INCORPORATING SECTORAL STRUCTURE INTO SHIFT-SHARE ANALYSIS

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Abstract: The objective of this paper is to present a way to incorporate sectoral structure within the measures of regional growth provided by the traditional shift-share analysis. The new tool makes it possible to considerer in the decomposition analysis three new effects: sectoral national effect, sectoral structural effect, and sectoral differential effect. To illustrate the analysis of sectoral structure through this extension of the shift-share method, an application is provided using sectoral data for Extremadura, a Spanish region, for the period 1990-2004. The results highlight how these new effects can shed light on the analysis of regional economic performance.

Key Words: Shift-share, regional growth, sectoral structure

1. Introduction

Shift share analysis is a traditional tool for interregional comparison, measuring and evaluating sectoral performance. A wide variety of applications have been appeared since Dunn (1960) introduced the methodology. Its widespread use is explained by its simplicity, modest data requirements and that the results are relatively easy to assess and interpret. It is clear that shift-share analysis does not constitute a model of the regional economy; however, the decomposition of any socioeconomic measure (for example gross value added, employment, etc.) into a national growth effect, an industry mix effect and a differential effect can prove useful for further exploratory analysis of the causes of sectoral and/or regional growth differentials (see for example, Haynes and , Dinc, 1997; Dinc and Haynes, 1999).

Despite its popularity, shift-share analysis has also attracted severe criticism for many different reasons, including the absence of theoretical content; sensitivity to the level of industry aggregation, and to the degree of regional disaggregation and to the considered period (initial and/or final observation could influence results). Another limitation of the shift-share is the omission of the impact of intra-regional sectoral linkages. In response to the many limitations of the shift-share method, numerous modifications and extensions have been developed. In this paper, a further step is carried out, since the traditional shift-share formulation is substituted by an analogue based on intra-regional inter-sector interactions. Thus, the main goal of this paper is to take into account sectoral structure within a region as a relevant benchmark of reference. The effects derived from this extension of the shift-share methodology can shed light on the analysis of regional economic performance through the detection of some underlying factors that may condition the intra-regional sectoral evolution.

The paper is organized as follows. In section two, background information is provided, following a discussion about how to incorporate the sectoral structure of regions. As a result, a sectoral shift-share analysis is presented. In section three the sectoral shift-share will be illustrated by means an application where results will be presented and discussed. Some concluding remarks complete the paper.

2. The analysis of sectoral structure through the decomposition in shift-share

The classical shift-share analysis decomposes a region's sectoral growth into the three traditional components (national, industry-mix and regional-shift effects). In this paper, to illustrate this shift-share decomposition, Gross Value Added (GAV) will be used as the variable of interest. For a given region *r* and a sector *i* in this region, the three components are formulated as:

National Effect $\equiv GAV_i * G$

Industry-Mix Effect $\equiv GAV_i * (G_i - G)$

Regional-shift Effect $\equiv GAV_i * (g_i - G_i)$

where the growth or decline in total GAV in sector i of region r is g_i, with G_i the national counterpart. The total regional GAV growth is denoted by g, while G is the corresponding total national GAV growth. Thus, the presence of subscript i will denote reference to a specific sector i, and the absence of a subscript indicates all sectors.

The shift-share identity for GAV could be expressed in the following form:

$$GAV_i g_i = GAV_i G + GAV_i (G_i - G) + GAV_i (g_i - G_i) \quad (1)$$

Equation 1 can be written in terms of GAV growth rates as:

$$g_i = G + (G_i - G) + (g_i - G_i) \tag{2}$$

This basic formulation of the shift-share analysis only considers global effects derived from factors related with regional performance within a nation-wide context. Thus, it is easy to verify that the national effect, the industry-mix effect and the regional shift effect are very mush dependent on economy-wide outcomes. These effects often connect with a regional goal: to increase its presence in the national economy, frequently in the context of the evaluation of regional competition within a national economy. The approach to be presented here derives inspiration from Esteban-Marquillas' (1972) recognition of the role of structure in disentangling the effects of industry composition from the regional competitive effect; his notion of an homothetic structure enabled shift and share analysis to begin to embrace the role of differences in structure but even here the nature of the linkages between sectors within the structures (homothetic and allocative) were not considered.

Nevertheless, the three components of the standard shift-share are not related with the behavior of the regional economies that are neighbors of the region under analysis. Nazara and Hewings (2004) incorporated spatial structure within this basic formulation, taking into account spatial interaction in the decomposition analysis.[1] In this sense, Ramajo and Márquez (2008) addressed this issue, proposing a 'pure' spatial shift-share specification that is not a part of the decomposition taxonomy shown in Nazara and Hewings (2004). In the formulation of this 'pure' spatial version, these authors were looking for simplicity, analytic clarity, easy application and an equivalence between the three traditional components and the three new spatial effects. As result, they proposed the following formulation:

$$g_i = W^{Spat} g + \left(W^{Spat} g_i - W^{Spat} g\right) + \left(g_i - W^{Spat} g_i\right) \tag{3}$$

[1] From the contribution of Nazara and Hewings (2004), several papers have adopted the spatial shift-share approach. For example, Mayor and López (2005) have combined the concept of homothetic employment -introduced by Esteban-Marquillas (1972)- with the spatial shift-share decomposition.

Where W^{Spat} defines, in this case, a matrix of geographical neighborhood[2] with values different from zero for the spatially adjacent regions. These spatial effects are related with the concept of regional competition at the local (neighborhood) level; the assumption is that a region seeks to increase its relative presence within its own neighborhood. Earlier work by Márquez *et al* (2006) explored the possibility of there being two pronounced spatial externality effects in regional growth – a national effect and a regional or neighborhood effect. Application to Spain revealed that these effects had not only different spatial manifestations but also different long-run and short-run properties. To date, this approach has not been considered in applications of shift and share analysis.

In the Ramajo-Márquez (2008) study, the spatial shift-share analysis decomposes economic change in a region into three additive spatial components: the neighborhood share or neighborhood component, the neighborhood industry mix or neighborhood structural effect, and the neighborhood differential (regional) shift. The first term on the right hand side of expression 3 (neighborhood component $W^{Spat}g$), refers to the regional GVA change that would have occurred if regional GVA had grown at the same rate as the average of the neighbor regions. The second term $\left(W^{Spat}g_i - W^{Spat}g\right)$ is the neighborhood industrial mix or neighborhood structural component. It measures the effect resulting from the concentration of a particular sector i in the neighbor regions (sectoral composition of the neighbor regions), and captures the extent to which this sector is growing or declining at the regional neighborhood level. Hence, if a region contains a relatively large share of sectors that are slow (fast) growing at the neighborhood level, this region will have a negative (positive) neighborhood industry mix. Finally, the neighborhood regional share, $\left(g_i - W^{Spat}g_i\right)$ measures the change in regional sector i due to the difference between its regional sector's growth (decline) rate and the neighbor sectors' average growth (decline) rate. The neighborhood regional share may result from different neighborhood factors like

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[2] Let *W** denote a neighborhood matrix defined as $W_{ij}^{*} = \begin{cases} 1 & if\ \ regions\ i\ and\ \ j\ are\ neighbors \\ 0 & if\ \ not \end{cases}$; the diagonal elements of this matrix are also zero. Matrix W^{Spat} is the result of a row-standardization of *W** obtained dividing each of the elements of the *i*th row of *W** by the sum of the elements of the row, $\sum_j W_{ij}^{*}$. This way, the element *i*th of vector $W^{Spat}g$ is the average of variable *g* in neighbors regions of region *i*. Other alternative definitions for the spatial weights matrix could be used, for example, different distance weights matrices.

comparative advantages or disadvantages, the effects of regional policy or the entrepreneurial ability of the region.

Moreover, in our opinion, the Ramajo-Márquez (2008) proposal would be the connection between the Nazara-Hewings (2004) proposition and the reference area interactions in shift-share analysis developed by Dinc and Haynes (2005). The reference area-region interaction approach allows the analyst to "*isolate the influence of a larger region or sector on the reference area*", providing "*more realistic information about the region and avoids over- or underestimation problems*" (Dinc and Haynes, 2005, p. 382).

Nevertheless, although spatial interactions have been considered in modeling the manner in which a region may have a dependent identity with respect to other regions, linkages between sectors could be another of the major determinants of the differential growth processes among regional sectors. In this sense, shift-share analysis does not contemplate links between activities within regions. Thus, an alternative way of examining the relationship between economic growth processes and intersectoral relationships may be considered through the incorporation of intersectoral interactions into shift-share analysis. The resulting effects would be related to the concept of sectoral competition, and the degree to which a regional sector might be able to increase its relative presence at both the regional and national levels. Starting from the standard shift-share formulation shown in (2), a 'pure' sectoral formulation of this decomposition would be:

$$\begin{aligned} g_i \;&=\; W^{Sect}\,G_i + \left(W^{Sect}\,g_i - W^{Sect}\,G_i\right) + \left(g_i - W^{Sect}\,g_i\right) \\ &= Sectoral\ National\ Effect + Sectoral\ Structural\ Effect \\ &+ (Sectoral\ Regional - Shift\ Effect) \end{aligned} \tag{4}$$

where W^{Sect} is a matrix that formally expresses the way in which the structure of sectoral interaction within the region is to be incorporated.

Expression (4) requires the specification of the "sectoral" structure, namely, the interaction among sectors as defined by a sectoral weights matrix (W^{Sect}). The simple concept of binary sectoral structure could be defined by expressing for each sector (row) those sectors (columns) that belong to its same region. Formally, $w_{ij}=1$ if sectors i and j belong to the same region, and $w_{ij}=0$ otherwise ($w_{ii}=0$, by convention, like in the case of W^{Spat}). This simple contiguity matrix ensures that interactions between sectors within the same region are considered. For ease of economic interpretation, a row-standardized form of the W matrix could be used. Thus, using expression (4) it is possible to obtain:

$$g_i \;=\; w^{Sect}\overrightarrow{G_i} + \left(w^{Sect}\overrightarrow{g_i} - w^{Sect}\overrightarrow{G_i}\right) + \left(g_i - w^{Sect}\overrightarrow{g_i}\right)$$
$$= Sectoral\ National\ Effect + Sectoral\ Structural\ Effect$$
$$+ (Sectoral\ \mathrm{Re}\,gional - shift\ Effect)$$

where $\overrightarrow{G_i}$ is a column vector that contains the growth in GAV in all the national sectors (except sector i); $\overrightarrow{g_i}$ is a column vector that contains the growth in GAV in all the regional sectors (except sector i). Thus, $w^{Sect}\overrightarrow{G_i}$ and $w^{Sect}\overrightarrow{g_i}$ would represent, respectively, the averages of sectoral growth (except sector i) at the national and regional levels. This definition of sectoral structure obviously assumes the existence of the same type of influence from the rest of regional sectors on regional sector i. However, the notion of sectoral interaction would imply the need to determine which of the other sectors in the regional system have an influence on the particular sector under analysis. Sectoral interaction could be defined as the set of flows between sectors transmitted through the economic system. Given an input-output table presenting flows, x_{ij} from each sector to all other sectors and with total sales depicted by X_i, construct a matrix of coefficients, $s_{ij} = x_{ij} / X_i$ derived from consideration of the distribution of sales from each industry to all other industries (in contrast to the usual application in which the purchases structure is considered). An alternative to the usual Leontief inverse can be obtained; given $s_{ij} \in S$, then, from this supply-driven perspective (Ghosh, 1958), the use of the Ghosh inverse (sometimes referred to as the output inverse) could provide a way to consider the existence of sectoral interactions. Denoting b^{ij} as an element of the Ghosh inverse $(I - S)^{-1}$, "*the element b^{ij} expresses the dollar increase of the output value of sector j –as caused by simultaneous price increases- necessary for an increase of the value added in sector i by one dollar*" (Dietzenbacher 1997, p. 637). This way, a row-standardized form of a weight matrix constructed from the known Ghosh inverse could be obtained. That is, the row-standardized Ghosh inverse could be used to calculate weighted averages of the sectoral growth rates at the regional level. Hence,

W^{Sect} defines the underlying structure of sectoral interactions and thus equation (4) shows the sectoral effects, substituting the traditional components by their respective sectoral equivalents.

The national effect (G) has as a sectoral equivalent the **Sectoral National Effect** ($W^{Sect}\,G_i$). The Sectoral National Effect (SNE) measures the regional change that would have been observed if regional sector *i* had recorded a weighted average of the growth rates of the other national sectors. The traditional assumption that regional sectors should grow at the same rate that national sectors is substituted by the hypothesis that their growth has to be equal to the weighted average growth of the rest of the national sectors. Now, the weighted average growth of the national sectors would determine a supra-sectorial effect. If SNE recorded faster growth than the regional sector *i*, this regional sector is not being competitive with respect to the weighted average behavior of the rest of the national sectors. This way, the Sectoral National Effect could be used as an indicator of the dynamism of regional sector *i* with respect to the rest of sectors at national level.

The Structural Effect $(G_i - G)$ is transformed into its equivalent **Sectoral Structural Effect**, $(W^{Sect}\,g_i - W^{Sect}\,G_i)$. The Sectoral Structural Effect (SSE) measures the proportional shift in sector *i* due to differences between the weighted average of the growth rates of the other sectors at the regional level and the weighted averages of the growth rates of the other sectors at the national level. Thus, SSE would be the change attributed to the stronger (weaker) average growth of the "neighboring" sectors at the regional level with respect to the weighted average growth of the same national sectors. SSE expresses the amount of change observed as a consequence of the greater (or smaller) dynamism of the regional sectors related to sector *i* with respect to these sectors at the national level. SSE measures the weighted average influence of sectors with rapid or slow growth in the regional sector under analysis. SSE would be the equivalent, at the sectoral level, of the standard structural effect, showing the part of change that is attributed to the particular evolution of the "neighboring" sectors of regional sector *i*. Accordingly, this term compares the special dynamism of neighbour regional sectors of regional sector i in contrast to the respective national sectors. As result, SSE provides an induced sectoral effect.

Finally, the regional-shift effect, or differential effect, $(g_i - G_i)$ has its counterpart at the sectoral level in the term $(g_i - W^{Sect}\ g_i)$, and is termed the **Sectoral Regional-shift Effect**. This term displays the comparative advantages (or disadvantages) for sector *i* with respect to the situation, in average terms, of the "neighboring" regional sectors. The Sectoral Regional-shift Effect (SRE) measures the regional shift due to differences between the growth of regional sector *i* and the weighted average of the growth rates of the other sectors at the regional level. Due to the importance of the study of the regional-shift effect in the context of the traditional shift-share analysis, where it has been interpreted as an indicator of regional competitiveness, it is necessary to highlight the contribution of this new SRE, which will provide a characterization of the competitive behavior of a regional sector *i* with respect to the weighted average behavior of the "neighboring" regional sectors. SRE evaluates the change attributable to the difference between the behavior of regional sector *i* and the weighted average behavior of the "neighboring" regional sectors. Thus, a positive (negative) SRE measures the advantage (disadvantage) of sector *i* in the analyzed region with respect to the weighted average behavior of the "neighboring" regional sectors.

3. Empirical application

In order to illustrate and discuss the usefulness of this new extension of the shift-share analysis, the Spanish regional economic system will be utilized. Spain is a decentralized state composed of 17 regions that constitute the so-called Autonomous Communities. Time series for Gross Value Added (GVA) in the 17 peninsular regions in Spain provides the main data source. The database of the HISPALINK[3] project (HISPADAT) was employed in this analysis; regional gross value added at market prices in 1995 constant euros (GAV) for the period 1990 to 2004 were used.

The application will explore the performance of the 9 regional sectors of Extremadura, an Autonomous Community in Spain. These 9 regional sectors are: Agriculture (A), Energy (E), Manufacturing industry of intermediate goods (Q), Manufacturing industry of capital goods (K), Manufacturing industry of consume goods (C), Construction (B), Transport and communications

[3] For a more detailed information concerning the HISPALINK project and the HISPADAT database, see Pulido and Cabrer (1994) and Cabrer (2001).

(Z), Sales-oriented services (L), Non sales-oriented services (G). The standard shift-share model application results undertaken on GVA in Extremadura for the period of investigation (1990-2004) appear in Table 1. The benchmark entity is Spain as a whole.

<<insert table 1 here>>

Over the period of analysis, GVA in Manufacturing industry of intermediate goods (Q), Manufacturing industry of consumer goods (C), Transport and communications (Z) and Non sales-oriented services (G) recorded stronger growth than in the whole country. In the case of Z and G, these results are explained by favorable structural effects and positive regional-shift. In the other sectors (Q and C), the growth differentials are explained by the regional effects, since the structural effects are negative. Thus, comparing the structural effect with the regional effect, it is possible to ascribe the growth differential to the fact that the regional shift effect is positive. In contrast, the other sectors (A, E, K, B and L) display a weaker growth rate of GVA than the national average. For A, E and L, the growth differentials are explained by negative structural effects and unfavorable regional-shift effects. In the remaining sectors (K and B) the regional shifts exert a negative influence, while the structural effects are positive.

<<insert table 2 here>>

Table 2 provides the results of the spatial shift-share analysis on the 9 sectors of Extremadura. An examination of the results reveals, from a qualitative point of view, the differences between the traditional shift-share and this spatial shift-share. Differences are found for sector L.

The traditional shift-share (table 1) revealed a negative total growth difference of sector L in Extremadura with respect to the national average in Spain. What it is possible to learn from the traditional shift-share is that the negative total growth difference of sector L in Extremadura with respect to the national average in Spain over the period was explained by both a negative structural effect and a negative regional-shift effect. Considering the spatial neighborhood level, the spatial shift-share[4] shows in table 2 a positive total growth difference of sector L in Extremadura with respect to the neighborhood effect (the average of neighbor regions). This introduces a new element of analysis, since L in Extremadura is performing better than the

[4] A row standardized binary spatial weights matrix was used.

average of the neighbor regions. The analysis suggests that positive neighborhood structural effect and positive neighborhood regional-shift effect explain this behavior. Therefore, sector L is growing at the regional neighborhood level (positive neighborhood structural component), having a positive neighborhood industry mix. Finally, the positive neighborhood regional share displays behavior advantages for sector L in Extremadura with respect to the situation, in average terms, of the sectors L in the neighbor regions. Thus, the spatial shift-share makes available a complementary perspective to the traditional shift-share.

To illustrate the sectoral shift-share that uses a reference sectoral approach, a row-standardized form of a simple unitary weight matrix could be constructed, assuming the existence of similar influences from the rest of regional sectors over the regional sector under analysis. Nevertheless, to obtain the underlying structure of sectoral interactions within Extremadura, a row-standardized form of a weight matrix was constructed from the Ghosh inverse obtained from a regional input-output table. The Ghosh inverse was taken from Márquez Paniagua (2001), who worked with the input-output table for Extremadura in 1990[5]. The results are shown in table 3.

<<insert table 3 here>>

Now, using this definition of the sectoral weights matrix (*W*), and from the perspective of the **sectoral national effects** that facilitate the calculation of the total sectoral shifts over the period, the results are the same as the previous spatial case: the dynamic sectors are Q, C, Z, L and G while the other sectors (A, E, K and B) are not dynamic sectors at the sectoral national level. In other words, the "supra-sectoral effect" measured by the weighted growth rate of national sectors recorded a stronger effect than sectors A, E, K and B; while this "supra-sectoral effect" displays a weaker weighted growth rate of national sectors than sectors Q, C, Z, L, and G. The case of sector G is special, since there were no linkages with the rest of sectors.

A qualitative difference is found for sector L with respect to the traditional shift-share (recall from table 1 that the total shift for this sector was negative). With respect to the **Sectoral Structural Effects**, where the growth disparity can be attributed to the sectoral neighborhood structure, the sectors with negative Sectoral Structural Effects are Q, K, C and Z. These sectors reveal a lack of dynamism in the neighboring sectors at the regional level with respect to the

[5] We realise that when using input-output coefficients, the issue is the timing. Nevertheless, in the case of Extremadura, the last input-output table was built for 1990, and different studies show indirect evidence of the lack of change in the sectoral inter-relationships.

neighboring sectors at national level. In sectors A, E, B, L and G, regional production has positive influences derived from the fact that their respective regional sectoral neighborhood has a better performance than the national sectoral neighborhood.

The **Sectoral Regional-Shift component** would incorporate all factors not related to the sectoral structure. The sectoral regional-shifts effects are positive in the case of Q, C, Z and G. These positive effects indicate competitive behavior of the sector under analysis with respect to the weighted average behavior of the neighboring sectors at the regional level. It is interesting to show that all the sectors with a positive total sectoral shift have positive sectoral regional-shift effects, an indicator of the existence of relative locational advantages of these sectors over neighboring sectors.

What has been proposed in this paper is that the regional comparison provided by the traditional shift-share analysis could be complemented by perspectives that are embraced in spatial and sectoral shift-share analysis. It is now possible to offer a qualitative analysis of the different results.

First, the qualitative "shifts" derived from the different versions of the shift-share analysis are shown in table 4.

<<insert table 4 here>>

From Table 4 it is possible to verify that the sign of the measure of the total change in every sector over the time period relative to that of the nation is the same as the "shifts" derived from the spatial and sectoral shift-share, the only exception being sector L. Now, both spatial and sectoral shift-share analyses expand the framework provided by the traditional shift-share for examining the aspects of regional economic growth. This sector (L) has a negative standard shift, but it shows positive spatial shift and positive sectoral shift. This would imply that although sector L displays a weaker growth rate than the national average (negative standard shift), its growth recorded was stronger than the average of the neighbor regions (positive spatial shift) and a higher growth than a weighted average of the growth rates of the other national sectors (positive sectoral shift). Obviously, the spatial and sectoral components of growth provide some new insights in evaluating performance of regional sector L (See tables 5 and 6).

<<insert tables 5 and 6 here>>

From tables 5 and 6, it is possible to corroborate that traditional components (structural effect and regional-shift) are negative. Nevertheless, at the spatial neighborhood level, sector L has a positive comparative advantage (positive spatial structural effect and positive spatial regional-shift). In addition, when the sectoral benchmark of reference is used, a positive sectoral structural effect and a positive sectoral regional-shift appear. Thus, the study of the difference between regional and national growth rates (standard shift-share) would be incomplete, since the behavior of sector L within the adjacent regions (spatial neighborhood) and within neighboring sectors (sectoral neighborhood) provide new insights in evaluating performance of this regional sector.

4. Conclusions

In this paper, a new sectoral benchmark of reference was proposed and illustrated for shift-share analysis. The traditional shift-share formulation is substituted by an analogue based on the intra-regional inter-industry linkages to capture interdependencies in the performance of sectors. The paper provides a sectoral complement to the proposal by Nazara and Hewings (2004) to consider spatial spillover effects in capturing any regional competitive effects in shift and share analyses. Using the same logic to justify consideration of spatial spillovers, this paper explores an approach that captures the sectoral effects in a way that compares the national and regional influences of “neighboring” sectors on economic performance. Hence, sectoral shift-share analysis provides a measure of the total change in a regional sector’s performance over a given time period relative to that of the weighted average of the growth rates of the other national sectors. Thus, this sectoral shift is divided into two components: the sectoral structural component and the sectoral regional-shift effect. The sectoral structural component results from the influence of the rest of sectors in the region. This component measures the extent to which these regional sectors are growing (or declining) at rates different from the same sectors a national level. The sectoral regional-shift effect results from the degree to which change in the regional sector is greater or smaller than that which would have occurred had the weighted average of the growth rates of the others regional sectors prevailed. This effect would be an indicator for the relative locational advantages of a sector over others.

Hence, it would be advisable to use of the standard shift-share together with the spatial and sectoral shift-share, since the new formulations offer a complementary perspective on the economic structure of a regional economy.

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Table 1: Standard shift-share analysis

	Regional sectors								
Growth 1990-2004	**A**	**E**	**Q**	**K**	**C**	**B**	**Z**	**L**	**G**
EXTREMADURA	-0,013	0,105	0,899	0,256	0,446	0,255	0,872	0,423	0,664
SPAIN	0,089	0,339	0,379	0,453	0,210	0,428	0,797	0,424	0,500
Total Shift	-0,438	-0,320	0,473	-0,170	0,021	-0,170	0,447	-0,002	0,239
EFFECTS	**SHIFT-SHARE**								
National	0,425	0,425	0,425	0,425	0,425	0,425	0,425	0,425	0,425
Structural	-0,336	-0,086	-0,046	0,028	-0,215	0,003	0,372	-0,001	0,075
Regional-shift	-0,102	-0,234	0,520	-0,198	0,236	-0,173	0,075	-0,001	0,164

Note: Regional sectors considered are: Agriculture (A), Energy (E), Manufacturing industry of intermediate goods (Q), Manufacturing industry of capital goods (K), Manufacturing industry of consume goods (C), Construction (B), Transport and communications (Z), Sales-oriented services (L), Non sales-oriented services (G).

Table 2: Spatial shift-share analysis

	Regional sectors.								
Growth 1990-2004	**A**	**E**	**Q**	**K**	**C**	**B**	**Z**	**L**	**G**
EXTREMADURA	-0,013	0,105	0,899	0,256	0,446	0,255	0,872	0,423	0,664
SPAIN	0,089	0,339	0,379	0,453	0,210	0,428	0,797	0,424	0,500
Total Spatial Shift	-0,385	-0,267	0,527	-0,116	0,074	-0,117	0,5	0,051	0,292
EFFECTS	**SPATIAL SHIFT-SHARE (Average)**								
Neighborhood	0,372	0,372	0,372	0,372	0,372	0,372	0,372	0,372	0,372
Neighborhood structural	-0,251	-0,017	-0,067	0,131	-0,164	-0,008	0,416	0,010	0,148
Neighborhood regional-shift	-0,134	-0,250	0,594	-0,248	0,238	-0,109	0,084	0,041	0,144

Note: Regional sectors considered are: Agriculture (A), Energy (E), Manufacturing industry of intermediate goods (Q), Manufacturing industry of capital goods (K), Manufacturing industry of consume goods (C), Construction (B), Transport and communications (Z), Sales-oriented services (L), Non sales-oriented services (G).

Table 3: Sectoral shift-share analysis (Influences measure by means a row-standardized Ghosh inverse).

	Regional sectors.								
Growth 1990-2004	**A**	**E**	**Q**	**K**	**C**	**B**	**Z**	**L**	**G**
EXTREMADURA	-0,013	0,105	0,899	0,256	0,446	0,255	0,872	0,423	0,664
SPAIN	0,089	0,339	0,379	0,453	0,210	0,428	0,797	0,424	0,500
Total Sectoral Shift	-0,264	-0,237	0,48	-0,12	0,124	-0,125	0,526	0,065	0,664
EFFECTS	**SECTORAL SHIFT-SHARE (Weighted average)**								
Sectoral national	0,251	0,342	0,419	0,376	0,322	0,380	0,346	0,358	0,000
Sectoral structural	0,198	0,041	-0,146	-0,051	-0,035	0,021	-0,010	0,010	0,000
Sectoral regional-shift	-0,463	-0,279	0,626	-0,069	0,158	-0,146	0,536	0,055	0,664

Note: Regional sectors considered are: Agriculture (A), Energy (E), Manufacturing industry of intermediate goods (Q), Manufacturing industry of capital goods (K), Manufacturing industry of consume goods (C), Construction (B), Transport and communications (Z), Sales-oriented services (L), Non sales-oriented services (G).

Table 4: Shifts derived from the standard shift-share, spatial shift-share and the sectoral shift-share.

	Regional sectors.								
Growth 1990-2004	**A**	**E**	**Q**	**K**	**C**	**B**	**Z**	**L**	**G**
Standard shift	-	-	+	-	+	-	+	-	+
Spatial shift	-	-	+	-	+	-	+	+	+
Sectoral shift	-	-	+	-	+	-	+	+	+

Note: Regional sectors considered are: Agriculture (A), Energy (E), Manufacturing industry of intermediate goods (Q), Manufacturing industry of capital goods (K), Manufacturing industry of consume goods (C), Construction (B), Transport and communications (Z), Sales-oriented services (L), Non sales-oriented services (G).

Table 5: Structural effects derived from the standard shift-share, spatial shift-share and the sectoral shift-share.

	Regional sectors.								
Growth 1990-2004	**A**	**E**	**Q**	**K**	**C**	**B**	**Z**	**L**	**G**
Standard structural effect	-	-	-	+	-	+	+	-	+
Spatial structural effect	-	-	-	+	-	-	+	+	+
Sectoral structural effect	+	+	-	-	-	+	-	+	+

Note: Regional sectors considered are: Agriculture (A), Energy (E), Manufacturing industry of intermediate goods (Q), Manufacturing industry of capital goods (K), Manufacturing industry of consume goods (C), Construction (B), Transport and communications (Z), Sales-oriented services (L), Non sales-oriented services (G).

Table 6: Regional-shift effects derived from the standard shift-share, spatial shift-share and the sectoral shift-share.

	Regional sectors.								
Growth 1990-2004	**A**	**E**	**Q**	**K**	**C**	**B**	**Z**	**L**	**G**
Standard regional-shift	-	-	+	-	+	-	+	-	+
Spatial regional-shift	-	-	+	-	+	-	+	+	+
Sectoral regional-shift	-	-	+	-	+	-	+	+	+

Note: Regional sectors considered are: Agriculture (A), Energy (E), Manufacturing industry of intermediate goods (Q), Manufacturing industry of capital goods (K), Manufacturing industry of consume goods (C), Construction (B), Transport and communications (Z), Sales-oriented services (L), Non sales-oriented services (G).