

# Sectoral Specialization and Export Orientation of European Union Countries and Regions in the Period of Crisis

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**Abstract** - In this study sectoral specialization of European Union countries and regions in the current period of crisis is analyzed. As a result, groups of countries shall emerge based on which the real developmental archetypes of European space will be shaped. The distinction does not lie on the traditional axis (of favored) North – (less favored) South, but mainly, on the under configuration axis (of favored) West – (less favored) East. As a result, the regions of Europe that specialize in dynamic sectors of economic activity shall be located. These regions demonstrate comparative advantages, which give rise to export capacities as well. Moreover the intertemporal analysis of indicators shall exhibit the great contribution of sectoral composition in relation to the general socioeconomic basis along with the structural characteristics of countries and regions, which are fundamental for the developmental process.

**Keywords** – *Economic crisis; Productive sector; Productive specialization; Regional policy; Development; Employment.*

## 1. Introduction

The enactment of economic policy and theory in recent years almost exclusively with the monetary dimension of the economy and the projection of fiscal and financial sizes has rendered of secondary interest the investigation of the real

economic variables, such as production, employment, consumption and investments. This is due to the prevalent theoretical approach of financial problems along with the dominant consideration of European Union bodies. The consequence of such a disproportional tendency was the displacement of the relevant policy activity towards the means and not the aims of the economy. This results in the inability of the economic system to target at real needs and abilities of countries and supranational organizations and to the satisfaction of societal needs.

In order to improve this lopsided growth, the current paper examines in a quantitative manner the sectoral structure of productive activity in the European Union countries and regions in the recent years of crisis, namely 2008 and 2013 respectively. By the year 2013 the severe consequences of financial crisis in Europe were already prevalent. Therefore, the time dimension examined does not affect the results of the study in a significant way. Also, it should be noted that the contribution of individual sectors to total economic activity is not of equal importance to all country members and

regions of the European Union. As a result, spatial distribution of the associated activities in the map of Europe shall be examined. Moreover, thematic maps depicting the schematization of countries and/or wider areas with intensive activity in each of the examined economic sectors are used. This analysis is conducted in order to investigate the existence of sectoral specialization and as a result the fundamental sectors of economic activity as far as the countries and regions of Europe are concerned, which display great export potential. Based on these results, strategies of economic development will be extracted with a main focus on the regional dimension. As a consequence, the analysis could be extended on the basis of a more optimistic scenario concerning the future of Europe, which could promote a unified regional policy framework.

Based on the preceding analysis, regions of Europe shall be located that are specialized in dynamic sectors of economic activity and, as a result, have a comparative advantage over the others. Therefore, groups of countries shall emerge on the grounds of sectors that are developed and specialized. In this way, (“fair”) exchange relationships between different groups of countries shall be determined. Besides, it is well known that distinct sectors of economic activity, independent of their real value and significance, do not have equivalent exchange value, such as the Industrial against Agricultural production. In other words, terms of trade between different sectors of economic activity are not static, but on the contrary dynamic, which is a fact that should not be ignored by policy makers.

Moreover, the study of the years 2008 and 2013 respectively permits to locate the transitions of productive activity in the economic map of Europe because of the financial crisis. In addition, restructuring of economic activity affects significantly the configuration of contemporary economic phenomena. Furthermore, based on the grouping of countries useful results shall emerge concerning the developmental archetypes of European space. According to this study, the aforementioned discrimination does not lie on the traditional axis (of favored) North – (less favored) South, but on the under configuration axis (of favored) West – (less favored) East. It should be pointed out that as far as the examined countries and regions are concerned, the term “favored” is

used instead of the term “developed”, which is mostly prevalent in the relevant empirical and theoretical research. This is attributed to the fact that over the course of the past decades central interfering policies at the European level have been recorded that privileged or not the evolution of specific economic sectors. Therefore, these policies have determined up to a degree the distribution of sectoral productivity in the European space.

The comparative analysis of the indicators shall give prominence to probable differentiations in sectoral structure of European countries and regions as the result of the financial crisis. In this way, the study could potentially contribute to the adoption of effective policies regarding this aspect. So, it will be proved that financial crises may act as mechanisms of redistributing economic activities and as a result income between countries and regions of Europe. Therefore, it emerges that the broader significance of sectoral specialization is related to the general socioeconomic environment and the structural characteristics of the examined countries and regions. These conclusions may also be applied on a more general framework. In effect, the advancement of agricultural, industrial or services sector is related to the general socioeconomic status as well as the level of social and economic development of the countries examined.

## **2. Sectoral structure of economic activity**

The distinction of production is necessary in order to understand the factors that contribute to the development of individual economic sectors (Vavouras 2008, p. 30). Based on this criterion, economic activity is categorized in the primary, secondary and tertiary sector of production (Fisher 1939, p. 24). Primary production consists of goods that people may obtain directly from nature, such as agriculture, forestry and fishing. Primary sector provides the raw material that is necessary for the development of secondary and tertiary sector of production. Secondary production refers to products that are the result of processing of raw material of primary production, such as industry and construction. Tertiary sector consists of the production of immaterial goods that satisfy human needs through the provision of services. This category comprises of trade, transport, tourism,

financial transactions and state provision, among others. The above mentioned categories are further classified into sectors so as to analyze structural characteristics of productive activity.

It should be noted that the issue of sectoral classifications is very complex and the national modulation proves to be difficult (Rontos 1994, p. 1). Nevertheless, for the purposes of the current study the classification of productive sectors is in line with the generalized archetypes of Statistical Classification of economic activities in the European Community (NACE)<sup>1</sup>. More specifically, the last revised version of the aforementioned classification is employed. Within this framework of analysis, it should be noted that NACE classification is legally safeguarded in European Union countries, so as to comply with uniformity in its application. The codification of productive sectors in one-digit form along with the basic activities included in each one of them is presented in table 1 that follows.

**Table 1.** Classification of economic activities in the European Community

<b>A</b>	Agriculture, forestry and fishing
<b>B-E</b>	Manufacturing
<b>F</b>	Construction
<b>G-I</b>	Wholesale and retail trade, transportation and storage, accommodation and food service activities
<b>J</b>	Information and communication
<b>K</b>	Financial and insurance activities
<b>L</b>	Real estate activities
<b>M-N</b>	Professional, scientific and technical activities, administrative and support service activities
<b>O-Q</b>	Public administration and defense, compulsory social security, education, human health and social work activities
<b>R-U</b>	Arts, entertainment and recreation, other service activities, activities of households as employers, undifferentiated goods and services, producing activities for own use, activities of extraterritorial organizations and bodies

Source: Eurostat (2008)

Therefore, it emerges that the classification above includes sectors with significant presence in contemporary economy and society.

### 3. Methodology

In the empirical research conducted an indicator of regional science is employed, namely

<sup>1</sup><http://ec.europa.eu/eurostat/web/nace-rev2>.

the Location Quotient of a country or region in relation to Europe as a whole (Isard 1960, p. 122). The principal variable of analysis is employment, as compiled by Eurostat<sup>2</sup>. The calculation of Location Quotient is based on the number of employed in the economic sectors examined. More specifically, the associated ratio measures the participation of an economic sector in a country or region in relation to the corresponding participation of the sector in the European Union. Based on the preceding analysis, the Location Quotient is calculated as follows:

$$\text{Location Quotient: QL} = \frac{\frac{A_{ir}}{A_{in}}}{\frac{A_r}{A_n}}$$

where,

A: employment

i: sector of economic activity

r: country or region of Europe

n: Europe

A sector of economic activity may be characterized as basic or not depending on the score of the associated indicator. More specifically, the interpretation of Location Quotient depends on its value and whether it is greater than unit or not. More analytically, the interpretation of Location Quotient in the applications below is based on the following criteria:

- If  $QL > 1$ , then the examined spatial unit r is specialized in the specific sector of economic activity i. To put it differently, the country/region participates in the examined sector at a greater percentage than it participates in the whole of European Union<sup>3</sup>.

- If  $QL < 1$ , then the sector of economic activity i is considered as not basic. To put it differently, the country/region participates in the examined sector at a lower percentage than it participates in the whole of European Union.

<sup>2</sup>[http://ec.europa.eu/eurostat/web/lfs/data/database?p\\_p\\_id=NavTreeportletprod\\_WAR\\_NavTreeportletprod\\_INSTANCE\\_IFjhoVbmPFHt&p\\_p\\_lifecycle=0&p\\_p\\_state=normal&p\\_p\\_mode=view&p\\_p\\_col\\_id=column-2&p\\_p\\_col\\_count=1](http://ec.europa.eu/eurostat/web/lfs/data/database?p_p_id=NavTreeportletprod_WAR_NavTreeportletprod_INSTANCE_IFjhoVbmPFHt&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1).

<sup>3</sup> It should be noted that regional analysis at the European level was conducted according to the NUTS2 classification.

- If  $QL = 1$ , then sector activity is considered balanced. To put it differently, the country/region participates in the examined sector at the same percentage as it participates in the whole of European Union.

## **4. Empirical analysis**

### **4.1 Analysis at the country level**

Sectoral structure of European Union countries for the years 2008 and 2013 is presented in tables 2 and 3 respectively. The comparative analysis in the recent period of crisis permits the study of sectors' restructuring characteristics in the countries or regions examined. Moreover, with the use of thematic maps countries or regions with high sectoral specialization are illustrated.

**Table 2.** Location Quotient of Economic Sectors in the Countries of the European Union(2008), Source of primary data: Eurostat (2008)

Country \ Sector	Agriculture, Forestry and Fishing	Manufacturing	Construction	Wholesale and Retail Trade, transportation	Information and Communication	Financial and Insurance Activities	Real Estate Activities	Professional, Scientific and Technical Activities	Public Administration and Defense	Arts, Entertainment and Recreation
Belgium	0.301	0.922	0.868	0.948	1.042	1.333	0.694	0.997	1.315	0.936
Bulgary	1.450	1.392	1.213	1.122	0.757	0.571	0.563	0.566	0.758	0.563
Czech Republic	0.616	1.637	1.152	0.953	0.842	0.780	1.075	0.779	0.784	0.670
Denmark	0.489	0.832	0.822	0.969	1.438	1.048	1.509	0.927	1.345	0.845
Germany	0.344	1.198	0.793	0.938	1.138	1.155	0.778	1.156	1.049	1.053
Estonia	0.748	1.221	1.478	1.073	0.832	0.533	2.085	0.694	0.838	0.839
Ireland	1.035	0.722	1.356	1.063	1.205	1.498	0.683	1.082	0.950	0.905
Greece	2.200	0.721	1.038	1.262	0.587	0.874	0.259	0.816	0.869	0.965
Spain	0.784	0.836	1.451	1.178	0.984	0.844	0.779	1.074	0.774	1.421
France	0.516	0.813	0.867	0.909	0.915	1.065	1.836	0.999	1.236	1.213
Croatia	2.599	1.150	1.080	1.097	0.815	0.715	0.279	0.588	0.719	0.696
Italy	0.719	1.131	1.017	1.045	0.842	0.942	0.708	1.192	0.852	1.200
Cyprus	0.821	0.580	1.446	1.211	0.858	1.725	0.981	0.936	0.815	1.742
Latvia	1.529	0.932	1.371	1.165	0.867	0.587	1.169	0.632	0.875	0.912
Lithuania	1.529	1.044	1.313	1.128	0.608	0.452	1.086	0.678	0.923	0.711
Luxembourg	0.326	0.395	0.935	0.809	1.200	3.580	0.729	1.144	1.284	1.872
Hungary	0.837	1.287	0.960	1.094	0.888	0.817	0.685	0.789	0.919	0.777
Malta	0.339	0.941	0.934	1.247	1.426	1.303	0.586	0.745	1.053	0.771
Netherlands	0.505	0.615	0.718	0.965	1.354	0.999	1.184	1.255	1.244	0.790
Austria	1.044	0.900	1.103	1.158	0.848	1.182	1.073	1.024	0.907	0.895
Poland	2.710	1.274	0.936	0.948	0.666	0.725	1.218	0.591	0.814	0.540
Portugal	2.170	0.988	1.280	1.031	0.640	0.624	0.699	0.718	0.809	1.164
Romania	5.571	1.250	0.958	0.804	0.453	0.397	0.217	0.366	0.565	0.350
Slovenia	1.660	1.497	0.800	0.936	1.033	0.812	0.336	0.752	0.799	0.661
Slovakia	0.768	1.564	1.268	0.973	0.672	0.767	0.716	0.677	0.842	0.552
Finland	0.873	0.936	0.879	0.925	1.338	0.688	1.044	1.208	1.116	1.040
Sweden	0.409	0.772	0.796	0.870	1.414	0.685	1.899	1.422	1.350	0.922
United Kingdom	0.209	0.688	1.070	1.031	1.403	1.450	1.167	1.140	1.208	1.042

The extent of specialization in the sense of regional accumulation of economic activity for the year 2008, as estimated by the application of Location Quotient in each of the productive sectors, is listed in table 2. More specifically, in the sector of Agriculture, forestry and fishing high value of the specialization indicator is observed in Romania (5.571), Poland (2.710), Croatia (2.599), Greece (2.200) and Portugal (2.170). Luxembourg scores the lowest value in the relevant indicator.

It should be noted that the accumulation of economic activity in a country does not always

concerns the whole territory and as a result the application of the relevant indicator should be extended at the regional level as well. In practical terms, as depicted in Thematic map 3, the specialization in industry refers to North Italy, while the South part is specialized in agriculture (Thematic map 4). For the purposes of this study, specific cases of countries shall be presented in which the accumulation of an activity is located at a specific region of the country.

In the Construction sector countries such as Estonia (1.478), Spain (1.451) and Cyprus (1.446)

score the highest value in the indicator referring to the accumulation of the associated economic activity. In the sector of Wholesale and retail trade, transportation and storage, accommodation and food service activities the highest values of the relevant indicator are observed in Greece, Malta and Cyprus. In the Information and communication sector high value of the indicator is observed in Denmark (1.438), Malta (1.426), Sweden (1.414) and the United Kingdom (1.403). Romania scores the lowest value in the relevant indicator.

In the Financial and insurance activities sector high value of the indicator is observed in Luxembourg (3.580), Cyprus (1.725), Ireland (1.498) and the United Kingdom (1.450). In the Real estate activities sector high value of the specialization indicator is observed in Estonia (2.805), Sweden (1.899), France (1.836) and Denmark (1.509). On the contrary, Romania scores the lowest value in the corresponding indicator.

In the Professional, scientific and technical activities, administrative and support service activities the highest value in the specialization indicator is discerned in Sweden (1,422), Netherlands (1,255) and Finland (1,208). In the Public administration and defense, compulsory social security, education, human health and social work activities sector the highest value in the associated indicator is discerned in Sweden (1,350), Denmark (1,345) and Belgium (1,315).

In the sector of Arts, entertainment and recreation, other service activities, activities of households and extraterritorial organizations and bodies the highest value of the relevant indicator is observed in Luxembourg (1.872), Cyprus (1.742) and Spain (1.421). Romania scores the lowest value in the associated indicator.



**Thematic map 1.** Countries that present high concentration in the sector of Agriculture, forestry and fishing (2008), Source of primary data: Eurostat



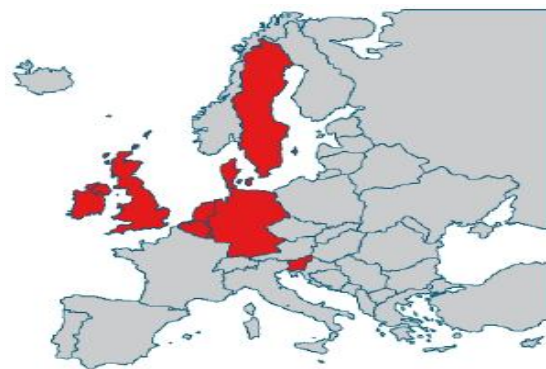
**Thematic map 2.** Countries that present high concentration in the sector of Industry (2008), Source of primary data: Eurostat



**Thematic map 3.** The sector of Industry for the case of Italy (2008), Source of primary data: Eurostat



**Thematic map 4.** The sector of Agriculture, forestry and fishing for the case of Italy (2008), Source of primary data: Eurostat



**Thematic map 7.** Countries that present high concentration in the sector of Information and communication (2008), Source of primary data: Eurostat



**Thematic map 5.** Countries that present high concentration in the sector of Construction (2008), Source of primary data: Eurostat



**Thematic map 8.** Countries that present high concentration in the sector of Financial and insurance activities (2008), Source of primary data: Eurostat



**Thematic map 6.** Countries that present high concentration in the sector of Wholesale and retail trade, transportation and storage, accommodation and food service activities (2008), Source of primary data: Eurostat



**Thematic map 9.** Countries that present high concentration in the sector of Real estate activities (2008), Source of primary data: Eurostat

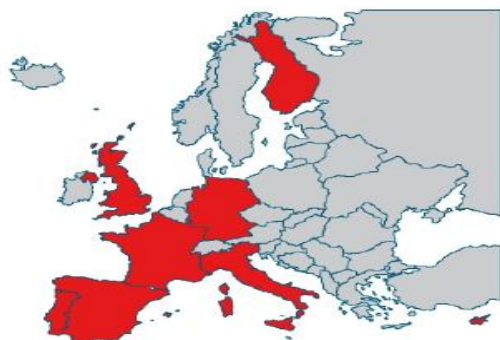


**Thematic map 10.** Countries that present high concentration in the sector of Professional, scientific and technical activities, administrative and support service activities (2008), Source of primary data: Eurostat

mainly in the axis of East-West instead of North-South.



**Thematic map 11.** Countries that present high concentration in the sector of Public administration and defense, compulsory social security, education, human health and social work activities, Source of primary data: Eurostat



**Thematic map 12.** Countries that present high concentration in the sector of Arts, entertainment and recreation, other service activities, activities of households as employers, undifferentiated goods and services, producing activities for own use, activities of extraterritorial organizations and bodies (2008), Source of primary data: Eurostat

The above thematic maps illustrate the grouping of countries that demonstrate or not specialization in each of the examined sectors



**Table 3.** Location Quotient of Economic Sectors in the Countries of the European Union (2013), Source of primary data: Eurostat (2013)

Country \ Sector	Agriculture, Forestry and Fishing	Manufacturing	Construction	Wholesale and retail Trade, Transportation	Information and Communication	Financial and Insurance Activities	Real Estate Activities	Professional, Scientific and Technical Activities	Public Administration and Defense	Arts, Entertainment and Recreation
Belgium	0.281	0.833	1.050	0.944	1.078	1.169	0.797	1.134	1.247	0.992
Bulgary	1.375	1.337	1.017	1.221	0.886	0.589	0.403	0.742	0.771	0.591
Czech Republic	0.625	1.675	1.229	0.925	0.978	0.931	1.206	0.759	0.790	0.732
Denmark	0.523	0.780	0.856	0.948	1.426	0.973	1.108	0.903	1.344	0.962
Germany	0.296	1.214	0.983	0.973	1.007	1.075	0.685	1.103	1.023	0.918
Estonia	0.880	1.221	1.315	1.025	1.095	0.550	2.298	0.842	0.871	0.858
Ireland	1.172	0.738	0.782	1.098	1.479	1.614	0.551	0.974	1.035	0.980
Greece	2.826	0.632	0.667	1.272	0.749	1.020	0.101	0.790	0.923	0.864
Spain	0.887	0.794	0.867	1.230	1.053	0.887	0.656	1.073	0.887	1.519
France	0.629	0.813	0.996	0.913	0.930	1.094	1.762	0.977	1.217	1.142
Croatia	2.223	1.183	1.026	1.107	0.827	0.868	0.320	0.648	0.787	0.769
Italy	0.749	1.164	1.024	1.053	0.848	0.943	0.798	1.085	0.810	1.421
Cyprus	0.639	0.547	1.166	1.290	0.842	2.044	0.468	0.999	0.787	1.960
Latvia	1.660	0.945	1.086	1.116	0.939	0.786	3.099	0.705	0.909	0.815
Lithuania	1.738	1.031	1.108	1.156	0.662	0.458	1.491	0.778	0.896	0.800
Luxembourg	0.320	0.341	0.840	0.657	1.331	4.207	0.920	1.116	1.207	1.940
Hungary	1.015	1.360	0.916	1.031	0.984	0.818	0.613	0.800	0.944	0.690
Malta	0.271	0.886	0.913	1.204	1.338	1.546	0.696	0.762	1.083	0.926
Netherlands	0.402	0.584	0.716	0.965	1.048	1.100	0.920	1.238	1.147	0.791
Austria	0.977	0.980	1.289	1.078	0.947	1.175	1.102	0.954	0.919	0.853
Poland	2.475	1.324	1.098	0.94	0.734	0.815	1.087	0.647	0.823	0.549
Portugal	2.111	0.993	0.939	1.056	0.698	0.654	0.760	0.746	0.915	1.191
Romania	5.878	1.222	1.079	0.847	0.568	0.461	0.248	0.419	0.516	0.491
Slovenia	1.745	1.440	0.857	0.939	1.105	0.939	0.498	0.748	0.829	0.676
Slovakia	0.683	1.491	1.443	1.011	0.766	0.753	0.964	0.619	0.905	0.569
Finland	0.849	0.901	1.032	0.899	1.405	0.664	1.123	1.134	1.113	1.084
Sweden	0.417	0.712	0.971	0.848	1.443	0.687	1.823	1.359	1.296	0.979
United Kingdom	0.217	0.665	1.044	0.988	1.347	1.300	1.376	1.234	1.191	1.012

As far as sectoral specialization of European Union countries for the year 2013 is concerned, it is prevalent that for Agriculture, forestry and fishing countries that get the highest score are Romania (5.878), Greece (2.826), Poland (2.475) and Croatia (2.223). The lowest value of the associated indicator is observed in the United Kingdom.

In the sector of Industry, countries that get the highest score in the relevant indicator are Czech Republic (1.675), Slovakia (1.491) and Slovenia

(1.440). The lowest value of the relevant indicator is recorded in Luxembourg. In the sector of Construction, countries with high concentration of

economic activity as captured by the relevant indicator are Slovakia (1.454) and Estonia (1.315).

In the sector of Wholesale and retail trade, transportation and storage, accommodation and food service activities high value of the indicator is recorded in Cyprus (1.290), Bulgaria (1.221), Spain (1.230), Greece (1.272) and Malta (1.204). On the contrary, the lowest value of the associated indicator is observed in Luxembourg.

In the sector of Information and communication high concentration of economic activity is observed in Ireland (1.479), Sweden (1.443), Denmark (1.426), Finland (1.405) and the United Kingdom (1.347). The lowest value of the associated indicator is observed in Romania (0.568). In the sector of Financial and insurance activities the highest value of the associated indicator is observed in Luxembourg (4.207), Cyprus (2.044), Ireland (1.614) and Malta (1.514). In the sector of Real estate activities the highest specialization is observed in Latvia (3.099), Estonia (2.298) and France (1.762). On the contrary, Greece scores the lowest value in the associated indicator (0.101).

In the sector of professional, scientific and technical activities, administrative and support service activities high value of the associated indicator is observed in Sweden (1,359), Netherlands (1,238) and the United Kingdom (1,234). In Romania the lowest value of the associated indicator is observed. In the sector of Public administration and defense, compulsory social security, education, human health and social work activities the greatest concentration is observed in Denmark (1.344), Sweden (1.296), Belgium (1.247), France (1.217) and Luxembourg (1.207). In the sector of Arts, entertainment and recreation, other service activities, activities of households as employers, undifferentiated goods and services, producing activities for own use, activities of extraterritorial organizations and bodies the highest specialization is observed in Cyprus (1.960), Luxembourg (1.940) and Spain (1.519).



**Thematic map 13.** Countries that present high concentration in the sector of Agriculture, forestry and fishing (2013), Source of primary data: Eurostat



**Thematic map 14.** Countries that present high concentration in the sector of Industry (2013), Source of primary data: Eurostat



**Thematic map 15.** The sector of Industry for the case of Italy (2013), Source of primary data: Eurostat



**Thematic map 16.** The sector of Agriculture, forestry and fishing for the case of Italy (2013), Source of primary data: Eurostat



**Thematic map 17.** Countries that present high concentration in the sector of Construction (2013), Source of primary data: Eurostat



**Thematic map 28.** Countries that present high concentration in the sector of Wholesale and retail trade, transportation and storage, accommodation and food service activities (2013), Source of primary data: Eurostat



**Thematic map 5.** Countries that present high concentration in the sector of Real estate activities (2013), Source of primary data: Eurostat



**Thematic map 39.** Countries that present high concentration in the sector of Information and Communication (2013), Source of primary data: Eurostat



**Thematic map 226.** Countries that present high concentration in the sector of Professional, scientific and technical activities, administrative and support service activities (2013), Source of primary data: Eurostat



**Thematic map 40.** Countries that present high concentration in the sector of Financial and insurance activities (2013), Source of primary data: Eurostat



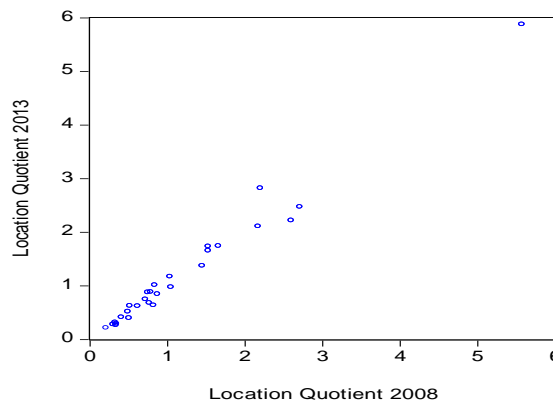
**Thematic map 7.** Countries that present high concentration in the sector of Public administration and defense, compulsory social security, education, human health and social work activities (2013), Source of primary data: Eurostat



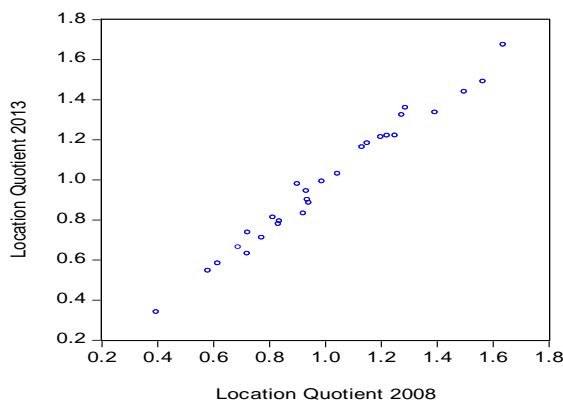
**Thematic map 8.** Countries that present high concentration in the sector of Arts, entertainment and recreation, other service activities, activities of households as employers, undifferentiated goods and services, producing activities for own use, activities of extraterritorial organizations and bodies (2013), Source of primary data: Eurostat

The major characteristics concerning the discrimination mainly in the axis of East-West instead of North-South for the year 2008 are maintained in the year 2013 as well. An extensive analysis concerning the diversification between the years 2008 and 2013 is presented in the following section.

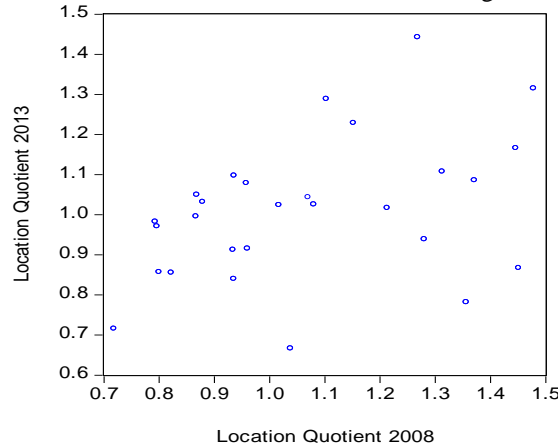
The Figures 1-10 present the scatter plot for each of the examined sectors concerning the values of Location Quotient for the years 2008 and 2013. This analysis presents at a primary level the dynamics of development related to sectoral concentration. The results depicted are in line with the conclusions reached by the thematic maps and the convergent hypothesis referring to sectoral specialization. More specifically, the scatter diagrams presented below illustrate that between the years 2008 and 2013 large differentiations concerning sectoral structure are not observed. The greatest disparities are observed in the sector of Construction, which denote weak correlation concerning the development of the aforementioned sector between the two periods examined. Based on the scatter plots, low correlation is also suggested for the case of the sector of Information and Communication.



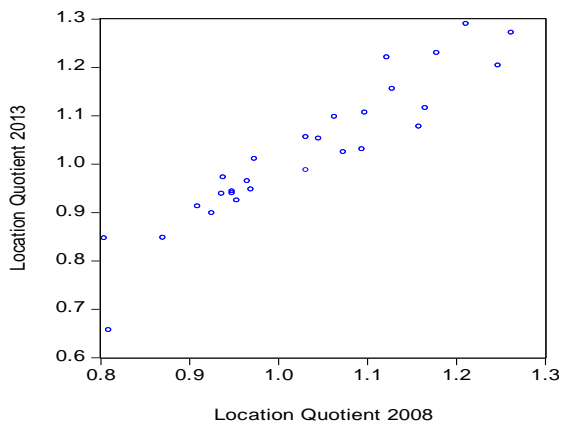
**Figure 1.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Agriculture



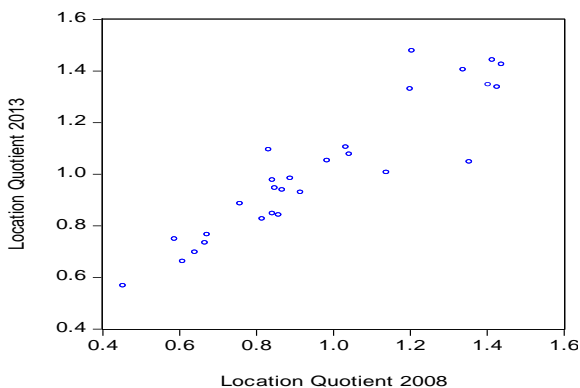
**Figure 2.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Manufacturing



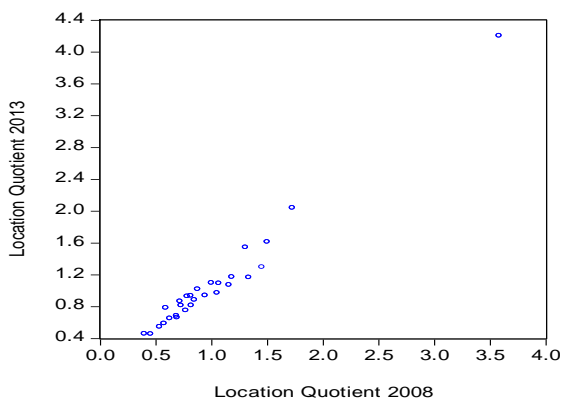
**Figure 3.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Construction



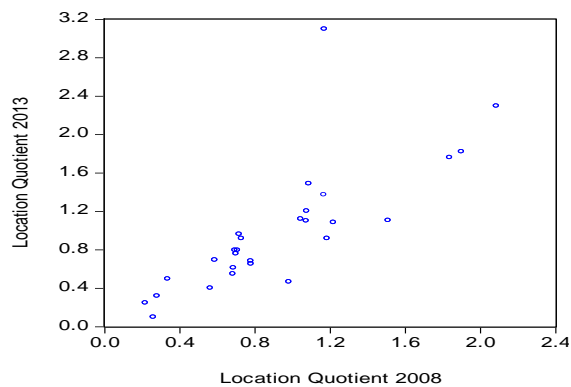
**Figure 4.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Wholesale and retail trade, transportation and storage, accommodation and food service activities



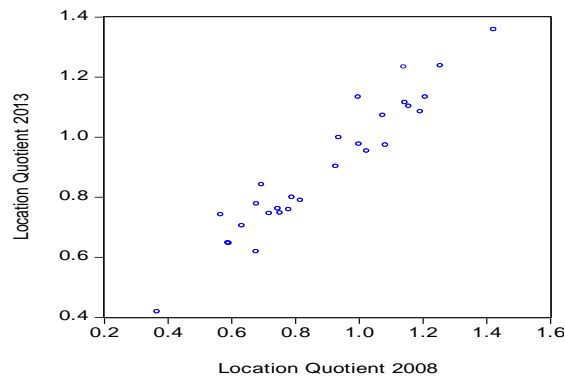
**Figure 5.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Information and communication



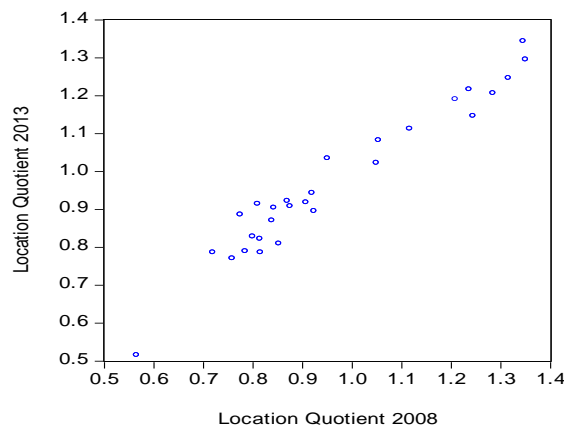
**Figure 6.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Financial and insurance activities



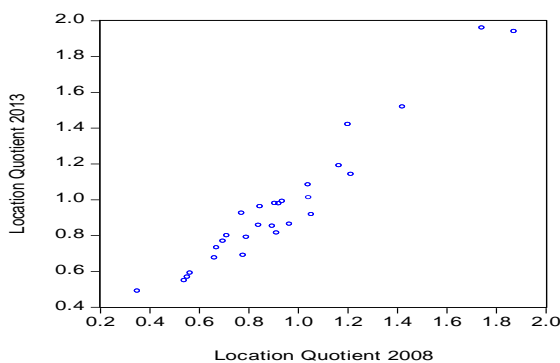
**Figure 7.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Real estate activities



**Figure 8.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Professional, scientific and technical activities, administrative and support service activities



**Figure 9.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Public administration and defense, compulsory social security, education, human health and social work activities



**Figure 10.** Scatter plot of Location Quotient 2008 vs. 2013 in the sector of Arts, entertainment and recreation other service activities, activities of households as employers, undifferentiated goods and services, producing activities for own use, activities of extraterritorial organizations and bodies

#### 4.2 Diversifications in the period of crisis 2008-2013

From the comparative analysis of indicators between the years 2008 and 2013 in order to study possible differentiations in sectoral structure of the countries examined as a result of the recent financial crisis, the most basic results that emerge are the following.

The general conclusion is that for the period examined great disparities concerning specialization patterns (Location Quotient greater or lower than one) are not observed (see thematic maps 2008 and 2013). The greatest of these discrepancies are observed in the sector of Construction, which is mainly shifted towards the East, the sector of Information and communication, which is extended to Spain and the United Kingdom.

On the contrary, changes took place in the intensity and magnitude of specialization expressed by the increase in the absolute value of the index examined (Location Quotient) during 2008-2013. In the sector of Agriculture further increase in the indicator during the crisis is observed in Greece, Romania and Slovenia. In the sector of Industry the evolution is almost steady with the exception of Hungary and Poland that demonstrate an increase in the associated indicator.

In the sector of Construction the associated activity is reduced in countries that are affected by the crisis (Ireland, Greece, Spain, Portugal as well as the less developed and new entry members, such as Bulgaria, Estonia, Latvia and Lithuania. On the

contrary, a significant increase in the relevant indicator is observed in Slovakia. Moreover, it should be pointed out that while Spain for the year 2008 gets the second highest score in the indicator (1.451) expressing specialization in the sector of Construction, there is a significant alteration for the year 2013, where it scores lower than unit (0.867). It should be noted that in Spain this sector has been seriously hit by the financial crisis. In general, it seems that the sector of Construction is more sensitive in the volatility of economic activity.

The sector of Construction does not constitute a principal sector of economic activity for the case of Greece during the period of crisis as is prevalent by the comparative analysis of the associated indicator. Therefore, while Greece in the sector of Construction for the year 2008 scores higher than unit (1.038), the value of the associated indicator for the year 2013 is less than unit (0.667). As far as Greece is concerned, the sector of construction has been seriously affected by the financial crisis and the increase in taxation as a means to fight the debt crisis.

In the wholesale and retail trade, transportation and storage, accommodation and food service activities there is a considerable stability in the period examined. It is argued that (World Economic Forum 2015, p. 8) in the sector of tourism (accommodation and food service activities) Greece and Spain further fortify their position in the period of crisis despite the serious fiscal problems. In the sector of Information and Communication, Sweden, Finland and Luxembourg score higher the year 2013 as compared to 2008, while Greece scores lower. A relative stability is observed in the rest sectors as well, despite the fact that countries such as Spain, Italy and Cyprus find a way out of the crisis by strengthening their position in the field of Arts, entertainment and recreation, as is prevalent by the increase in the associated indicator.

Another remark at the country level is the fact that the United Kingdom demonstrates increased specialization over a broad spectrum of productive activities in a balanced way. Therefore, from the empirical analysis emerges that the United Kingdom records increased levels of specialization in all productive sectors with the exception of Agriculture and Manufacturing that scores lower than unit. On the other hand, it emerges that Italy is among the countries with high specialization in the

sector of Manufacturing mainly due to the industrialized North. On the other hand, the South of Italy presents a totally different performance and, more specifically, is specialized in the sector of Agriculture.

Based on the analysis above it could be argued that the importance of sectoral structure is not independent but on the contrary is associated with the general socioeconomic environment, the contextual conditions and the structural characteristics of the countries and regions examined. There are sectors that are seriously affected by the crisis, while its effective treatment depends on the ability of countries to revolve into new dynamic activities.

#### 4.3 Regional concentration of productive activity

In many countries, a specific activity is accumulated in certain areas due to their natural wealth, their geographic position and characteristics or even to successful developmental policies exercised. For the purposes of the current study, the analysis is restricted to specific areas (North etc) of each country.



**Thematic map 25.** Regions of Romania that are specialized in Agriculture (2013)

Romania consists a typical case as far as the sector of Agriculture is concerned, which constitutes a fundamental sector of economic activity in terms of its contribution to Gross Domestic Product (GDP) of Romania as well as employment. Therefore, it is illustrated that the concentration of the associated activity is located in specific geographic regions in the South and North-East part of the country (Thematic map 25). The climate is continental along with intense rainfall in the Carpathian Mountains (North-East Romania). Moreover, the morphology of the ground favors the development of the Agricultural sector as in the

South the fertile plains are traversed by rivers (Danube region).



**Thematic map 26.** Regions of Slovakia that are specialized in Manufacturing (2013)

The major sector of economic activity for the case of Slovakia is Manufacturing. Slovakia is located in a beneficial geographic position. It has achieved broad structural reforms and due to the favorable tax regulations it consists pole of attraction for investments. Based on the enduring tradition and specialized workforce the dominant type of industry is the automotive industry. Moreover, the aforementioned sector of production is presented to be accumulated in the West side of the country around the capital, which is Bratislava (Thematic map 26).



**Thematic map 27.** Regions of Spain that are specialized in Construction (2013)

In Spain (Thematic map 27) concentration of productive activity in Constructions is located in the North-West part of the country. The observed productive accumulation is related to the broader infrastructure. Such is the case of the infrastructure in transportation and railway transportation in particular.



**Thematic map 28.** Regions of Greece that are specialized in Wholesale and retail trade, transportation and storage, accommodation and food service activities (2013)

In the sector of Wholesale and retail trade, transportation and storage, accommodation and food service activities Greece serves as a typical example. The associated activity is dominant in the islands and the two metropolitan regions of Attica and West Macedonia (Thessaloniki) due to their increased commercial character (Thematic map 28).



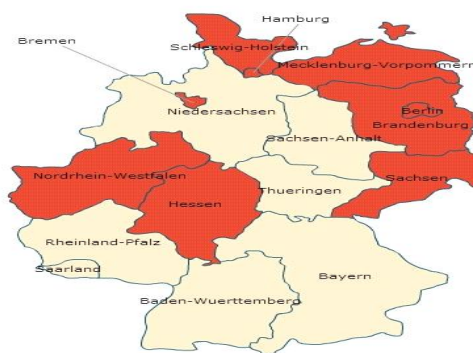
**Thematic map 29.** Regions of England that are specialized in Information and communication (2013)

In the sector of Information and communication England is a typical case. The associated activity is mostly developed in the area of London and the two surrounded regions in the South-East part of the country (Thematic map 29). In these areas, that constitute the core of the United Kingdom, mass media (British Broadcasting Corporation-BBC, an abundance of television and radio networks and newspapers) are developed. Also, it should be pointed out that in this area publishing activity is remarkably enhanced while all types of publishing are prevalent (printed, electronic and digital).



**Thematic map 30.** Regions of Belgium that are specialized in Financial and insurance activities (2013)

Financial and insurance activities in Belgium are located in the central regions that surround the capital, which is Brussels (Thematic map 30). It should be pointed out that the financial sector in Belgium is large and dominated by acquisitions.



**Thematic map 31.** Regions of Germany that are specialized in Professional, scientific and technical activities, administrative and support service activities (2013)

Professional, scientific and technical activities, administrative and support service activities in Germany (Thematic map 31) are accumulated in the North-East and Central-West regions of Hesse and North Rhine-Westphalia. The North-East regions are characterized by intense cultural and economic activity with highly prestigious research institutions and universities. A reference case could be the capital of Brandenburg region, Potsdam, in which numerous research centers and academic institutions are established. The same result applies for the case of Central-West regions and especially the region of Hesse, which constitutes one of the most affluent states of Germany.





**Thematic map 32.** Regions of Croatia that are specialized in Public administration and defense, compulsory social security, education, human health and social work activities (2013)

In Croatia the development of public sector activities in the West part of the country (Thematic map 32) is a typical case along with the strengthening of services. This area is located in the Adriatic Sea and is constituted by national parks while it comprises a popular tourist attraction all the year.



**Thematic map 33.** Regions of Italy that are specialized in Arts, entertainment and recreation, other service activities, activities of households as employers, undifferentiated goods and services, producing activities for own use, activities of extraterritorial organizations and bodies (2013)

The sector of Arts, entertainment and recreation, other service activities, activities of households as employers, undifferentiated goods and services, producing activities for own use, activities of extraterritorial organizations and bodies (Thematic map 33) presents concentration in Central Italy (Rome, Tuscany, Umbria and Sardinia). In the regions of Central Italy there are historical cities that have been characterized by UNESCO as Monuments of World Cultural Heritage. Sardinia, which was under the influence of diversified cultural archetypes, has shaped a distinct cultural identity.

#### 4.4 Categorization of countries based on their productive activity

Based on the preceding results concerning the years 2008 and 2013, areas of Europe could be located that demonstrate accumulated activity in specific sectors.

The thematic maps illustrate that the classification according to the productive activity of countries conforms to the axis of East-West instead of North-South. If Europe is segregated for each of the productive sectors as developed and non developed (based on the Location Quotient), this would approach the vertical instead of the horizontal layout or in some cases the diagonal from downwards and left to upwards and right. It should be mentioned that Spain is regarded as country of West Europe instead of South, due to the consideration of individual characteristics. However, this classification is only roughly approximated and in order to give emphasis to the fact that there is homogeneity between countries on the basis of the structure of their production mostly at the level of East-West instead of North-South.

Therefore, it emerges that countries of East Europe are specialized in the sensitive sectors of Agriculture, Manufacturing and Construction, while Services are mainly developed in West Europe.

As far as the sector of Wholesale and retail trade, transportation and storage, accommodation and food service activities it could be argued that it does not follow the above described pattern but is mainly developed in the European South due to the extensive presence of tourism, which is included in the aforementioned sector.

Moreover, in the sector of Manufacturing the greatest concentration is located in countries of East Europe (Czech Republic, Slovenia, Slovakia, Poland) as well as in Germany, which according to more confined geographic criteria is considered as country of Central Europe.

## 5. Conclusion

The current study aims to investigate in a quantitative manner the countries and regions of Europe that display high or low concentration of sectoral activity and in this sense the respective sector is considered as developed or not in relation

to the European Union as a whole. Therefore, areas of Europe are located that the sector examined is primarily “exporting”. Moreover, the study of the years 2008 and 2013 permits to locate possible shifts in economic activity due to the financial crisis that may contribute to the strengthening or weakening of productive sectors and as a result to the change of the economic map of Europe. Therefore, it emerges that financial crises may function as mechanisms of redistributing economic activities between countries and as a result income and wealth. As a result, appropriate state policies should be shaped, especially in those countries that because of the financial crisis have limited competitive advantages in other sectors. The restructuring of productive activity in sectors that countries or regions show comparative advantage, may decisively contribute to the quicker exit from the crisis. This ascertainment applies especially for the case of Greece.

In this way, countries and regions of Europe are analyzed that are specialized in dynamic sectors of economic activity and, as a result, have a comparative advantage over the others. In this way, the terms of (fair) trade may be designated. More analytically, in major sectors of economic activity, such as Industry, the greatest concentration is observed in countries of East Europe and Central Europe at a lesser extent. In the sector of Agriculture the greatest concentration is observed in countries of East Europe. Tourism activity is mostly located in the South of Europe (Mediterranean countries). In Financial and insurance activities and Professional, scientific and technical activities, administrative and support service activities the greatest accumulation is observed in West Europe. Therefore, it should be pointed out that in addition to the established developmental archetype of European space, which is based on the axis of (favored) North – (less favored) South, there is a thorough analysis conducted on the axis of (favored) West – (less favored) East.

More extensively, the comparative study of the indicators between the years 2008 and 2013 has appointed differentiations in the sectoral structure of European economies as an outcome of the economic crisis. For example, in countries that great concentration of tourism is observed and that at the same time face fiscal difficulties, a greater accumulation of tourism activity is recorded in the

period of crisis. Therefore, the importance of tourism in terms of employment has increased. This observation could be construed as follows. The policies of fiscal discipline that have been put into effect and especially the policies of internal devaluation have improved the competitiveness of tourism product. At the same time, the shift into tourism product could be interpreted as an effort to react to the shrink of income from other sources because of the crisis or even as a means to face the extensive unemployment due to the financial recession. Moreover, it is proved that the comparative advantage in the sector of tourism is not static, but evolves dynamically, which is a fact that should not be ignored by policy makers and the private sector. Therefore, it is proved that the importance of sectoral structure is related to the general socioeconomic conditions.

In conclusion, the specialization of countries/regions in dynamic sectors of economic activity that have a comparative advantage over the others is a multidimensional and dynamic process. This fact should not be neglected especially by those countries that because of their deficient convergence towards the core economies of Europe, which is further expanded due to the financial crisis, have a limited number of productive sectors in which they dispose a competitive advantage. These countries, which are affected by the crisis, such is the case for Greece, should shape an appropriate policy framework in order to strengthen the competitiveness of their dynamic productive sectors after taking into account the composite character of the issues examined.

Under this framework of analysis, the content of the term economic dependence could be modified. Therefore, as economic independent could be characterized the countries (or regions) that may select the sectors of their economic specialization, while as economic dependent those countries that their economic specialization is the result of a necessary adjustment to the general economic circumstances.

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