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An approach to describe regional economies at NUTS 3 level in the EU

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Abstract

This paper presents a structural analysis for a set of twelve NUTS 3 regions distributed across the EU. Our approach focuses on capturing the most relevant sectors in each of these economies and identifying dynamics for fostering growth. Backward and forward structural linkages are detected within a SAM framework and a key sectors analysis is addressed. The novelty of our approach is double. On the one hand, we use a set of previously built rural-urban NUTS3 SAMs that allow for endogenization of institutional sectors, so that the circular flow of income can be adequately closed ant further interpretations can be outlined. On the other hand, the regions are organized by clusters with the aim of searching for common development patterns. This exercise can be useful for policymakers when designing optimal agricultural or regional policies.

Keywords: Social Accounting Matrix, Linear Multiplier Model, Common Agricultural Policy, Impact Analysis.

JEL Classification: C67, D57, D58

1 Introduction

Social Accounting Matrices (SAM) are databases comprising economic transactions which allow us to extract information on the different economic agents such as producers, consumers, the government and the foreign sector; as well as on the behaviour of productive factors and institutions. They complete the information provided by the input-output analysis, deeply discussed in the literature[1], with the regional or national accounting and the surveys of family constraints, among other databases.

The interest on SAMs is based on the fact that not only do they study the production relationships among the economic sectors but also the transactions that take place among the different institutions of an economic system in terms of revenues or consumption. Besides their statistical content, which enables us to close the circular flow of income, the SAMs have become a useful tool for evaluation of policy interventions in national or regional frameworks.

In this paper we work with SAM NUTS3 databases, previously built by the authors (Cardenete et alia (2015)). For the construction of the NUTS3 SAMs, we initially link input-output framework with economic flows between productive sectors, commodities and institutional sectors. To do this, we use additional information, most of it from Eurostat in order to achieve greater uniformity in the estimation of the matrices for all NUTS3 analyzed. However, when it is necessary to obtain more specific information, we take it from local or national statistical offices. Small discrepancies that may arise in the estimation process are corrected by using a simple technical adjustment by RAS. Furthermore, the estimate of the NUTS3 SAM has been performed using a two-step process: first, input-output frameworks have been regionalized (Supply, Use and Symmetric tables) from the NUTS 1 or countries concerned, using the EURO method (Beutel, 2002, 2008 and Eurostat, 2008). Subsequently, we estimated the SAM of the NUTS3 based on these tables and adding additional information. To cover these objectives, we will apply a bietapic process –two steps-: first, regionalizing (NUTS 2 to NUTS 3); and second, updating and splitting Households and Activities/Commodities in Rural and Urban.

The result is a NUTS3 level basic SAM composed by the following accounts:

Table 1. NUTS3 SAM accounts structure.

- A.0-1 Agriculture, hunting and related services
- A.0-2 Forestry, logging and related services
- A.0-3 Fish
- A.0-4 Mining
- A.0-5 Food industries
- A.0-6 Other manufacturing
- A.0-7 Utilities
- A.0-8 Construction
- A.0-9 Trade
- A.0-10 Hotels and restaurants
- A.0-11 Transport and communication
- A.0-12 Other private services

[1] See in this respect Roland-Holst, D.W. (1990).

•	A.0-13	Public services
•	C.0-1	Products of agriculture, hunting and related services
•	C.0-2	Products of forestry, logging and related services
•	C.0-3	Fish
•	C.0-4	Mining
•	C.0-5	Food industries
•	C.0-6	Other manufacturing
•	C.0-7	Utilities
•	C.0-8	Construction
•	C.0-9	Trade
•	C.0-10	Hotels and restaurants
•	C.0-11	Transport and communication
•	C.0-12	Other private services
•	C.0-13	Public services
•	L	Labour
•	K	Capital
•	ANT	Activity net taxes
•	CNT	Commodity net taxes
•	INT	Income net taxes
•	H	Households
•	E	Enterprises
•	G	Government
•	IS	I-S
•	ROW	Rest of the World

Source: Own elaboration.

If a SAM is available for more than one year –or different SAMs from different regions or countries in the same base year-, it is feasible to carry out a complete analysis of the productive structure of the economy and also to obtain a perspective of the changes that have occurred. Several methodologies are able to outline such analysis in a particular economy.

The aim of this research is to address a structural analysis for a set of twelve rural-urban NUTS3 regions organized by clusters of similar regions. To this extend, we propose two methodologies. On the one hand we analyse the hierarchical structure of the multipliers of the selected economies, with respect to a fixed economy so that comparisons will be done in terms of our numeraire economy. From that analysis we can check whether the hierarchy of multipliers of each economy coincides with the numeraire or, on the contrary, if the corresponding figures present a visual disorder that do not respect the hierarchy of the reference matrix. On the other hand, it is feasible to carry out a complete analysis of the productive structure of the economy and also to obtain a perspective of the changes in terms of importance of key sectors. This approach will provide us with interesting information at local level that can be useful for regional and agricultural policy implementation.

The structure of the paper is as follows: in the second section we introduce more details about the dataset used in our study and we develop the methodological approach, the third section presents the main results and the fourth section outlines the main conclusions.

2. Data and methodology

For constructing twelve rural-urban ('rurban') SAMs NUTS3 we have tried to use the full set of statistical (IOT or SAM material from national and/or regional official statistical offices) and expert information locally available, always linking this information with official statistics.

Cluster analysis encloses a rather wide collection of statistical methods that can be used to assign cases to groups that are mutually exclusive. Following Raggi (2012) different clusters are distinguished: **Cluster 1** includes provinces classified as intermediate urban/rural, economically diversified, with high accessibility and high gross domestic product (GDP). **Cluster 2** contains rural provinces agriculturally dependent, with good accessibility and high GDP. **Cluster 3** takes into account NUTS3 predominantly rural and agriculture dependent, with low accessibility and low GDP. **Cluster 5** contains rural NUTS3, strongly economically dependent from agriculture with the lowest accessibility index and low GDP. **Cluster 6** consists of urban and intermediate provinces with low GDP, intermediate accessibility and intermediate economic diversification.

The list of regions and clusters that we work with is presented below:

Table 2. NUTS3 regions and clusters' classification.

	EU CODE	**NAME**	**CLUSTER**
1	DE935	Lüneburg	1
2	UKH13	Norfolk	1
3	DE138	Konstanz	1
4	SI022	Gorejnska	2
5	SE124	Örebro	2
6	HU312	Heves	3
7	EE004	Lääne-Eesti	3
8	ES241	Huesca	5
9	PT172	Península de Setúbal	6
10	PL631	Słupski	3
11	NL131	Noord Drenthe	2
12	FR522	Finistere	2

Source: Own elaboration.

We propose SIMSIPSAM software[2] (Parra and Wodon, 2008), which has received the World Bank support, to perform this task. SIMSIPSAM is a user-friendly application to analyse SAMs and I-O tables. The tool works with MATLAB as computation engine. It performs a large number of decompositions and analyses including two algorithms for SAM balancing (RAS and Cross Entropy Method), SAM aggregation, multiplier decompositions, several types of economic linkages, income-redistribution analysis, structural-path analysis, several methods to analyse structural change (fields of influence, direction of change, importance of technical

[2] Several studies have been realised with SIMSIPSAM software. See Bostwick (2012), Nganou et al. (2011), Fofana et al. (2011) and Parra and Wodon (2008).

coefficients), supply constraints, price models, price controls, together with poverty and income-distribution analysis by linking the tool to household survey data.

In this study, the software is used to detect backward and forward structural linkages as well as key sectors. If a SAM is available for more than one year –or different SAMs from different regions or countries in the same base year-, it is feasible to carry out a complete analysis of the productive structure of the economy and also to obtain a perspective of the changes that have occurred. Several methodologies are able to outline such analysis in a particular economy. For instance, a methodology based on a three-dimensional landscape[3] called "structural path analysis".

The methodologies commonly used to determine productive key sectors are usually classified into two categories: the t*raditional methods*, and the *hypothetical extraction methods*. Briefly, both methods are based on the combination of two indicators: a *backward linkage* (*BL*) and a *forward linkage* (*FL*), both traditionally obtained from a symmetrical input-output table (SIOT).

The backward linkage indicator (*BL*) for a given sector analyses the effect of a change in the final demand of this specific sector on the economy's total production, whereas the forward linkage indicator (*FL*) values the effect of a joint change in the final demand of all sectors on the production of this specific sector.

From these indicators, it is possible to determine the key sectors in an economy. These sectors generate a high multiplier and fostering effect on production, allowing for development strategies to be designed upon them as part of the economic policies.

In this analysis we use a more complex database than the traditional SIOT to determine the key sectors. This database is the Social Accounting Matrix (SAM). It is well known that the SAM means an enlargement of the traditional input-output framework in the sense that considers and reflects the complete circular flow of income. From this perspective, the measurement of the economic transactions incorporated in a SAM allows to extract more precise information about the different economic agents, such as producers, consumers, public administration and the foreign sector, as well as about the behaviour of the productive factors[4].

2.1 Key Sectors Analysis

The analysis of linkages, used to examine the interdependence between productive structures, has got a long history starting from the pioneer works of Chenery and Watanabe (1958), Rasmussen (1956) or Hirschman (1958).

We use the methodology developed by Rasmussen (1956) to obtain the *BL*, and that of Augustinovics (1970), designed to obtain the *FL*, both of them are traditional methods. More precisely, for the *BL* the method suggests that the database should be a SAM and not a SIOT. This SAM should have a high degree of endogenization of the institutional sectors, so that the circular flow of income can be adequately closed. At least, the productive factors (labour and capital) and the households should be endogenized. This way, when analysing the *BL*, not only the change in the final demand of a certain sector will reflect how the rest of the sectors change in order to "supply" the alteration in the final demand, but also, since the productive activity

[3] For more details, see Hewings, G.J.D., Sonis, M. et al. (1997), or Sonis, M. et al. (1997), about the economies of Chicago and Indonesia respectively.

[4] For a demonstration of the advantages in the use of multipliers based on SAM instead of IO, see Roland-Holst, D.W. (1990).

will increase, the factors remuneration and the consumers' expenditure will increase as well, thus influencing again the productive sectors in a "second round".

Starting with the method proposed by Rasmussen (1956), from the associated inverse matrix $B_t = (I - A_t)^{-1}$, being I an identity matrix of size *n*, we obtain the expression of the *BL*:

$$B_{.j} = \sum_{i=1}^{n} b_{ij} \qquad j = 1..n \qquad (2)$$

b_{ij} denoting the elements of the inverse matrix associated B_t.

Once this indicator is normalized, if the backward linkage is above one, a one-unit change in the final demand of sector *j* will generate an increase above the average in the economy's global activity.

In 1976, Jones stated that the obtaining of the *FL* as defined by Rasmussen did not have the quality of being a symmetrical measure in relation to the *BL*, and, from a similar perspective, Augustinovics (1970) had already defined the obtaining of *FL* as the row summatory of the Goshiana inverse, where the distribution coefficients ($¢_{ij}$) – obtained from the *SIOT* through dividing each cell by the row total, not the column total – replace the technical coefficients. This way, *FL* is calculated as $O_{i.}$:

$$O_{i.} = \sum_{j=1}^{n} ¢_{ij} \qquad i = 1...n \qquad (3)$$

from which we can value the joint effect of altering the supply of primary inputs in a particular sector on all sectors. Again, after its normalization, if the indicator is above one, a one unit change in all sectors, will generate an increase above the average in sector *i*. In this case, it will use the SIOT because, if it leaves as exogenous the primary inputs, which are the thread of the circular flow of income, the economic interpretation lying in the *FL* will lose its meaning once the institutional sectors are endogenized through the use of the SAM.

The structural analysis is then a graphical classification of the activities, according to the size of their forward and backward linkages. The forward linkage of sector j quantifies the change in income in sector j, relative to the average change in the economy, caused by a unitary injection in the final demand of all sectors. If the forward linkage for sector j is greater than 1, the change in sector j's income is higher than the average income change in the economy after a unitary injection in all sectors. On the other hand, the backward linkage of sector j quantifies the change in economy wide income, relative to the average change in the economy, caused by a unitary injection in the final demand of sector j. A key sector is usually defined as one with both backward and forward linkages greater than 1. A sector with backward (forward) linkages greater than 1, and forward (backward) linkages below 1, is called backward (forward) oriented. If none of the linkages is greater than 1, the sector is called weak.

2.2 Structural-path analysis

Following Sonis et al. (1997), to complete this sectoral perspective of the different regions, we calculate the Multiplier Product Matrix (MPM) derived from the SAM, which allows us analysing the sectoral interdependencies of these economies. *M* defines the elements of this matrix as the product of the multiplier *M* row (M_i) and column (M_j) divided by total intensity factor, (this factor is calculated as the sum of all elements of matrix *M*):

$$MPM_{ij} = \frac{M_{i.} \cdot M_{.j}}{\sum_{i=1}^{n} \sum_{j=1}^{n} M_{ij}} \quad (4)$$

Thus, the MPM structure is essentially connected with the properties of sector backward and forward linkages. The rows and columns of the matrix M can be rearranged along the magnitude of the values of backward and forward linkages from the largest to the smallest to provide the hierarchy of backward (for columns) and forward (for rows) linkages. Using the MPM matrix, it is possible to construct economic landscapes to provide a summary view of the economic structure, that allows visually identifying which are the sectors that generate above-average impact on the economy through changes in themselves, what are the sectors that are most influenced by changes in the rest of the economy, and how they interact with the rest of the other sectors.

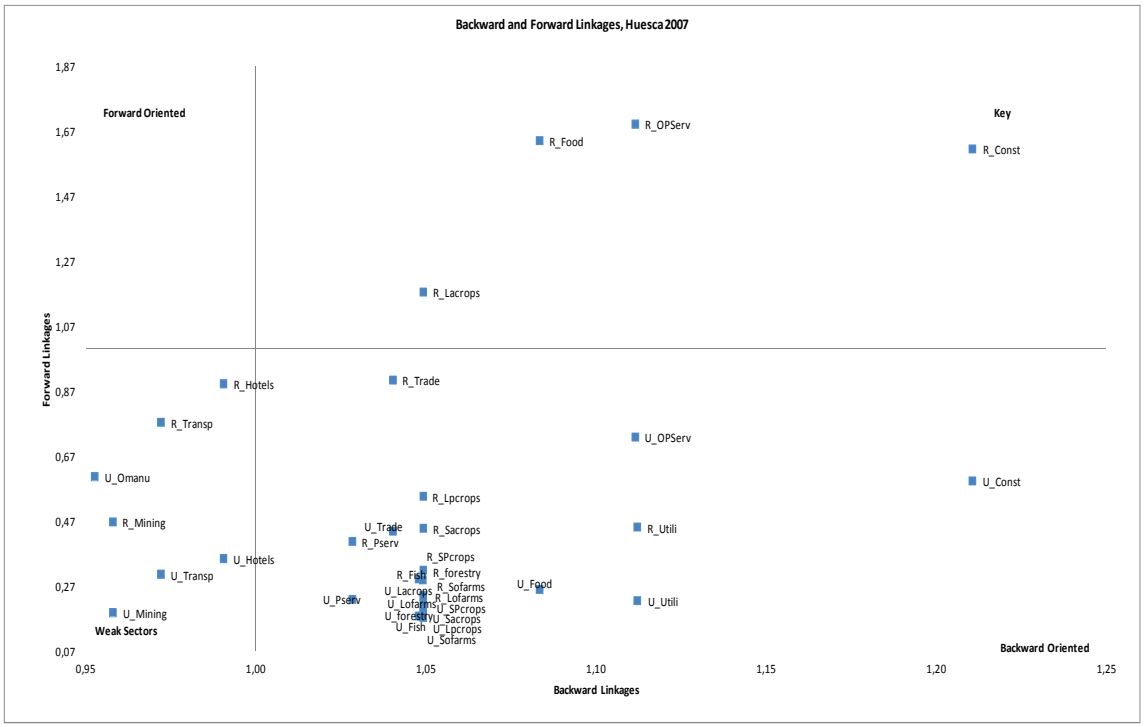
Regarding the interpretation of the information we are going to obtain, the multiplier product matrix (MPM) denotes the first order change in the sum of all elements of the inverse matrix caused by the change in the (i, j)-th technical coefficient. The elements of the MPM can be sorted, to get a graphical representation of the hierarchies of backward and forward linkages known as economic landscape. The MPM is also known as first order intensity field of influence. The cell (i, j) quantifies the first order change in the sum of all terms in the inverse matrix generated by a change in the technical coefficient (i, j). If the columns and rows of the MPM are reordered in such a way that the highest element of the matrix is in cell (1, 1), the next highest (excluding the new first row and column) is in cell (2,2), and so on, the graph of the resulting matrix is called the economic landscape.

3. Main Results

Below, we present figures ordered by clusters with the corresponding backward and forward linkages and key sectors for each NUTS3.

- Cluster 5: Huesca.

Figure 1. BL and FL for Huesca, 2007.



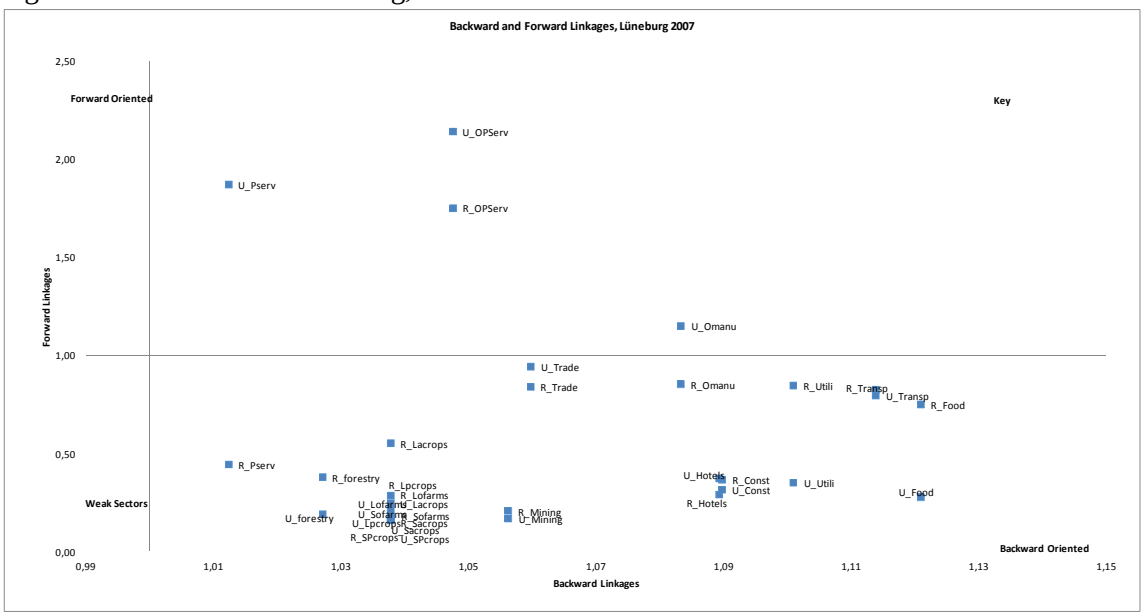
Source: Own elaboration.

The structural analysis of cluster 5 is visualised in Figure 1. In the specific case of Huesca, the majority of sectors can be classified as backward oriented, whereas only four sectors can be categorized as key (sectors R_Lacrops, R_Food, R_Const and R_OPServ). The rest are weak sectors.

The analysis of cluster 1 is presented in Figures 2, 3 and 4.

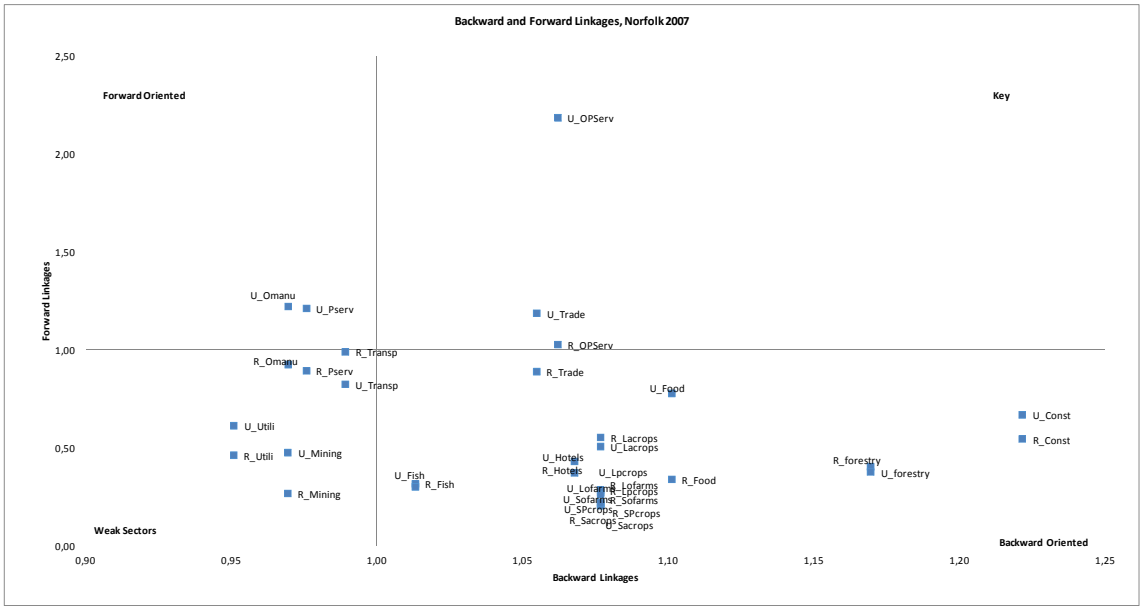
- Cluster 1: Lüneburg, Norfolk, Konstanz.

Figure 2. BL and FL for Lüneburg, 2007.



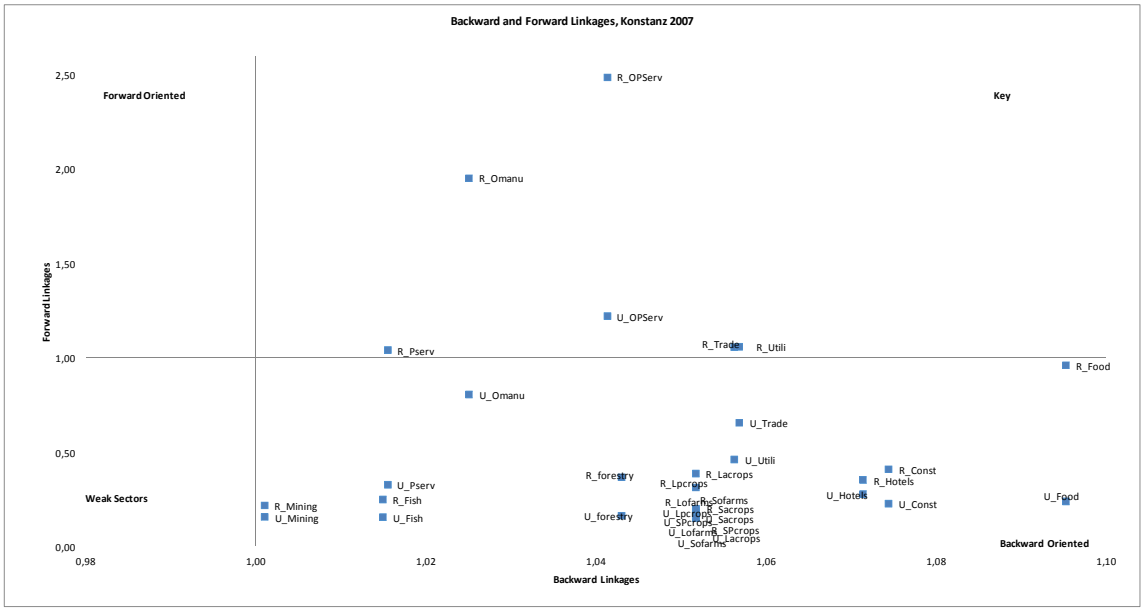
Source: Own elaboration.

Figure 3. BL and FL for Norfolk, 2007.



Source: Own elaboration.

Figure 4. BL and FL for Konstanz, 2007.



Source: Own elaboration.

Figure 2 shows that sectors categorised as key in Lüneburg are R_OPServ, U_Omanu, U_OPServ and U_Pserv. The majority of the sectors can be classified as backward oriented in this region. In the case of Norfolk (Figure 3), R_OPServ, U_Trade, U_OPServ can be categorised as key sectors. U_Omanu, U_Pserv are forward oriented and R_Mining, R_Omanu, R_Utili, R_Transp, R_Pserv, U_Mining, U_Utili, U_Transp are weak sectors. Regarding

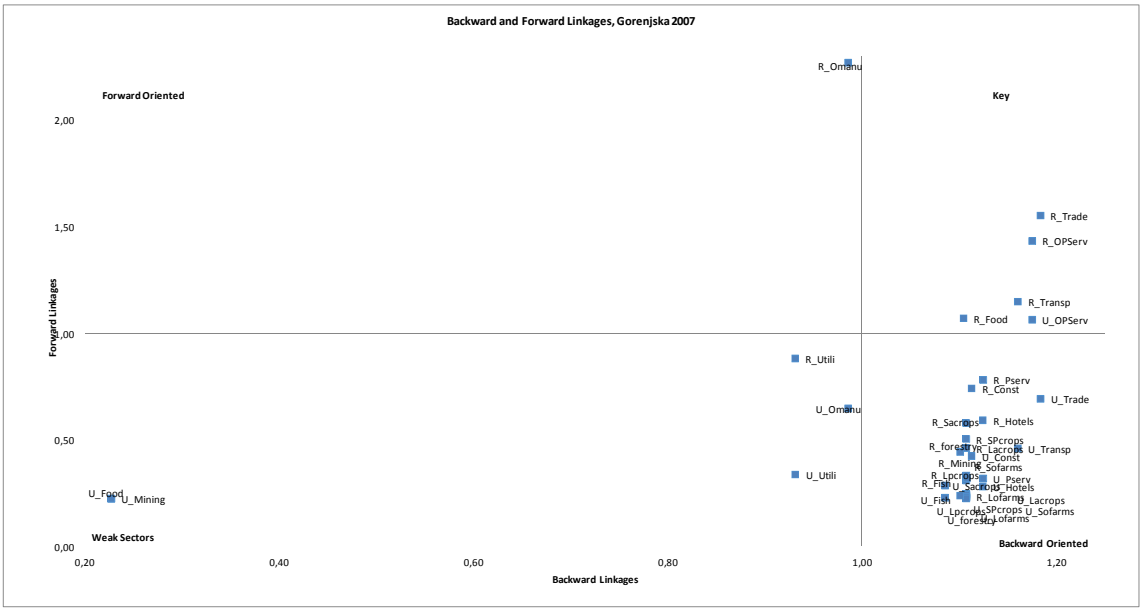
Konstanz (Figure 4), the majority of sectors are backward oriented but there are six key sectors: R_OPServ, R_Omanu, U_OPServ, R_Pserv, R_Utili and R_Trade.

In this first cluster we can find some similarities regarding key sectors, the three regions register a huge majority of backward oriented sectors and share some key sectors such as R_OPServ and U_OPServ.

The cluster 2 is presented below.

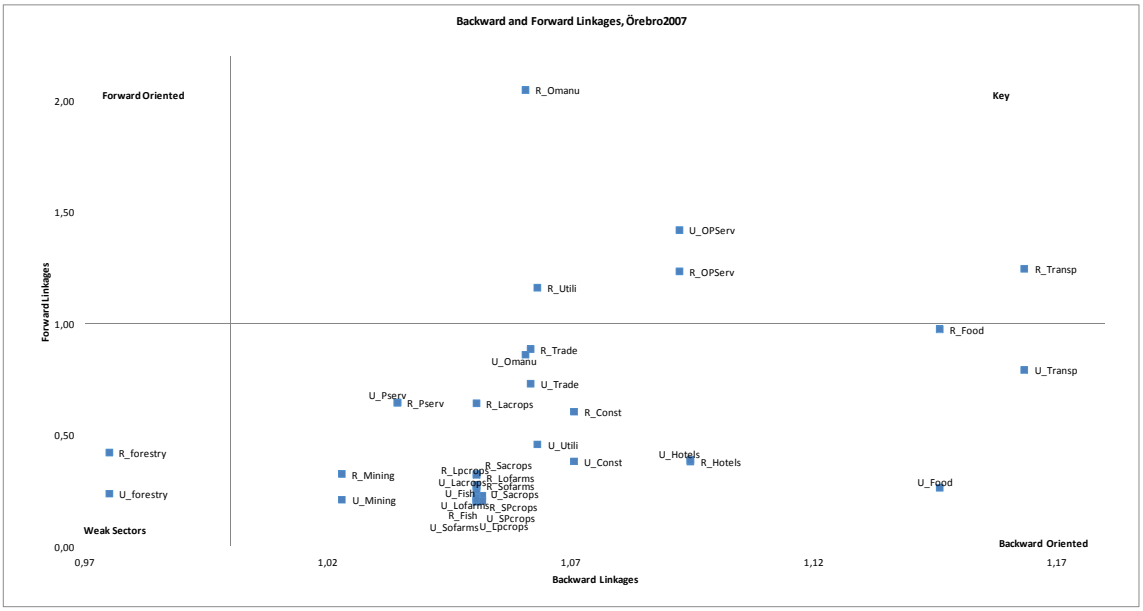
- Cluster 2: Gorejnska, Örebro, Noord Drenthe, Finistère.

Figure 5. BL and FL for Gorenjska, 2007.



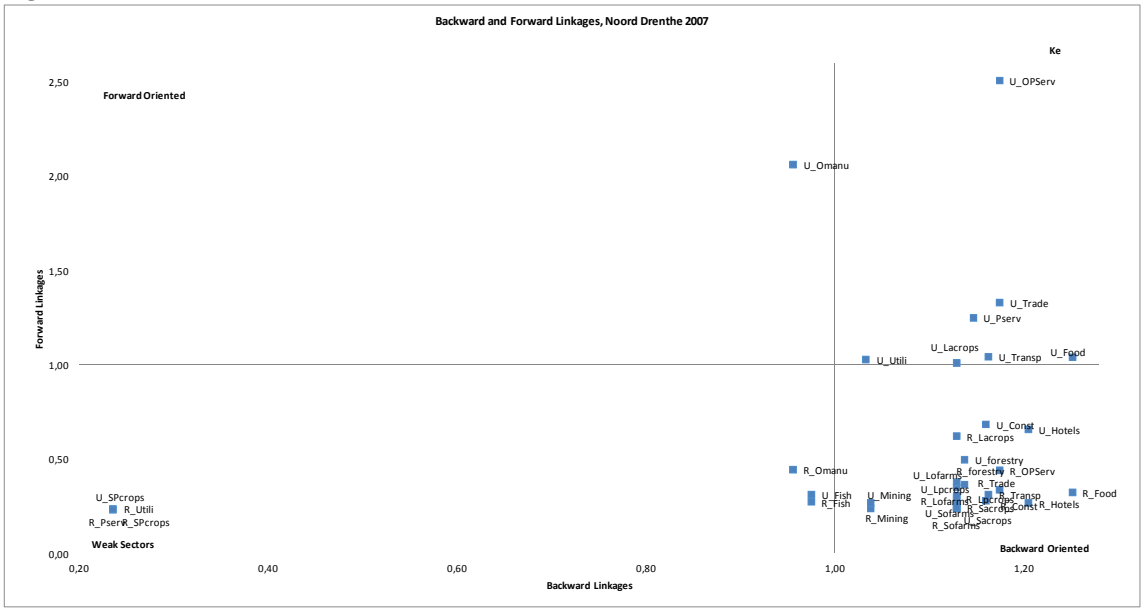
Source: Own elaboration.

Figure 6. BL and FL for Örebro, 2007.



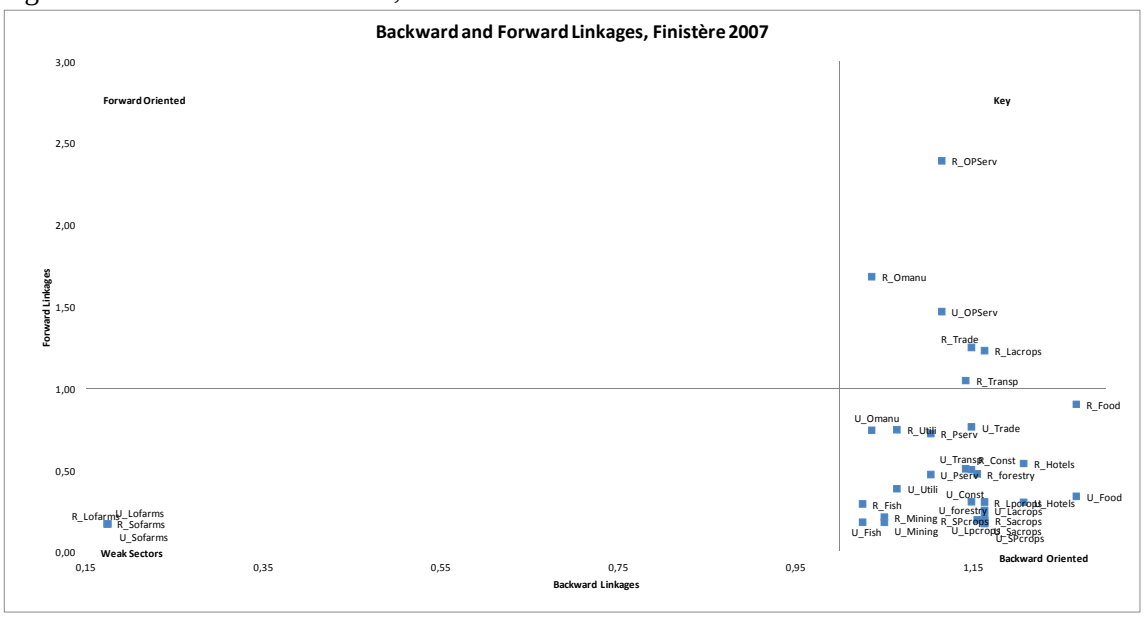
Source: Own elaboration.

Figure 7. BL and FL for Noord Drenthe, 2007.



Source: Own elaboration.

Figure 8. BL and FL for Finistère, 2007.



Source: Own elaboration.

The graphs show that the majority of sectors can be classified as backward oriented in this case. Figure 5 shows the classification of Gorenjska where we can categorize as key sectors R_Food, R_Trade, R_Transp, R_OPServ and U_OPServ. The forward oriented sector is R_Omanu and the weak sectors R_Utili, U_Mining, U_Food, U_Omanu, U_Utili. In Figure 6, we present the results for Örebro, where key sectors are R_Omanu, R_Utili, R_Transp, R_OPServ and U_OPServ. In this region, the weak sectors are R_forestry and U_forestry. In this case there are not forward oriented sectors and the rest of sectors are backward oriented.

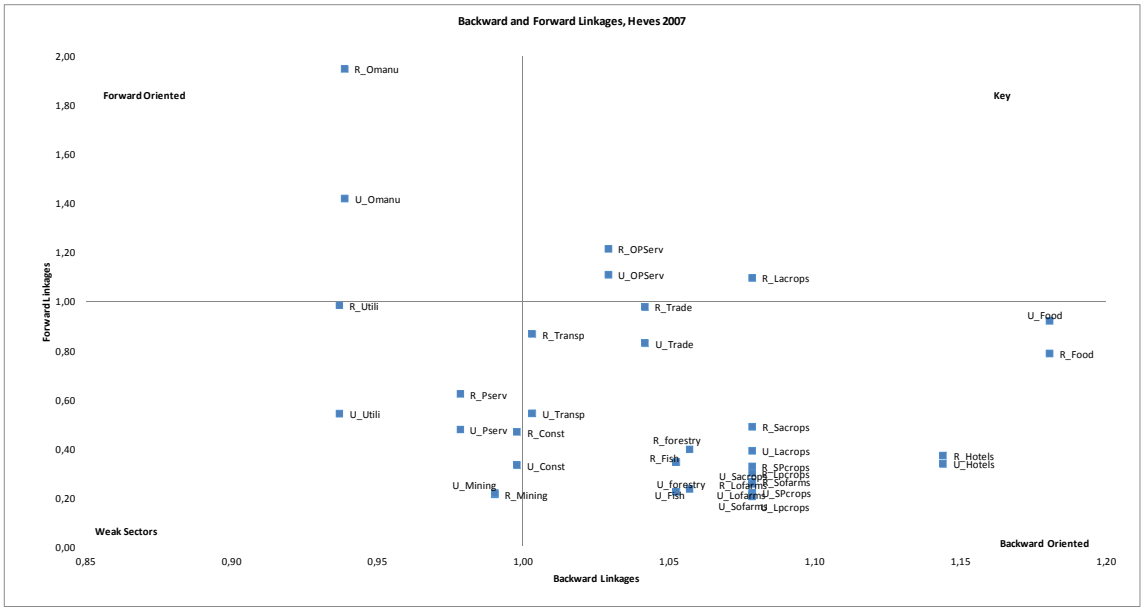
The analysis of Noord Drenthe can be consulted in Figure 7. The key sectors are U_Lacrops, U_Food, U_Utili, U_Trade, U_Transp, U_OPServ and U_Pserv. The forward oriented ones are U_Omanu. Finally, the weak sectors are R_Spcrops, R_Fish, R_Omanu, R_Utili, R_Pserv, U_Spcrops, U_Fish. Again the rest are backward oriented. In Figure 8, we can see the classification for Finistère. As key, we can find R_Lacrops, R_Omanu, R_Trade, R_Transp, R_OPServ, U_OPServ, whereas R_Sofarms, R_Lofarms, U_Sofarms, U_Lofarms can be classified as weak sectors. The others are backward oriented.

Searching for common patterns in this cluster, some coincidences can be found. There is a majority of backward oriented sectors within the cluster and U_OPServ is also key sectors in the four regions. It is important to remark that the regions Gorenjska, Örebro and Finistère register a closer pattern while Noord Drenthe has a different structure classification with a higher number of key sectors.

The analysis of cluster 3 is presented in Figures 9, 10 and 11.

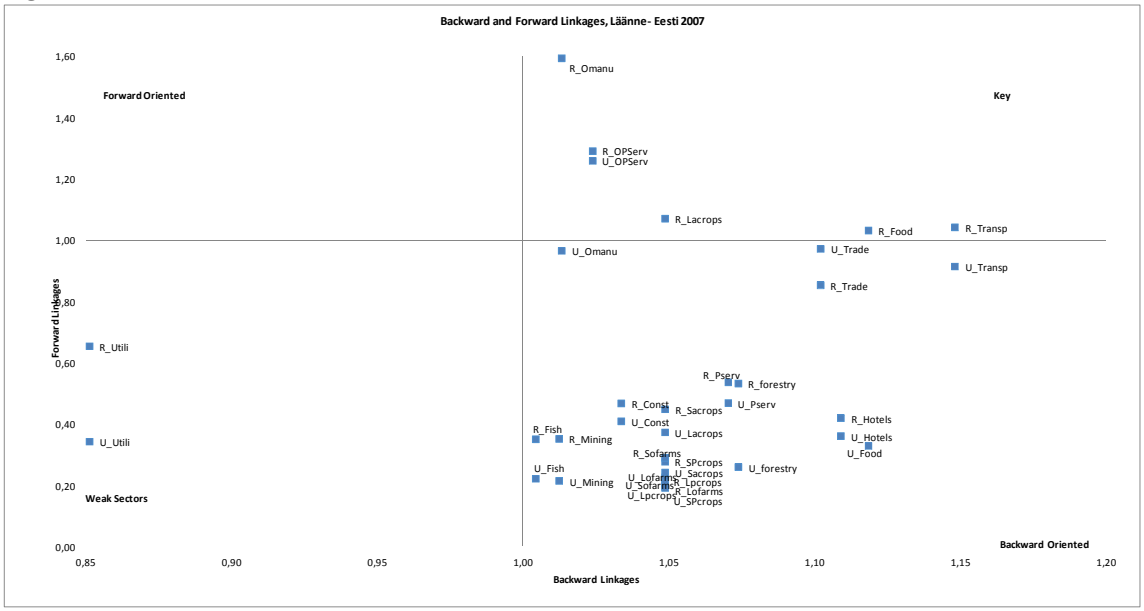
- Cluster 3: Heves, Lääne – Eesti, Slupski.

Figure 9. BL and FL for Heves, 2007.



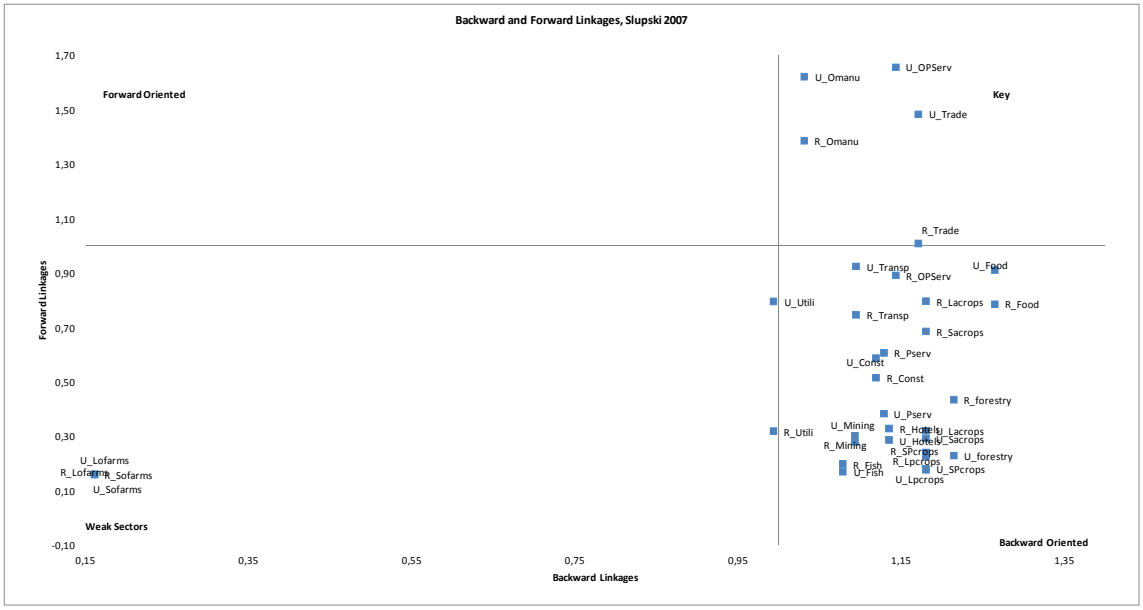
Source: Own elaboration.

Figure 10. BL and FL for Lääne-Eesti, 2007.



Source: Own elaboration.

Figure 11. BL and FL for Slupski, 2007.



Source: Own elaboration.

The majority of sectors can be classified as backward oriented. The analysis of Heves is visualised in Figure 9. It shows the sectors that can be categorised as key: R_Lacrops, R_OPServ and U_OPServ. The forward oriented ones are R_Omanu and U_Omanu and the rest are weak sectors: R_Mining, R_Utili, R_Const, R_Pserv, U_Mining, U_Utili, U_Const and U_Pserv.

The analysis of Lääne Eeesti is visualised in Figure 10. In this region, the sectors that can be categorised as key are R_Lacrops, R_Food, R_Omanu, R_Transp, R_OPServ and U_OPServ.

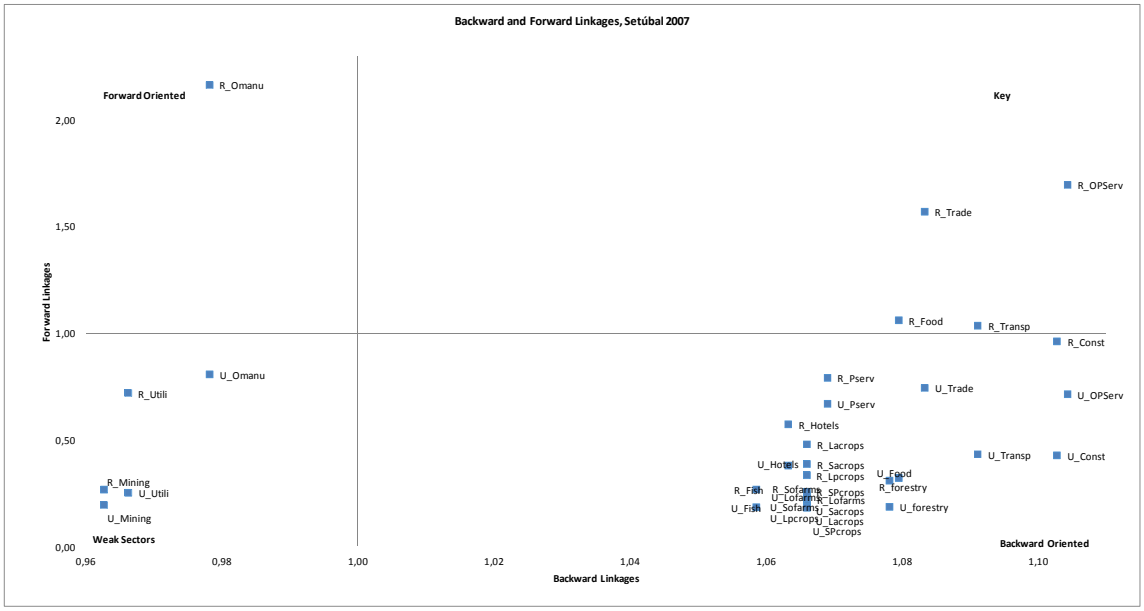
The weak sectors are R_Utili and U_Utili. In this case there are not sectors classified as forward oriented.

The analysis of Slupski is in Figure 11. The sectors classified as key are R_Omanu, R_Trade, U_Omanu, U_Trade and U_OPServ while the weak sectors are R_Sofarms, R_Lofarms, R_Utili, U_Sofarms, U_Lofarms and U_Utili.

In this cluster we can point out some similarities regarding the classification of sectors, with coincidences in most of backward oriented sectors and being U_OPServ key sector for the three regions.

- Cluster 6: Setúbal.

Figure 12. BL and FL for Setúbal, 2007.



Source: Own elaboration.

Figure 12 shows the analysis of cluster 6 represented by Setúbal, where most of sectors can be classified as backward oriented, whereas the rest of the sectors are key (R_Food, R_Trade, R_Transp and R_OPServ), forward oriented (R_Omanu) and weak sectors (R_Mining, R_Utili, U_Mining, U_Omanu and U_Utili).

One we have finished the cluster´s analysis, we present a table with a summary of key sectors. Table 3 records the key sectors for each NUTS3. These activities represent the sectors with the "diffusion effect" or backward linkage and the "absorption effect" or forward linkage above one.

Table 3. Key Sectors by cluster and NUTS3 regions.

	NUTS 3	Rural	Urban

Cluster 5	**Huesca**	(2) Large arable crops farms; (10) Food industries; (13) Construction; (17) Other private services	
Cluster 1	**Lüneburg**	(17) Other private services	(29) Other manufacturing; (35) Other private services; (36) Public services
	Norfolk	(17) Other private services	(32) Trade; (35) Other private services
	Konstanz	(11) Other manufacturing; (12) Utilities; (14) Trade; (16) Transport and communication; (17) Other private services; (18) Public services	(35) Other private services
Cluster 2	**Gorenjska**	(10) Food industries; (14) Trade; (16) Transport and communication; (17) Other private services	(35) Other private services
	Örebro	(11) Other manufacturing; (12) Utilities; (16) Transport and communication	(35) Other private services
	Noord Drenthe		(20) Large arable crops farms; (28) Food industries; (30) Utilities; (32) Trade; (34) Transport and communication; (35) Other private services; (36) Public services
	Finistère	(2) Large arable crops farms; (11) Other manufacturing; (14) Trade; (16) Transport and communication; (17) Other private services	(35) Other private services
Cluster 3	**Heves**	(2) Large arable crops farms; (17) Other private services	(35) Other private services
	Lääne-Eesti	(2) Large arable crops farms; (10) Food industries; (11) Other manufacturing; (16) Transport and communication; (17)	(35) Other private services

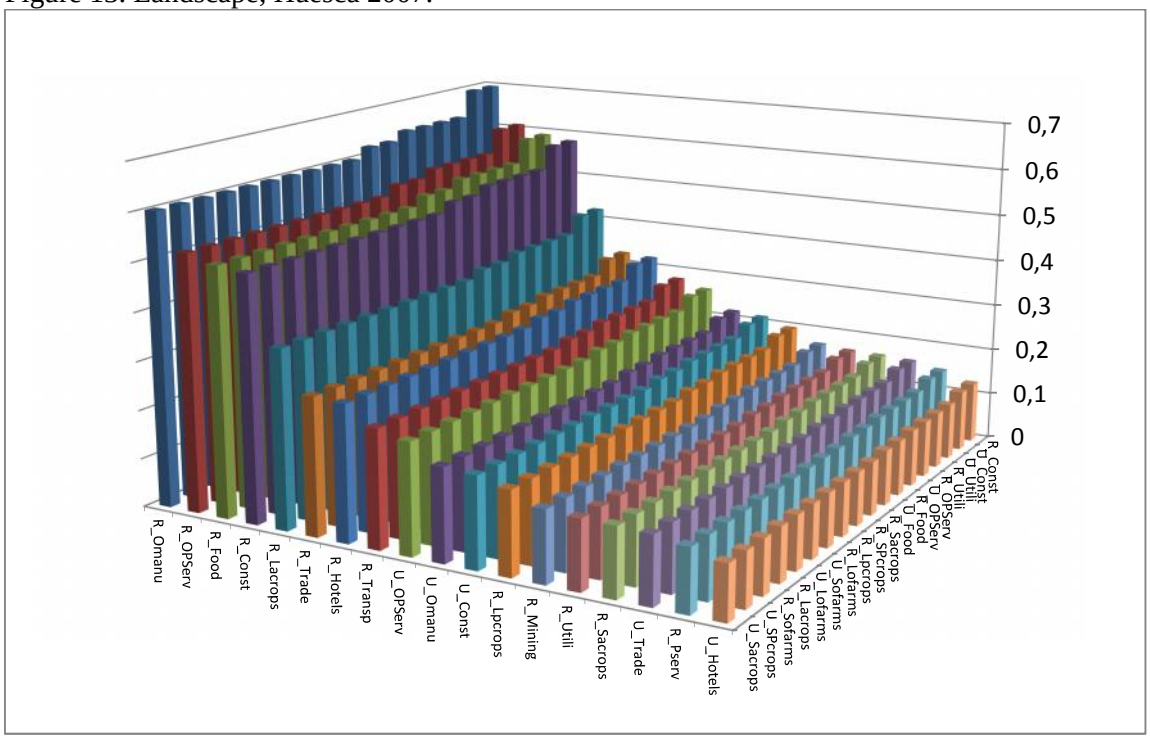
		Other private services	
	Slupski	(11) Other manufacturing; (14) Trade	(29) Other manufacturing; (32) Trade; (35) Other private services
Cluster 6	**Setúbal**	(10) Food industries; (14) Trade; (16) Transport and communication; (17) Other private services	

Source: Own elaboration.

Next, we develop the landscapes for each NUTS3, presenting the most important links between the main 18 accounts in each economy.

- Cluster 5: Huesca.

Figure 13. Landscape, Huesca 2007.



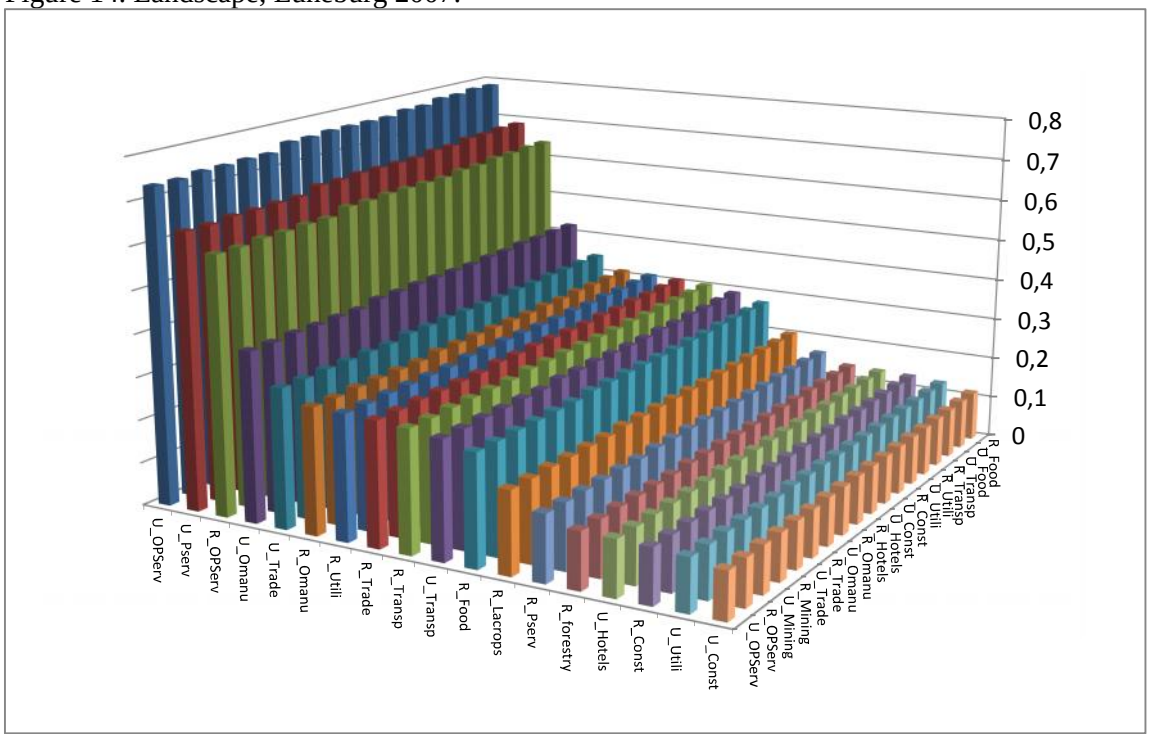
Source: Own elaboration.

In Figure 13 we can identify the most important sectors and linkages in the economy of Huesca (cluster 5) using structural path analysis. These sectors are Other manufacturing_Rural (11), Other private services_Rural (17) and Food industries_Rural (10). With this landscape, we can look for links between sectors; so, we can see that Other manufacturing_Rural (11) and

Construction_Rural (13) register the closest link because the highest forward linkage value corresponds to Other manufacturing_Rural (11) and the one for backward linkages is Construction_Rural (13).

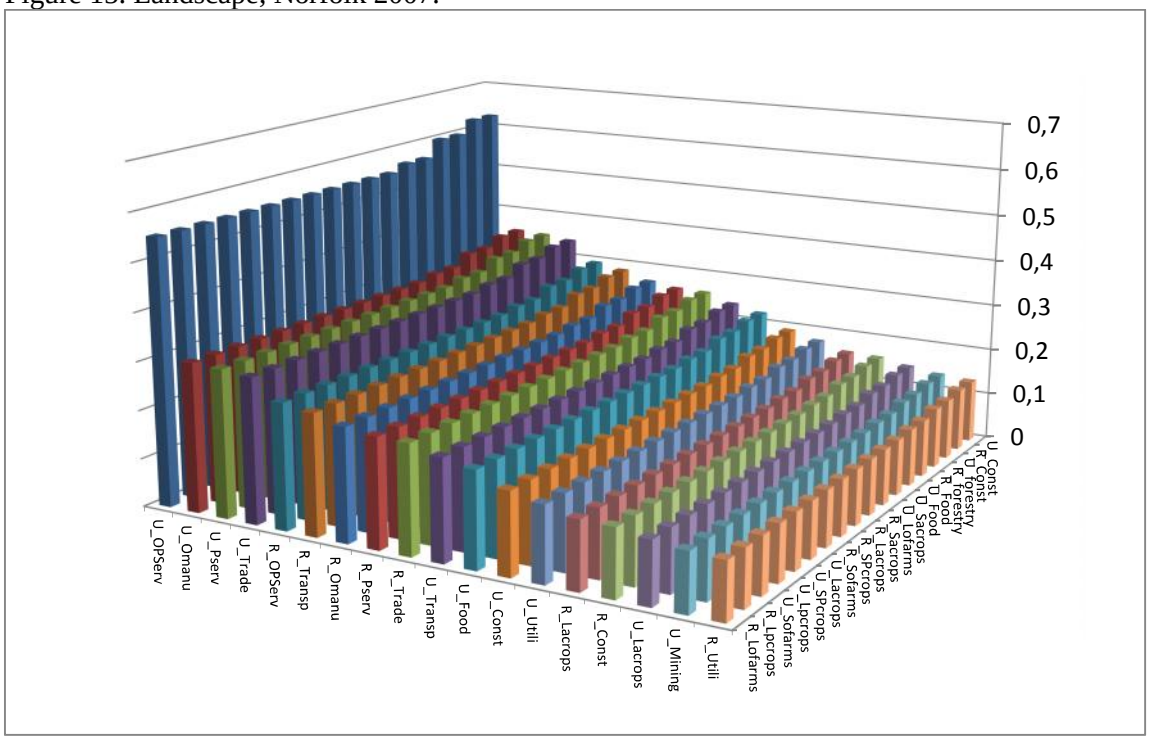
- Cluster 1: Lüneburg, Norfolk, Konstanz.

Figure 14. Landscape, Lüneburg 2007.



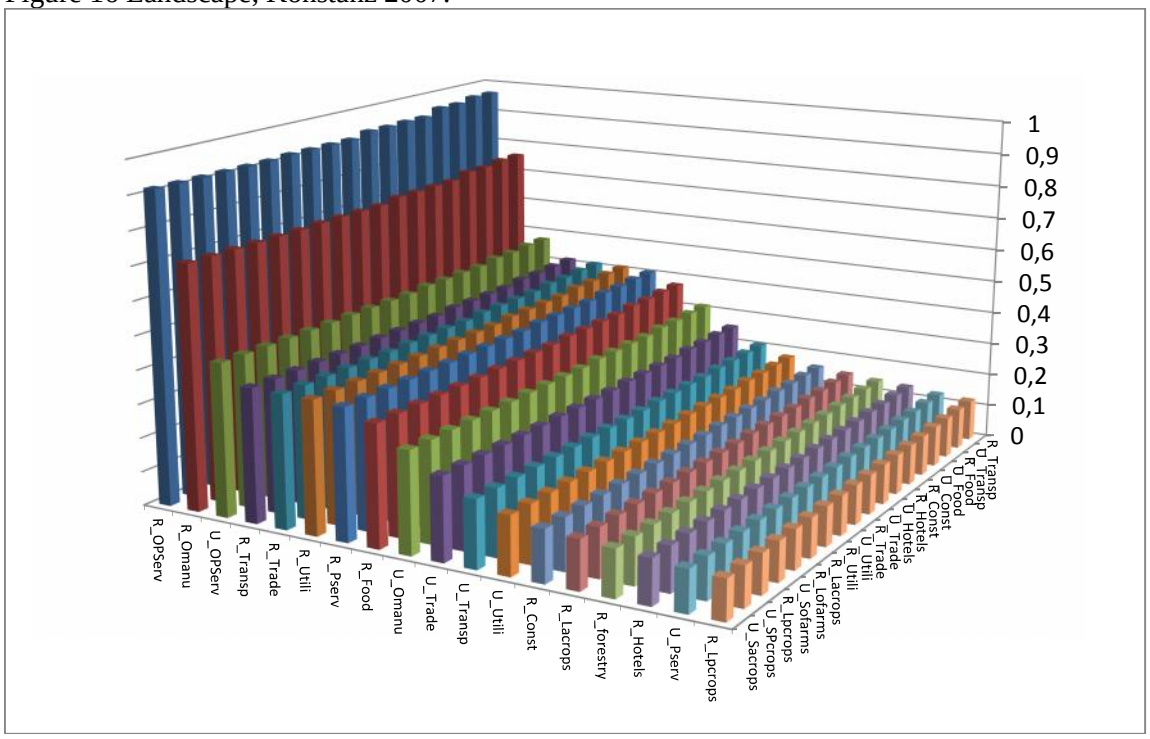
Source: Own elaboration.

Figure 15. Landscape, Norfolk 2007.



Source: Own elaboration.

Figure 16 Landscape, Konstanz 2007.



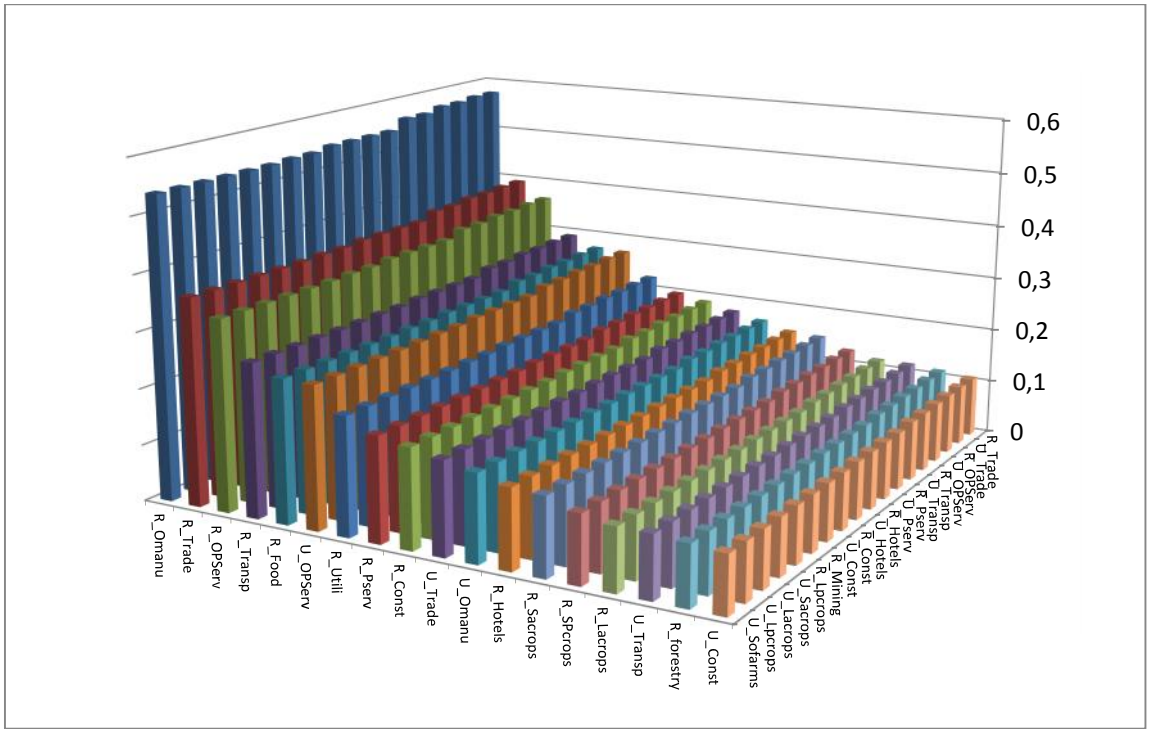
Source: Own elaboration.

Economic landscapes of cluster 1 are presented in Figure 14, 15 and 16. In Figure 14 for the Lüneburg economy, those sectors with higher importance in this region are: Other private services_Urban (35), Public services_Urban (36) and Other private services_Rural (17). With this landscape, we can detect the most important links among sectors. This way, Other private services_Urban (35) together with the sector Food industries_Rural (10) registers the most important linkages, because the greatest forward linkage value corresponds to sector 35 and the one for backward linkages is sector 10. In Figure 15 we can identify the most relevant sectors as well as linkages in the economy of Norfolk. Sectors with higher importance in this economy are Other private services_Urban (35), Other manufacturing_Urban (29) and Public services_Urban (36). Regarding the most significant linkages between sectors, we find that Other private services_Urban (35) and Construction_Urban (31) register the most important linkage. The highest forward linkage value corresponds to Other private services_Urban (35) and the one for backward linkages is Construction_Urban (31). In order to finish with cluster 1, Konstanz is represented in Figure 16. Sectors with higher importance in this economy are Other private services_Rural (17), Other manufacturing_Rural (11) and Other private services_Urban (35). With this landscape, we can detect the most important linkages between sectors: Other private services_Rural (17) and Transport and communication_Rural (16) register the most important link, as a result of the greatest forward and backward linkages.

Regarding this cluster, we can highlight that two sectors share leadership within these three regions: Other private services_Urban and Public services_Urban.

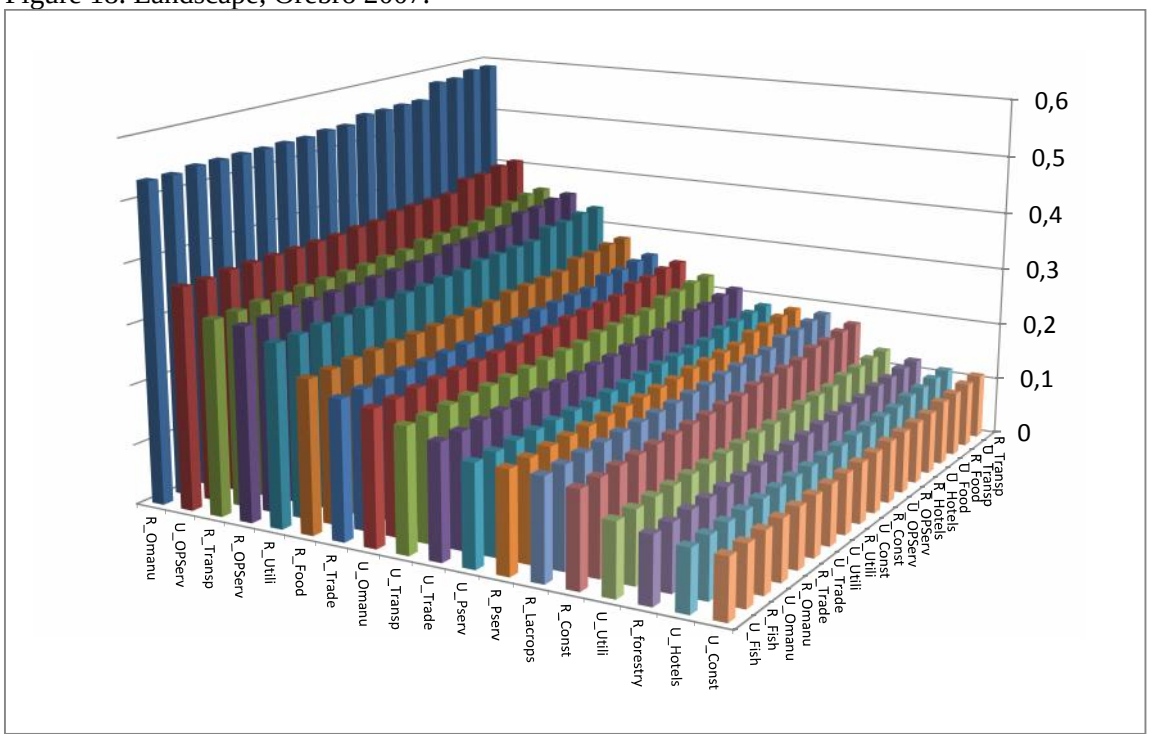
- Cluster 2: Gorejnska, Örebro, Noord Drenthe, Finistère.

Figure 17. Landscape, Gorenjska 2007.



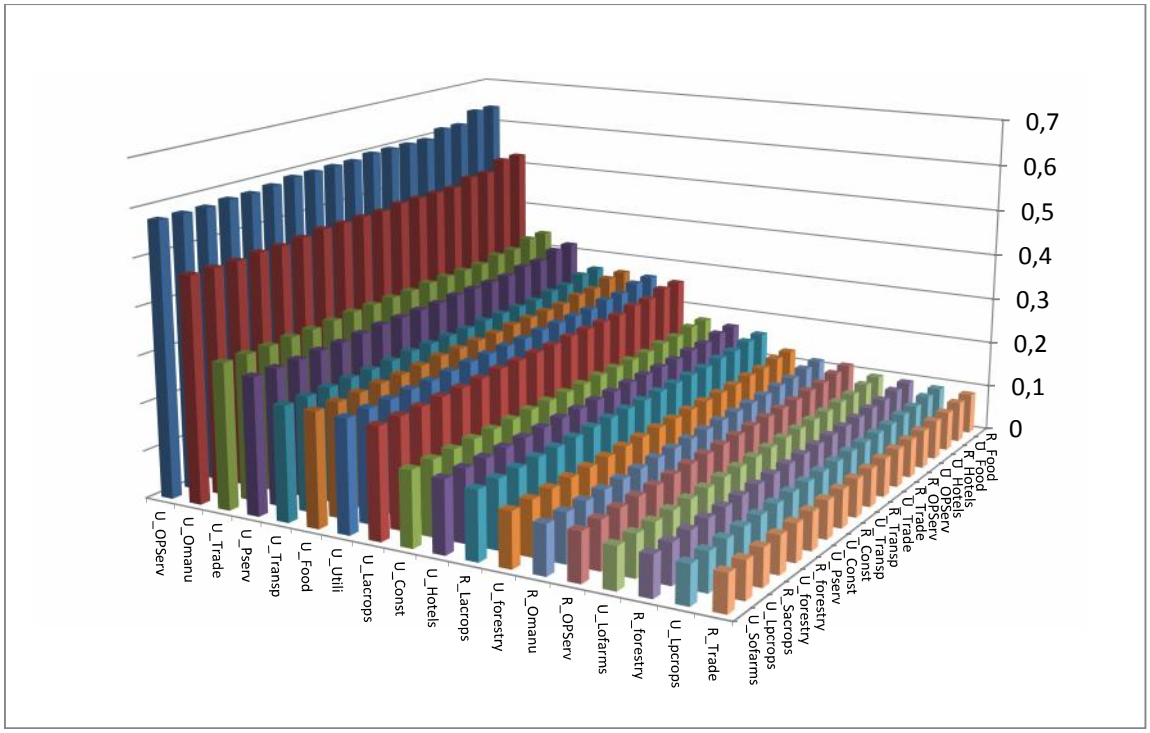
Source: Own elaboration.

Figure 18. Landscape, Örebro 2007.



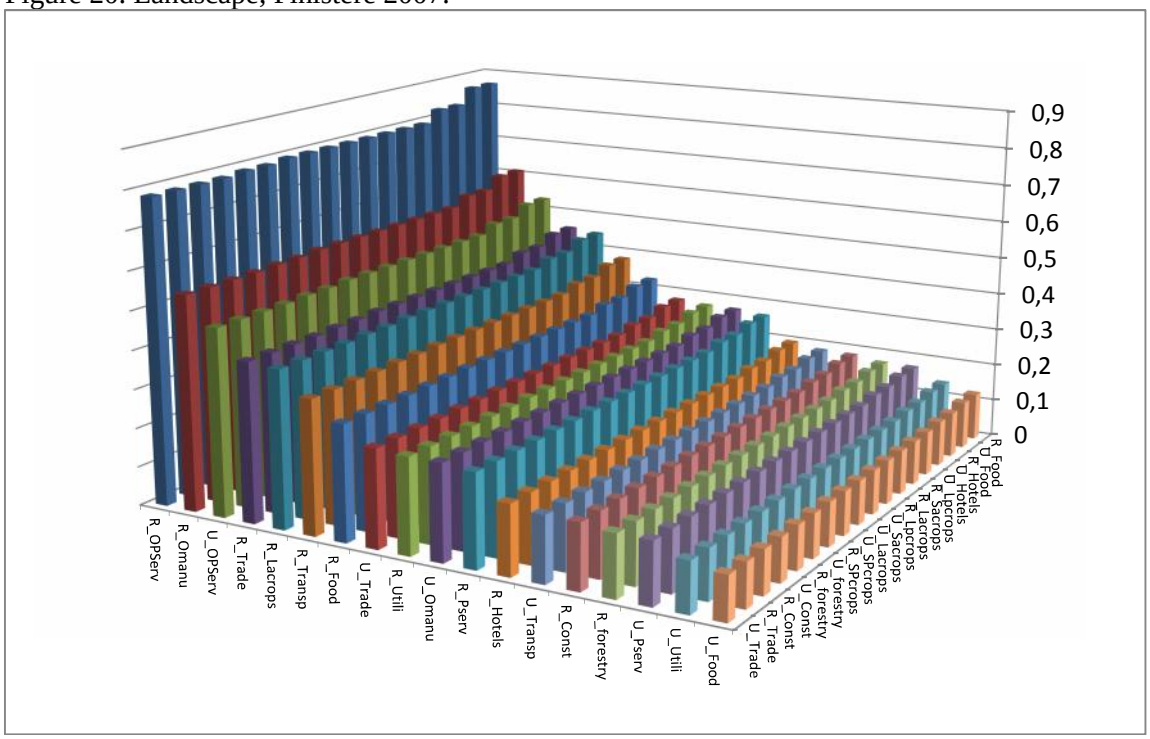
Source: Own elaboration.

Figure 19. Landscape, Noord Drenthe 2007.



Source: Own elaboration.

Figure 20. Landscape, Finistère 2007.



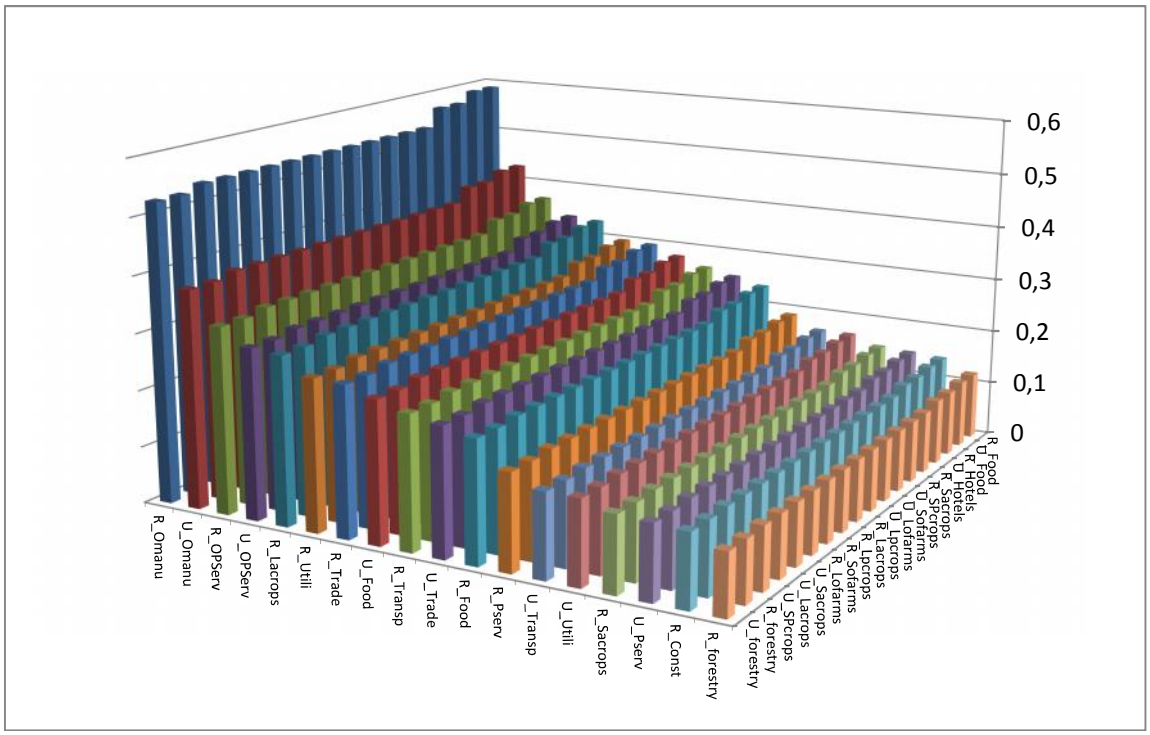
Source: Own elaboration.

Economic landscapes for cluster 2 are presented in Figure 17, 18, 19 and 20. In Figure 17 we can distinguish the most significant sectors and linkages in the economy of Gorenjska. Sectors with higher importance in this economy are Other manufacturing_Rural (11), Trade_Rural (14)

and Other private services_Rural (17). With this landscape, we can detect the most important linkages between sectors; so, we can see that Other manufacturing_Rural (11) and Trade_Rural (14) register the most important relationship. The highest forward linkage value corresponds to Other manufacturing_Rural (11) and the one for backward linkages is Trade_Rural (14). Figure 18 shows the information for Örebro. Sectors with higher importance in this economy are the following: Other manufacturing_Rural (11), Other private services_Urban (35) and Transport and communication_Rural (16). With this landscape, we can detect the most important linkage between sectors for Other manufacturing_Rural (11) and Transport and communication_Rural (16). Figure 19 stands for Noord Drenthe. The relevant sectors are Other private services_Urban (35), Other manufacturing_Urban (29) and Trade_Urban (32), as structural path analysis shows. The most important linkage between sectors corresponds with Other private services_Urban (35) and Food industries_Rural (10). In Figure 20, we have the case for Finistère. Sectors with higher importance in this economy are Other private services_Rural (17), Other manufacturing_Rural (11) and Other private services_Urban (35). With this landscape, the most important linkage between sectors can be found between Other private services_Rural (17) with Food industries_Rural (10).
As a summary for this cluster, we can distinguish some similarities regarding the classification of sectors, where three sectors are specially relevant: Other manufacturing_Rural, Other private services_Rural and Other private services_Urban.

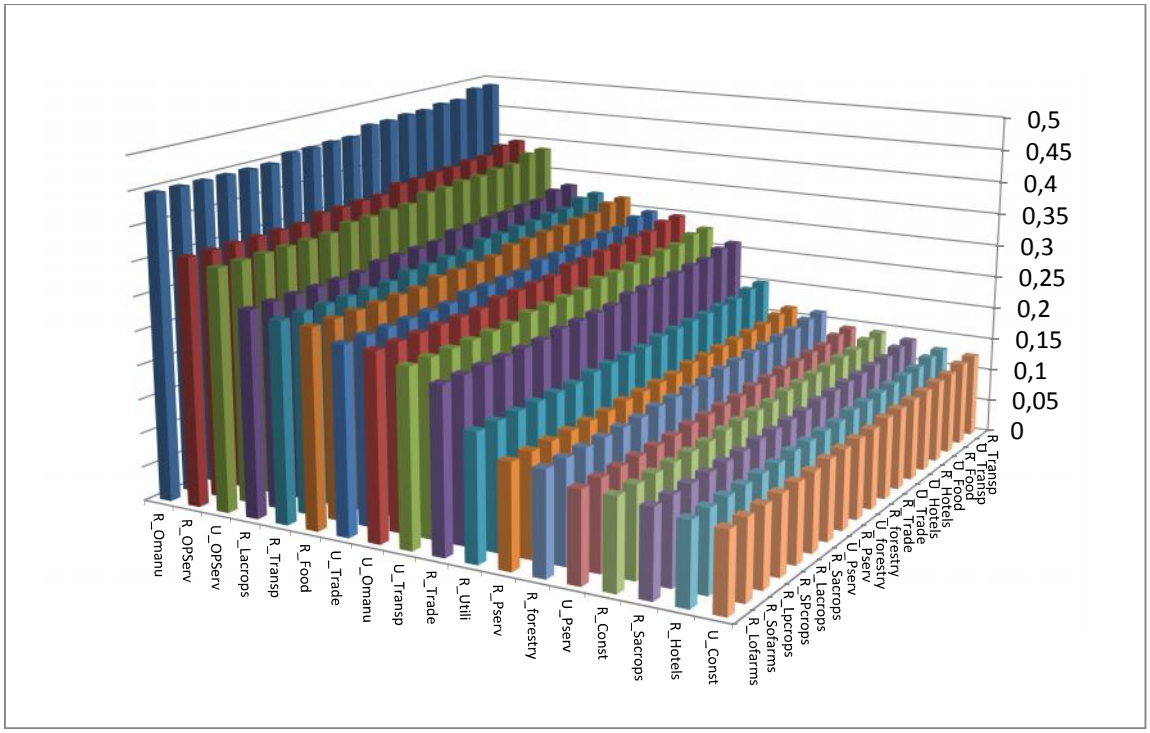
- Cluster 3: Heves, Lääne – Eesti, Slupski.

Figure 21. Landscape, Heves 2007.



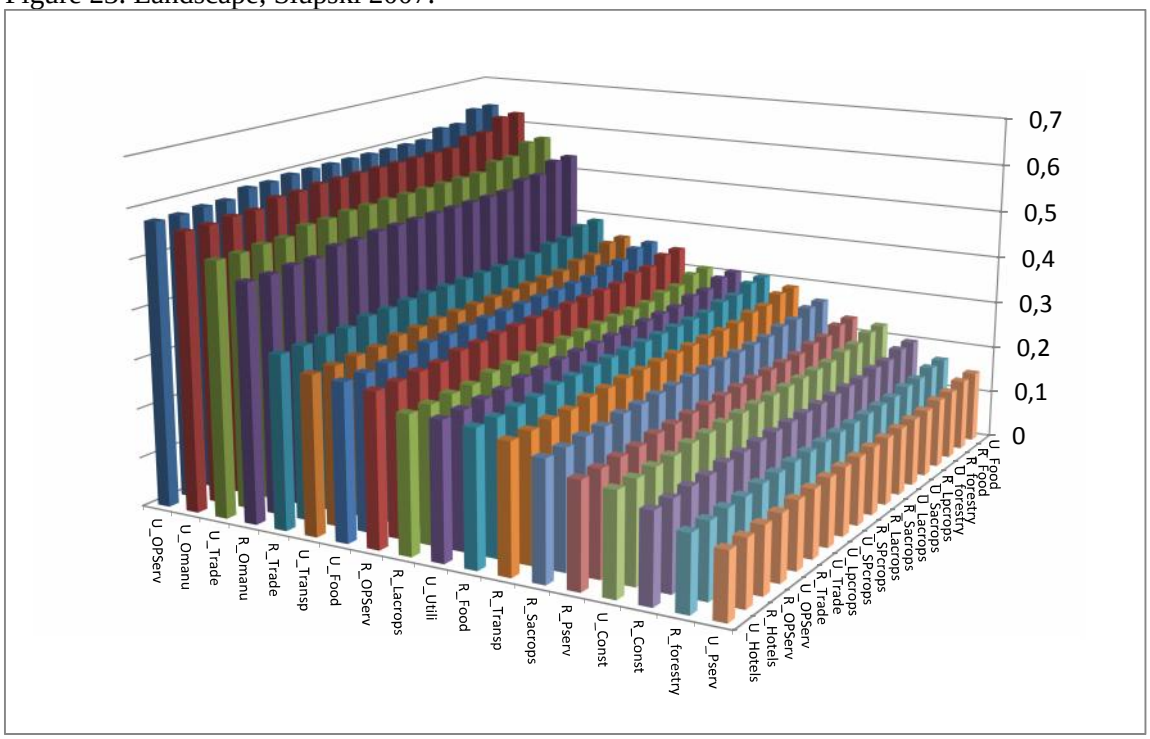
Source: Own elaboration.

Figure 22. Landscape, Lääne-Eesti 2007.



Source: Own elaboration.

Figure 23. Landscape, Slupski 2007.



Source: Own elaboration.

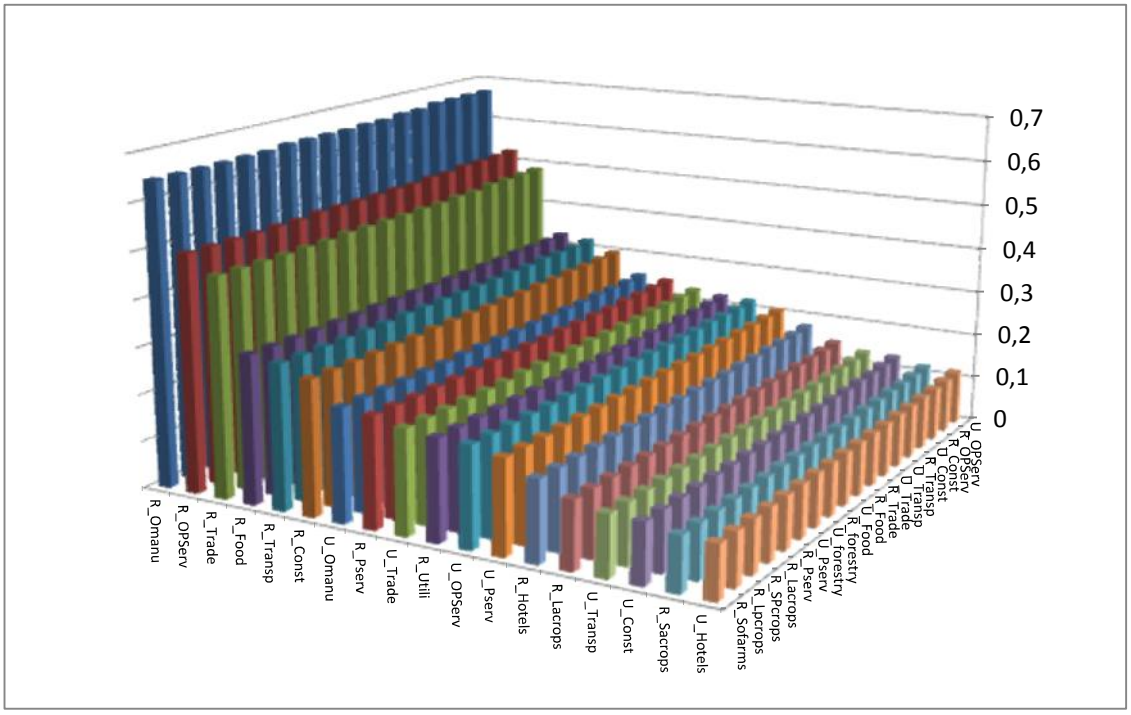
Economic landscapes of cluster 3 are presented in Figure 21, 22 and 23. Figure 21 shows the most important sectors and the most important linkages in the economy of Heves. Sectors with higher importance in this economy are Other manufacturing_Rural (11), Other

manufacturing_Urban (29) and Other private services_Rural (17). With this landscape, we can detect the most important linkages for Other manufacturing_Rural (11) and Food industries_Rural (10). In Figure 22 we study the case of Lääne-Eesti. Sectors with higher importance in this region are Other manufacturing_Rural (11), Other private services_Rural (17) and Other private services_Urban (35). The sectors Other manufacturing_Rural (11) and Transport and communication_Rural (16) show the highest linkage. In Figure 23 we can identify the relevant sectors for Slupski, following structural path analysis methodology. Sectors with higher importance in this economy are: Other private services_Urban (35), Other manufacturing_Urban (29) and Trade_Urban (32). Other private services_Urban (35) is linked with Food industries_Urban (28).

Finally, in cluster 3 some similarities can be found, being the most relevant sectors: Other manufacturing_Rural, Other private services_Rural and Other private services_Urban.

- Cluster 6: Setúbal.

Figure 24. Landscape, Setúbal 2007.



Source: Own elaboration.

In Figure 24 we can identify the most important sectors and the most important linkages in the economy of Setúbal (cluster 6). Sectors with higher importance following this methodology are Other manufacturing_Rural (11), Other private services_Rural (17) and Trade_Rural (14). With this landscape, we can detect the most important links between sectors; so, we can see that Other manufacturing_Rural (11) and Other private services_Urban (35) register the most important link. The highest forward linkage value corresponds to Other manufacturing_Rural (11) and the one for backward linkages is Other private services_Urban (35).

4. Conclusions

In this research we have worked with previously designed rural-urban NUTS3 SAM for a selection of regions within the EU. Ought to the huge data involved in the whole procedure, we have designed and interpreted the databases and policy shocks from a cluster's perspective, trying to detect similarities or differences within the cluster environment.

Our contribution has consisted of applying two well-known methodological approaches such as key sectors analysis and landscape analysis and a significant battery of results has been outlined. Our results show that clusters perspective provides a more comprehensive analysis of regional patterns that can be useful as a tool for policy analysis, especially for ex-ante and ex-post policy evaluation.

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