	228.3	446.1	239.7
Iaşi	88.0	123.3	546.6	280.0	239.8	288.3
Neamț	69.1	120.9	290.5	275.3	256.6	233.1
Suceava	52.7	121.3	469.7	256.7	191.3	234.2
Vaslui	75.0	170.0	605.4	192.0	379.3	312.2
Sud - Est	135.3	168.5	401.9	204.6	210.6	278.1
Brăila	169.0	151.9	516.5	300.7	198.1	317.2
Buzău	142.7	237.5	453.5	230.7	191.0	217.3
Constanța	185.0	185.1	347.6	169.0	241.3	290.3
Galați	131.0	125.0	450.0	226.7	245.5	263.7
Tulcea	106.9	142.2	345.1	193.7	239.7	326.5
Vrancea	66.8	161.4	482.9	285.4	128.0	281.6
Macroregion 3	126.9	208.5	680.7	340.4	238.3	304.0
Bucureşti - Ilfov	76.8	178.5	786.6	377.7	234.6	331.3
Ilfov	52.7	220.0	1393.9	654.1	353.5	352.8
Municipiul Bucureşti	261.9	171.5	768.5	352.5	228.7	330.2
Sud - Muntenia	130.9	243.7	462.6	246.9	249.1	249.4
Argeş	126.3	265.1	496.9	250.3	402.6	237.6
Călăraşi	149.5	282.3	697.4	218.1	484.2	340.3
Dâmbovița	122.9	217.9	388.1	252.6	226.6	219.8
Giurgiu	139.0	173.3	766.0	228.1	131.1	232.2
Ialomița	173.6	136.5	394.2	253.0	141.0	284.8
Prahova	180.0	266.7	397.4	266.1	204.4	246.9
Teleorman	64.4	174.9	548.0	187.4	262.7	247.3
Macroregion 4	111.8	223.2	424.5	252.8	207.5	251.7

	A01	A02	A03	A04	A05	A06
	2002-2008	2002-2008	2002-2008	2002-2008	2002-2008	2002-2008
Sud - Vest Oltenia	156.8	203.9	409.4	238.0	217.9	243.3
Dolj	413.8	238.8	501.1	249.5	261.6	249.4
Gorj	69.1	166.8	322.8	217.1	252.0	288.3
Mehedinţi	154.9	149.6	406.3	266.4	217.7	221.7
Olt	128.2	261.6	439.5	207.6	193.6	227.7
Vâlcea	56.0	217.1	384.9	249.5	153.7	226.7
Vest	77.7	242.5	439.6	263.9	200.6	259.7
Arad	113.2	321.0	384.9	184.4	177.9	232.9
Caraş-Severin	83.3	224.5	335.2	242.5	150.9	242.1
Hunedoara	38.3	201.5	296.3	251.9	199.1	239.4
Timiş	67.7	236.2	644.5	333.0	228.5	291.3

Note: A01 - agriculture, forestry, hunting and fishery, A02 – industry, A03 – constructions, A04 – trade, hotels and restaurants, transport and communications, A05 – financial intermediations, real estate and other services for companies, A06 – public administration, education, health and social welfare.

Source: Author's computations, on the basis of Romanian territorial statistics.