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Dynamics of the Comparative Advantages in Romanian Exports Compared to the European Union

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Abstract

The main objective of this paper is to prove if the dynamics of the comparative advantages in Romania in the period of time 2000-2011 has any convergence potential and if the specialization of production capacities has suffered modifications. For the study of the comparative advantage dynamics in Romanian exports compared to the European Union in the period of time 2000-2011, we analysed the modifications in the structure of the sections included in the Combined Nomenclature for national exports and we calculeted the Balassa and the Dalum indexes. In order to emphasize the convergence and the stability in time of the export structure we used the econometric tools specific to the regression analysis.

Keywords: export; comparative advantages; Balassa index; Dalum index.

1. Introduction

The evaluation of the dynamics of comparative advantages in Romanian exports compared to the European Union is an important part of the diagnosis for a national economy which is in an intensive process of real integration in the economical structures of the European Union, and of increasing involvement in the international trade.

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2. Short methodological presentation

For this analysis we started from the ***data base*** in which ***the export trade flow*** in the period of time 2000-2011 is represented by the 19 sections in the *Combined Nomenclature* (CN). This database was created after studying the matrix EU27 Trade Since 1988 By CN8 on the server *Traditional external trade database access (ComExt)*existing on the official site of the Statistical Office of the European Union, Eurostat, (http://epp.eurostat.ec.europa.eu). *The total value of the export trade on the level of the EU-27 was reached by adding the data in the statistical systems Intrastat (*for the Intra-EU trade – data gathered by the statistics offices in each country*) and Extrastat (*for the Extra-EU trade – data gathered from the customs declarations).

In order to assess the degree of specialization of trade and the comparative advantages in exports (Iapadre, 2001), we used the following 2 indicators:

- the Balassa index for specialization (Balassa, 1965), known in the literature as the RCA (***revealed comparative advantage***) index, is determined by reporting the share of a product in the total trade flow to the share of the same product in the total trade flow for a certain area. Consequently, ***the degree of export specialization*** is determined by the following formula:

$$RCA_i = \frac{x_i / X}{\sum x_i / \sum X}$$

Where: x_i= exports of product *i* in Romania

X= total exports in Romania

Σx_i= exports of product *i* in EU-27

ΣX= total exports in EU-27

As the analysis of the specialization processes refers to Romania and the data concerning the international trade which we have used are classified on sections *(i)* of the CN, then $i \in \{1,\ldots, 19\}$.

- *the index suggested by****Dalum,Laursen and Villumsen***,(Dalum, Laursen and Villumsen, 1998) named RSCA (***revealed symmetric comparative advantage***). *It is an enhanced formula of the Balassa index* and it clearly expresses the comparative advantage and disadvantage respectively in the exports or the imports of a product in a certain area, as this new indicator has values between -1 and 1, and it is positive when the area has comparative advantage in the exports or disadvantage in the imports, or it is negative when there is disadvantage in exports and advantage in imports respectively.

The indicator is determined by the following formula:

$$RSCA_i = \frac{RCA_i - 1}{RCA_i + 1}$$

Where: RCA_j = value of the Balassa index for product *i* in Romania

$i \in \{1,\ldots, 19\}$

3. Assessment of the comparative advantages of Romania over the European Union

In Romania, during the last 3 years, the highest percentage – over 25,0% - in the **structure of the exports on sections listed in the Combined Nomenclature (CN)** was that of the section „Machines, devices and electrical equipment; machines for recording sound and picture and reader machines". Since this section has great percentage in the total exports, we can say that the Romanian economy has specialised its production capacities in manufacturing such products. According to figure 1, 27,0% of Romanian exports in 2011 are products listed in this section, and Romania specialized in manufacturing machines and electrical devices, particularly during the last 6 years, since during the first years this sections had low percentages in the total exports. A different phenomenon occurred in the European Union where, during the period subjected to the analysis, the percentage of these products in the European exports remained approximately constant (from 28,7% in 2000 to 23,6% in 2011).

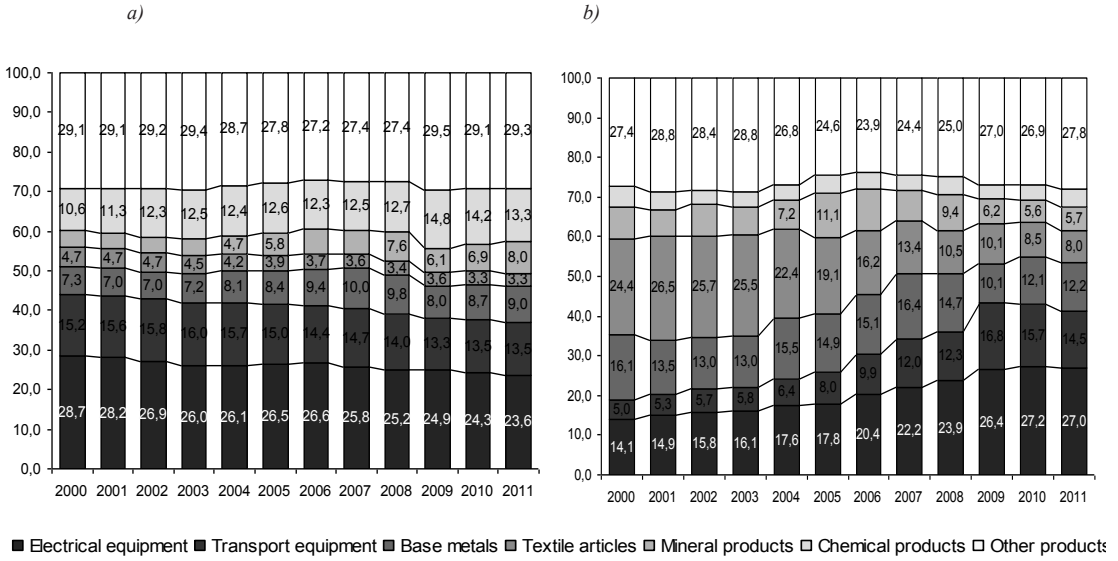


Figure 1. Percentage of the exports for the main sections listed in the CN during the period 2000-2011 (%);
a) The European Union (EU-27); b) Romania
Source: personal processing of the Eurostat data

Other sections with significant percentages in the total exports in Romania and in the European Union are:

- „*Means of transport*" – The percentage of exports due to the specialization in manufacturing these products has increased dramatically in Romania (from 5,0% in 2000 to 14,5% in 2011) compared to the slight decrease registered on the level of the European Union (from 15,2% in 2000 to 13,5% in 2011);
- *" Common metals and articles made of these metals"* - The percentage of exports slightly decrease in Romania (from 16,1% in 2000 to 12,2% in 2011), while on the level of the European Union we noticed a slight increase (from 7,3% in 2000 to 9,0% in 2011);
- " *Textile fabrics and textile products*" - The percentage of exports has decreased dramatically (from 24,4% in 2000 to 8,0% in 2011) due to the despecialization of the production capacities for manufacturing such products in Romania, while on the level of the European Union the percentage of these products in the total exports is very low, the decreasing trend in specialization being visible on this level as well (from 4,7% in 2000 to 3,3% in 2011).

In order to assess the export specialization phenomenon for each section included in the Combined Nomenclature, we calculated for Romania the Balassa specialization index reported to the EU-27. It is determined by reporting the percentage of product exports in the total national exports to the percentage of the product exports in the European Union. The indicator has positive values, being higher than 1, when the economy has a great degree of specialization in manufacturing that product, the country's percentage on the external market for that product being in this case higher than the average calculated on European level. Consequently, the index calculated on the level of the national economy is influenced by the specialization processes pertaining to other European economies.

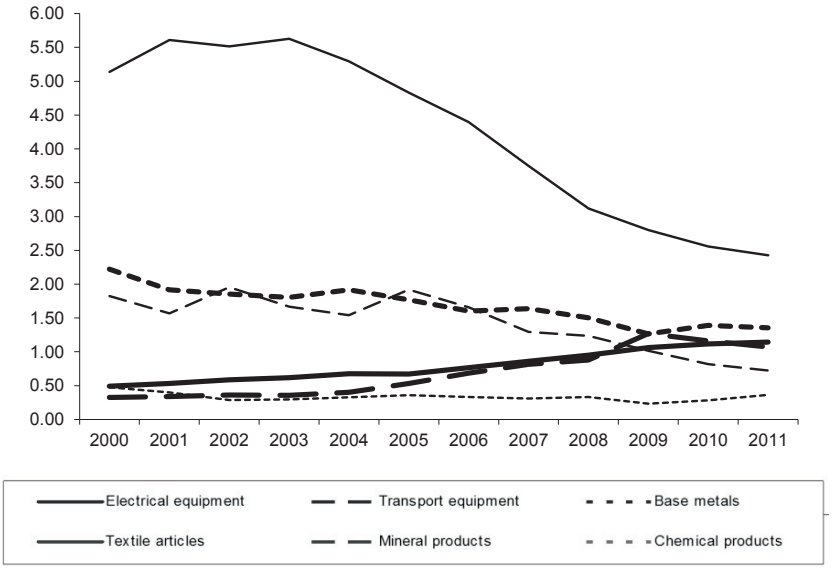


Figure 2. Evolution of the national Balassa indexes of specialization - reported to EU-27 – for the export on the main sections included in the CN in the period 2000-2011 / Source: personal processing of the Eurostat data

For the sections which have the highest percentages in the national exports, *Romania has a high specialization level* and consequently it has significant comparative advantages over the European Union in the *export of textile products* during the whole period subjected to the analysis. However, after 2003 Romania loses some of these comparative advantages in exports (from 5,63 in 2003 to 2,43 in 2011) [figure 2]. On the other hand, *the export of electrical equipment and means of transport* has brought Romania increasing comparative advantages over the European Union, especially during the last 3 years – from 1,06 and 1,27 respectively in 2009 to 1,14 and 1,07 respectively in 2011. Another section which has comparative advantages over the European Union during the whole period subjected to the analysis is the section *"Common metals and articles made of these metals"*. The specialization in manufacturing metal products is a tradition of the Romanian economy, since the degree of specialization remains *approximately constant* (around 1,50) during the last years.

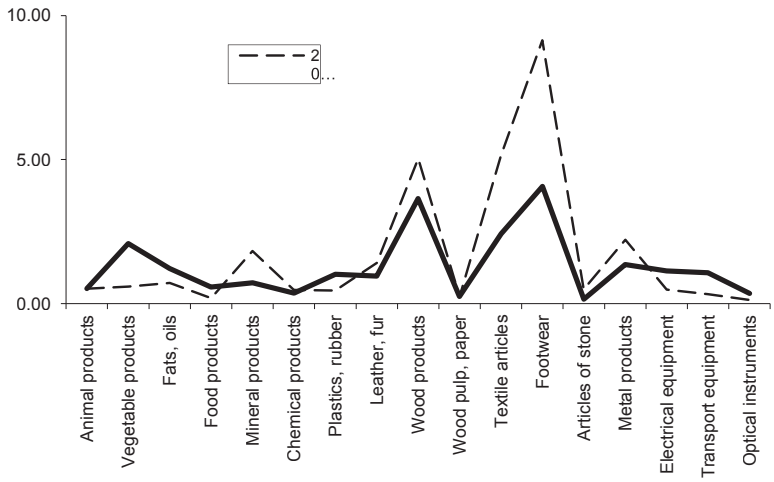


Figure 3. Evolution of the national Balassa indexes of specialization - reported to EU-27 – for the export on each section included in the CN in the period 2000-2011 / Source: personal processing of the Eurostat data

As we can notice in figure 3, *the highest degree of exports specializationis registered in footwear*, which means that the national economy has significant comparative advantages over the European Union in manufacturing these products; however, these advantages do not have great contribution to the country's economic growth, since they have low percentages in the total exports (7,6% in 2000 and 3,0% in 2011). Just as in the case of the textile products, *the Romanian production capacities have despecialized* in manufacturing footwear, thus losing during the last 11 years some of the important comparative advantages registered at the beginning of the period (from 9,14 in 2000 to 4,07 in 2011). Other goods which have *great comparative advantages* over the EU-27 belong to the section *"Wood and cork products"*. Although Romania has a high degree of specialization remaining *approximately constant* during all the period of time subjected to the analysis, the values of the Balassa indexes varying around the value of 4,00, the importance of these comparative advantages in the national exports is rather small (the percentage of this section in the total exports being of only 4,0%).

In order to complete the analysis of the specialization phenomenon for exports reported to the European Union, it is necessary ***to assess the comparative advantages or disadvantages over the European Union on each type of exported goods***. In order to show the comparative advantage for the export of a certain product, we calculated the ***specialization index used by Dalum*** (which is an enhanced formula of the Balassa index). It is calculated by reporting the difference and the sum between the Balassa index and 1. The indicator has values between -1 and 1 and it is positive when the national economy has a comparative advantage in that product. Consequently, this index is influenced by the specialization processes of other economies.

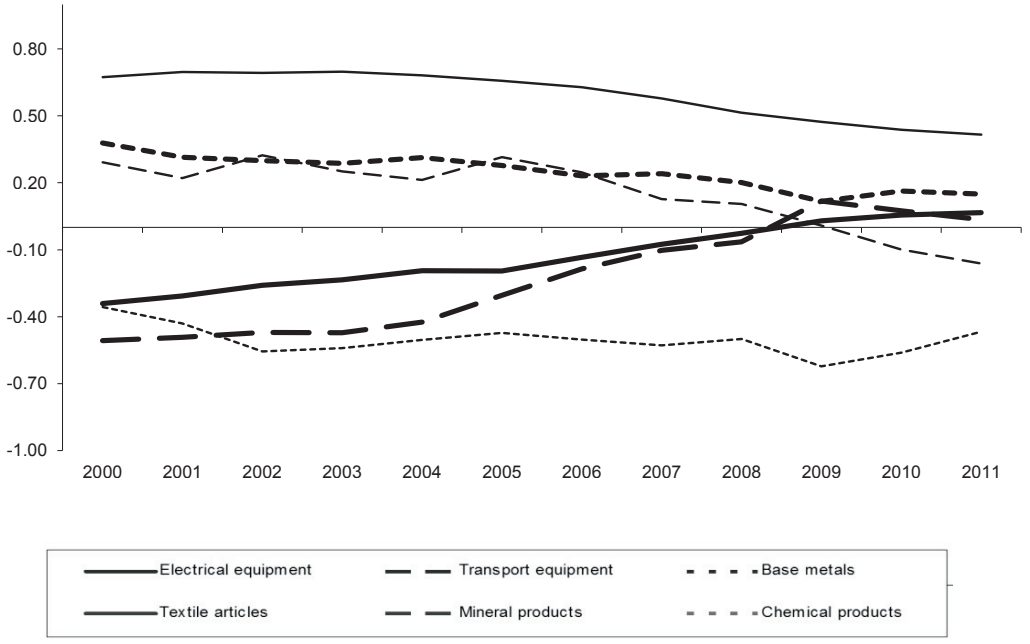


Figure 4. Evolution of the national Dalum indexes of specialization - reported to EU-27 – for the export of the main sections included in the CN in the period 2000-2011
Source: personal processing of the Eurostat data

For the main sections presented above, where there are high percentages in the national exports, Romania has great comparative advantages over the European Union in the export of textile products during the whole period subjected to the analysis; however, these comparative advantages in exports decrease after 2003 from 0,70 to 0,42 in 2011 [figure 4]. Other sections with comparative advantages over the European Union, especially during the first years, were the sections: "Common metals and articles made of these metals" and "Mineral products". The specialization of the production capacities in manufacturing metal products shows certain stability in the Romanian economy;

consequently, the advantages are approximately constant during the last years, while the despecialization in manufacturing mineral products led to a significant loss of the export advantages, even to comparative disadvantages starting in 2010. On the other hand, the export of electrical equipment and means of transport brings Romania increasing comparative advantages starting in 2009.

In figure 5 we can also notice the fact that, out of the 17 sections of the CN analyzed in graphic, Romania has comparative advantages over the European Union in 9 of them in 2011, while in 2000 there were comparative advantages only in 6 of the sections. During the whole period of time subjected to the analysis there were comparative advantages for exports in: wood products, textile fabrics, footwear and metal products, while vegetal products, oils, plastics, electrical devices and means of transport brought our national economy comparative advantages for export only during the last years. The increase in the degree of specialization in manufacturing these products turned the disadvantages recorded at the beginning of the period into advantages. On the other hand, during the 11 years analyzed there were also products such as food, chemicals, wood paste, stone products and optical devices the exports of which registered great comparative disadvantages compared to the average of the European Union.

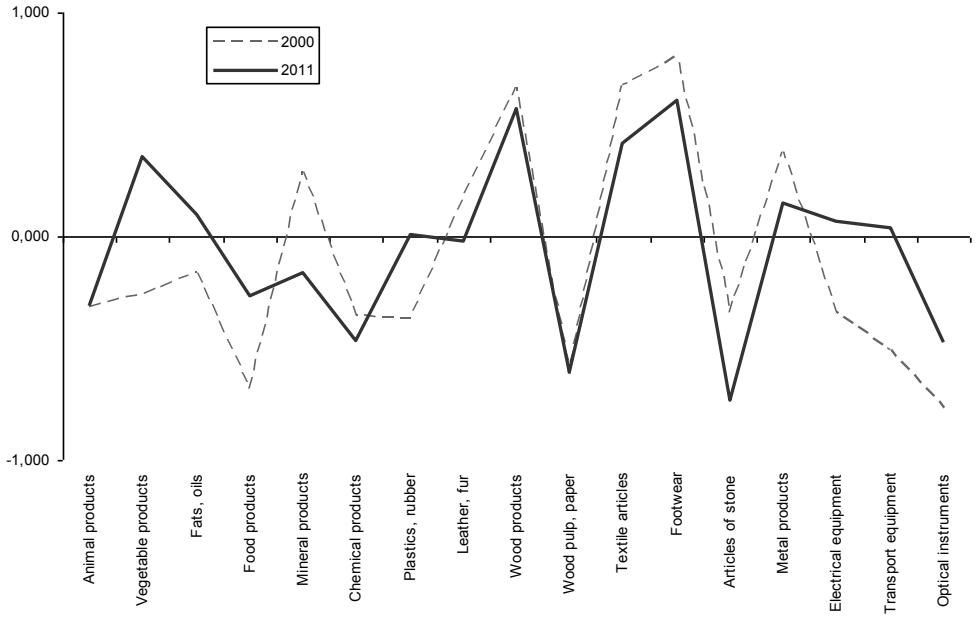


Figure 5.
Evolution of the national Dalum specialization indexes – reported to the EU-27 for the export on each section in the CN from 2000 to 2011
Source: personal processing of the Eurostat data

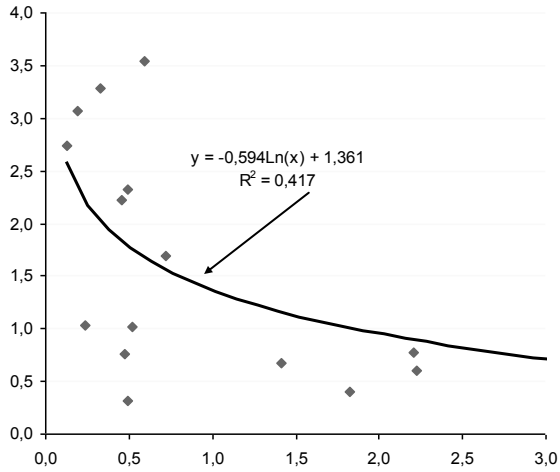
4. Dynamics of the comparative advantages of Romania over the European Union

Identifying the connection between the national Balassa *indexes* reported to EU-27, calculated on each section of the CN for 2000 and their *dynamics* in 2011 compared to 2000 offer important information concerning the process of ***convergence*** (Hallet, 2000) ***over EU-27 of the Romanian exports specialization***. In *the regression function* and in the correlogram respectively, the independent variable represents the *values of the Balassa indexes over the EU-27, calculated for the exports on each section in the CN* for 2000, and the dependant variable shows the dynamic of these indexes in 2011 comparatively to 2000 (2000=100%).

The regression function has the following form:

$$RCAe\text{-}_{UE\text{-}27\text{-}2011/2000} = f\,(RCAe\text{-}_{UE\text{-}27\text{-}2000})$$

Where:
$RCAe\text{-}_{UE\text{-}27\text{-}2011/2000}$ = dynamic of the Balassa index over EU-27 in 2011 compared to 2000
$RCAe\text{-}_{UE\text{-}27\text{-}2000}$ = Balassa indexes compared to EU-27 in 2000.



Logarithmic

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,646	,417	,381	,873

The independent variable is Balassa Index for 2000.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	8,728	1	8,728	11,453	,004
Residual	12,193	16	,762		
Total	20,921	17			

The independent variable is Balassa Index for 2000.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
ln(Balassa Index for 2000)	-,594	,175	-,646	-3,384	,004
(Constant)	1,361	,207		6,559	,000

Figure 6. Correlogram and results in SPSS between the national Balassa indexes reported to EU-27 for exports, on each section of the CN in 2000 and their dynamics in 2011 compared to 2000
Source: personal processing of the Eurostat data

According to figure 6, there is a certain interdependence between the two indexes, as the logarithmic connection has low intensity (*the degree of exports specialization determines its dynamics in proportion of 41,7%*). Consequently, *on the level of sections in the CN, there is a medium-intensity convergence of the degree of specialisation for exports in Romania compared to the specialization existing in the European Union* (the lower the degree of specialisation for exports on a certain section in 2000, the higher its dynamics during the period of time subjected to the analysis).

The linear regression equation where the dependent variable represents the values of the Dalum index for exports, and not the value of the Balassa index as Guerrieri P. and Iammarino S. had used (Guerrieri P., Iammarino S., 2007) at the end of the period (2011) and the independent variable represents the values of the same indexs, calculated compared to the EU-27 at the beginning of the period analyzed (2000), offers information about ***the stability in time of the comparative advantages in the specialization processes for exports.***

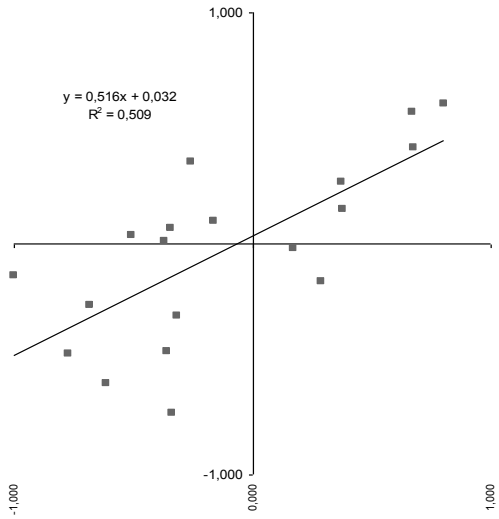
The regression equation has the following form:

$DLe\text{-}_{UE\text{-}27\text{-}2011} = \alpha + \beta\, DLe\text{-}_{UE\text{-}27\text{-}2001} + \varepsilon$

Where: $DLe\text{-}_{UE\text{-}27\text{-}2011}$ and $DLe\text{-}_{UE\text{-}27\text{-}2011}$ = Dalum indexes compared to EU-27 for 2011 and 2000
α and β = parameters of the linear regression equation
ε = residual error

According to the regression parameter (β) *the interpretation of the results* can be done as follows (Zaghini, 2003):

- β is *lower than zero* – the specialization processes for exports *were reversed compared to EU-27*
- β is *equal to 1* - the specialization processes for export *did not suffer any modifications* compared to EU-27;
- β is *between 0 and 1 - on average the specialization processes for exports remained the same* - thus occurring a process of convergence to the EU-27;
- β is *higher than 1 - the specialization for exports increased* or decreased respectively for those products *where there was already an advantage or a disadvantage*- thus occurring a process of divergence from the EU-27;



Linear

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
,714	,509	,480	,276

The independent variable is Dalum Index for 2000.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1,343	1	1,343	17,638	,001
Residual	1,294	17	,076		
Total	2,636	18			

The independent variable is Dalum Index for 2000.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Dalum Index for 2000	,516	,123	,714	4,200	,001
(Constant)	,032	,065		,489	,631

Figure 7. Correlogram and SPSS results between the national Dalum indexes of specialization for export reported to EU-27, on each section in the CN for 2000 and 2011
Source: personal processing of the Eurostat data

According to figure 7, *the export specialization processes in Romania remained the same on average* during the period of time 2000-2011, since the regression parameter is between 0 and 1 ($\beta=0,52$), but the average values of the regression parameter and the correlation report ($R=0,71$) show the fact that there were however *slight changes in the structure of the comparative advantage distribution for the nation export compared to EU-27*. Since the parameter of the regression equation is lower than the correlation report, we can state that in Romania, although on the whole *there is a slight decrease in the export specialization compared to EU-27, in the structure of the comparative advantage distribution there are however certain changes (the mobility effect of the structure compensates for the regression effect*). In other words, the production capacities in Romania *specialized slightly in the fields in which the first years they were less specialized and despecialized in manufacturing products in which they were initially specialized*.

5. Conclusions

In Romania, onthe level of the sections listed in the Combined Nomenclature, ***the dynamics of the export specialization processes registered a medium-intensity process of convergence*** compared to the average value of the European Union.Although in 2011, compared to 2000, there is a slight decrease compared to EU-27 in the export specialization, ***in the structure of the comparative advantage distribution there were,*** however, slight ***modifications***. One of the main causes of this slight decrease in the degree of specialization for exports could be ***the decrease of specialization in manufacturing textile products***, decrease which could not be compensated by *the increase of the degree of specialization in manufacturing electrical devices and means of transport*. Consequently, during the last 11 years, Romania ***passed from comparative disadvantages to advantages over the EU-27*** in the export of *electrical devices and means of transport*, while the section "*Textile fabrics and textile products*" still brings significant (although decreasing) comparative advantages for exports.

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