UNIVERSITY OF THESSALY

DEPARTMENT OF PLANNING AND REGIONAL DEVELOPMENT

European Regional Development Studies
Postgraduate Program

Msc Dissertation

The impact of regional specialization on economic growth: The case of Greece

Student: Filippopoulos Dimitrios
Supervisor: Petrakos George

Volos, June 2012

ABSTRACT

The aim of this dissertation is to draw a basic picture of Greece's post EU accession experience regarding changes in the structure of manufacturing employment. For this reason, it is undertaken an investigation of regional specialization patterns at NUTS III spatial level disaggregated at 17 manufacturing branches according to STAKOD classification. The dataset which is taken from ELSTAT covers the period 1980-2005 and estimations are based on the entropy index of Theil. The analysis reveals a rather stable pattern of regional specialization. Moreover, it shows that large urban centers are presented more diversified in relation to small-sized regions. In addition, an econometric model is used in order to provide a possible relationship between regional specialization and per capita Gross Value Added. The results indicate that a non-linear relationship between the two variables has been emerged, graphically depicted by a mirror image J-shaped pattern.

Keywords: Regional specialization, per capita GVA, Greek regions, employment, manufacture.

ACKNOWLEDGEMENTS

The completion of this dissertation would be impossible without the support and the assistance of some people. First of all, I would like to thank my supervisor Mr. Dimitris Kallioras for the guidance and support he showed me throughout the entire period of study preparation. I am also truly thankful to Mrs. Maria Tsiapa whose contribution to the completion of my dissertation was extremely important.

I would like to show my gratitude to the staff of the Department of Planning and Regional Development, my professors and my classmates who helped me to improve my dissertation through conversation and constructive dialogue. Finally, I would like to thank my family and my friends for their encouragement and patience during the period of study preparation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS

ELSTAT: Hellenic Statistical Authority

EMU: Economic and Monetary Union

GDP: Gross Domestic Product

GVA: Gross Value Added

MAUP: Modifiable Area Unit Problem

NACE: Nomenclature Statistique des Activites Economiques dans la Communaute Europeenne (in French)

NEG: New Economic Geography

NMS: New Member States

NTT: New Trade Theory

NUTS: Nomenclature of Territorial Units for Statistic

OECD: Organization for Economic Cooperation and Development

STAKOD: Statistical Classification of Branches of Economic Activity

CHAPTER 1: Introduction

1.1 Objectives of the dissertation

Internationalization process placed on a framework of globalization system have created new conditions in worldwide transactions affecting to a great extent the productive structure of countries and by extension specialization patterns across countries and regions. The lowering of trade barriers, the abolishment or reduction on trade restrictions and the remarkable progress on technological improvements in terms of better transport and communication systems enhanced the procedure of economic liberalization towards a more integrated economic environment (Wolfmayr-Schnitzer, 2000). The formation of this new economic environment had a remarkable impact on government policies since each country had to be adapted to the new demands in order to stimulate a better economic performance in its regions. In addition, the undoubtedly dynamic presence of new economic powers such as China and India and a more enlarged and integrated European Union which includes the ex-Soviet countries of Eastern Europe changed the scope and the nature of global competition and therefore played a significant role in the spatial re-distribution of economic activities. In this framework, the study of a regional specialization constitutes a rather significant issue which may have sensible implications on a country's economic structure.

The current study deals with the distribution of industrial employment in the Greek regions and the possible effect it can have on their economic performance. For this reason, an analysis of regional specialization trends in the Greek manufacture during the period 1980-2005 is attempted. Moreover, an econometric investigation is undertaken in order to identify a possible relationship between specialization and per capita Gross Value Added. The objective of this research is to find out which policy can be considered as the most effective for a better economic potential in the Greek regions. A policy of specialization in specific industrial sectors or a more diversified industrial policy? In other words, in which way industrial employment should be allocated through the regions under consideration? These are basic questions that are fully addressed in the remainder of this study.

1.2 Defining regional specialization

The observed trends in regional specialization across countries or regions are quantified through the use of indicators. It would be therefore absolutely useful for the analysis to provide some clear definitions about regional specialization. According to Aiginger (1999), regional specialization is defined as the (distribution of the) shares of an industry i in total manufacturing in a specific region r. Again, regional specialization is the extent to which a given country specializes its activities in a relatively small number of industries. Accordingly, a production structure of a country is said to be "highly specialized" if a small number of industries accounts for a large share of production. Specialization can be measured not only for production but also for exports, exports and imports[1] together and employment. On the other side, the process of a more equal distribution of production or employment activities across industries is generally called de-specialization or dispersion.

As it is previously referred, regional patterns of specialization are displayed through the use of the appropriate indicators. There are several indicators used in the empirical literature, with each presenting advantages as well as disadvantages. Whatever the case may be, the basic distinction as regards indicators of regional specialization is between absolute and relative measures. Absolute specialization measures the shares of individual industries in the total manufacturing activity of a specific region. Accordingly, a region is said to be specialized in a few industries when these industries present high shares in the total manufacturing of this region. On the other hand, relative specialization measures the shares of individual industries in relation to a benchmark (the distribution of a broader geographical area). To explain this better, indexes of relative specialization compare the distribution of industrial shares in a certain region to the structure of a reference country. However, it is important to choose the appropriate absolute or relative indicator in relation to the questions that should be investigated. Thus, it is suggested by the majority of the empirical literature that absolute measures of regional specialization should be used mainly in large countries (e.g. when we compare

[1] Specialization in these cases is called "production", "export" and "trade specialization" respectively.

EU countries), whereas relative indicators should deal with the internal of countries (e.g. when we compare regions within countries).

1.3 Structure of the dissertation

The remainder of the current dissertation is organized in five parts. Chapter two, which follows the introduction, provides an extensive review of the theoretical framework and the existing empirical literature with regard to regional specialization. In addition, an analysis of the relation between regional specialization and economic growth is undertaken in this section. Chapter three presents the dataset used in the analysis and describes the methodological approach. Chapter four analyzes patterns of regional specialization in Greek regions as far as manufacturing sector is concerned. Moreover, it discusses the possible implications which can be derived from the changing patterns of regional specialization. Chapter five examines the relationship between specialization and per capita Gross Value Added through an econometric investigation, and finally Chapter six summarizes the findings of the current research.

CHAPTER 2: Literature Review

2.1 Regional specialization and location theories

The geographic location of economic activities and in particular concentration of industrial activity plays a significant role in the configuration of industrial structures especially in a status of economic integration. Therefore it is crucial to examine to what extent traditional and contemporary trade theories can explicitly or implicitly explain patterns of regional specialization. Recent developments in location theory try to answer these questions by providing a wide range of evidence. In a second reading, it is absolutely important to determine the possible impact regional patterns of specialization could have on economic growth. Thus, theoretical elements and the reflecting theories which explain changes in regional specialization and geographic concentration must be carefully examined. However it must be highlighted that none of these theories and hypotheses alone has been proved sufficient to fully explain the determinants of industrial location. A brief summary of location theories is presented below in order to be conceived the main determinants of the interaction between space and industrial activities.

2.1.1 Neoclassical theory of trade

International trade theory has severe impacts on regional specialization and industrial concentration patterns and as Isard (1956) pointed out spatial location of economic activity and trade are the two sides of the same coin. Neoclassical theory has fairly characterized by Krugman (1993) as “first nature”, paying particular attention to natural (factor) endowments and technology for determining the spatial dimension of economic activity. The neo-classical trade theory – assuming perfect competition, constant returns to scale in production and a market with homogeneous products as the determining factors in these models – has tried to explain regional specialization through the notion of comparative advantage in terms of the availability of natural recourses and technological level. Ricardo’s (1817) “comparative advantage” refers to cross-country differences in the productivity of labour as the only factor which can explain

differences in comparative production costs. On the other hand Heckscher-Ohlin theory of trade focuses mainly on factor endowments assuming that technology is similar across countries. Therefore, differences in production can be explained by differences in factor endowments or differences in the abundance of production factors [Heckscher (1919), Ohlin (1933)].

2.1.2 New Trade Theories (NTT)

On the other hand new models of trade theories – assuming imperfect competition, increasing returns to scale and differentiated products – have emerged to point out that comparative advantage could not be considered to be the only sufficient explanation for regional specialization due to the fact that regions and particularly countries do exhibit completely different production structures. New trade theories have been developed in an attempt to supplement the traditional neoclassical trade theory explaining the notion of intra-industry[2] trade as the main determinant in a framework of monopolistic competition and differentiated products. However, this does not mean that New Trade Theories exclude the existence of inter-industry trade among countries as both intra and inter-industry forms of trade take place to the theoretical framework of New Trade Theories. In this procedure the most important element in the theoretical modeling of NTT is the role of market access. The latter can be explained by the industrial concentration in countries that exhibit good access to large markets. Assuming immobility of production factors, firms tend to concentrate in large markets where industries can exploit scale economies and take advantage of lower trade costs due to the large domestic demand. Krugman (1980) made this clearer by what has become known as the "home market effect". The explanation for "home market effect" stems from the ascertainment that, ceteris paribus, countries tend to export those goods for which they have relatively large domestic markets. Consequently, in a model of two countries, each country specializes in types of products for which it has the larger home market and thus it becomes a net exporter of these products.

[2] Intra-industry trade is characterized by an exchange of differentiated goods which belong in the same product category (same industries)

2.1.3 New Economic Geography

The New Economic Geography that has emerged recently maintains the basic assumptions made by New Trade Theory namely monopolistic competition and increasing returns to scale. The new distinctive characteristic of NEG is Krugman's (1991a, 1991b) assumption that labor is an internationally mobile production factor. In this framework he shows that due to the interaction between scale economies, trade costs and international mobility of labor, two initially identical countries may give rise to an industrial core and a periphery. Thus, agglomeration of economic activities forces industrial firms to locate in regions with larger market share because they can better exploit economies of scale taking advantage of an extensive labor force and sharing specialized input suppliers. A second class of NEG models proposed by Venables (1996) assumes that labor is internationally immobile but allows for input-output linkages between firms. To put it simply, producers of final goods (downstream firms) seek to locate in a market comprised of many upstream firms[3] lowering in such a way transport costs. The demand and cost linkages or else backward and forward linkages created by vertically related firms represent the driving force that can trigger agglomeration. In these models a reduction in transport costs can lead to increased specialization and concentration but at very low levels of transport costs dispersion trends are likely to appear. To sum up, scale economies, spillovers and forward and backward linkages function as centripetal forces whilst costs incurred by agglomeration such as commuting and congestion costs function as centrifugal forces (Fujita, Krugman, Venables 1999). Conclusively, at intermediate trade costs industries prefer to concentrate at the core taking advantage of a larger market even if wages are higher in relation to the periphery, while industries tend to move to the periphery in order to be benefited from lower wages at very low levels of trade costs. Whatever the case may be, these models follow specific assumptions and function under particular circumstances. We must therefore be very cautious when we try to interpret the operation of these models to reality. The fact is that each model alone can explain a part of reality but in any case they cannot explain the whole truth.

[3] Upstream firms are the producers of intermediate goods whereas downstream firms are the producers of final goods

2.2 Specialization and Concentration: Examining their relationship through empirical literature

Globalization and trade liberalization have induced dramatic changes in global production and consumption and this unequivocally does affect the productive structures of countries especially when they are in a status of economic integration. European Union constitutes a special example of economic integration having created a single market and a single currency in part. This procedure has produced severe implications in national and regional level affecting to a great extent the structure of European manufacturing and afterwards patterns of regional specialization and industrial concentration. In this respect, another crucial question that literature of spatial economics has examined is the relationship between regional specialization and geographic concentration. Accordingly, are there specific characteristics between countries and industries that could explain the differences in specialization and concentration patterns? What are the driving forces which determine the location choice of industries and which factors drive them to change their behavior over time? Although traditional trade theory, new trade theory and new economic geography bring into light some useful insights about this possible relationship they do not provide clear and definite predictions about this relationship. As Aiginger and Pfaffermayr (2004) point out *"some determinants are addressed in trade theory, some in industrial organization and some in economic geography"*.

It is therefore crucial to examine thoroughly the consistency of predictions made by traditional and contemporary location theories with industry characteristics basically in the light of EU experience. Economic integration within the European Union dropped the trade barriers in favor of further trade liberalization allowing for free movement of goods and people. Thus, in addition to theoretical models of traditional trade theories which are based on comparative advantage and factor endowments, new trade theories draw attention to the role of market access and the interaction between scale economies and trade costs concerning both the characteristics of the industries and the characteristics of the countries where industries locate (Amiti 1998). Starting from traditional trade theories, one could say intuitively that specialization according to

comparative advantage affects significantly the pattern of relative concentration[4] while says nothing about absolute concentration. However, in the case of New Economic Geography which emphasizes in industrial agglomerations stimulated by forward and backward linkages between firms, the appropriate measure should be the absolute concentration (Haaland et al. 1999). In this sense, one can conclude that specialization according to comparative advantage fits well to small labour-based countries while specialization explained by home market effect and agglomeration forces has to do with larger and more central – as market access considered – countries. Indeed, Haaland et al. (1999) find that industries like Motor Vehicles, Electrical Apparatus, Machinery and Equipment, Radio, TV and Communication Equipment *"are among the most concentrated ones in terms of absolute concentration, whereas there are not particularly concentrated in relative terms".* This is the case of industries that can exploit high levels of scale economies implying that are basically concentrated in large countries. On the other hand, industries like Railroad Equipment, Wearing Apparel and Shipbuilding and Repairing *"are fairly concentrated in relative terms, but not in absolute terms".* The latter indicates that small countries are mainly specialized in this type of industries. Brulhart (1998) comes to confirm the above observations regarding country specialization in light of concentration of industrial sectors. From the estimation of locational Gini index between 1980 and 1990, he finds a considerable increase of industrial concentration in 14 out of 18 sectors with respect to manufacturing employment. There is also evidence that industries subject to high scale economies are highly concentrated and located in central EU countries. But the most interesting point in his analysis is to see in which way specialization patterns of individual countries reflect the increasing trend in concentration. The following example shows the general tendency. On the one side Portugal which is regarded as a peripheral country presented in 1990 the highest level of specialization in labor-intensive sectors such as Textiles and Clothing/footwear, while the Netherlands exhibited the lowest value in these sectors. On the other side, Germany – which belongs to the strong European core –, appeared to be the most specialized country in Motor Vehicles and Electrical Engineering while the opposite is true for Greece. In terms of overall manufacturing employment the same stylized fact is applied: Germany is the

[4] Relative concentration measures to which degree an industry is concentrated relative to the average spread of activities between countries, while absolute concentration indicates whether an industry is concentrated in absolute terms (Haaland et al. 1999)

most specialized member, whereas Greece – the EU's most peripheral country – is the least specialized. It therefore becomes tangible that peripheral countries are specialized in low-scaled and labor-intensive activities, whilst more central countries concentrate high-scaled, high-technology and capital-intensive activities.

In addition, there is also another element that should be taken into consideration in the examination of regional patterns of specialization and industrial concentration: the possible connection among them. Are regional specialization and geographic concentration the two sides of the same coin? In other words do the two concepts move in the same direction as regards industrial structures of countries or regions? One might suppose that a country or region which becomes more specialized in a few industrial sectors, it probably concentrates more of its activity in these sectors. But in a world of asymmetries, different population sizes and differences in factor endowments and technology it is not that simple. Aiginger and Davies (2004) using production data in their analysis suggest that although specialization of European manufacturing has showed an increasing trend, concentration has moved in the opposite direction with respect to the period 1985-1998. The results form a different picture if we analyze the data for the two sub-periods, 1985-1992 and 1992-1998. Between the period 1985-1982 which is defined as the Pre-Single Market period industries became more concentrated, while in the second sub-period a decrease in geographical concentration had been observed. This view is also supported by Aiginger and Rossi-Hansberg (2006). They used two data sets on manufacturing activity across the United States and the European Union member states for the period 1987-1996 and showed that for a broad set of transport costs specialization increases and concentration decreases as transport costs fall. With respect to specialization Amiti (1997) finds that *"even though specialization decreased for some countries when comparing 1968 and 1990, there was a significant increase in specialization between 1980 and 1990 in all of them"*. It can therefore be implied that the impact of the Single Market implementation in the European Union is undoubtedly of particular significance. The trends of industrial de-concentration during the Single Market period at the early nineties have also been confirmed by Aiginger and Pfaffermayr (2004) either by using value added or employment or even export data. As for the Pre-Single Market period and especially during the 1980s Brulhart (1998), Brulhart and Torstensson (1996), Amiti (1998) and Haaland et al. (1999) also provide evidence of increasing trends in geographical concentration. Haaland et al. (1999) find

that on average relative concentration increased by 11.4 % during the period 1985-1992 and only few industries exhibited decreased concentration. The main conclusion is that concentration and specialization went together until the early 1990s but from this point onwards they did not develop in parallel. All in all, the empirical research has confirmed the stylized fact that the enactment of the Single Market during the 1990s leaded to a significant decrease in overall geographical concentration in the EU territory.

2.3. Specialization and Economic Growth

International trade theories have shown that the nature of the specialization of a country is non-neutral on its growth performance. However most empirical studies related to growth literature do not take into account the potential effects of specialization on growth (Bensidoun et al. 2001). In addition, it is observable a lack of research in this field – connection between specialization and growth – and thus further observation is required in order to be determined a possible relation among the two. Empirical literature must therefore seek to answer in the following questions:

-Do the specific types of industries which countries are specialized in provide evidence of a more growth motivating economy?
-Does the industrial sector composition across countries or regions constitute a major factor of explaining growth rates?
-In other words, what is the best strategy that promotes growth in a country as far as manufacture is concerned? Regional specialization or regional diversification?

The answer in the latter is not so obvious due to the fact that several features – endogenous or exogenous in nature – that induce growth should be taken into consideration before a clear policy of specialization or diversification is adopted. Furthermore, the choice of the appropriate strategy constitutes an issue of high importance regarding its impact on personal income, employment, value added, the level of education and other determining factors of economic growth.

2.3.1 The spatial dimension of Growth theories

Economic growth and its determinants have attracted the attention of theoretical and empirical literature especially over the last decades. As far as growth theories are concerned, it is worth mentioning that *"due to the lack of a unifying theory on economic growth [...] studies draw on several theoretical frameworks and examine factors that are taken from several sources"* (Arvanitidis et al. 2007). It is therefore easily understood that findings and conclusions of these studies are at least insecure and often contradictory. However, despite the lack of a unifying growth theory, there are several theories that can partially explain the role of growth determinants and their impact on regional income. At this point it is essential for the purpose of the analysis to examine which of these theories can include in their framework the component of spatial dimension. The conventional neoclassical model of Solow (1956) which assumes constant returns to scale, substitutability between labor and capital and an exogenously determined technological progress, it does not provide signs of how industrial activity can be distributed in space. The model shows how the interrelation between the increase in accumulation of capital, the increase in workforce and technological progress can affect the aggregate income of an economy. However, despite the fact that technological progress is regarded as a major factor in this model, its exogenous nature does not allow for any spatial interpretation. On the other side endogenous growth theories (Romer 1986; Lucas 1988)[5] operating in a context of increasing returns to scale, highlight the role of factors such as the accumulation of knowledge and innovation. The introduction of these factors in these models aims to endogenize the process of technological progress causing in such a way a self-powered economic growth. Whatever the case may be, it seems that endogenous growth models are likely to play an important role as regards spatial dimension. Due to the fact that endogenous theories leave room for state intervention in the forms of national and regional policies the above statement may intuitively be true. Another strand of theory which moves in the same direction with the previous is the cumulative causation growth theory (Myrdal 1957; Kaldor 1970). The basic point of this theory is that economic activity is not evenly distributed across space and that "initial conditions"

[5] Romer's (1986) model explains growth through technological externalities such as learning by doing and knowledge spillovers, while the basic role in Lucas' (1988) model plays human capital.

play a decisive role in the determination of economic growth. This growth process generates unbalanced regional growth as powerful regions reinforce their position increasing the distance from the weak regions. Cumulative causation theory seems to present some striking similarities with the New Economic Geography (Krugman 1991a) although NEG is not regarded a growth theory. Despite the fact that NEG has to do with location of economic activity, it also has severe implications on economic growth.

2.3.2 Structural change, specialization and growth

The presence of income differences across countries but even across regions has given rise to a continuous empirical research in order to identify possible factors that induce growth. In this respect it is of high importance the examination of the impact that sectoral composition of economic activity can have on regional growth. This phenomenon has been mainly explored in European Union where extensive structural change has taken place in the light of economic integration. However, while most work try to explain growth differences by focusing on structural characteristics and other variables such as human capital and level of technology, few studies use specialization as a determining factor of growth rates in a country. As Aiginger (2001) rightly argues *"the relation between structural change and growth seems to be under-researched relative to its alleged importance"* since very few studies consider the interrelation among the two. The impact that structural change could have on economic dynamics of a country or even region must be therefore faced with particular attention from the scientific community.

Most empirical research has focused so far on the examination of specialization of countries and concentration of industries leaving unsearchable the possible relation between specialization and economic growth. However, there are studies that have attempted to analyze how changes in spatial allocation of industrial activity can affect the economic potential of countries implicitly or explicitly. Peneder (2002) referring to the connection between structural change and aggregate growth suggests the confirmation of three general lessons:

-Firstly, industries generally do not contribute equally to overall growth in labor productivity.
-Secondly, structural change itself is not a uniform process since it is more pronounced for some industries in certain periods, and less in others.
-Thirdly, there is a tendency for structural change during periods of low aggregate growth.

The suggestions made by Peneder underline the fact that it is very difficult to define a clear and monotonic relation between observed structural change and aggregate growth as there is evident an uneven distribution of industrial activity across space and time. Moreover, it is also difficult to determine a direct one-way causality – whether growth depends on past change or whether growth promotes structural change – as regards the two variables. In the same line Aiginger (2001) argues that growth provokes structural change, but on the other hand a change in industrial structures is a precondition for growth. He nevertheless finds evidence that growth depends on past structural change more closely than the other way round. Using nominal and real value added, and employment as variables in his study, Aiginger finds support for a close relation between speed of change and growth of manufacturing regarding European Union for the period 1985-1998. The only exception which reduces the closeness of the fit is Greece in which structural change is considerable while growth is appeared to be the lowest in the EU.

Another stylized fact presented in both studies (Aiginger 2001; Peneder 2002) is the positive relation between the levels of economic development and specific kind of industrial structure. Peneder (2002) finds that within the manufacturing sector both technology driven and high skill industries present a significant and positive impact on the level of GDP per capita, confirming the fact that fast growing industries can achieve higher rates of productivity growth than others. Aiginger (2001) moves in the same direction stressing that increases in the shares of fast growing industries[6] and decreases in opposite kinds of industries are considered to be growth promoting for a specific country. According to economic theory, rising incomes induce changes in demand

[6] Aiginger (2001) entitles this kind of positive changes "active" change, while he refers to "passive change" as far as negative changes -increases in slowly growing industries and decreases in fast growing industries- take place.

structures and thus countries must specialize in growth promoting sectors adapting their production structures in accordance with changing demand structures. This means that countries or regions must proceed a systematic re-shaping of specialization patterns in order to be adjusted to the new demand requirements. An important interpretation can be implied from the latter statement: changes in specialization patterns induced by structural changes may implicitly affect economic growth if not explicitly.

The adjustment process to new market conditions could be the case for the countries which belong to diverging clubs[7] or "the poor countries". These countries have to follow another specialization strategy provided that they need to succeed better growth rates. Bensidoun et al. (2001) explain that these countries have presented better catching-up performance when they succeed to adapt their international specialization to dynamic products or else in products that incorporate a dynamic international demand. This fact is also confirmed by Bensidoun and Ünal-Kesenci (1998) and Grossman and Helpman (1991) who point out that specialization in high-technology and high-quality sectors and generally in increasing returns sectors can only provide better results as regards growth performance. On the other side, countries that do not follow this strategy and insist on traditional production structures are characterized by low share in world trade and thereupon by poor growth performance. The latter seems to be the case for the regions of European Union. In a study of European Union regions during the period 1977-1999, Ezcurra et al. (2004) find that changes in regional specialization patterns are closely linked to the distribution of regional GDP per capita. They suggest that the increase in regional specialization during the nineties may explain the presence of regional inequality and the maintenance in the degree of polarization of regional per capita income. It can be therefore implied from this that specialization of low-income countries in sectors of low growth potential has negative effects on their economies especially in a status of economic integration.

Furthermore, a basic point that must be explored through the scanning of scientific literature is the possible role specialization may have on growth determinants such as productivity and employment. There are several studies that confirm this relation whilst others do not find an explicit relation between the two. Weinhold and Rauch (1997)

[7] For an overview about converging and diverging clubs see Quah (1996)

suggest that in a state of openness – where economies can take advantage of dynamic scale economies associated with learning by doing – regional specialization can have a positive impact on productivity growth. However, Combes (2000) looking at the economic structure and local growth for 341 French spatial entities over the period 1984-1993 finds evidence that regional specialization negatively affects employment growth. He, nevertheless, stresses the fact that specialization may improve local growth in expansion periods while the opposite is true during recession periods.

2.3.3 Specialization or diversification? A policy issue

At this point, another crucial aspect of economic growth that must be examined is the choice of the appropriate strategy between specialization and diversification. Do specialization or diversification trends across regions or countries coincide with increases in per capita incomes or declines? As Aiginger (1999) points out *"no comprehensive empirical investigation is available on the topic whether higher specialized countries or those with a more dispersed structures - across industries or locations - are better for growth"*.

As it has been suggested from many studies, specialization in specific growth-promoting sectors such as high-technology or more generally scale-intensive industries can evidently foster economic growth. But can regional specialization be proved an effective policy which can be applied to countries without putting them in a state of jeopardy? Dalum et al. (1999) stresses that specialization in the "right" kind of activities may be successful but he also suggests that *"enhancing growth by steering specialization patterns seems a quite risky art rather than a well-established science without major uncertainty"*. Aiginger (1999) and Ezcurra et al. (2004) referring to the EU case point out that specialization in narrow product groups may increase demand risk for individual countries and this possibly will make them more vulnerable to asymmetric shocks especially when these countries belong to a common currency area. It is obvious that external shocks – especially for the countries of a Monetary Union – can lead to severe demand asymmetries which cannot be faced by changes in the external value of currencies. On the other hand, countries which present a more diversified industrial structure will be in a more advantageous position than others

(Aiginger 2001). However, Bode et al. (2004) examining sectoral specialization and performance of the Spanish regions showed that diversification coincides with slow growth, while specialization with quick growth. This does not seem to be the case for the peripheral regions of European Union over the period 1950-1990. Molle (1997) finds out that the lower levels of GDP per capita have been presented in those peripheral regions which exhibited higher levels of specialization.

Whatever the case may be, it is beyond any question that specialization not only presents advantages with regard to growth potentials, but also performs major disadvantages related to risk effects. Specialization in dynamic markets give countries the chance to enjoy higher levels of productivity and accordingly higher economic growth, while countries specialized in mature, low-wage or low-growth potential industries will not be able to achieve faster growth (Aiginger 2001).

2.4 Empirical evidence on regional specialization

A considerable number of empirical studies related to the estimation of specialization across countries, regions or more generally geographical entities have been exhibited over the last years especially in the European context. However, there is an observable lack of information in this field, since most of studies deal with specialization in European countries and empirical evidence at the level of European regions is particularly sparse (Krieger-Boden 2000). Whatever the case may be, the thorough examination of regional specialization has been proved to be a very effective tool for policy makers due to its particular importance in both economic and political terms. The main focus of this review will be the exploration of regional specialization trends in the European Union which forms a geographical location of high interest due to its distinctive spatial specificities. The extensive European integration that took place over the last decades has nevertheless showed that the mobility of labor appears to be rather limited with respect to EU-15 (Fertig and Schmidt 2002; Fertig 2003), hence only marginal changes in the degree of specialization of member states have occurred (European Commission 1999a).

Most empirical research in the field of regional specialization refers to the manufacturing sector due to the availability of data sources. Trade, production and employment data are used in this direction in order to be examined the role of specialization in both higher (e.g. countries) and lower (e.g. regions) level of spatial aggregation.

2.4.1 Specialization in European Union countries

Various studies that deal with European countries concentrate their analysis in a basic question: Have economic integration affected patterns of regional specialization over the last years? In other words do EU member states present increasing or decreasing trends of specialization?

Firstly, Hine (1990) and Greenaway and Hine (1991) find evidence of increasing specialization as regards EU countries in the early 1980s. The results of their survey are based on the estimation of the mean of the Finger-Kreinin index (F-K), using production and export data for 28 manufacturing industries. On the contrary, Sapir (1996) comes to a different conclusion regarding specialization in EU countries. His analysis is based on the estimation of Herfindahl index with trade data from 100 manufacturing industries. He finds that specialization did not changed in Germany, Italy and the UK for the period 1977-1992, while increased in France since 1986.

A comprehensive analysis of specialization trends in EU member states was conducted by Amiti (1997). She uses two databases – one from Eurostat and the other from Unido – and considers the estimation of two measures of specialization, the Gini (G_j) index and the weighted standard deviation of the Balassa index (s_j) using production and employment data. The Eurostat dataset includes 65 manufacturing industries and presents results for five European countries (Belgium, France, Germany, Italy and the UK), while the Unido dataset consists of 27 manufacturing industries and 10 European countries namely Belgium, France, Germany, Italy, Denmark, Greece, Portugal, Spain, the Netherlands and the UK. In the case of Eurostat dataset she finds increasing specialization at an average annual rate of 2% in all countries for the period 1976-1989. In the second case of Unido dataset the results are mixed but the general trend is increasing. More specifically, between 1968 and 1990 there was a significant increase

in specialization for Belgium, Denmark, Germany, Greece, Italy and the Netherlands, a significant fall for France, Spain and the UK, and no significant change for Portugal. However, it is remarkable that France, Spain, Portugal and the UK exhibited upward trends for the period 1980-1990. Amiti (1997) argues that the latter is possibly the outcome of the elimination of trade barriers within the EU especially for countries that are late joiners to the EU.

Almost the same results are applied to Midelfart-Knarvik et al. (2000) survey. They use as the main data source the OECD STAN database for 14 European countries (the EU-15 except Luxemburg) and estimate Krugman specialization index using production data over the period 1970-1997. Although a fall in specialization is observable between 1970-1980, there is evident a steady increase from 1980 onwards in all countries except the Netherlands. This consequently leads to the conclusion that from the early 1980s industrial structure of each individual country tended to be more dissimilar in relation to the rest of the EU. Midelfart-Knarvik et al. (2000) draw attention to this feature and estimate the bilateral differences between the industrial structures of pairs of countries. The basic point which can be excluded from this comparison is that countries of European core (e.g. Germany, France, GB) appear to be more similar each other and the same is true for peripheral countries (e.g. Greece, Portugal). However, when the first group is compared to the second, there is evident an increasing degree of dissimilarity, confirming in such a way an established core-periphery pattern. The steady increase in specialization of EU member states from 1980 onwards is also evident in Aiginger and Davies (2004). Having used nominal value added data for 14 countries (Belgium and Luxemburg are taken together) and 99 manufacturing industries, they estimate the entropy index[8] of specialization and find that countries became more specialized during the period 1985-1998. Besides, the main point of their analysis is that specialization grew faster during the nineties after the full introduction of the Single Market, having presented a change of 5% in a period of 6 years (1992-1998). The above consideration is also confirmed by Aiginger and Rossi-Hansberg (2006) who come to the conclusion that average specialization in European Union countries rose by 5.7% for the period 1987-1996. Furthermore, they go through a

[8] The used entropy index $SPEC_j = -\sum_i \left(X_{ij} / X_j\right) * \ln\left(X_{ij} / X_j\right)$ is defined by the summation of the products of the shares and log shares of each industry in the country's aggregate manufacturing (Aiginger and Davies 2004).

comparison between United States and European Union specialization degrees and conclude that average specialization grew faster in the EU (EU 5.7% ; US 2.3%) for the same period. For their survey, they use Gini coefficient as the appropriate index for two datasets; one for 50 US countries and 10 industries and the other for 14 EU countries and 23 industries.

On the other side, no clear tendency towards increasing or decreasing specialization for the period 1980-1994 has been detected by Krieger-Boden (2000). The estimations of coefficients of specialization[9] for value added and employment for 12 EU countries leads to ambiguous results, since some countries show a slight increase while others do not present any clear trend. The survey of the European Commission (1999b) comes to the same conclusion as there is no general trend of increasing specialization[10] or increasing diversification over the period 1988-1998. However, it is evident that although production specialization exhibits increasing trends in the majority of member states, export specialization presents a downward trend in almost all countries.

2.4.2 Specialization in European regions

Until recently, most empirical studies related to specialization in European Union have used national data (e.g. data at country level) and not regional. The lack of empirical results at a lower territorial level was mainly due to a severe lack of data on European regions. As it can be observed from the literature, the time periods that have been taken in most surveys are extremely short by virtue of insufficient industrial disaggregation found in most European regions. Using GVA data from Eurostat REGIO database, Hallet (2000) tries to find out trends in sectoral specialization[11] for 119 European regions. For this purpose, he estimates the absolute difference between the sectoral share y_i^k of branch k in region i and the respective EU15 average $\overline{y^k}$, summed over all

[9] $s = \sum_i^n |a_i - b_i|$, where a_i are the industrial shares of the country under investigation and b_i are the industrial shares of a reference economy (e.g. EU average), where $0 \leq s \leq 2$ (Krieger-Boden, 2000).

[10] The results are based on the estimates of 7 indicators of specialization for 14 countries and two levels of aggregation.

[11] He actually uses the sectoral classification NACE 17, which comprises 17 branches of economic activity and includes 5 groups of services.

branches k[12]. He finds that between 1980 and 1995 regional specialization presented a decreasing trend, as only 34 out of 119 European regions have become more specialized. However, a clear pattern of specialization cannot be identified by the results because the regions that became more specialized during this period are either among the poorer regions or among the richer ones. The study of Hallet comes to confirm the results of a similar study conducted by Molle (1997) who finds a general decreasing trend in specialization for a longer time period, 1950-1990. With respect to within countries analysis, Bode et al. (2004) examines the evolution of regional specialization in Spain with the use of Theil index and Weighted Theil index. Employment data disaggregated into 18 Spanish regions and 88 manufacturing branches reveals that during the period 1978-1999 specialization of Spanish regions seems to have been moderate. Furthermore no clear tendency of increasing or decreasing trend in regional specialization has been observed for this period. Having used employment data Krieger-Boden (2000) examines regional specialization in France for the period 1973-1996. Herfindahl and Gini indices have been calculated for 21 regions and 30 manufacturing branches, but the outcome seems to be rather contradictory. According to the results, Herfindahl index reveals no variation as regards specialization, whereas the estimation of Gini coefficient shows that specialization in most regions has presented decreasing trends.

During the last decade, European Union carried out the greater enlargement in its history, accepting countries of former Eastern bloc as new member states. Specialization patterns in the regions of these countries especially from 1990 onwards, when they start functioning in a state of free market, have been extensively explored by the empirical literature. Traistaru et al. (2002) analyze trends in specialization patterns during the period 1990-1999 for the accession countries of Bulgaria, Romania, Estonia, Hungary and Slovenia using regional manufacturing employment data at NUTS III spatial level. They find that average regional specialization[13] increased in Bulgaria and

[12] The equation is formed as follows: $s_i = \frac{1}{2}\sum_k \left| y_i^k - \overline{y^k} \right|$

[13] They use as a measure of regional specialization the Dissimilarity Index: $DSR_j = \sum_i \left| s_{ij}^s - s_i \right|$, where s_{ij}^s is the share of employment in industry *i* in region *j* in total employment of the region and s_i is the share of country employment in industry *i* in total country employment.

Romania, decreased in Estonia and it did not exhibited any significant change in Hungary and Slovenia. Also it can be observed from the analysis that highly-specialized regions reveal higher GDP per capita than low-specialized regions. For the same group of countries and the same time period, Kallioras et al. (2004) – with the use of Theil entropy index estimated for NUTS III regions – find that countries with intermediate economic level such as Hungary and Estonia presented prominent changes in the degree of regional specialization, whereas countries with high (Slovenia) or low (Bulgaria, Romania) level of economic development were characterized by stable industrial patterns. In addition, Kallioras (2006) points out that during the period 1990-2000 the majority of regions in EU accession countries recorded a general decreasing trend in the degree of specialization as measured by Theil index. However in some cases, – mostly for the regions of Hungary, Estonia and Slovenia – regional specialization exhibited increasing trends mainly due to the durability of productive bases of the respective regions. In this framework, it is of high interest the observation made by Resmini (2002) who stresses that relocation activity of manufacturing sector was very intensive during that period and mainly in favor of regions which border the EU. As a result, specialization levels in most border regions – but also in capital cities – presented upward trends and better growth levels as compared to the rest of the regions. The latter comes to confirm the crucial role European integration process has played to the structure of industrial sector in EU accession countries.

2.4.3 Econometric models

Theoretically, it is admissible by the literature that regional specialization can influence the growth prospects of countries and regions. However, the impact regional specialization can have on per capita income has not been explicitly proved by the scientific research. At the same time, spatial econometric analysis has revealed in some cases that specialization – especially in industrial sector – matters for growth. Indeed, changes in regional specialization together with other determinants of growth such as regional population, density of population, investments or technology appear to be depicted by changes in per capita income. The majority of econometric models use regional specialization as independent variable, while regional per capita GDP is applied in most cases as the dependent variable in the models under consideration.

Below, a further investigation of spatial econometric models is attempted in an effort to be understood the interplay between growth and specialization.

Bensidoun et al. (2001) in a study of 53 countries for six periods of 5 years (1967-1997) examine the interrelation between international specialization and growth with the use of a dynamic panel-data model. The general form of the equation is the following:

$$\ln y_{it} - \ln y_{it-\tau} = \alpha_i + \beta \ln y_{it-\tau} + \delta_1 \ln inv_{it} + \delta_2 \ln disc_{it} + \lambda \ln spec_{it} + \gamma_t + \varepsilon_{it},$$

where y_{it} is the PPP[14] GDP per capita of country i at time t, inv_{it} is the investment rate for the period from 1-τ to t-1, $disc_{it}$ is an indicator of openness and $spec_{it}$ is the specialization indicator. From the estimates it can be concluded that the nature of specialization or more specifically the ability of countries to adapt to new demand conditions relates positively and significantly to growth. According to the authors, specialization in dynamic products may be proved growth promoting, since specialization in specific products is better for growth than specialization in other less dynamic products.

Dalum et al. (1999) stresses the importance of specialization on economic growth through a study of 20 OECD countries[15] for the period 1965-1988. They use export data for 75 industrial products, each of which belongs to one of 11 manufacturing sectors and estimate separate equations for three periods[16]: 1965-1973, 1973-1979 and 1979-1988. The model used for this analysis can be written as:

$$Q_{ijt} = \alpha_{jt} L_{ijt} + \beta_{jt} K + \gamma_{jt} T_{ijt} + \delta_{jt} U_{ijt} + s_{jt} S_{ijt}$$

where Q is value added, L is labor input, K is capital input, T depicts technology investment, U is a proxy for international technology diffusion and finally S is a vector of specialization variables. The regression results indicate that specialization does

[14] PPP or Purchasing Power Parity is an alternative measure of GDP

[15] Austria, Belgium, Canada, The Netherlands, Portugal, Spain, France, Germany (West), Switzerland, Denmark, Sweden, Norway, Finland, Japan, the United Kingdom, the United States, Greece, Turkey, Ireland, Italy

[16] The period of analysis is divided into three sub-periods because the authors try to catch the cyclical variations in export and exchange rates. The years 1965, 1973, 1979 and 1988 are regarded as peaks in the business and trade cycles.

matter for growth, even if the effect becomes less important over time. It seems that specialization in combination with other factors such as technology and knowledge spillovers can evidently explain growth, despite the fact that more work in this field is essential.

With respect to European Union, Ezcurra et al. (2004) present an econometric model in which regional productive specialization is considered to be the dependent variable, while regional per capita income plays the role of the explanatory variable. The model is as follows:

$$SPEC_{it}^{K} = \beta_0 + \beta_1 \log POP_{it} + \beta_2 \log DENS_{it} + \beta_3 \log \mathrm{GV}\, Apc_{it} + \beta_4 \log\left(\log GVApc\right)_{it}^{2} + \beta_5\, CENTRAL_i + \beta_6\, NORTH_i + \beta_7\, SOUTH_i + u_{it}$$

where POP_{it} measures regional population, $DENS_{it}$ is the density of population in a region, $\mathrm{GV}\, Apc_{it}$ reflects regional per capita income and $GVApc_{it}^{2}$ the square of regional per capita income. Finally, the dummy variables $CENTRAL_i$, $NORTH_i$ and $SOUTH_i$ are used in the model to catch a possible North-South distinction. The results indicate that during the period 1977-1999, increases in regional growth tend to decrease productive specialization initially but it rises at later stages of development. The same is true for regional size as regional specialization falls with increases in regional population. In addition, an important element of this study is the relation between specialization and the geographical location of European regions. The findings reveal that a possible centre-periphery gradient is evident in the model as Northern and Southern regions present higher levels of regional specialization as compared to more Central regions.

Regarding EU New Member-states, Kallioras and Petrakos (2010) test the industrial growth performance[17] for the regions of Hungary, Bulgaria, Romania, Estonia and Slovenia during the early accession period, 1991-2000. The econometric model they use takes the form:

$$Y_{r,t\_t+k} = \sum_{\lambda=1}^{n}\left(\alpha_\lambda X_{\lambda,r,t}\right) + \varepsilon_{r,t}$$

[17] The industrial growth of EU New Member-states is expressed in terms of employment data

where Y_{r,t_t+k} is the dependent industrial growth variable for region r and $\sum_{\lambda=1}^{n}(\alpha_{\lambda} X_{\lambda,r,t})$ is the set of λ independent variables which are: *Economic Integration*[18] with the average EU-15 economy in the base year (1991), *Regional Industrial Diversification*[19] (the inverse of regional specialization) in the base year, the share of *Industrial Employment in Capital-intensive Sectors* in the total industrial employment, the *Average Size of Industrial Firms* which accounts for possible economies of scale and finally a *Geographic Variable of the Relative Centrality* of the EU NMS. From the estimates, it seems that industrial diversification variable has a positive and statistically significant effect on industrial employment growth. The authors try to interpret these findings indicating that greater diversity in productive bases of NMS regions is better for regional growth as it may act as a safeguard protecting the regions from possible asymmetric shocks. From the rest of the variables only the Economic Integration variable has a negative and statistically significant impact on regional employment growth. The latter indicates that the exposure of weaker peripheral regions to new market conditions has negatively affected them in terms of employment. Consequently, there seems to be winners and losers from the process of European integration. Capital regions and western regions that border the EU presented better growth potentials as compared to the other more peripheral regions, mainly due to their favored geographic location. Contrary to the previous study, Iara and Traistaru (2004) using regional data for 20 NUTS III regions in Hungary over the period 1994-2000, find evidence of a positive relationship between regional growth and regional manufacturing specialization. However, the results in the last two surveys cannot be characterized as comparable due to the fact that different dependent and explanatory variables are used in the models, thereby changing the scope of each analysis.

2.4.4 The case of Greek regions

In this section, an overview of the available empirical literature with regard to Greek regions – whose performance is the object of the dissertation – is presented. Greece,

[18] Economic integration is expressed in the model with the use of an index of economic integration (IEI), proposed by Petrakos et al. (2005)

[19] Regional industrial diversification is displayed with the use of Theil Entropy Index, proposed by Theil (1972)

which is considered to be the most peripheral country of the EU, could not sufficiently deal with the new market conditions in the period after EU membership. The latter can be attributed not only to its disadvantageous geographic position but also to the less advanced industrial base in relation to the EU core and to the numerous structural problems. It is evident that the share of industry in GDP has presented declining trends[20] throughout the period 1980-2000 and moreover, it is the lowest of all member countries (Aiginger 2000). Despite the observed industrial decline, Greece has exhibited an enormous speed of structural change, which nevertheless has no results in terms of growth. This is probably due to the specialization of Greece in low growth sectors, while the majority of member states follow high growth industries (Aiginger 2001). Indeed, Greek industrial structure seems to have been dominated by labour-intensive sectors, as 50% of industrial GDP in 1985 has been concentrated in these sectors (42% in only two sectors: Food, Beverages & Tobacco and Textiles & Wearing Apparel) while the respective figure for the EU-15 is 36%. The overall image remains almost the same in the year 2000, as labour-intensive sectors counts for the 45% of industrial GDP in relation to 32% in EU-15 (Petrakos et al. 2005).

With respect to regional productive specialization for the period 1977-1999, Ezcurra et al. (2004) point out that initially, Greek regions appeared to be more specialized in comparison to the other European countries, but a tendency towards more diversification and convergence with the European average took place during that period. Using manufacturing employment data Brulhart (1998) finds that Greece has presented the lowest specialization level in the European Union, thereby confirming the view that a process of increasing diversification is evident from 1980 onwards. This fact is also confirmed by Petrakos et al. (2006) who estimate regional diversification for NUTS II and NUTS III Greek regions with the use of Theil index during the period 1980-2000. A closer look at the results reveals that the most urbanized regions (Athens, Thessaloniki, Patra, Larissa and Volos) present more diversified structures as compared to the other regions.

Finally, it will be very informative to present an econometric model of regional growth performance in Greek regions proposed by Petrakos et al. (2005). They examine

[20] From 14.59% in 1980 to 12.08% in 2000 (Petrakos et al. 2005)

manufacturing performance at NUTS III spatial level for the period 1981-2000 by using as dependent variables the industrial GDP growth and labour productivity growth. The explanatory variables used in the model are the following: regional diversification expressed by Theil index, the average firm size of industrial firms, an index of integration with the EU economy, an index of dissimilarity of regional structures in comparison to EU economy, the shares in the tertiary sector, the shares in regional productivity of the tertiary sector, the percentage of investment subsidized by the state and per capita public investment by region. The results indicate that all variables – except for index of integration and per capita public investment – have a statistically significant and positive impact on regional growth. A more careful interpretation of the results suggests that in the light of economic integration and fierce competition from other European countries, increasing diversification and increasing dissimilarity to the European average in combination with other factors was the key for better growth performance. On the other side, regions which experienced increasing specialization and similar industrial structures to the EU average faced with poor growth performance and industrial decline. As a matter of fact, the results seem to confirm the view that a more diversified production structure constitutes the appropriate solution for “weak”, peripheral countries.

CHAPTER 3: Data and methodology

The purpose of this section is to provide some useful explanations about the empirical method and the data used in the analysis. It is basically attempted to be justified the choice of an index which will be capable of explaining patterns of regional specialization in Greek regions. A comprehensive presentation of the index and its specific properties follows.

3.1 Indicators of regional specialization

A variety of indicators have been used in the literature in order to be determined the spatial distribution of economic activity. A thorough analysis of the existing empirical literature as regards regional specialization has been presented in the previous chapter of literature review. The majority of surveys conducted include explanations of why some indicators are better than others when patterns of regional specialization are examined. A basic conclusion that can be securely inferred from these considerations is that none of these measures can be regarded as optimal. Furthermore, very few attempts have been undertaken to determine the criteria by which we should choose the appropriate index[21]. Whatever the case may be, it is beyond any question that the decision on which measure is the most appropriate for a specific survey depends highly on the purpose of the investigation. Each measure presents specific properties, produces different results and therefore may fit or may not fit to the purpose of a certain study. For this purpose, a table which describes indicators that have been used most in the existing empirical literature has been constructed (see Table 1 in the Appendix). The table presents both absolute and relative measures of regional specialization describing the mathematical form and the main characteristics of these indicators.

Obviously, the main distinction is between the so-called absolute and relative measures of regional specialization[22]. Accordingly, the choice of the appropriate index constitutes a trade-off procedure between absolute and relative measures. With respect to industrial

[21] See Combes and Overman (2003) and Bode et al. (2004)
[22] The notions of absolute and relative specialization are described in the introduction of the present study.

specialization, absolute indicators are based on the shares of individual industries without taking into account a benchmark. This means that absolute measures do not take into consideration the behavior of the broader geographical area (e.g. a country when regions are under examination) and are based on shares which refer to a zero distribution or a uniform distribution (Bode et al. 2004). A major advantage of absolute indicators is that they measure the absolute size of specialization within a region, but on the other side they do not allow for interregional comparisons of structural change. On the other hand, relative indicators refer to the shares of individual industries according to a reference distribution, and therefore they deal better with the internal of countries. In this case relative specialization may be helpful if a comparison between different regions in a country is attempted. Taking into account the above considerations, it can be implied that absolute indicators focus on large countries as the degree of absolute specialization will be proportional to the size of countries, while relative indicators give more weight to small countries (Aiginger 1999).

3.2 Description of the methodology

Considering the merits of other indicators (see Table 1 in the Appendix) which have been extensively used in the empirical literature, it is suggested that the most appropriate index for the case of Greek regions is the Brülhart-Traeger-Theil index, the general form of which is the following:

$$\text{THEIL}=\sum_{i}^{I}\frac{n_i}{N}\frac{a_i(r)}{a_i}\ln\left(\frac{a_i(r)}{a_i}\right)$$

where I is the number of observations (the number of industries in the case of regional specialization) investigated in the analysis, r is the region under examination, $a_i(r)$ indicates the share of industry i in region r (in terms of employment) and a_i denotes the national share of industry i in the total manufacturing activity and functions as the benchmark for the corresponding $a_i(r)$. In addition $\frac{n_i}{N}$ represents the weighting factor

of Theil index such that $N = \sum_i n_i$. The $\frac{n_i}{N}$ ratio indicates the relative gravity each industry presents (e.g. employment, production, area[23]) in relation to the total industrial activity.

Theil index is characterized by substantial advantages, as compared to the other measures of specialization and concentration. Simultaneously these advantages constituted the basic criteria for the choice of Theil indicator. First of all, different types of Theil indices can be estimated for different forms of specialization. This is to say that Theil indicator can be measured for both types of specialization, absolute and relative (Tsiapa 2008). Moreover, the relative indicator can be weighted by the share of each industry in the total manufacturing providing in such a way another version of Theil index. Secondly, a major advantage of Theil index not presented in other indicators is the tendency to downgrade extreme observations due to its logarithmic form (Bode et al. 2004). Another significant characteristic that all entropy measures[24] deal with is the ability of decomposition. According to its decomposition property, Theil index allows for international, interregional and intertemporal comparisons (Bode et al. 2004). With respect to regional specialization, decomposition property provides the ability of estimation on both total spatial levels (e.g. comparison between regions) and segmentary spatial levels (e.g. the internal of a region) [Tsiapa 2008]. Last but not least, entropy measures present the capability to deal better with the Modifiable Area Unit Problem known as MAUP in the literature. The use of entropy indices implies that they may be estimated for different spatial levels (e.g. NUTS I, NUTS II or NUTS III spatial level)[25], but however this can lead to differentiated valuations and conclusions regarding each spatial unit. Theil index partially reduces the intensity of this problem by using as basic variable the number of employees or the area covered by each region (Tsiapa 2008).

In our study, trends in regional specialization in Greek regions are estimated with the use of the relative Theil index which takes the following form:

[23] Area (square kilometers) cannot be used in the case of regional specialization as it is basically used for the estimation of spatial concentration (Topographic Theil index).
[24] Theil index belongs to the category of entropy measures.
[25] NUTS or Nomenclature of territorial units for statistics refers to the standard regional classification system used by Eurostat.

$$\text{THEIL}=\sum_{i}^{I} a_i(r)\ln\left(\frac{a_i(r)}{a_i}\right)$$

where $a_i(r)$ indicates the employment shares of industry i in the total manufacturing in region r and a_i refers to the employment shares of industry i in the total manufacturing of Greek economy.

3.3 Data presentation

The main objective of this dissertation is to provide a comprehensive study of industrial specialization patterns across Greek regions. For this purpose it has been proposed the use of Theil entropy index as it is obviously more suitable than other conventional measures to deal with the Greek case. The choice of Theil index was mainly due to its desirable decomposition properties and its ability to downgrade the influences of outliers. The estimation of Theil index is based on regional employment manufacturing data for 51 NUTS III regions and 17 industrial sectors covering a period of 25 years, from 1980 to 2005. With respect to the choice of the appropriate data set, employment data are valuated as more preferable than other variables due to the fact that through the use of employment, problems related to currency conversion and inflation rates – which are inherent in value added and output data – can be avoided (Brülhart and Traeger 2003). Moreover, employment data can be characterized by "mobility", an asset inherent in employment which can provide a different viewpoint regarding the inspection of industrial behavior.

It is worth noting that the period covered coincides with historical moments as regards political and economic situation in Greece. The year 1980 constitutes a key point in Greek history because one year later Greece joined officially the (then called) European Economic Community. The enactment of the Single Market in 1992 and the entry of Greece in the Economic and Monetary Union in 2001 also represent crucial points for which manufacturing data are available. At this point, it should be pointed out that trends in regional employment specialization are computed for the years 1980, 1985,

1990, 1995, 2000 and 2005 catching in this way the possible effects EU agreements could have on industrial structure of Greece before and after their implementation.

The dataset used in this study is from ELSTAT[26] and consists of 17 manufacturing branches (see Table 2 in the Appendix) following the Stakod 80 classification. It must be referred that for the years 1980, 1985 and 1990 ELSTAT uses Stakod 80 classification, whereas for the years 1995, 2000 and 2005 ELSTAT uses Stakod 03[27] classification. Originally Stakod 80 classification consists of 20 manufacturing branches, however, they have been accumulated in 17 branches in order to be achieved the best fit between Stakod 80 and Stakod 03. Although it is generally desirable *"to seek the most sectorally disaggregated data, since this maximizes the likelihood that an industry contains truly similar products"* (Brülhart 1998), there is a lack of data in an adequate level of disaggregation regarding the spatial division of labor.

Moreover, the analysis of regional employment specialization trends faces difficulties related to the data availability. From 1995 onwards there are some missing observations and this can probably result to distortions as regards the regional distribution of industrial employment. The data coverage problem is mainly due to the policy of confidentiality from the side of ELSTAT whereby data in cases where there are two or less establishments in a region (NUTS II or NUTS III) cannot be provided (Petrakos et al. 2006). Another problem that has to do with the surveyed data is that from 1995 onwards firms which employ less than 10 employees are excluded from the data coverage (Petrakos et al. 2006). This creates an additional problem which makes the database used in the analysis less reliable. However, the total number of employees that are excluded is too small in relation to the total employment power and therefore do not seem to significantly affect the picture of the results.

[26] Hellenic Statistical Authority
[27] Stakod 03 follows the NACE two-digit classification proposed by Eurostat and includes 23 industrial sectors.

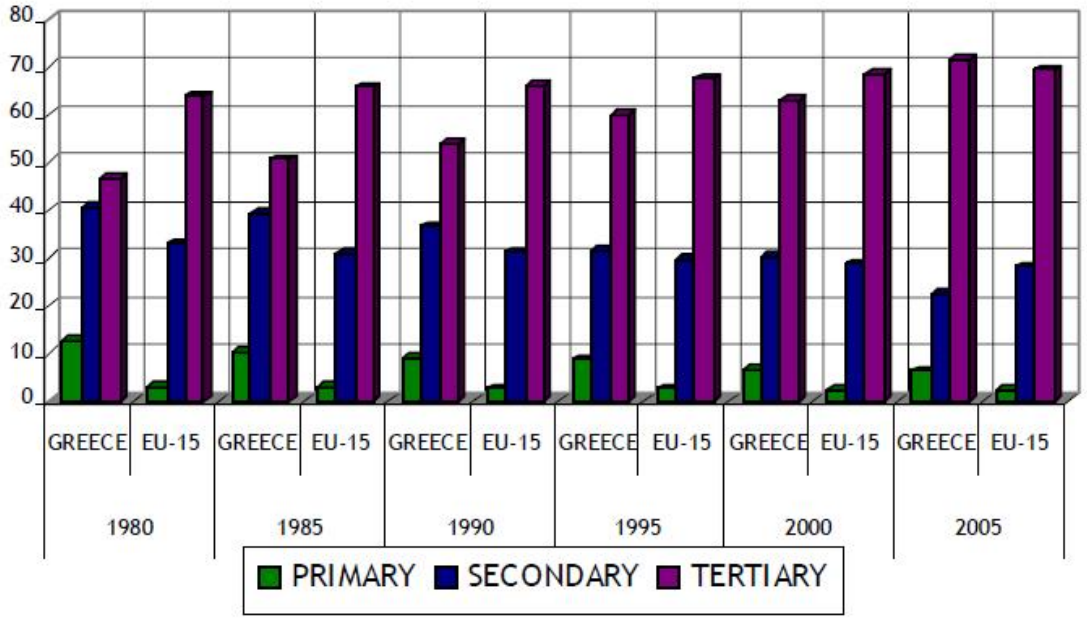
CHAPTER 4: Specialization in Greek regions

4.1 Structural characteristics of the Greek economy

The aim of this section is to give an insight about changes in structural and spatial patterns of development that took place in the Greek territory during the last decades. It is noticeable that all these changes are examined in parallel with the process of economic integration with the European Union. As it has been mentioned before, the period covered in the analysis coincides with Greece's post EU accession period. It is therefore vital to present evidence from the general economic performance of Greece during this period before analyzing regional specialization trends in manufacturing.

The general situation of the Greek economic structure with respect to the three economic sectors (primary, secondary and tertiary) is clearly depicted in Figure 1 below. A comparison between Greek and EU-15 productive structures is undertaken in terms of Gross Value Added (GVA) for the years 1980, 1985, 1990, 1995, 2000, 2005. From the examination of the graph, it becomes evident that Greece followed a path of industrial decline from 1980 onwards. As it can be observed, the decreasing share of the secondary sector in GVA during this period is striking (from 40% in 1980 to almost 20% in 2005) as compared to the respective share in EU-15. It is also notable that the de-industrialization process that took place in the country between 1980 and 2005 was made in favor of a tertiarization of production while the agriculture sector presented a steady decline. However, the most impressive overturn is detected in 2005, where in contrast to the previous years Greece presented higher share in the service sector than the EU-15 while its share in manufacture fell below the EU-15 average. The fact of industrial decline during the last decades seems to have had negative results on the effectiveness of Greek economy. The shrink of industrial base and the dependence of Greek regions from the tertiary sector obviously have severe implications on unemployment and per capita GDP growth.

Figure 1: *Comparison of Greek and EU-15 economic structures, GVA shares (%) of the three productive sectors (primary, secondary, tertiary) for the period 1980-2005*

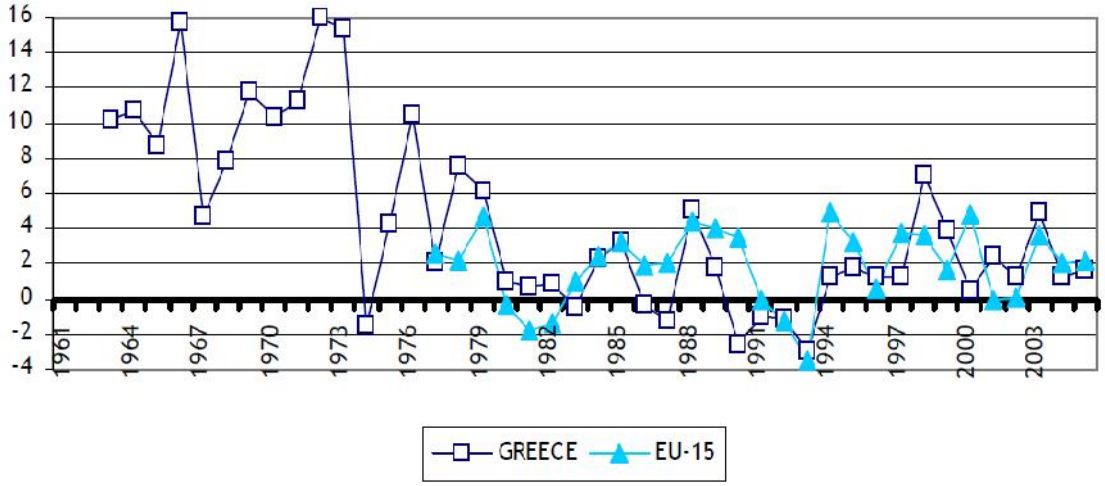


Source: *Petrakos et al. (2006), p.192, Data from Ameco Database (ECOFIN) and European Regional Database (CAMBRIDGE ECONOMETRICS)*

Figure 2 shows the annual percentage change of industrial production as compared to the EU-15 average for the period 1961-2005. It becomes visible that Greece experienced extremely high increases in industrial output during the 60s' and the 70s', however, this trend seems to have not been continued from 1980 onwards confirming in this way the previous considerations about industrial decline. Manufacturing sector faced considerable pressure, especially in the period of adaptation to Single Market conditions between 1990 and 1995, where even negative growth rates had been recorded. A more steady increase in annual industrial change is observed since 1995 when Greek governments attempted to improve the country's investment climate and to make investment philosophy more compatible with the EU conditions through two Development Laws (Law 2234/1994, Law 2601/1998) [Petrakos et al. 2006] with a view to the inclusion of Greece to the Economic and Monetary Union (EMU). The reduced importance of manufacturing sector in Greek economy is clearly reflected from the share of industry as a percentage of GDP. Table 1 shows this tendency for the years 1980, 1985, 1990, 1995 and 2000 in comparison with EU-15 average. Although the industrial share in GDP presents declining trends for both Greece and the EU-15, it is without doubt that Greek manufacture contributes much less to the economy compared

to the EU-15 average. More specifically Greece's industrial share in GDP appears to be significantly lower than that of the EU-15, maintaining a difference of about 7% and 9% from the EU-15 average. The latter indicates that the less advanced industrial base of Greece was proved to be too difficult to follow the European standards mainly due to a lack of adaptability to the pressures of economic integration.

Figure 2: *Annual percentage growth of Greek and EU-15 industrial production (1995 constant prices), 1961-2005*



Source: *Petrakos et al. (2006), p.194, Data from New Cronos Database (EUROSTAT)*

Table 1: *Share of industrial sector in GDP (%), 1980-2000*

YEAR	SHARE OF INDUSTRIAL SECTOR IN GDP (%)	
	Greece	EU-15
1980	*14.59*	*22.65*
1985	*14.66*	*21.46*
1990	*13.83*	*22.06*
1995	*13.00*	*20.73*
2000	*12.08*	*20.73*

Source: *Petrakos et al. (2005), p.288, Data from Cambridge Econometrics*

4.2 Patterns of industrial employment

Before identifying patterns of regional specialization in the Greek regions it is useful to analyze the employment structure of manufacturing activity and its change during the period 1980-2005. For this purpose employment data used for the estimation of regional specialization are presented in the Appendix of the present paper (see Tables 3A to 3F). The first and most important observation that can be inferred from the data analysis is that total employment in Greek manufacture declined from 327,544 in 1980 to 185,970, having recorded a reduction of about 43% in a 25-year period. But the most impressive of all is the fact that employment growth presented an average annual decline of 10.56%, mainly occurred between 1990-1995 and 2000-2005 (see Table 2). However, not only Greece but also the European Union experienced a decline of 11.2% in total and 0.9% annually from 1985 to 1998 (WIFO 1999). The dramatic fall in manufacturing employment especially from 1990 onwards can be explained mostly by an expansion of the tertiary sector, the share of which – as it was clearly shown in the figure 1 before – increased from 52% in 1990 to almost 70% in total GVA. Together with this, another reason for this downfall could be the unsuccessful attempts by the side of Greek governments to create a new framework of industrial policy through structural changes. Despite the efforts made in this direction, Greece was not proved able to be adapted to a new competitive environment – which was promoted by the Single Market Act – because of a weak industrial base and a lack of firm competitiveness.

Table 2: *Total employment and employment change in manufacture, 1980-2005*

YEAR	TOTAL EMPLOYMENT IN MANUFACTURE	PERIOD	EMPLOYMENT CHANGE (%)
1980	*327,544*	1890-1985	*-8.4*
1985	*299,853*	1985-1990	*-4.0*
1990	*287,608*	1990-1995	*-16.5*
1995	*240,283*	1995-2000	*-8.9*
2000	*218,890*	2000-2005	*-15.0*
2005	*185,970*		

Source: *ELSTAT, Own Elaboration*

Another characteristic of the data that may help the analysis of regional manufacturing specialization is the way industrial employment is shared between the 17 sectors over the examined period. Table 3 presents the industrial structure of employment in Greece

and its evolution between 1980 and 2005. It reveals that Greek manufacture was dominated – especially in the 1980s – from labor-intensive sectors as almost 50% of industrial employment was concentrated in these sectors. Moreover, it is worth noting that the bulk of employment activity was concentrated in only three sectors namely Food and Beverages[28] (code: 20+21), Manufacture of Textiles (code: 23) and Leather and Fur Products, Footwear and Wearing Apparel (code 24+29). From 1995 onwards the last two industries reduced their shares while the sector Food and Beverages attained a sensible increase. On the other side, in most cases intermediate-intensive and capital intensive industries seem to have a more evenly distributed employment activity with slight increases or decreases during the period 1980-2005. Whatever the case may be, it is beyond any question that Greek regions had a tendency to specialize mostly in labor-intensive industries and only after 1990 a re-distribution of employment activity was observed. However, the restructuring took place in favor of intermediate-intensive sectors which experienced a 21.4% increase between 1980-2005, while the respective change for capital-intensive sectors was a 6% decrease.

Table 3: *Employment shares of industrial sectors (%), 1980-2005*

SECTORS	SHARE IN INDUSTRIAL EMPLOYMENT (%)					
	1980	**1985**	**1990**	**1995**	**2000**	**2005**
20+21	*15.2*	*16.8*	*17.5*	*21.3*	*22.9*	*26.7*
22	*2.5*	*2.8*	*2.9*	*0.8*	*0.6*	*0.6*
23	*18.4*	*17.6*	*15.0*	*9.3*	*7.7*	*5.8*
24+29	*11.5*	*10.8*	*13.3*	*14.3*	*10.1*	*6.0*
25	*2.2*	*1.7*	*1.6*	*1.8*	*1.9*	*1.2*
27	*2.4*	*2.6*	*2.8*	*2.9*	*2.8*	*2.6*
28	*2.4*	*2.6*	*2.7*	*4.1*	*6.5*	*7.0*
30	*4.0*	*3.2*	*3.1*	*3.5*	*3.8*	*4.4*
31	*6.0*	*6.8*	*7.2*	*7.4*	*6.7*	*7.4*
32	*1.2*	*1.5*	*1.9*	*1.3*	*0.8*	*0.9*
33	*6.1*	*6.4*	*6.0*	*7.1*	*7.0*	*8.2*
34	*3.3*	*3.6*	*3.2*	*4.3*	*4.9*	*5.8*
35	*6.5*	*6.2*	*5.6*	*4.3*	*5.7*	*6.2*
36	*2.0*	*1.9*	*1.8*	*4.6*	*5.3*	*5.1*
37	*4.9*	*4.6*	*4.1*	*3.1*	*3.9*	*3.9*
38	*9.2*	*9.0*	*9.0*	*6.8*	*6.2*	*4.9*
39+26	*2.1*	*2.0*	*2.2*	*3.2*	*3.2*	*3.2*

Source: *ELSTAT, Own Elaboration*

[28] For an overview of industrial sectors see Table 2 in the Appendix.

With respect to Greek regions, the data reveal that the bulk of manufacturing employment is concentrated in the two largest NUTS III regions, namely Attiki and Thessaloniki. These regions are responsible for 62.7% of the total manufacturing employment in Greece in 1980, 58.5% in 1985, 58.1% in 1990, 63.3% in 1995, 62% in 2000 and 63% in 2005. Larissa, Magnisia and Achaia which constitute large urban areas follow Attiki and Thessaloniki in employment concentration. On the other hand Voiotia and Evvoia also concentrate a large amount of employment despite being far less urbanized. In addition these regions present a disproportional – relative to their size – large per capita GVA (see Map 2 in the Appendix). The main reason for this is the fact that Voiotia and Evvoia are placed next to the capital city of Athens and therefore represent important industrial hubs. The rest of the regions appear not to have a large employment share in manufacturing activity and most of them specialize in a few sectors. However, such regions which are in most cases islands and mountainous areas are traditionally specialized in the tourism sector or agriculture. All things considered, it is true that a reduction in industrial employment of almost all NUTS III regions was observed from 1995 onwards, although there were upward trends in some cases until then[29]. How this decline may affect patterns of industrial specialization in Greek regions? And, which employment structure is regarded as the most appropriate for achieving higher growth rates? These questions compose basic issues fully addressed in the following sections.

4.3 Analysis of specialization patterns in Greek regions

Patterns of regional specialization are evaluated through the application of the relative Theil index over the period 1980-2005. The analysis which contains 51 NUTS III Greek regions and 17 manufacturing industries is based on employment data coming from ELSTAT. The full presentation of the results which concerns the years 1980, 1985, 1990, 1995, 2000 and 2005 is contained in Tables 4A, 4B, 4C, 4D, 4E, 4F of the Appendix respectively. The general picture of the results does not seem to be clear-cut and moreover it gives the impression that a mixed pattern of regional specialization has been emerged during the period surveyed. Although no particular specialization trend

[29] Evros, Rhodopi, Xanthi and Pieria constitute examples of this situation.

was observed during this period, it can be indicated that the average employment specialization of Greek regions presented a slight decrease. More specifically, average specialization presented a 0.5% increase during 1980-1985, while for the periods 1985-1990, 1990-1995 and 1995-2000 specialization decreased 1.8%, 1.5% and 5.4% respectively. With respect to the period 2000-2005, Greek regions appeared to have been increased their specialization by 0.8%. The vast majority of the 51 regions recorded small fluctuations in their level of specialization and very few regions have been the exception to the rule, having displayed a clear increasing or decreasing trend. On the one side Xanthi, Kilkis and Achaia revealed clear increasing trends in employment specialization from 1985 onwards, while on the other side Lasithi and Rethymno presented decreasing trends all over the period considered. As a consequence the majority of Greek regions are characterized by relatively stable industrial patterns as regards employment specialization.

Table 4 below illustrates the ranges of specialization values during the examined period. The lowest values which indicate quite diversified employment structures are all presented in Thessaloniki, the second most populated urban center. On the other side the highest values which indicate completely specialized employment structures appeared in small regions without significant industrial base, namely Zakynthos (1980, 1985), Grevena (1990, 1995), Thesprotia (2000) and Kastoria (2005). The results of the research reveal that the largest urban centers in the Greek territory, namely Athens (Attiki), Thessaloniki, Patra (Achaia), Larissa and Volos (Magnisia) are considered to be less specialized (more diversified) than the rest of the regions. On the other hand, less populated regions which consist of islands and several small-sized mainland regions exhibited more specialized industrial structures. In addition, the economies of these regions do not present any significant share in manufacturing employment due to the fact that they are mostly depended from the primary and the tertiary sector. Therefore, the results of this research obviously indicate that there is a clear positive relationship between urbanization and industrial employment and also between urbanization and diversification. Map 1 (see Appendix) which presents regional specialization in Greek regions for the years 1980 and 2005 clearly reveals this relationship. However, there are notable exceptions to this general rule as some less urbanized regions such as Voiotia, Evros and Xanthi are presented quite diversified,

mainly as a result of government policies aimed to stimulate industrial growth in specific parts of the country.

Table 4: *Range of employment specialization values, 1980-2005*

RANGE OF VALUES	HIGHEST VALUE	LOWEST VALUE
1980	*3.8460*	*0.0405*
1985	*3.9124*	*0.0558*
1990	*4.1441*	*0.0717*
1995	*4.0036*	*0.0716*
2000	*2.6550*	*0.0874*
2005	*2.8088*	*0.0735*

Source: *ELSTAT, Own elaboration*

Regarding the internal behavior of each region over the examined period it was considered that it is more convenient for the Greek regions to be included in a higher level of aggregation[30]. In this way, a clearer image of the spatial employment distribution in manufacturing sector can be given because a more adequate comparison among regional economies can be undertaken. Accordingly, the next part of the text explores the structural characteristics of employment in each region at a NUTS II framework. In addition, Graphs 1A-1M of the Appendix present the evolution of regional specialization trends over the period 1980-2005[31].

Eastern Macedonia and Thrace which contains the regions of Evros, Rhodopi, Xanthi, Drama and Kavala presented relatively diversified industrial structures during 1980-2005. As it is previously pointed out, this is an effect of regional policies promoted by Greek governments with a view to reinforce the border regions of the country. However, it was observed a slight increase in employment specialization levels from 2000 onwards.

Central Macedonia which comprises the metropolitan region of Thessaloniki and its adjacent regions of Serres, Kilkis, Pella, Chalkidiki, Imathia and Pieria exhibited quite diversified employment structures during that period. Thessaloniki appears to be almost completely diversified since it is the only region which performed prominent employment shares in all industrial sectors. The rest of the regions also revealed

[30] This is the NUTS II spatial level and consists of 13 Greek regions.
[31] See also Map 1 (Appendix) for a comparison in the specialization levels of Greek regions.

important employment shares in some industries mainly due to the fact that they are the border regions of Thessaloniki. All in all, the dominant trend is that of a stable specialization during the examined period for the majority of the regions.

On the other side Florina, Kastoria, Kozani and Grevena which compose **Western Macedonia** presented quite specialized industrial structures. Grevena and Kastoria showed an upward trend in specialization levels, while Kozani and Florina presented more stable employment patterns all over the period. Grevena is the leader of this group with respect to higher specialization levels and is followed by Kastoria. It is noteworthy that these two regions recorded some of the highest specialization values in Greece in most of the 25-year period.

Thessaly contains two of the largest cities in Greece, namely Larissa and Volos (Magnisia) together with Trikala and Karditsa. It is clear from the results that Larissa and Magnisia can be regarded as quite specialized, maintaining a constant level of specialization. On the other hand, Karditsa and Trikala, which are primarily specialized in labor and intermediate-intensive industries, showed a rather upward trend particularly from 1990 onwards.

Ipeiros which includes the regions of Ioannina, Thesprotia, Preveza and Arta are specialized in labor and intermediate-intensive sectors. Thesprotia appears to be more specialized than the other three regions and furthermore it developed an upward specialization trend during the nineties. The results show some small fluctuations for the rest of the regions that have not affected to a great extent their employment patterns.

Regarding **Western Greece** Achaia which belongs to the group of the largest urban areas in Greece was presented as it was expected more diversified than the other two regions, Ileia and Aitoloakarnania and showed a constant specialization trend during the examined period. No specific trend is observed for Ileia, while Aitoloakarnania exhibited a slight increasing trend from 1990 onwards.

Specialization level in **Peloponnesus** – which consists of the regions of Messinia, Arkadia, Lakonia, Argolida and Korinthia – ranges from 0.87 to 1.56 in 1980 and from 0.90 to 1.32 in 2005. As it seems these regions revealed several fluctuations in specialization levels from 1980 to 2005 with the exception of Korinthia which performed a more stable pattern of industrial employment. It is worth noting that Korinthia has a considerable performance of industrial employment not only in labor-intensive but also in intermediate and capital-intensive industries despite its small size.

The latter can be justified by the fact that Korinthia concentrates a part of industrial activity of Attiki region.

Attiki, in which the capital city of Athens is located, represents the most populated area in the country and as a result it concentrates the bulk of manufacturing employment. It is the second most diversified region in Greece following Thessaloniki and presented completely stable patterns of industrial employment during the period considered. However, a de-industrialization process and a resulting expansion of the tertiary sector is evident during this period.

Central Greece is constituted by five regions namely Evrytania, Fokida, Fthiotida, Evvoia and Voiotia, the two of which (Evvoia, Voiotia) are adjacent to Attiki. The evolution of specialization in all these regions did not show any particular tendency, since quite a few fluctuations were made throughout the period. The main feature of the results is that Voiotia, Evvoia and to a lesser extent Fthiotida presented quite diversified employment structures in relation to their population size. The influence of Athens in these regions – which obviously function as satellites gathering a considerable amount of its industrial activity (Petrakos and Psycharis 2004) – is undoubted.

With reference to **Ionian Islands** which are constituted by the regions of Kerkyra, Leykada, Keffalonia and Zakynthos, it would be risky to provide secure conclusions because of a data deficiency. The only exception is the region of Kerkyra which did not present any specific specialization trend during 1980-2005. However, it must be noted that the economy of Ionian Islands depends heavily on the tourism sector and as a consequence manufacturing sector does not take up an important share. The same is applied for **North Aegean Islands** (Chios, Lesvos, Samos). The opposite is true in the case of **South Aegean Islands** (Kyklades, Dodekanisa) which seem to exhibit a respectable industrial activity as compared to their population size.

As regards **Crete**, Heraklion is normally more diversified than the other three regions (Chania, Rethymno, Lasithi) because it constitutes one of the biggest urban centers in the country. Heraklion and Rethymno presented quite stable employment structures, while Chania and Lasithi seem to have developed several variations all over the period.

All things considered, it can be inferred that no significant changes in employment patterns of Greek manufacture were observed during the period surveyed. Moreover regional specialization did not present any specific increasing or decreasing trend as regards the vast majority of Greek regions. Another important finding is that labor-

intensive industries continued to dominate – particularly in the sectors of Food and Beverages, and Printing and Publishing – over intermediate and capital-intensive industries throughout the period under consideration despite the considerable employment re-allocation in favor of intermediate sectors. Taking into account all the above considerations, it can be stressed that very few changes took place during this period as regards the structural characteristics of the Greek industry. Thus, the small variations in the level of regional specialization may be possibly attributed to the deficiency of structural changes in the manufacturing sector. The weakness of national governments to be adjusted to new market demands reduced the importance of manufacturing sector in the Greek economy minimizing in such a way the possibility of attracting new investments and creating an additional unemployment problem in this sector.

With respect to the spatial dimension of industrial employment, an important stylized fact has been emerged from this survey. The two largest urban centers in the country, Attiki and Thessaloniki, are appeared to be almost completely diversified, while the rest of the regions – with the exception of regions located across the Thessaloniki-Larissa-Athens-Patra corridor – are presented more specialized. It is therefore clear that "agglomeration economies" which are exported to the adjacent regions of Attiki and Thessaloniki have been evolved during the examined period, confirming in this way the considerations of New Economic Geography. It is also notable that regions which perform a relatively favorable geographic position (e.g. near metropolitan areas) exhibit better results in terms of per capita GVA (see Map 2 in the Appendix). As a consequence, the rest of the regions are forced to be specialized in a few sectors, increasing greatly the possibility to put their economies in a state of jeopardy.

CHAPTER 5: An Econometric confirmation

5.1 Description of the model

This section deals with an econometric model of economic performance of the 51 Greek regions, covering the period examined in the analysis of specialization. Which employment structure can be proved as the most appropriate for the Greek regions in order to achieve a better economic performance? In other words, what is the ideal employment strategy in the case of Greek regions? The answer to the latter is proposed in this section through a panel econometric model, which consists of two variables, one dependent and one independent. The model is undertaken in an attempt to investigate the nature of the relationship between relative specialization and per capita GVA during the period 1980-2005. The general equation which we will regress is as follows:

$$GVApc_{rt} = a_0 + \beta_1 SPEC_{rt} + \beta_2 SPEC_{rt}^{\ 2} + \varepsilon_0 \quad (1)$$

where $GVApc_{rt}$ expresses per capita Gross Value Added and functions as the dependent variable of the model, $SPEC_{rt}$ represents the level of regional specialization which has been estimated through the use of Theil entropy index, $SPEC_{rt}^{\ 2}$ is the square of regional specialization, while the term r refers to the regions under consideration in the year t. In addition a_0 is the constant term of the model, β_1 and β_2 depict the coefficients of the explanatory variables $SPEC_{rt}$ and $SPEC_{rt}^{\ 2}$ respectively, and ε_0 is the disturbance term which follows the normal probability distribution [$\varepsilon \sim N(0, \sigma^2)$]. A positive sign in the coefficients of $SPEC_{rt}$ and $SPEC_{rt}^{\ 2}$ implies a positive relation between specialization and per capita GVA, while the opposite is true if the two coefficients reveal a negative sign.

The use of the variables $SPEC_{rt}$ and $SPEC_{rt}^{2}$ seeks for a possible non-linear relationship between GVA per capita and relative specialization, where regional diversification is connected to higher levels of per capita GVA up to a certain point while from this point onwards, per capita GVA rises with an increase in specialization levels.

In order to capture the change in the slope of the curve we can take the derivative of $GVApc_{rt}$ with respect to $SPEC_{rt}$. Therefore, equation (1) can be written as:

$$GVApc_{rt} = a_0 + \beta_1 SPEC_{rt} + \beta_2 SPEC_{rt}^{2} + \varepsilon_0 \Rightarrow$$

$$\frac{\partial GVApc_{rt}}{\partial SPEC_{rt}} = \beta_1 + 2\beta_2 SPEC_{rt} \quad (2)$$

Setting $\frac{\partial GVApc_{rt}}{\partial SPEC_{rt}} \succ 0$, the equation (2) can be written as:

$$\beta_1 + 2\beta_2 SPEC_{rt} \succ 0 \Rightarrow \qquad 2\beta_2 SPEC_{rt} \succ -\beta_1 \Rightarrow$$

$$SPEC_{rt} \succ -\frac{\beta_1}{2\beta_2} \quad (3)$$

5.2 Interpreting the results

The results obtained from the application of a panel data approach in equation (1) are presented in Table 5 below:

Table 5: *Regional specialization as an explanatory factor of per capita GVA (Pooled Least Squares) at NUTS III spatial level, 1980-2005*

Dependent Variable: GVAPC?
Method: Pooled Least Squares
Sample: 1 51
Included observations: 50
Total panel (unbalanced) observations 280
White Heteroskedasticity-Consistent Standard Errors & Covariance

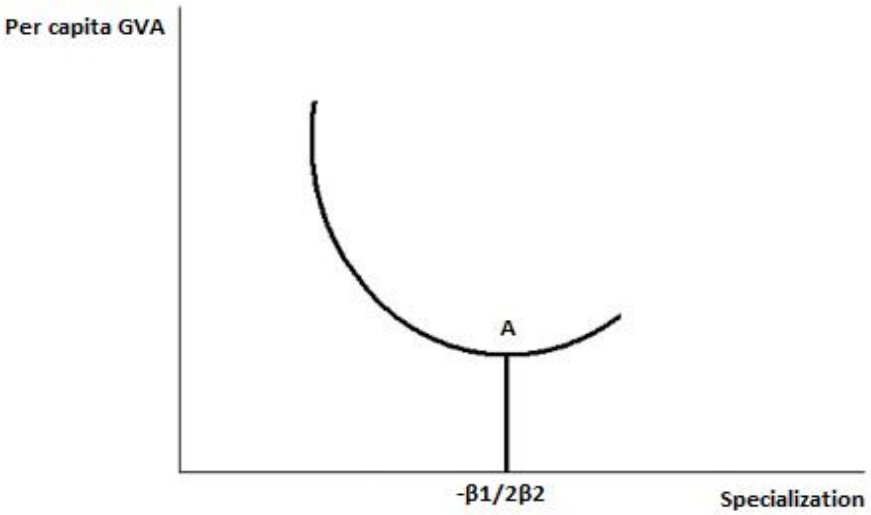
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10431.54	579.8210	17.99097	0.0000
RSPEC?	-1958.090	643.9170	-3.040905	0.0026
RSPEC?^2	272.0639	138.2988	1.967218	0.0502
R-squared	0.058292	Mean dependent var		8729.304
Adjusted R-squared	0.051493	S.D. dependent var		2891.721
S.E. of regression	2816.286	Sum squared resid		2.20E+09
Log likelihood	-2596.470	F-statistic		8.573207
Durbin-Watson stat	1.272116	Prob(F-statistic)		0.000244

Source: *Own Elaboration*

Regarding the statistical significance of the coefficients of the explanatory variable, the results reveal that both β_1 and β_2 coefficients are statistical significant at 1% (P<0.01) and 10% (P<0.1) respectively. In addition, it must be referred that the standard errors are corrected with White Heteroskedasticity test proposed by White (1980). Despite the fact that R^2 and Adjusted R^2 present very low values, denoting that the explanatory power of the model cannot be regarded as satisfactory, it is also evident a non-linear relationship between relative specialization and per capita GVA. As expected, $SPEC_{rt}$ is related negatively with $GVApc_{rt}$ suggesting that more diversified regions are capable of achieving greater increases in per capita GVA. With respect to $SPEC_{rt}^{2}$, it appears to have a positive relationship with per capita GVA confirming in this way the non-monotonic relationship between the two. As a consequence a mirror-image J-shaped pattern has been emerged from this model in the sense that there is a point at which regions will begin to specialize. Replacing the estimated coefficients in equation (3) we

can derive that $SPEC_{rt}$>3.60 which indicates the minimum point of the curve that changes its slope. The shape of the certain curve is depicted in Figure 3 below, where point A (=3.60) represents the minimum point of the curve.

Figure 3: *The non-linear relationship between specialization and per capita GVA*



Source*: Own elaboration*

The interpretation of the results obtained by the regression model with regard to Greek regions suggests that employment diversification within manufacture has a positive impact on per capita GVA. As a result more diversified regions – which in most cases are constituted by large urban areas –, are more likely to present a better economic performance than more specialized regions. In the case of the upward portion of the curve, it is revealed a positive relation between specialization and per capita GVA, meaning that more specialization leads to better results in terms of GVA. According to specialization values obtained by the estimation of Theil index, it is true that only Zakynthos for the years 1980, 1985, 1990 and Grevena for the years 1990, 1995 exhibited specialization values larger than 3.60. However, the fact that only two out of 51 regions lie above the minimum point of the curve may imply that this is the effect of

a few outliers. Indeed, the economies of the specific regions (Zakynthos, Grevena) which are furthermore small-sized regions depend mainly on the tertiary and agriculture sectors, showing no particular participation in the manufacturing sector which can significantly affect their economic potential. Therefore, it seems that non-linearity is stronger in the descending portion of the curve in relation to its upward portion, indicating that greater diversity in Greek regions can lead to a better economic performance. The latter confirms the view that more employment diversification may act as a safeguard in cases of demand variations and asymmetric shocks. On the other side, the model suggests that a high degree of specialization may lead to higher per capita GVA levels. However, as it has been proposed by the empirical literature, this would be feasible – especially as regards Greek regions – only in the case of specialization in growth-promoting sectors.

At this point, it should be noted that there were efforts to correlate relative specialization and per capita growth in a regression model, but the statistical insignificant results did not allow us to continue.

CHAPTER 6: Conclusions

The liberalization of the global economic system has caused dramatic changes in worldwide production and consumption during the last decades and this undoubtedly affected the productive structures of countries. European Union, which constitutes a special example of economic integration, implemented a Single Market Program in 1992 and put into operation an Economic and Monetary Union in 1999 with a view to foster the economies of its member states. However, economic integration was disproportionately effective in member states since regions that exhibited strong industrial bases seem to have been the most favored from this procedure, while regions with relatively weak industrial structures lagged behind. This process produced severe implications in national and regional level having affected to a great extent patterns of regional specialization and generally the structure of European manufacturing. As it is obviously perceived, the manufacturing sector of Greek regions is not left unaffected by the process of economic integration.

In addition, it is widely accepted by the empirical literature that the composition of industrial sector within countries or regions may constitute a major factor that promotes growth. It has been suggested from many studies that specialization in specific growth-promoting sectors such as high-technology or more generally scale-intensive industries can evidently foster economic growth. But can regional specialization be proved an effective policy which can be applied to countries without putting them in a state of jeopardy? The other side of the controversy between specialization and diversification proposes that more diversified regions are presented to be more “secure” when they are exposed to the global competition.

The aim of this study was to present a thorough analysis of employment specialization patterns across Greek regions and furthermore to detect a possible non-linear relationship between specialization and per capita GVA. In this framework, the ultimate goal of this research was to make it clear which of the two strategies, regional specialization or regional diversification, could be regarded as the most effective for the Greek regions. For this purpose, it was proposed the use of Theil entropy index as more

appropriate than other conventional measures of specialization to deal with the Greek case. The estimation of Theil index was based on regional employment manufacturing data for the 51 NUTS III Greek regions. The dataset which is derived from ELSTAT is disaggregated at 17 industrial sectors following STAKOD classification and covers a period of 25 years, specifically from 1980 to 2005. The period considered is of high importance for Greece since it coincides with the post-accession to the EU period.

The interpretation of structural characteristics and industrial employment patterns in Greek regions before the analysis of regional specialization has revealed a series of very interesting conclusions. Firstly, it is clearly observable a decline in the manufacturing sector in the period after membership to the EU in favor of tertiary sector. The less advanced industrial base of Greece and the absence of significant structural changes during the examined period made it too difficult for Greek regions to follow the European standards. Moreover, the weak presence of capital-intensive industries in combination with a relatively large concentration in labor-intensive sectors also constituted a factor that justifies this decline. Secondly, de-industrialization process can also be justified by a dramatic fall in manufacturing employment, which recorded a reduction of about 43% in a period of 25 years, confirming in this way an absence of industrial policies by the side of Greek governments and a severe lack of adaptability to new more competitive environments. Thirdly, the bulk of manufacturing employment is concentrated in the two largest NUTS III regions namely Attiki and Thessaloniki, which counts for about 60% of the total manufacturing employment all over the period considered. The two metropolitan regions are followed by regions which contain in their boundaries medium-sized cities such as Achaia, Larissa and Magnisia.

With respect to the evolution of regional specialization it is clear that in general a mixed pattern of regional specialization has been emerged during the period surveyed. Although small fluctuations had been observed in the level of specialization for almost all regions, the majority of the regions did not present any particular increasing or decreasing trend, having displayed relatively stable industrial patterns. Regarding the range of specialization values, the results reveal that the lowest values which indicate a high degree of diversification were all presented in the largest urban areas of Greece, namely Attiki and Thessaloniki, and secondarily Achaia, Larissa and Magnisia. On the other hand, less populated, small-sized regions and islands presented the highest values

of employment specialization. These findings lead to the verification of a positive relationship between urbanization and diversification as well as between urbanization and industrial employment. The exception to the rule is the case of the adjacent to Attiki and Thessaloniki regions, which despite being less urbanized, they exhibit quite diversified structures. The latter finding suggests that regions which perform a more favorable geographic location than the others have succeeded in attracting a considerable amount of industrial activity, increasing in this way the potential to stimulate a better economic performance. It is therefore evident that "agglomeration economies" which are exported to the adjacent regions of Attiki and Thessaloniki had been developed during the examined period, confirming in such a way the determinants of New Economic Geography. Another important finding is that Greek regions exhibited a severe lack of structural changes throughout the period 1980-2005. Despite the observed decline in the sectors of Textiles, and Leather and Furs, Footwear and Wearing Apparel there was no significant reformation in manufacture. Thus, labor-intensive industries continued to perform higher shares – particularly in the sectors of Food and Beverages, and Printing and Publishing – over intermediate and capital-intensive industries.

The provision of a panel econometric model which investigates a possible non-linear relationship between specialization and per capita GVA was the next step in our analysis. Per capita GVA functions as the dependent variable of the model while regional specialization plays the role of the independent variable in a quadratic regression equation. The results – which are statistically significant – reveal a mirror image J-shaped pattern, indicating that specialization is related negatively with per capita GVA up to a certain minimum point, while from this point onwards the relation between the two variables turns out to be positive. The finding suggests that in the case of the descending portion of the curve more diversified regions present the highest per capita GVA, whereas in the case of the upward portion of the curve more specialized regions exhibit better results in terms of GVA. However, non-linearity appears to be stronger in the descending than in the upward portion of the curve, highlighting that a high degree of regional diversification is considered to be more appropriate for Greek regions since this can lead them to a better economic performance. All things considered, it can be concluded that the case of Greek regions confirms the strand of the theory which suggests that regional diversification is the most appropriate policy for

promoting growth and moreover enhances regions to deal with the possibility of asymmetric shocks.

Finally, it should be noted that this study places a basic framework as regards the investigation of employment specialization at NUTS III Greek regions and its relation to per capita GVA. Thereupon, in spite of considerable problems of data availability, further investigation in this field that will contain more data and a longer period of time is absolutely essential. In addition, it would be very informative to be explored a possible relationship of specialization with other indicators of economic performance through an econometric model which will contain an enlarged set of explanatory variables.

REFERENCES

Aiginger K. (1999), "Do Industrial Structures Converge? A Survey on the Empirical Literature on Specialization and Concentration of Industries", Background Study conducted for European Commission

Aiginger K. (2000), "Country Profiles in European Manufacturing", Research Report Conducted for Eurostat

Aiginger K. (2001), "Speed of Change and Growth of Manufacturing" in Peneder M., Aiginger K., Hutschenreiter G. and Marterbauer M. (Eds.), *Structural Change and Economic Growth*, WIFO, Vienna, pp. 53-86

Aiginger K. and Pfaffermayr M. (2004), "The Single Market and Geographic Concentration in Europe", *Review of International Economics,* 12 (1), pp. 1-11

Aiginger K. and Davies S. (2004), "Industrial Specialization and Geographic Concentration: Two Sides of the Same Coin? Not for the European Union", *Journal of Applied Economics*, 7 (2), 231-248

Aiginger K. and Rossi-Hansberg E. (2006), "Specialization and Concentration: A Note on Theory and Evidence", *Empirica* Springer, 33 (4), 255-266

Amiti M. (1997), "Specialization Patterns in Europe", *CEP Discussion Paper No 363*, Centre for Economic Performance, LSE

Amiti M. (1998), "New Trade Theories and Industrial Location in the EU: A Survey of Evidence", *Oxford Review of Economic Policy,* 14 (2), pp. 45-53

Arvanitidis P., Petrakos G. and Pavleas S. (2007), "Determinants of Economic Growth: The Experts' View", *Discussion Papers Series*, 13 (10) pp. 245-276, University of Thessaly

Bensidoun I. and Ünal-Kesenci D. (1998), "La concurrence International: Vingt ans Apres", La lettre du CEPII, No 171

Bensidoun I., Gaulier G. and Ünal-Kesenci D. (2001), "The Nature of Specialization Matters for Growth: An Empirical Investigation", CEPII Document de Travail No 13

Bode E., Krieger-Boden C., Siedenburg F. and Soltwedel R. (2004) "European Integration, Regional Structural Change and Cohesion in Spain", *Contribution to EURECO Project*, EU 5th Framework Program

Brülhart M. and Torstensson J. (1996), "Regional Integration, Scale Economies and Industry Location in the European Union", *CERP Discussion Paper*, No 1435

Brülhart M. (1998), "Trading Places: Industrial Specialization in the European Union", *Journal of Common Market Studies,* 36 (3), 319-346

Brülhart M. and Traeger R. (2003), "An Account of Geographic Concentration Patterns in Europe", *HWWA Discussion Paper No 226*, Hamburg Institute of International Economics

Combes P.-P. (2000), "Economic Structure and Local Growth: France, 1984-1993", *Journal of Urban Economics,* 47: 329-355

Combes P.-P. and Overman H. (2003), "The Spatial Distribution of Economic Activities in the European Union", *CEP Working Paper*, London School of Economics and Political Science

Dalum B., Laursen K. and Verspagen B. (1999), "Does Specialization Matter for Growth?", *Industrial and Corporate Change*, 8 (2): 267-288

European Commission (1999a), "The Competitiveness of European Industry", 1999 Report, Brussels

European Commission (1999b), "Specialization and Geographic Concentration of European Manufacturing", *Enterprise DG Working Paper No1*, July 1999

Ezcurra R., Gil C., Rapun M. And Pascual P. (2004), "Regional Productive Specialization and Inequality in the European Union", *44th ERSA Congress "Regions and Fiscal Federalism",* Porto 25-29/08/2004

Fertig M. and Schmidt (2002), "Mobility within Europe – The Attitude of European Youngsters", *RWI Discussion Papers No 1*

Fertig M. (2003), "The Impact of Economic Integration on Employment – An Assessment in the Context of EU Enlargement", *IZA Discussion Paper No919*

Fujita M., Krugman P., Venables A. J. (1999), "*The Spatial Economy: Cities, Regions and International Trade",* MIT Press, Cambridge

Greenaway D. and Hine R.C. (1991), "Intra-industry Specialization, Trade Expansion and Adjustment in the European Economic Space", *Journal of Common Market Studies*, 29 (6), pp. 603-622

Grossman G.M. and Helpman E. (1991), *"Innovation and Growth in the Global Economy",* Cambridge, Mass.: MIT Press

Haaland J. I., Kind H. J., Knarvik K. H., Torstensson J. (1999), "What Determines the Economic Geography of Europe", *CERP Discussion Paper*, No 2072

Hallet M. (2000), "Regional Specialization and Concentration in the EU", *Economic Papers No 141*, DG for Economic and Financial Affairs, European Commission

Heckscher E. F. (1919), "The Effect of Foreign Trade on Distribution of Income", *Economisk Tidskrift,* 497-512, reprinted in H. S. Ellis and L. A. Metzler (eds.), (1949) A. E. A. Readings in the Theory of International Trade, Philadelphia: Blakiston, 272-300

Hine R.C. (1990), "Economic Integration and Inter-industry Specialization", *Credit Research Paper 89/6*, University of Nottingham

Iara A. and Traistaru I. (2004), "Integration, Regional Specialization and Growth Differentials in EU Acceding Countries: Evidence from Hungary", *Ersa Conference Papers, Ersa04p298,* European Regional Science Association

Isard W. (1956), "*Location and Space Economy*", Cambridge Mass.: MIT Press and J. Wiley

Kaldor N. (1970), "The Case for Regional Policies", *Scottish Journal of Political Economy,* 17, 337-348

Kallioras D., Fotopoulos G. and Petrakos G. (2004), "Patterns of Regional Specialization and Sectoral Concentration of Industrial Activity in Bulgaria, Romania, Slovenia, Hungary and Estonia", *44th European Congress of the European Regional Science Association,* Porto, 25-29 August 2004

Kallioras D. (2006), "The Regional and the Structural Impact of the European Union Eastwards Enlargement on its New Member States", Ph.D. Thesis, University of Thessaly, 2006 (in Greek)

Kallioras D. and Petrakos G. (2010), "Industrial Growth, Economic Integration and Structural Change: Evidence from the EU New Member-states Regions", *Annals of Regional Science,* 45 (3), pp. 667-680

Krieger-Boden C. (2000), "Globalization, Integration and Regional Specialization", *Kiel Working Paper No 1009*

Krugman P. (1980), "Scale Economies, Product Differentiation and the Pattern of Trade", *American Economic Review,* 70, pp. 950-959

Krugman P. (1991a), "*Geography and Trade*", Cambridge: MIT Press

Krugman P. (1991b), "Increasing Returns and Economic Geography", *Journal of Political Economy,* 99, pp. 484-499

Krugman P. (1993), "First Nature, Second Nature, and Metropolitan Location", *Journal of Regional Science,* 33 (2), pp. 129-144

Lucas R. (1988), "On the Mechanics of Economic Development", *Journal of Monetary Economics,* 22, 3-42

Midelfart-Knarvik K.H., Overman H.G., Redding S.J., Venables A.J. (2000), "The Location of European Industry", Report prepared for the Directorate General for Economic and Financial Affairs, European Commission, *Economic Papers 142*, ECFIN/318/00-EN

Molle W. (1997), "The Regional Economic Structure of the European Union: An Analysis of Long-term Developments", *Zeitschrift fur Wirtschafts und Sozialwissenschaften,* 5, 13-32

Myrdal G. (1957), "*Economic Theory and Underdeveloped Regions*", Hutchinson, London

Ohlin B. (1933), "*Interregional and International Trade*", Cambridge, MA: Harvard University Press

Peneder M. (2002), "Structural Change and Aggregate Growth", *WIFO Working Papers*, No 182, Vienna

Petrakos G. and Psycharis Y. (2004), *"Regional Development in Greece"*, Athens: Kritiki (in Greek)

Petrakos G., Fotopoulos G. and Kallioras D. (2005), "Peripherality and Integration: Industrial Growth and Decline in the Greek Regions", University of Thessaly, *Discussion Paper Series*, 11 (15), 281-302

Petrakos G., Rodriguez-Pose A. and Rovolis A. (2005), "Growth, Integration and Regional Disparities in the European Union", *Environment and Planning,* A 37 (10): 1837- 1855

Petrakos G., Fotopoulos G. and Kallioras D. (2006), "A Southern Perspective on Economic Integration and Structural Change: The Case of Greek Regions", University of Thessaly, *Discussion Paper Series*, 12 (10), 189-218

Quah D. (1996), "Regional convergence clusters across Europe", *European Economic Review,* 40, 951-958

Resmini L. (2002), "Specialization and Growth Patterns in Border Regions of Accession Countries", *ZEI Working Paper B 17*, 2002

Ricardo D. (1817), "*On the Principles of Political Economy and Taxation*", London: John Murray

Romer P. (1986), "Increasing Returns and Long Run Growth", *Journal of Political Economy,* 94 (5), pp. 1002-1037

Sapir A. (1996), "The effects of Europe's Internal Market Programme on Production and Trade: A First Assessment", *Weltwirtschaftliches Archiv*, 132, 457-475

Solow R. (1956), "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics,* 70 (1), pp. 65-94

Theil H. (1972), "*Statistical Decomposition analysis with applications in the social and administrative sciences*", North-Holland, Amsterdam

Traistaru I., Nijkamp P., Longhi S. (2002), "Regional Specialization and Location of Industrial Activity in Accession Countries", *42nd Congress of the European Regional Science Association*, Dortmund, 27th-31st August 2002

Tsiapa M. (2008), "Asymmetries, Dynamics and Prospects of Industrial and Spatial Development Systems of the European Area and especially of the South and East European Region", Ph.D. Thesis, University of Thessaly, 2008 (in Greek)

Venables A. J. (1996), "Equilibrium Locations of Vertically Linked Industries", *International Economic Review,* 37, pp. 341-359

Weinhold D. and Rauch J.E. (1997), "Openness, Specialization, and Productivity Growth in Less Developed Countries", *NBER Working Papers, 6131*

White H. (1980), "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity", *Econometrica* 48 (4): 817-838

WIFO (1999), "Employment in European Manufacturing", WIFO – Austrian Institute of Economic Research, *Background Paper for the Lisbon Summit 2000*, Brussels-Vienna, November 1999

Wolfmayr-Schnitzer Y. (2000), "Economic Integration, Specialization and the Location of Industries: A Survey of the Theoretical Literature", *WIFO Working Papers 120*, WIFO

APPENDIX

Tables of the Appendix

Graphs of the Appendix

Maps of the Appendix

***Table 1**: Indicators of regional specialization*

Absolute and relative measures of regional specialization	
The subscripts a_i, r, i have the same usefulness for all indexes and refer to the distribution of the shares, region, and sector or industry respectively. In addition a_i shows the shares of industry i in the total manufacturing of a reference economy, $a_i(r)$ refers to the shares of industry i in the total output or employment of region r, and $\bar{a}(r)$ is the weighted average of the shares of individual industries i in region r.	
Indicators	***Characteristics***
Finger-Kreinin index $\mathrm{FK}_{rk}=\sum_{i}^{I}\min(a_i(r),a_i(k))$ where k denotes the region which is compared to the examined region	- relative measure of specialization - it ranges from 0 to 1 (0: no similarity in structures, complete specialization, 1: perfect similarity)
Herfindahl index $\mathrm{H}_r=\sum_{i}^{n}(a_i(r))^2$	- absolute measure of specialization - it takes values from N^{-1} (complete diversification) to 1 (complete specialization)
Location Quotient or **Hoover-Balassa index** $B_{ir}=\frac{a_i(r)}{a_i}$	- relative measure of specialization - $B_{ir}>1$ denotes that region r is considered to be specialized in industry i, whereas $B_{ir}=1$ indicates completely similar structures
Concentration ratio CR=the share of the largest n units/total manufacturing	- absolute measure of specialization - the index is written CRn (e.g. CR3) if it concerns the share of the largest n industries

Amiti (modified version of **Hoover-Balassa)** $S_i = \sqrt{\frac{1}{c}\sum_r (a_i(r))^2}$ where c is the number of regions	- absolute measure of specialization - $0 \leq S_i \leq \infty$
Amiti (modified version of **Hoover-Balassa)** $S_i = \sqrt{\frac{1}{c}\sum_r (a_i(r) - a_i)^2}$ where c is the number of regions	- relative measure of specialization - $0 \leq S_i \leq \infty$
Krugman or Dissimilarity index $DSR_r = \sum_i \lvert a_i(r) - a_i \rvert$	- relative measure of specialization - it takes values from 0 (complete similar structures) to 2 (complete dissimilar structures)
Coefficient of Variation (Weighted) $\text{CV} = \frac{1}{\bar{a}(r)} \sqrt{\sum_{i=1}^{I} \frac{n_i}{N} (a_i(r) - \bar{a}(r))^2}$	- relative measure of specialization - it takes values from 0 (identical distribution) to $(N-1)^{1/2}$ (complete specialization)
Brülhart-Traeger-Theil index $\text{THEIL} = \sum_i^I a_i(r) \ln(n a_i(r))$	- absolute measure of specialization - it ranges from 0 (complete diversification) to lnN (complete specialization)
Brülhart-Traeger-Theil index $\text{THEIL} = \sum_i^I a_i(r) \ln\left(\frac{a_i(r)}{a_i}\right)$	- relative measure of specialization - it ranges from 0 (complete diversification) to lnN (complete specialization)
Gini index $G_r = 1 - \sum_{i=1}^{I} (a_i - a_{i-1})(a_i(r) + a_{i-1}(r))$	- relative measure of specialization - it ranges from 0 (complete diversification) to 1 (complete specialization)

Sources: *Aiginger (1999), Amiti (1997), Bode et al. (2004), Tsiapa (2008)*

***Table 2**: STAKOD 80 Classification*

SECTOR CODE	NAME
20+21	Food and Beverages
22	Tobacco
23	Manufacture of Textiles
24+29	Leather and Fur Products, Footwear and Wearing Apparel
25	Wood Products
27	Paper
28	Printing and Publishing
30	Rubber and Plastic Products
31	Chemical Products
32	Petroleum and Coal Refining
33	Non Metallic Mineral Products
34	Basic Metal Products
35	Fabricated Metal Products except Machinery
36	Machinery and Appliances except Electrical
37	Electrical Machinery and Optical Equipment
38	Transport Equipment
39+26	Other Manufactured Products

Source: *ELSTAT*

***Table 3A**: Manufacturing Employment at Nuts3 Regions, 1980*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTALS**
GREECE	49,671	8,217	60,124	37,722	7,273	7,885	7,840	13066	19715	3,988	20,041	10,859	21,191	6,647	16,029	30,278	6,998	327,544
EVROS	656	0	58	535	n/a	0	0	0	0	0	43	0	50	8	0	66	48	1,464
RHODOPI	170	0	19	397	0	0	0	12	0	0	39	n/a	n/a	0	0	0	27	664
XANTHI	912	151	524	573	123	37	0	0	0	0	31	25	34	0	216	0	0	2,626
DRAMA	289	102	0	1,758	175	765	0	16	0	0	741	0	0	0	0	0	80	3,926
KAVALA	317	589	247	1,216	38	0	0	183	811	0	223	0	32	0	0	0	155	3,811
SERRES	1,489	13	289	67	238	0	0	0	0	0	86	0	54	61	0	0	38	2,335
KILKIS	208	0	801	1,106	52	0	0	29	0	0	81	n/a	84	0	85	0	26	2,472
PELLA	2,813	39	907	1,068	51	0	0	41	0	0	29	0	57	41	0	0	0	5,046
THESSALONIKI	6,074	2,490	8,488	6,936	1,770	836	398	1,807	2,116	376	2,488	1,310	2,459	1,161	2,135	3,358	642	44,844
CHALKIDIKI	228	0	188	0	0	0	0	63	0	0	27	0	0	121	0	0	0	627
IMATHIA	2,745	187	3,173	40	268	0	0	26	0	0	36	0	0	7	0	0	49	6,531
PIERIA	462	0	367	874	118	0	0	0	0	0	14	0	0	0	0	0	26	1,861
FLORINA	123	0	0	n/a	23	0	0	0	0	0	52	0	0	0	0	0	0	198
KASTORIA	0	0	0	794	0	0	0	0	0	0	0	0	0	0	0	0	0	794
KOZANI	23	0	0	332	0	0	0	0	1,194	114	107	0	48	53	0	0	0	1,871
GREVENA	0	0	0	21	53	0	0	0	0	0	0	0	0	0	0	0	0	74
LARISSA	1,635	0	2,287	1,006	222	433	41	519	0	0	453	216	98	233	31	173	127	7,474
TRIKALA	342	0	211	52	422	0	0	0	0	0	100	0	0	0	0	0	0	1,127
KARDITSA	199	57	146	0	0	0	0	0	0	0	77	0	0	0	0	0	13	492
MAGNISIA	782	54	1,537	1,553	0	243	136	177	128	0	1,136	1,055	1,839	84	462	434	27	9,647
IOANNINA	639	0	0	251	60	0	0	0	0	0	445	n/a	0	0	0	0	159	1,554
THESPROTIA	0	0	229	0	0	0	0	0	0	0	0	0	0	0	0	0	0	229
PREVEZA	163	0	427	213	0	0	0	0	0	0	32	0	0	0	0	0	12	847
ARTA	482	0	0	17	47	0	0	0	0	0	57	0	0	0	0	0	0	603

KERKYRA	290	0	290	0	0	0	0	0	0	0	44	0	0	0	0	0	0	624
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ZAKYNTHOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	309	309
AITOLOAKARNANIA	393	728	482	357	0	0	0	58	0	0	250	0	0	0	0	0	0	2,268
EVRYTANIA	0	0	238	0	60	0	0	0	0	0	0	0	0	0	0	0	0	298
FOKIDA	210	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	210
FTHIOTIDA	470	0	1,383	146	0	307	0	43	294	0	418	1,482	121	0	324	0	0	4,988
VOIOTIA	1,049	0	2,707	51	309	0	0	1,316	457	0	928	2,214	812	75	1,665	2,400	561	14,544
EVVOIA	689	0	949	16	1,326	185	0	0	320	0	3,080	0	1,868	60	906	550	98	10,047
ATTIKI	16,041	2,477	27,443	14,798	1,183	3,735	7,166	7,715	14,249	2,767	6,797	4,557	12,247	4,234	8,745	21,896	4,322	160,372
ACHAIA	2,316	0	4,856	2,014	231	1,105	79	567	48	0	1,027	0	705	188	110	163	115	13,524
ILEIA	1,092	0	0	0	0	0	0	0	0	0	91	0	43	45	20	0	23	1,314
MESSINIA	766	1,305	219	329	36	0	0	0	0	0	103	0	0	30	0	65	0	2,853
ARKADIA	46	0	457	0	61	0	0	0	0	0	27	0	76	0	35	0	0	702
LAKONIA	86	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	110
KORINTHIA	1,674	0	185	0	330	239	0	211	56	731	349	0	536	89	1,257	0	8	5,665
ARGOLIDA	1,661	25	130	257	44	0	0	176	0	0	117	0	0	14	11	0	0	2,435
CHANIA	267	0	0	139	0	0	0	0	0	0	66	0	0	0	27	0	30	529
HERAKLION	1,093	0	268	46	33	0	20	107	22	0	170	0	0	143	0	0	64	1,966
LASITHI	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	17
RETHYMNO	12	0	0	0	0	0	0	0	20	0	24	0	0	0	0	0	0	56
KYKLADES	44	0	452	0	0	0	0	0	0	0	0	0	0	0	0	1,139	0	1,635
DODEKANISA	349	0	0	369	0	0	0	0	0	0	111	0	0	0	0	34	39	902
CHIOS	75	0	0	105	0	0	0	0	0	0	77	0	0	0	0	0	0	257
LESVOS	194	0	58	243	0	0	0	0	0	0	24	0	28	0	0	0	0	547
SAMOS	103	0	109	43	0	0	0	0	0	0	0	0	0	0	0	0	0	255

Source: *ELSTAT, Own Elaboration*

***Table 3B**: Manufacturing Employment at Nuts3 Regions, 1985*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTALS**
GREECE	50,446	8,393	52,824	32,335	5,053	7,762	7,764	9,703	20,480	4,366	19,046	10,770	18,494	5,625	13,785	27,012	5,995	299,853
EVROS	722	0	174	596	94	0	0	0	0	0	7	0	31	0	0	74	30	1,728
RHODOPI	198	0	190	195	0	88	0	45	0	0	54	115	0	0	0	0	29	914
XANTHI	1,311	457	647	806	76	410	0	0	0	0	16	45	150	0	180	0	0	4,098
DRAMA	747	123	0	1,767	142	770	0	0	0	0	580	0	0	0	0	0	38	4,167
KAVALA	232	581	369	1,626	31	0	0	173	973	0	429	0	54	0	60	0	147	4,675
SERRES	1,740	0	235	65	64	0	0	0	0	0	65	0	105	54	70	0	46	2,444
KILKIS	165	0	1,254	424	44	0	0	25	0	0	70	155	148	56	65	0	23	2,429
PELLA	2,512	84	933	1,278	4	60	0	3	0	0	9	0	63	39	0	0	0	4,985
THESSALONIKI	6,404	2,921	6,808	5,497	1,014	880	451	1,669	2,069	524	2,168	1,514	1,741	1,350	1,683	2,389	581	39,663
CHALKIDIKI	313	0	78	0	0	0	0	37	0	0	18	0	0	85	0	0	0	531
IMATHIA	2,887	31	3,180	31	247	0	0	33	0	0	30	0	0	22	30	0	44	6,535
PIERIA	393	0	277	1,200	131	0	0	0	0	0	15	0	0	18	0	0	38	2,072
FLORINA	111	0	0	4	14	0	0	0	0	0	27	0	0	0	0	0	0	156
KASTORIA	0	0	0	555	0	0	0	0	0	0	0	0	0	0	0	0	0	555
KOZANI	6	0	0	213	0	0	0	0	1,422	92	441	0	25	212	0	0	0	2,411
GREVENA	0	0	0	5	42	0	0	0	0	0	0	0	0	0	0	0	0	47
LARISSA	1,698	0	2,483	1,529	83	363	35	103	0	0	431	226	53	240	22	148	169	7,583
TRIKALA	334	0	183	101	359	0	0	0	96	0	94	0	0	0	0	0	28	1,195
KARDITSA	196	112	158	0	9	0	0	0	0	0	112	0	0	0	0	0	0	587
MAGNISIA	751	29	1,427	1,090	0	229	115	163	148	0	1,167	1,285	1,747	52	416	657	62	9,338
IOANNINA	497	0	0	270	31	0	0	0	0	0	127	0	136	0	0	0	210	1,271
THESPROTIA	0	0	389	0	0	0	0	0	0	0	0	0	0	0	0	0	0	389
PREVEZA	146	0	392	0	0	0	0	0	0	0	39	0	0	0	0	0	0	577
ARTA	536	0	0	6	15	0	0	0	0	0	38	0	0	0	0	0	0	595

KERKYRA	184	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	204
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
ZAKYNTHOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	265	265
AITOLOAKARNANIA	297	672	293	310	0	0	0	102	0	0	177	0	0	0	187	0	0	2,038
EVRYTANIA	0	0	297	0	44	0	0	0	0	0	0	0	0	0	0	0	0	341
FOKIDA	260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	260
FTHIOTIDA	927	0	965	21	68	238	0	57	584	0	96	1,622	113	0	322	0	0	5,013
VOIOTIA	1,035	186	2,412	45	138	0	0	1,253	535	0	659	2,650	685	102	1,751	3,276	391	15,118
EVVOIA	769	0	817	23	1,046	116	0	0	335	0	4,858	0	1,816	41	1,030	570	30	11,451
ATTIKI	16,230	2,217	21,673	11,446	866	3,768	7,071	5,276	14,206	2,873	5,412	3,158	10,047	2,931	6,680	18,342	3,622	135,818
ACHAIA	2,534	0	4,619	1,614	165	662	72	534	*	0	860	0	922	141	267	191	16	12,597
ILEIA	952	0	391	132	0	0	20	19	0	0	84	0	0	33	0	0	15	1,646
MESSINIA	630	980	293	408	28	0	0	0	0	0	55	0	0	62	0	70	0	2,526
ARKADIA	40	0	617	0	10	0	0	0	0	0	26	0	30	59	33	0	0	815
LAKONIA	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74
KORINTHIA	1,493	0	148	2	288	178	0	24	81	877	229	0	457	43	986	0	80	4,886
ARGOLIDA	1,058	0	302	259	0	0	0	53	0	0	115	0	120	6	0	0	0	1,913
CHANIA	304	0	0	193	0	0	0	0	0	0	55	0	0	0	3	0	18	573
HERAKLION	990	0	191	34	0	0	0	134	16	0	262	0	21	79	0	0	60	1,787
LASITHI	54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54
RETHYMNO	12	0	0	0	0	0	0	0	15	0	20	0	0	0	0	0	0	47
KYKLADES	37	0	385	0	0	0	0	0	0	0	0	0	0	0	0	1,258	0	1,680
DODEKANISA	373	0	0	256	0	0	0	0	0	0	100	0	0	0	0	37	53	819
CHIOS	49	0	0	96	0	0	0	0	0	0	58	0	0	0	0	0	0	203
LESVOS	119	0	36	238	0	0	0	0	0	0	23	0	30	0	0	0	0	446
SAMOS	123	0	208	0	0	0	0	0	0	0	0	0	0	0	0	0	0	331

Source: *ELSTAT, Own Elaboration*

***Table 3C**: Manufacturing Employment at Nuts3 Regions, 1990*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTALS**
GREECE	50,406	8,232	43,091	38,375	4,561	8,137	7,882	8,946	20,831	5,450	17,307	9,227	15,963	5,315	11,674	25,824	6,387	287,608
EVROS	712	0	199	1,103	118	0	0	20	0	0	0	0	19	125	0	0	61	2,357
RHODOPI	252	25	94	462	0	131	0	103	0	0	84	0	35	27	0	0	33	1,246
XANTHI	1,307	630	1,036	741	33	282	0	0	0	0	33	127	0	75	113	0	0	4,377
DRAMA	277	38	25	2,379	104	855	0	0	0	0	583	0	0	0	0	25	49	4,335
KAVALA	258	739	184	2,020	11	9	0	215	875	0	586	59	0	0	35	0	137	5,128
SERRES	987	0	163	836	59	0	0	17	0	0	129	0	95	58	125	0	83	2,552
KILKIS	318	0	1,514	593	256	0	0	0	0	0	194	284	114	133	49	0	56	3,511
PELLA	2,709	13	983	1,223	43	47	0	0	0	0	25	0	197	0	0	0	26	5,266
THESSALONIKI	7,072	3,206	7,276	7,269	993	905	661	1,806	1,894	763	2,241	1,274	1,544	1,375	784	2,268	924	42,255
CHALKIDIKI	511	0	45	47	0	0	0	6	0	0	21	0	0	52	0	0	20	702
IMATHIA	3,469	14	2,462	214	184	0	0	0	0	0	72	0	73	0	0	0	46	6,534
PIERIA	452	48	337	2,173	43	0	0	0	0	0	25	0	0	0	37	0	0	3,115
FLORINA	62	0	0	26	0	0	0	0	0	0	31	0	0	0	0	0	0	119
KASTORIA	0	0	29	559	0	0	0	0	0	0	0	0	0	0	0	0	0	588
KOZANI	0	0	0	14	0	0	0	0	1,124	110	518	0	65	26	194	0	0	2,051
GREVENA	0	0	0	0	47	0	0	0	0	0	0	0	0	0	0	0	0	47
LARISSA	1,863	0	2,345	1,827	55	416	61	85	0	0	516	232	26	317	36	0	186	7,965
TRIKALA	427	0	289	88	261	0	0	0	154	0	54	0	37	0	0	0	18	1,328
KARDITSA	183	100	155	0	43	0	0	0	21	0	85	0	14	16	0	0	0	617
MAGNISIA	1,076	27	1,233	663	0	209	131	298	175	0	1,159	723	818	486	422	737	60	8,217
IOANNINA	782	0	0	195	30	0	0	0	44	0	99	0	295	0	0	0	56	1,501
THESPROTIA	0	0	402	8	0	0	0	0	0	0	21	0	0	0	0	0	0	431
PREVEZA	235	0	318	47	0	0	0	0	0	0	0	0	24	0	0	0	0	624
ARTA	298	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	343

KERKYRA	132	0	0	31	0	0	0	0	0	0	93	0	0	0	0	0	0	256
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	33	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	88
ZAKYNTHOS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129	129
AITOLOAKARNANIA	304	439	311	171	0	0	0	99	249	0	0	0	0	0	70	0	0	1,643
EVRYTANIA	0	0	275	0	78	0	0	0	0	0	0	0	0	0	0	0	0	353
FOKIDA	257	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	0	457
FTHIOTIDA	551	0	699	0	40	329	0	98	141	0	91	1,201	97	0	303	0	0	3,550
VOIOTIA	1,113	170	2,657	57	91	68	33	1,241	463	0	551	2,523	1,035	62	1,481	3,442	144	15,131
EVVOIA	1,040	0	617	18	1,134	122	0	81	325	0	3,171	0	1,210	325	964	256	103	9,366
ATTIKI	16,071	1,932	14,633	12,182	724	4,230	6,824	4,047	15,327	3,653	4,488	2,756	8,514	1,911	6,011	17,903	3,756	124,962
ACHAIA	2,495	0	3,484	1,594	184	269	127	510	0	0	729	48	1,138	152	257	69	17	11,073
ILEIA	716	0	0	76	0	0	0	0	0	0	396	0	40	35	57	0	0	1,320
MESSINIA	431	851	347	386	0	0	0	0	0	0	114	0	0	0	0	59	0	2,188
ARKADIA	47	0	0	0	0	21	0	0	0	0	19	0	0	52	29	0	0	168
LAKONIA	0	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	72
KORINTHIA	825	0	176	223	0	147	0	23	28	924	337	0	462	29	707	0	343	4,224
ARGOLIDA	1,120	0	209	344	0	46	0	25	0	0	68	0	53	0	0	0	0	1,865
CHANIA	327	0	0	230	0	0	0	13	0	0	26	0	0	0	0	0	37	633
HERAKLION	958	0	148	40	14	0	45	259	0	0	434	0	30	59	0	15	37	2,039
LASITHI	70	0	0	0	16	51	0	0	0	0	0	0	0	0	0	0	0	137
RETHYMNO	67	0	0	0	0	0	0	0	11	0	53	0	0	0	0	0	0	131
KYKLADES	26	0	158	0	0	0	0	0	0	0	0	0	0	0	0	1,023	0	1,207
DODEKANISA	274	0	0	317	0	0	0	0	0	0	153	0	0	0	0	27	66	837
CHIOS	49	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	68
LESVOS	132	0	24	0	0	0	0	0	0	0	8	0	28	0	0	0	0	192
SAMOS	118	0	192	0	0	0	0	0	0	0	0	0	0	0	0	0	0	310

Source: *ELSTAT, Own Elaboration*

***Table 3D**: Manufacturing Employment at Nuts3 Regions, 1995*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTALS**
GREECE	51,105	1,882	22,408	34,245	4,385	6,849	9,963	8,478	17,797	3,052	16,975	10,264	10,237	11,116	7,509	16,423	7,595	240,283
EVROS	924	0	212	694	n/a	0	n/a	n/a	0	0	n/a	0	69	35	0	n/a	95	2,029
RHODOPI	395	0	0	460	n/a	n/a	0	102	n/a	0	n/a	159	0	n/a	0	0	n/a	1,116
XANTHI	1,217	n/a	848	878	n/a	n/a	0	n/a	n/a	0	137	n/a	n/a	0	n/a	0	n/a	3,080
DRAMA	231	0	55	1,819	162	n/a	0	0	0	0	548	0	n/a	0	0	n/a	63	2,878
KAVALA	519	0	246	1,430	54	n/a	n/a	216	n/a	0	628	0	99	n/a	0	0	145	3,337
SERRES	1,091	0	0	590	141	0	n/a	n/a	0	0	128	n/a	144	n/a	0	0	184	2,278
KILKIS	359	0	1,284	348	157	0	0	n/a	n/a	0	293	397	97	312	n/a	n/a	79	3,326
PELLA	1,829	0	1,018	469	n/a	n/a	0	48	0	0	73	n/a	n/a	n/a	0	0	n/a	3,437
THESSALONIKI	7,497	56	4,866	9,512	690	836	683	1,731	2,014	431	1,903	1,214	1,911	1,592	749	1,563	1,582	38,830
CHALKIDIKI	532	0	68	n/a	0	0	0	n/a	0	0	57	0	0	n/a	0	0	0	657
IMATHIA	2,303	0	1,292	350	229	0	n/a	71	0	0	143	0	n/a	29	0	n/a	51	4,468
PIERIA	273	0	n/a	1,565	n/a	0	n/a	0	n/a	0	97	0	n/a	48	107	0	n/a	2,090
FLORINA	81	0	0	n/a	n/a	0	0	0	n/a	0	n/a	0	0	0	0	0	0	81
KASTORIA	n/a	0	0	584	0	0	0	0	0	0	32	0	0	0	0	0	0	616
KOZANI	42	0	0	159	35	0	0	0	n/a	0	160	0	n/a	n/a	n/a	0	n/a	396
GREVENA	n/a	0	0	0	170	0	0	0	0	0	0	0	0	n/a	0	n/a	0	170
LARISSA	2,008	0	1,899	1,081	92	n/a	137	166	n/a	0	520	331	355	214	0	0	402	7,205
TRIKALA	439	0	107	30	188	0	n/a	n/a	n/a	0	79	n/a	n/a	0	0	n/a	100	943
KARDITSA	172	0	0	0	48	0	n/a	n/a	n/a	0	135	n/a	n/a	n/a	n/a	0	n/a	355
MAGNISIA	1,335	0	626	345	n/a	215	118	n/a	198	0	1,115	552	626	405	202	170	n/a	5,907
IOANNINA	995	0	n/a	65	129	0	0	0	n/a	0	229	0	220	0	0	0	185	1,823
THESPROTIA	n/a	0	n/a	0	0	0	0	n/a	0	0	42	0	0	0	0	0	0	42
PREVEZA	332	0	n/a	n/a	n/a	0	0	0	0	0	38	0	0	0	0	0	n/a	370
ARTA	283	0	0	0	0	0	0	0	0	0	61	0	0	0	0	0	0	344

KERKYRA	105	0	0	n/a	0	0	0	0	0	0	52	0	0	0	0	0	n/a	157
LEFKADA	n/a	0	0	n/a	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
KEFALLONIA	33	0	0	0	0	0	0	0	n/a	0	n/a	0	0	0	0	0	0	33
ZAKYNTHOS	0	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
AITOLOAKARNANIA	442	0	230	n/a	0	0	0	n/a	n/a	0	283	0	n/a	0	n/a	0	0	955
EVRYTANIA	0	0	n/a	0	n/a	0	0	0	0	0	0	0	0	0	0	0	0	n/a
FOKIDA	142	0	0	n/a	0	0	0	0	0	0	n/a	0	0	n/a	0	0	0	142
FTHIOTIDA	1,243	0	528	n/a	46	351	0	n/a	156	0	222	1,049	101	60	n/a	n/a	n/a	3,756
VOIOTIA	1,106	n/a	1,133	n/a	0	n/a	n/a	1,246	525	0	626	2,924	597	118	589	2,974	25	11,863
EVVOIA	1,211	0	n/a	n/a	973	n/a	n/a	n/a	406	0	2,370	477	206	441	752	n/a	n/a	6,836
ATTIKI	16,764	1,826	7,095	12,348	838	4,858	8,754	4,500	14,336	2,621	4,346	3,127	5,381	6,244	4,471	11,614	4,350	113,473
ACHAIA	2,399	0	432	1,168	147	383	80	157	17	0	620	n/a	172	1,364	54	102	118	7,213
ILEIA	623	0	n/a	0	n/a	0	n/a	n/a	n/a	0	395	0	n/a	n/a	0	0	n/a	1,018
MESSINIA	233	n/a	n/a	n/a	0	0	40	0	0	0	181	0	n/a	n/a	0	n/a	n/a	454
ARKADIA	71	0	0	n/a	n/a	n/a	0	n/a	0	0	72	0	n/a	119	0	0	0	262
LAKONIA	210	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	n/a	210
KORINTHIA	834	0	125	0	183	206	0	n/a	145	n/a	354	n/a	188	n/a	585	0	n/a	2,620
ARGOLIDA	584	0	188	200	n/a	n/a	0	n/a	n/a	n/a	178	34	n/a	46	0	0	0	1,230
CHANIA	412	0	0	n/a	103	0	n/a	n/a	0	0	n/a	0	0	0	0	0	0	515
HERAKLION	902	0	156	72	n/a	n/a	151	241	0	0	357	0	71	89	0	n/a	71	2,110
LASITHI	69	0	0	0	n/a	n/a	0	n/a	0	0	66	0	n/a	0	0	0	0	135
RETHYMNO	206	0	0	n/a	0	0	n/a	0	0	0	114	0	0	0	0	0	n/a	320
KYKLADES	101	0	n/a	n/a	n/a	0	0	0	0	0	61	0	0	0	0	n/a	0	162
DODEKANISA	380	0	0	78	0	0	n/a	n/a	0	0	202	0	n/a	n/a	0	0	89	749
CHIOS	n/a	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
LESVOS	178	0	n/a	0	0	0	0	0	n/a	0	58	0	n/a	n/a	0	0	56	292
SAMOS	n/a	0	n/a	n/a	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a

Source: *ELSTAT, Own Elaboration*

Table 3E: *Manufacturing Employment at Nuts3 Regions, 2000*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTALS**
GREECE	50,087	1,339	16,935	22,003	4,062	6,194	14,294	8,213	14,743	1,725	15,387	10,759	12,496	11,609	8,508	13,549	6,987	218,890
EVROS	823	0	157	242	n/a	n/a	n/a	n/a	0	0	n/a	n/a	75	23	n/a	n/a	57	1,377
RHODOPI	434	0	209	504	119	n/a	0	223	n/a	0	244	153	n/a	n/a	0	0	0	1,886
XANTHI	1,175	n/a	1,375	726	0	n/a	0	n/a	n/a	0	135	n/a	0	0	n/a	0	n/a	3,411
DRAMA	275	0	71	358	98	n/a	0	0	0	0	684	0	n/a	0	0	n/a	75	1,561
KAVALA	406	0	196	1,046	40	n/a	n/a	n/a	n/a	0	536	0	168	42	0	0	119	2,553
SERRES	905	0	n/a	208	87	0	n/a	n/a	n/a	0	108	0	111	n/a	0	0	231	1,650
KILKIS	678	0	1,230	158	61	0	0	n/a	n/a	0	286	939	100	489	n/a	0	n/a	3,941
PELLA	1,236	0	625	161	n/a	n/a	0	n/a	0	0	81	n/a	228	69	0	0	n/a	2,400
THESSALONIKI	7,014	57	3,118	6,418	432	898	627	1,585	1,822	n/a	1,730	1,183	2,098	1,458	725	1,577	1,199	31,941
CHALKIDIKI	559	0	n/a	n/a	0	0	0	n/a	n/a	0	80	0	0	n/a	0	0	0	639
IMATHIA	2,579	0	1,109	244	161	0	n/a	86	0	0	50	0	n/a	38	0	n/a	n/a	4,267
PIERIA	247	0	160	541	n/a	0	n/a	0	n/a	0	71	0	0	n/a	129	0	n/a	1,148
FLORINA	82	0	0	0	n/a	0	0	0	n/a	0	0	0	0	0	0	0	0	82
KASTORIA	n/a	0	0	483	0	0	0	0	0	0	n/a	0	0	0	0	0	0	483
KOZANI	44	0	0	140	39	0	0	0	0	0	152	0	n/a	n/a	n/a	0	n/a	375
GREVENA	n/a	0	n/a	0	n/a	0	0	0	0	0	0	0	0	n/a	0	n/a	0	n/a
LARISSA	1,955	0	1,776	476	61	n/a	n/a	298	0	0	452	365	604	241	0	0	382	6,610
TRIKALA	588	0	49	n/a	117	0	n/a	n/a	n/a	0	122	n/a	n/a	0	0	n/a	86	962
KARDITSA	80	0	0	0	48	0	n/a	n/a	n/a	0	105	n/a	n/a	n/a	n/a	0	n/a	233
MAGNISIA	961	0	52	44	n/a	250	188	n/a	160	0	882	646	999	323	n/a	225	n/a	4,730
IOANNINA	1,314	0	n/a	163	126	0	0	0	n/a	0	180	0	351	0	0	0	149	2,283
THESPROTIA	n/a	0	0	0	0	0	0	n/a	0	0	32	0	0	0	0	0	0	32
PREVEZA	382	0	n/a	n/a	n/a	0	0	0	0	0	n/a	0	0	0	0	0	n/a	382
ARTA	297	0	0	0	0	0	0	0	0	0	76	0	0	0	0	0	0	373

KERKYRA	80	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	n/a	80
LEFKADA	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	n/a
KEFALLONIA	n/a	0	0	0	0	0	0	0	n/a	0	n/a	0	0	0	0	0	0	n/a
ZAKYNTHOS	0	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
AITOLOAKARNANIA	436	0	185	n/a	0	0	0	n/a	n/a	0	337	n/a	0	0	n/a	0	0	958
EVRYTANIA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FOKIDA	130	0	0	n/a	0	n/a	0	0	0	0	n/a	0	0	n/a	0	0	0	130
FTHIOTIDA	1,403	0	265	n/a	40	553	0	n/a	70	0	190	888	n/a	71	n/a	n/a	n/a	3,480
VOIOTIA	1,787	n/a	851	n/a	n/a	286	n/a	1,654	638	0	996	3,625	816	169	463	2,905	195	14,385
EVVOIA	1,176	0	n/a	n/a	929	n/a	n/a	n/a	369	0	1,631	439	287	410	829	n/a	n/a	6,070
ATTIKI	15,640	1,282	4,705	9,098	1,146	3,642	13,102	3,825	11,526	1,725	4,009	2,500	5,976	6,819	5,708	8,678	4,314	103,695
ACHAIA	2,084	0	306	726	132	377	103	189	33	0	512	0	226	1,341	n/a	164	90	6,283
ILEIA	535	0	n/a	0	n/a	0	n/a	0	n/a	0	155	0	n/a	n/a	0	0	n/a	690
MESSINIA	165	n/a	0	0	0	0	87	0	0	0	206	0	n/a	n/a	0	n/a	n/a	458
ARKADIA	80	0	0	0	n/a	n/a	0	n/a	0	0	52	0	n/a	n/a	0	0	0	132
LAKONIA	214	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	n/a	214
KORINTHIA	933	0	96	0	304	188	0	n/a	125	n/a	314	n/a	192	n/a	654	0	n/a	2,806
ARGOLIDA	692	0	167	147	n/a	n/a	0	n/a	n/a	n/a	173	21	65	38	0	0	0	1,303
CHANIA	401	0	0	n/a	122	0	n/a	n/a	0	0	n/a	0	0	0	0	0	0	523
HERAKLION	1,240	0	233	50	n/a	n/a	187	353	0	0	349	0	125	78	0	n/a	90	2,705
LASITHI	56	0	0	0	0	n/a	0	n/a	0	0	81	0	75	0	0	0	0	212
RETHYMNO	353	0	0	n/a	0	0	n/a	0	0	0	121	0	0	0	0	0	n/a	474
KYKLADES	113	0	n/a	0	n/a	0	0	0	0	0	83	0	0	0	0	n/a	0	196
DODEKANISA	379	0	0	70	0	0	n/a	n/a	0	0	135	0	n/a	n/a	0	0	n/a	584
CHIOS	n/a	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
LESVOS	156	0	0	0	n/a	0	0	0	n/a	0	37	0	n/a	0	0	0	n/a	193
SAMOS	n/a	0	n/a	n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	n/a

Source: *ELSTAT, Own Elaboration*

***Table 3F**: Manufacturing Employment at Nuts3 Regions, 2005*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTALS**
GREECE	49,580	1,177	10,870	11,210	2,253	4,809	13,055	8,099	13,750	1,756	15,243	10,776	11,462	9,439	7,324	9,172	5,995	185,970
EVROS	654	0	n/a	0	n/a	0	0	258	n/a	0	87	n/a	n/a	n/a	n/a	n/a	56	1,055
RHODOPI	272	0	484	n/a	197	0	0	220	n/a	0	173	n/a	n/a	0	0	0	0	1,346
XANTHI	1,066	n/a	1,198	233	n/a	n/a	n/a	n/a	n/a	0	146	n/a	0	0	n/a	0	n/a	2,643
DRAMA	259	0	n/a	184	n/a	0	0	0	0	0	815	0	0	0	0	n/a	n/a	1,258
KAVALA	278	0	69	350	n/a	0	n/a	226	n/a	0	521	0	176	n/a	0	0	114	1,734
SERRES	812	0	0	35	77	0	0	n/a	n/a	0	92	0	74	n/a	0	0	237	1,327
KILKIS	570	0	883	52	71	0	n/a	194	0	0	n/a	1,505	196	792	0	0	n/a	4,263
PELLA	1,363	0	430	107	n/a	n/a	0	n/a	0	0	75	n/a	139	n/a	0	0	n/a	2,114
THESSALONIKI	7,129	n/a	1,883	3,395	245	1,049	751	1,638	1,700	n/a	1,703	1,260	1,823	1,290	781	1,349	1,047	27,043
CHALKIDIKI	360	0	n/a	n/a	0	0	n/a	0	n/a	0	74	0	0	n/a	0	0	0	434
IMATHIA	2,068	0	947	n/a	137	0	n/a	148	0	0	n/a	0	n/a	n/a	0	0	n/a	3,300
PIERIA	340	0	n/a	62	n/a	0	n/a	0	0	0	59	0	n/a	n/a	n/a	0	n/a	461
FLORINA	n/a	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	0	0	n/a
KASTORIA	n/a	0	0	311	0	0	0	0	0	0	n/a	0	0	0	0	0	0	311
KOZANI	n/a	0	0	146	36	0	0	0	0	0	110	0	177	n/a	n/a	0	0	469
GREVENA	n/a	0	n/a	0	n/a	0	0	0	0	0	0	0	0	n/a	0	n/a	0	n/a
LARISSA	1,997	0	1,223	326	n/a	n/a	147	309	0	0	679	433	452	185	0	n/a	318	6,069
TRIKALA	801	0	n/a	0	193	0	n/a	n/a	n/a	0	63	n/a	0	0	0	n/a	148	1,205
KARDITSA	140	0	0	0	99	0	n/a	n/a	n/a	0	106	0	n/a	n/a	n/a	0	n/a	345
MAGNISIA	1,002	0	n/a	0	n/a	n/a	148	n/a	192	0	748	894	979	251	n/a	n/a	0	4,214
IOANNINA	1,956	0	0	n/a	56	0	0	0	n/a	0	158	0	288	0	0	0	n/a	2,458
THESPROTIA	n/a	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
PREVEZA	426	0	0	n/a	n/a	0	0	0	0	0	49	0	0	0	0	0	0	475
ARTA	306	0	0	0	n/a	0	0	0	0	0	n/a	0	0	0	0	0	0	306

KERKYRA	67	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	n/a	67
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	n/a	0	0	0	0	0	0	0	n/a	0	n/a	0	0	0	0	0	0	n/a
ZAKYNTHOS	0	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
AITOLOAKARNANIA	458	0	n/a	0	0	0	0	n/a	0	0	378	0	0	0	0	0	0	836
EVRYTANIA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FOKIDA	n/a	0	0	n/a	0	0	0	0	0	0	0	0	0	n/a	0	0	0	n/a
FTHIOTIDA	1,360	0	138	0	63	439	0	n/a	n/a	0	180	n/a	n/a	n/a	n/a	n/a	0	2,180
VOIOTIA	1,677	n/a	505	n/a	n/a	353	n/a	1,534	605	0	1,068	4,202	946	202	468	n/a	157	11,717
EVVOIA	1,466	0	n/a	n/a	n/a	n/a	n/a	n/a	301	0	1,291	n/a	391	n/a	627	n/a	n/a	4,076
ATTIKI	15,796	1,177	2,704	5,677	567	2,627	11,617	2,995	10,779	1,756	4,323	2,482	5,015	5,644	5,448	7,649	3,790	90,046
ACHAIA	2,164	0	100	332	n/a	341	98	n/a	54	0	391	0	264	1,005	n/a	174	53	4,976
ILEIA	514	0	n/a	0	0	0	n/a	0	n/a	0	199	0	n/a	n/a	0	0	0	713
MESSINIA	254	n/a	n/a	0	0	0	91	0	0	0	213	0	n/a	n/a	0	n/a	n/a	558
ARKADIA	62	0	0	0	n/a	n/a	0	0	0	0	n/a	0	n/a	n/a	0	0	0	62
LAKONIA	254	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	n/a	254
KORINTHIA	749	0	n/a	0	391	n/a	0	183	119	n/a	386	0	270	n/a	n/a	0	0	2,098
ARGOLIDA	437	0	n/a	n/a	n/a	n/a	0	57	0	0	176	0	n/a	n/a	0	0	0	670
CHANIA	329	0	0	0	121	0	n/a	n/a	0	0	146	0	0	0	0	0	0	596
HERAKLION	1,053	0	306	n/a	n/a	n/a	203	337	0	0	397	0	170	70	0	0	75	2,611
LASITHI	n/a	0	0	0	0	n/a	0	0	0	0	72	0	102	0	0	0	0	174
RETHYMNO	538	0	0	0	0	0	n/a	0	0	0	147	0	0	0	0	0	n/a	685
KYKLADES	80	0	n/a	0	n/a	0	0	0	0	0	50	0	0	0	0	n/a	0	130
DODEKANISA	373	0	0	n/a	0	0	n/a	n/a	0	0	115	0	0	0	0	0	n/a	488
CHIOS	n/a	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a
LESVOS	150	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	0	203
SAMOS	0	0	0	0	0	0	0	0	0	0	n/a	0	0	0	0	0	0	n/a

Source: *ELSTAT, Own Elaboration*

***Table 4A**: Regional Specialization at Nuts3 regions, 1980*

REGIONS	SECTOR CODE																	TOTAL SPEC
	20+21	22	23	24+29	25	27	28	30	31	32	33	34	35	36	37	38	39+26	
EVROS	0.4855	n/d	-0.0607	0.4220	n/a	n/d	n/d	n/d	n/d	n/d	-0.0216	n/d	-0.0218	-0.0072	n/d	-0.0324	0.0140	**0.7778**
RHODOPI	0.1341	n/d	-0.0532	0.9847	n/d	n/d	n/d	-0.0143	n/d	n/d	-0.0024	n/a	n/a	n/d	n/d	n/d	0.0262	**1.0751**
XANTHI	0.2878	0.0477	0.0167	0.1394	0.0350	-0.0075	n/d	n/d	n/d	n/d	-0.0194	-0.0119	-0.0208	n/d	0.0427	n/d	n/d	**0.5096**
DRAMA	-0.0532	0.0009	n/d	0.6081	0.0311	0.4075	n/d	-0.0093	n/d	n/d	0.2126	n/d	n/d	n/d	n/d	n/d	-0.0010	**1.1967**
KAVALA	-0.0500	0.2810	-0.0675	0.3252	-0.0080	n/d	n/d	0.0089	0.2687	n/d	-0.0026	n/d	-0.0171	n/d	n/d	n/d	0.0262	**0.7648**
SERRES	0.9159	-0.0084	-0.0488	-0.0399	0.1553	n/d	n/d	n/d	n/d	n/d	-0.0187	n/d	-0.0238	0.0066	n/d	n/d	-0.0044	**0.9339**
KILKIS	-0.0496	n/d	0.1841	0.6072	-0.0011	n/d	n/d	-0.0144	n/d	n/d	-0.0205	n/a	-0.0219	n/d	-0.0121	n/d	-0.0075	**0.6643**
PELLA	0.7257	-0.0091	-0.0038	0.1288	-0.0080	n/d	n/d	-0.0129	n/d	n/d	-0.0136	n/d	-0.0197	-0.0074	n/d	n/d	n/d	**0.7801**
THESSALONIKI	-0.0153	0.0441	0.0058	0.0456	0.0227	-0.0048	-0.0088	0.0004	-0.0115	-0.0031	-0.0054	-0.0037	-0.0091	0.0063	-0.0013	-0.0158	-0.0057	**0.0405**
CHALKIDIKI	0.3180	n/d	0.1471	n/d	n/d	n/d	n/d	0.0928	n/d	n/d	-0.0151	n/d	n/d	0.4347	n/d	n/d	n/d	**0.9775**
IMATHIA	0.4285	0.0038	0.4729	-0.0180	0.0252	n/d	n/d	-0.0092	n/d	n/d	-0.0133	n/d	n/d	-0.0032	n/d	n/d	-0.0079	**0.8789**
PIERIA	0.1224	n/d	0.0141	0.6601	0.0665	n/d	n/d	n/d	n/d	n/d	-0.0158	n/d	n/d	n/d	n/d	n/d	-0.0059	**0.8415**
FLORINA	0.8760	n/d	n/d	n/a	0.1922	n/d	n/d	n/d	n/d	n/d	0.3826	n/d	n/d	n/d	n/d	n/d	n/d	**1.4508**
KASTORIA	n/d	n/d	n/d	2.1614	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**2.1614**
KOZANI	-0.0309	n/d	n/d	0.0767	n/d	n/d	n/d	n/d	1.5067	0.0981	-0.0039	n/d	-0.0237	0.0094	n/d	n/d	n/d	**1.6325**
GREVENA	n/d	n/d	n/d	0.2559	2.4879	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**2.7438**
LARISSA	0.0802	n/d	0.1564	0.0210	0.0086	0.0509	-0.0081	0.0385	n/d	n/d	-0.0006	-0.0040	-0.0209	0.0134	-0.0102	-0.0321	-0.0039	**0.2892**
TRIKALA	0.2105	n/d	0.0037	-0.0422	1.0579	n/d	n/d	n/d	n/d	n/d	0.0330	n/d	n/d	n/d	n/d	n/d	n/d	**1.2628**
KARDITSA	0.3968	0.1773	0.1425	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.1470	n/d	n/d	n/d	n/d	n/d	0.0056	**0.8692**
MAGNISIA	-0.0508	-0.0084	-0.0226	0.0539	n/d	0.0011	-0.0075	-0.0142	-0.0201	n/d	0.0771	0.1305	0.2060	-0.0074	-0.0010	-0.0324	-0.0057	**0.2987**
IOANNINA	0.4102	n/d	n/d	0.0546	0.0214	n/d	n/d	n/d	n/d	n/d	0.4419	n/a	n/d	n/d	n/d	n/d	0.1603	**1.0884**
THESPROTIA	n/d	n/d	1.6952	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.6952**
PREVEZA	0.0458	n/d	0.5093	0.1964	n/d	n/d	n/d	n/d	n/d	n/d	-0.0182	n/d	n/d	n/d	n/d	n/d	-0.0058	**0.7275**
ARTA	1.3287	n/d	n/d	-0.0397	0.0979	n/d	n/d	n/d	n/d	n/d	0.0411	n/d	n/d	n/d	n/d	n/d	n/d	**1.4280**

KERKYRA	0.5205	n/d	0.4317	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.0100	n/d	n/d	n/d	n/d	n/d	n/d	**0.9622**
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
ZAKYNTHOS	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	3.8460	**3.8460**
AITOLOAKARNANIA	0.0231	0.8182	0.0311	0.0492	n/d	n/d	n/d	-0.0114	n/d	n/d	0.0649	n/d	n/d	n/d	n/d	n/d	n/d	**0.9752**
EVRYTANIA	n/d	n/d	1.1743	n/d	0.4439	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.6182**
FOKIDA	1.8862	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.8862**
FTHIOTIDA	-0.0448	n/d	0.1144	-0.0401	n/d	0.0578	n/d	-0.0132	-0.0012	n/d	0.0264	0.6516	-0.0238	n/d	0.0184	n/d	n/d	**0.7453**
VOIOTIA	-0.0536	n/d	0.0026	-0.0122	-0.0009	n/d	n/d	0.0741	-0.0204	n/d	0.0027	0.2320	-0.0082	-0.0071	0.0973	0.0956	0.0228	**0.4246**
EVVOIA	-0.0544	n/d	-0.0628	-0.0068	0.2352	-0.0049	n/d	n/d	-0.0203	n/d	0.4940	n/d	0.1963	-0.0073	0.0551	-0.0287	-0.0076	**0.7878**
ATTIKI	-0.0416	-0.0075	-0.0120	-0.0205	-0.0081	-0.0008	0.0279	0.0090	0.0346	0.0060	-0.0156	-0.0044	0.0127	0.0069	0.0059	0.0532	0.0063	**0.0521**
ACHAIA	0.0208	n/d	0.2409	0.0383	-0.0045	0.0998	-0.0082	0.0021	-0.0100	n/d	0.0164	n/d	-0.0113	-0.0053	-0.0146	-0.0246	-0.0078	**0.3321**
ILEIA	1.4137	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.0086	n/d	-0.0223	0.0179	-0.0178	n/d	-0.0035	**1.3967**
MESSINIA	0.1534	1.3280	-0.0669	0.0002	-0.0071	n/d	n/d	n/d	n/d	n/d	-0.0190	n/d	n/d	-0.0069	n/d	-0.0319	n/d	**1.3496**
ARKADIA	-0.0550	n/d	0.8241	n/d	0.1186	n/d	n/d	n/d	n/d	n/d	-0.0179	n/d	0.0557	n/d	0.0009	n/d	n/d	**0.9265**
LAKONIA	1.2822	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.2774	n/d	n/d	n/d	n/d	n/d	n/d	**1.5596**
KORINTHIA	0.1971	n/d	-0.0564	n/d	0.0562	0.0237	n/d	-0.0026	-0.0179	0.3046	0.0004	n/d	0.0360	-0.0040	0.3354	n/d	-0.0038	**0.8688**
ARGOLIDA	1.0257	-0.0092	-0.0659	-0.0092	-0.0037	n/d	n/d	0.0430	n/d	n/d	-0.0116	n/d	n/d	-0.0073	-0.0108	n/d	n/d	**0.9510**
CHANIA	0.6069	n/d	n/d	0.2167	n/d	n/d	n/d	n/d	n/d	n/d	0.0889	n/d	n/d	n/d	0.0021	n/d	0.0554	**0.9701**
HERAKLION	0.7223	n/d	-0.0406	-0.0373	-0.0047	n/d	-0.0087	0.0169	-0.0188	n/d	0.0299	n/d	n/d	0.0929	n/d	n/d	0.0137	**0.7655**
LASITHI	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	2.7938	n/d	n/d	n/d	n/d	n/d	n/d	**2.7938**
RETHYMNO	0.0741	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.6359	n/d	0.8342	n/d	n/d	n/d	n/d	n/d	n/d	**1.5443**
KYKLADES	-0.0465	n/d	0.1132	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	1.4070	n/d	**1.4737**
DODEKANISA	0.3624	n/d	n/d	0.5185	n/d	n/d	n/d	n/d	n/d	n/d	0.0860	n/d	n/d	n/d	n/d	-0.0338	0.0305	**0.9636**
CHIOS	0.1910	n/d	n/d	0.5173	n/d	n/d	n/d	n/d	n/d	n/d	0.4760	n/d	n/d	n/d	n/d	n/d	n/d	**1.1843**
LESVOS	0.3013	n/d	-0.0582	0.5997	n/d	n/d	n/d	n/d	n/d	n/d	-0.0146	n/d	-0.0120	n/d	n/d	n/d	n/d	**0.8163**
SAMOS	0.3957	n/d	0.3613	0.0643	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**0.8213**

Source: *ELSTAT, Own Elaboration*

***Table 4B**: Regional Specialization at Nuts3 regions, 1985*

REGIONS	SECTOR CODE																	TOTAL SPEC
	20+21	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	
EVROS	0.3801	n/d	-0.0563	0.4010	0.0637	n/d	n/d	n/d	n/d	n/d	-0.0111	n/d	-0.0222	n/d	n/d	-0.0318	-0.0025	**0.7209**
RHODOPI	0.0548	n/d	0.0344	0.1456	n/d	0.1265	n/d	0.0207	n/d	n/d	-0.0043	0.1577	n/d	n/d	n/d	n/d	0.0147	**0.5500**
XANTHI	0.2056	0.1542	-0.0173	0.1182	0.0018	0.1353	n/d	n/d	n/d	n/d	-0.0109	-0.0130	-0.0191	n/d	-0.0020	n/d	n/d	**0.5527**
DRAMA	0.0114	0.0016	n/d	0.5806	0.0240	0.3632	n/d	n/d	n/d	n/d	0.1092	n/d	n/d	n/d	n/d	n/d	-0.0072	**1.0828**
KAVALA	-0.0606	0.1853	-0.0634	0.4073	-0.0062	n/d	n/d	0.0050	0.2319	n/d	0.0338	n/d	-0.0193	n/d	-0.0164	n/d	0.0142	**0.7116**
SERRES	1.0271	n/d	-0.0582	-0.0372	0.0115	n/d	n/d	n/d	n/d	n/d	-0.0232	n/d	-0.0155	0.0036	-0.0136	n/d	-0.0011	**0.8934**
KILKIS	-0.0616	n/d	0.5551	0.0841	0.0013	n/d	n/d	-0.0118	n/d	n/d	-0.0228	0.0367	-0.0007	0.0048	-0.0145	n/d	-0.0071	**0.5634**
PELLA	0.5528	-0.0086	0.0113	0.2220	-0.0024	-0.0092	n/d	-0.0024	n/d	n/d	-0.0064	n/d	-0.0200	-0.0068	n/d	n/d	n/d	**0.7302**
THESSALONIKI	-0.0066	0.0712	-0.0045	0.0348	0.0107	-0.0034	-0.0094	0.0111	-0.0141	-0.0013	-0.0082	0.0023	-0.0149	0.0203	-0.0034	-0.0242	-0.0046	**0.0558**
CHALKIDIKI	0.7391	n/d	-0.0267	n/d	n/d	n/d	n/d	0.0534	n/d	n/d	-0.0213	n/d	n/d	0.3432	n/d	n/d	n/d	**1.0877**
IMATHIA	0.4265	-0.0084	0.4944	-0.0148	0.0305	n/d	n/d	-0.0094	n/d	n/d	-0.0121	n/d	n/d	-0.0058	-0.0106	n/d	-0.0073	**0.8831**
PIERIA	0.0227	n/d	-0.0369	0.9735	0.0836	n/d	n/d	n/d	n/d	n/d	-0.0157	n/d	n/d	-0.0067	n/d	n/d	-0.0016	**1.0190**
FLORINA	1.0261	n/d	n/d	-0.0368	0.1501	n/d	n/d	n/d	n/d	n/d	0.1735	n/d	n/d	n/d	n/d	n/d	n/d	**1.3128**
KASTORIA	n/d	n/d	n/d	2.2271	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**2.2271**
KOZANI	-0.0105	n/d	n/d	-0.0176	n/d	n/d	n/d	n/d	1.2715	0.0368	0.1935	n/d	-0.0185	0.1358	n/d	n/d	n/d	**1.5910**
GREVENA	n/d	n/d	n/d	-0.0014	3.5484	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**3.5470**
LARISSA	0.0640	n/d	0.2030	0.1262	-0.0047	0.0294	-0.0080	-0.0118	n/d	n/d	-0.0063	-0.0056	-0.0152	0.0166	-0.0080	-0.0299	0.0024	**0.3522**
TRIKALA	0.1419	n/d	-0.0215	-0.0206	0.8654	n/d	n/d	n/d	0.0130	n/d	0.0168	n/d	n/d	n/d	n/d	n/d	0.0037	**0.9988**
KARDITSA	0.2289	0.3662	0.1141	n/d	-0.0014	n/d	n/d	n/d	n/d	n/d	0.2099	n/d	n/d	n/d	n/d	n/d	n/d	**0.9176**
MAGNISIA	-0.0594	-0.0068	-0.0217	0.0092	n/d	-0.0013	-0.0092	-0.0108	-0.0232	n/d	0.0846	0.1848	0.2076	-0.0068	-0.0014	-0.0174	-0.0073	**0.3211**
IOANNINA	0.3298	n/d	n/d	0.1440	0.0090	n/d	n/d	n/d	n/d	n/d	0.0453	n/d	0.0590	n/d	n/d	n/d	0.3489	**0.9360**
THESPROTIA	n/d	n/d	1.7363	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.7363**
PREVEZA	0.1033	n/d	0.9170	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.0042	n/d	n/d	n/d	n/d	n/d	n/d	**1.0245**
ARTA	1.5116	n/d	n/d	-0.0239	0.0102	n/d	n/d	n/d	n/d	n/d	0.0003	n/d	n/d	n/d	n/d	n/d	n/d	**1.4982**

KERKYRA	1.5146	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.0426	n/d	n/d	n/d	n/d	n/d	n/d	**1.5571**
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	1.7824	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.7824**
ZAKYNTHOS	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	3.9124	**3.9124**
AITOLOAKARNANIA	-0.0209	0.8133	-0.0292	0.0523	n/d	n/d	n/d	0.0218	n/d	n/d	0.0272	n/d	n/d	n/d	0.0634	n/d	n/d	**0.9279**
EVRYTANIA	n/d	n/d	1.3920	n/d	0.2627	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.6546**
FOKIDA	1.7824	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.7824**
FTHIOTIDA	0.0175	n/d	0.0171	-0.0136	-0.0029	0.0288	n/d	-0.0119	0.0622	n/d	-0.0230	0.7112	-0.0227	n/d	0.0215	n/d	n/d	**0.7842**
VOIOTIA	-0.0616	-0.0101	-0.0158	-0.0107	-0.0056	n/d	n/d	0.0780	-0.0233	n/d	-0.0164	0.2779	-0.0140	-0.0069	0.1070	0.1902	0.0067	**0.4954**
EVVOIA	-0.0617	n/d	-0.0645	-0.0080	0.1544	-0.0095	n/d	n/d	-0.0248	n/d	0.8056	n/d	0.1498	-0.0059	0.0604	-0.0295	-0.0053	**0.9609**
ATTIKI	-0.0409	-0.0088	-0.0158	-0.0208	-0.0062	0.0019	0.0364	0.0071	0.0446	0.0079	-0.0186	-0.0101	0.0134	0.0030	0.0033	0.0547	0.0077	**0.0589**
ACHAIA	0.0360	n/d	0.2688	0.0221	-0.0033	0.0372	-0.0086	0.0114	n/a	n/d	0.0049	n/d	0.0125	-0.0058	-0.0164	-0.0270	-0.0035	**0.3283**
ILEIA	0.7142	n/d	0.0710	-0.0238	n/d	n/d	-0.0092	-0.0119	n/d	n/d	-0.0112	n/d	n/d	0.0013	n/d	n/d	-0.0072	**0.7234**
MESSINIA	0.0982	1.0200	-0.0485	0.0653	-0.0046	n/d	n/d	n/d	n/d	n/d	-0.0233	n/d	n/d	0.0066	n/d	-0.0327	n/d	**1.0809**
ARKADIA	-0.0605	n/d	1.1038	n/d	-0.0039	n/d	n/d	n/d	n/d	n/d	-0.0220	n/d	-0.0190	0.0978	-0.0051	n/d	n/d	**1.0911**
LAKONIA	1.7824	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.7824**
KORINTHIA	0.1824	n/d	-0.0533	-0.0023	0.0738	0.0124	n/d	-0.0093	-0.0235	0.4509	-0.0142	n/d	0.0389	-0.0067	0.2985	n/d	-0.0033	**0.9444**
ARGOLIDA	0.6582	n/d	-0.0173	0.0308	n/d	n/d	n/d	-0.0043	n/d	n/d	-0.0033	n/d	0.0011	-0.0056	n/d	n/d	n/d	**0.6595**
CHANIA	0.6093	n/d	n/d	0.3836	n/d	n/d	n/d	n/d	n/d	n/d	0.0396	n/d	n/d	n/d	-0.0114	n/d	0.0142	**1.0354**
HERAKLION	0.6603	n/d	-0.0534	-0.0330	n/d	n/d	n/d	0.0630	-0.0182	n/d	0.1226	n/d	-0.0195	0.0379	n/d	n/d	0.0174	**0.7771**
LASITHI	1.7824	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.7824**
RETHYMNO	0.1065	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.4920	n/d	0.8094	n/d	n/d	n/d	n/d	n/d	n/d	**1.4079**
KYKLADES	-0.0448	n/d	0.0603	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	1.5858	n/d	**1.6013**
DODEKANISA	0.4536	n/d	n/d	0.3327	n/d	n/d	n/d	n/d	n/d	n/d	0.0798	n/d	n/d	n/d	n/d	-0.0312	0.0760	**0.9108**
CHIOS	0.0871	n/d	n/d	0.6991	n/d	n/d	n/d	n/d	n/d	n/d	0.4296	n/d	n/d	n/d	n/d	n/d	n/d	**1.2158**
LESVOS	0.1231	n/d	-0.0630	0.8533	n/d	n/d	n/d	n/d	n/d	n/d	-0.0107	n/d	0.0058	n/d	n/d	n/d	n/d	**0.9085**
SAMOS	0.2945	n/d	0.7992	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.0936**

Source: *ELSTAT, Own Elaboration*

***Table 4C**: Regional Specialization at Nuts3 regions, 1990*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTAL SPEC**
EVROS	0.1645	n/d	-0.0484	0.5872	0.0576	n/d	n/d	-0.0110	n/d	n/d	n/d	n/d	-0.0156	0.0559	n/d	n/d	0.0040	**0.7941**
RHODOPI	0.0290	-0.0071	-0.0518	0.3790	n/d	0.1380	n/d	0.0808	n/d	n/d	0.0077	n/d	-0.0191	0.0034	n/d	n/d	0.0047	**0.5645**
XANTHI	0.1591	0.2325	0.1082	0.0403	-0.0056	0.0530	n/d	n/d	n/d	n/d	-0.0157	-0.0029	n/d	-0.0013	-0.0117	n/d	n/d	**0.5560**
DRAMA	-0.0645	-0.0104	-0.0188	0.7761	0.0099	0.3830	n/d	n/d	n/d	n/d	0.1082	n/d	n/d	n/d	n/d	-0.0158	-0.0076	**1.1600**
KAVALA	-0.0628	0.2329	-0.0513	0.4264	-0.0043	-0.0049	n/d	0.0125	0.1462	n/d	0.0733	-0.0118	n/d	n/d	-0.0122	n/d	0.0049	**0.7491**
SERRES	0.3061	n/d	-0.0545	0.2942	0.0087	n/d	n/d	-0.0103	n/d	n/d	-0.0088	n/d	-0.0149	0.0047	0.0092	n/d	0.0124	**0.5470**
KILKIS	-0.0598	n/d	0.4559	0.0398	0.1112	n/d	n/d	n/d	n/d	n/d	-0.0047	0.0748	-0.0174	0.0272	-0.0149	n/d	-0.0053	**0.6068**
PELLA	0.5539	-0.0060	0.0410	0.1287	-0.0054	-0.0103	n/d	n/d	n/d	n/d	-0.0121	n/d	-0.0148	n/d	n/d	n/d	-0.0074	**0.6677**
THESSALONIKI	-0.0077	0.0740	0.0240	0.0437	0.0092	-0.0060	-0.0088	0.0136	-0.0215	-0.0009	-0.0067	-0.0019	-0.0153	0.0184	-0.0145	-0.0276	-0.0003	**0.0717**
CHALKIDIKI	1.0365	n/d	-0.0544	-0.0462	n/d	n/d	n/d	-0.0110	n/d	n/d	-0.0209	n/d	n/d	0.1028	n/d	n/d	0.0071	**1.0139**
IMATHIA	0.5884	-0.0056	0.3475	-0.0460	0.0162	n/d	n/d	n/d	n/d	n/d	-0.0187	n/d	-0.0179	n/d	n/d	n/d	-0.0081	**0.8558**
PIERIA	-0.0274	-0.0095	-0.0352	1.1539	-0.0019	n/d	n/d	n/d	n/d	n/d	-0.0162	n/d	n/d	n/d	-0.0146	n/d	n/d	**1.0490**
FLORINA	0.5676	n/d	n/d	0.1078	n/d	n/d	n/d	n/d	n/d	n/d	0.3817	n/d	n/d	n/d	n/d	n/d	n/d	**1.0571**
KASTORIA	n/d	n/d	-0.0548	1.8668	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.8120**
KOZANI	n/d	n/d	n/d	-0.0203	n/d	n/d	n/d	n/d	1.1091	0.0558	0.3623	n/d	-0.0178	-0.0048	0.0800	n/d	n/d	**1.5643**
GREVENA	n/d	n/d	n/d	n/d	4.1441	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**4.1441**
LARISSA	0.0675	n/d	0.1989	0.1243	-0.0057	0.0320	-0.0098	-0.0114	n/d	n/d	0.0048	-0.0028	-0.0092	0.0305	-0.0099	n/d	0.0012	**0.4103**
TRIKALA	0.1951	n/d	0.0812	-0.0464	0.4947	n/d	n/d	n/d	0.0546	n/d	-0.0159	n/d	-0.0192	n/d	n/d	n/d	-0.0067	**0.7374**
KARDITSA	0.1560	0.2810	0.1298	n/d	0.1032	n/d	n/d	n/d	-0.0257	n/d	0.1141	n/d	-0.0203	0.0088	n/d	n/d	n/d	**0.7470**
MAGNISIA	-0.0382	-0.0071	0.0002	-0.0406	n/d	-0.0027	-0.0086	0.0056	-0.0261	n/d	0.1202	0.0888	0.0582	0.0688	0.0121	-0.0001	-0.0081	**0.2223**
IOANNINA	0.5676	n/d	n/d	-0.0035	0.0046	n/d	n/d	n/d	-0.0265	n/d	0.0060	n/d	0.2485	n/d	n/d	n/d	0.0194	**0.8161**
THESPROTIA	n/d	n/d	1.7056	-0.0366	n/d	n/d	n/d	n/d	n/d	n/d	-0.0103	n/d	n/d	n/d	n/d	n/d	n/d	**1.6587**
PREVEZA	0.2881	n/d	0.6239	-0.0431	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	-0.0141	n/d	n/d	n/d	n/d	**0.8548**
ARTA	1.3908	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.1023	n/d	n/d	n/d	n/d	n/d	n/d	**1.4931**

KERKYRA	0.5564	n/d	n/d	-0.0117	n/d	n/d	n/d	n/d	n/d	n/d	0.6531	n/d	n/d	n/d	n/d	n/d	n/d	**1.1978**
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	0.2852	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	1.4628	n/d	n/d	n/d	n/d	n/d	n/d	**1.7480**
ZAKYNTHOS	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	3.8073	**3.8073**
AITOLOAKARNANIA	0.0100	0.5969	0.0443	-0.0259	n/d	n/d	n/d	0.0398	0.1119	n/d	n/d	n/d	n/d	n/d	0.0021	n/d	n/d	**0.7791**
EVRYTANIA	n/d	n/d	1.2843	n/d	0.5821	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.8664**
FOKIDA	0.6556	n/d	n/d	0.5198	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.1755**
FTHIOTIDA	-0.0189	n/d	0.0538	n/d	-0.0039	0.1100	n/d	-0.0033	-0.0239	n/d	-0.0219	0.7969	-0.0194	n/d	0.0634	n/d	n/d	**0.9330**
VOIOTIA	-0.0639	-0.0105	0.0279	-0.0134	-0.0058	-0.0083	-0.0055	0.0795	-0.0264	n/d	-0.0183	0.2748	0.0143	-0.0062	0.0862	0.2115	-0.0081	**0.5278**
EVVOIA	-0.0507	n/d	-0.0541	-0.0081	0.2461	-0.0101	n/d	-0.0111	-0.0255	n/d	0.5849	n/d	0.1091	0.0219	0.0958	-0.0325	-0.0077	**0.8578**
ATTIKI	-0.0398	-0.0095	-0.0289	-0.0306	-0.0058	0.0061	0.0377	0.0013	0.0646	0.0127	-0.0185	-0.0083	0.0140	-0.0029	0.0082	0.0669	0.0091	**0.0762**
ACHAIA	0.0566	n/d	0.2334	0.0109	0.0008	-0.0037	-0.0100	0.0181	n/d	n/d	0.0059	-0.0087	0.0633	-0.0041	-0.0130	-0.0166	-0.0041	**0.3289**
ILEIA	0.6128	n/d	n/d	-0.0484	n/d	n/d	n/d	n/d	n/d	n/d	0.4820	n/d	-0.0183	0.0096	0.0027	n/d	n/d	**1.0403**
MESSINIA	0.0230	1.0148	0.0090	0.0493	n/d	n/d	n/d	n/d	n/d	n/d	-0.0075	n/d	n/d	n/d	n/d	-0.0324	n/d	**1.0562**
ARKADIA	0.1308	n/d	n/d	n/d	n/d	0.1857	n/d	n/d	n/d	n/d	0.0714	n/d	n/d	0.8723	0.2499	n/d	n/d	**1.5101**
LAKONIA	n/d	n/d	1.8983	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.8983**
KORINTHIA	0.0212	n/d	-0.0533	-0.0489	n/d	0.0072	n/d	-0.0095	-0.0159	0.5351	0.0225	n/d	0.0742	-0.0068	0.2371	n/d	0.1053	**0.8682**
ARGOLIDA	0.7396	n/d	-0.0325	0.0597	n/d	-0.0034	n/d	-0.0113	n/d	n/d	-0.0183	n/d	-0.0190	n/d	n/d	n/d	n/d	**0.7148**
CHANIA	0.5584	n/d	n/d	0.3640	n/d	n/d	n/d	-0.0085	n/d	n/d	-0.0157	n/d	n/d	n/d	n/d	n/d	0.0566	**0.9548**
HERAKLION	0.4633	n/d	-0.0526	-0.0376	-0.0057	n/d	-0.0048	0.1787	n/d	n/d	0.2689	n/d	-0.0195	0.0130	n/d	-0.0184	-0.0037	**0.7816**
LASITHI	0.5467	n/d	n/d	n/d	0.2332	0.9593	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.7392**
RETHYMNO	0.5478	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.0124	n/d	0.7710	n/d	n/d	n/d	n/d	n/d	n/d	**1.3311**
KYKLADES	-0.0452	n/d	-0.0177	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	1.9027	n/d	**1.8398**
DODEKANISA	0.2045	n/d	n/d	0.3951	n/d	n/d	n/d	n/d	n/d	n/d	0.2031	n/d	n/d	n/d	n/d	-0.0330	0.0999	**0.8697**
CHIOS	1.0188	n/d	n/d	0.2065	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.2253**
LESVOS	0.9397	n/d	-0.0226	n/d	n/d	n/d	n/d	n/d	n/d	n/d	-0.0153	n/d	0.1409	n/d	n/d	n/d	n/d	**1.0426**
SAMOS	0.2952	n/d	0.8790	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.1742**

Source: *ELSTAT, Own Elaboration*

***Table 4D**: Regional Specialization at Nuts3 regions, 1995*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTAL SPEC**
EVROS	0.3467	n/d	0.0119	0.2994	n/a	n/d	n/a	n/a	n/d	n/d	n/a	n/d	-0.0077	-0.0170	n/d	n/a	0.0184	**0.6517**
RHODOPI	0.1803	n/d	n/d	0.4377	n/a	n/a	n/d	0.0870	n/a	n/d	n/a	0.1716	n/d	n/a	n/d	n/d	n/a	**0.8766**
XANTHI	0.2447	n/a	0.2981	0.1976	n/a	n/a	n/d	n/a	n/a	n/d	-0.0206	n/a	n/a	n/d	n/a	n/d	n/a	**0.7198**
DRAMA	-0.0782	n/d	-0.0303	0.9414	0.0634	n/a	n/d	n/d	n/d	n/d	0.1888	n/d	n/a	n/d	n/d	n/a	-0.0080	**1.0770**
KAVALA	-0.0487	n/d	-0.0173	0.4718	-0.0019	n/a	n/a	0.0393	n/a	n/d	0.1844	n/d	-0.0107	n/a	n/d	n/d	0.0138	**0.6306**
SERRES	0.3888	n/d	n/d	0.1547	0.0756	n/d	n/a	n/a	n/d	n/d	-0.0129	n/a	0.0249	n/a	n/d	n/d	0.0758	**0.7069**
KILKIS	-0.0732	n/d	0.5484	-0.0323	0.0449	n/d	n/d	n/a	n/a	n/d	0.0194	0.1227	-0.0111	0.0663	n/a	n/a	-0.0068	**0.6783**
PELLA	0.4880	n/d	0.3423	-0.0059	n/a	n/a	n/d	-0.0129	n/d	n/d	-0.0255	n/a	n/a	n/a	n/d	n/d	n/a	**0.7859**
THESSALONIKI	-0.0187	-0.0024	0.0370	0.1327	-0.0005	-0.0060	-0.0151	0.0104	-0.0185	-0.0015	-0.0179	-0.0098	0.0071	-0.0050	-0.0093	-0.0213	0.0103	**0.0716**
CHALKIDIKI	1.0825	n/d	0.0108	n/a	n/d	n/d	n/d	n/a	n/d	n/d	0.0178	n/d	n/d	n/a	n/d	n/d	n/d	**1.1111**
IMATHIA	0.4563	n/d	0.3272	-0.0469	0.0529	n/d	n/a	-0.0127	n/d	n/d	-0.0253	n/d	n/a	-0.0127	n/d	n/a	-0.0116	**0.7272**
PIERIA	-0.0637	n/d	n/a	1.2423	n/a	n/d	n/a	n/d	n/a	n/d	-0.0195	n/d	n/a	-0.0161	0.0253	n/d	n/a	**1.1683**
FLORINA	1.5479	n/d	n/d	n/a	n/a	n/d	n/d	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**1.5479**
KASTORIA	n/a	n/d	n/d	1.7965	n/d	n/d	n/d	n/d	n/d	n/d	-0.0160	n/d	n/d	n/d	n/d	n/d	n/d	**1.7805**
KOZANI	-0.0738	n/d	n/d	0.4159	0.1394	n/d	n/d	n/d	n/a	n/d	0.7046	n/d	n/a	n/a	n/a	n/d	n/a	**1.1861**
GREVENA	n/a	n/d	n/d	n/d	4.0036	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/d	**4.0036**
LARISSA	0.0753	n/d	0.2738	0.0077	-0.0046	n/a	-0.0148	-0.0098	n/a	n/d	0.0015	0.0033	0.0072	-0.0132	n/d	n/d	0.0317	**0.3583**
TRIKALA	0.3647	n/d	0.0223	-0.0477	0.4767	n/d	n/a	n/a	n/a	n/d	0.0143	n/a	n/a	n/d	n/d	n/a	0.1284	**0.9586**
KARDITSA	0.3989	n/d	n/d	n/d	0.2708	n/d	n/a	n/a	n/a	n/d	0.6401	n/a	n/a	n/a	n/a	n/d	n/a	**1.3098**
MAGNISIA	0.0137	n/d	0.0135	-0.0521	n/a	0.0089	-0.0146	n/a	-0.0266	n/d	0.1855	0.0732	0.0966	0.0270	0.0031	-0.0249	n/a	**0.3033**
IOANNINA	0.5144	n/d	n/a	-0.0494	0.0959	n/d	n/d	n/d	n/a	n/d	0.0723	n/d	0.1257	n/d	n/d	n/d	0.1184	**0.8772**
THESPROTIA	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/a	n/d	n/d	2.6501	n/d	n/d	n/d	n/d	n/d	n/d	**2.6501**
PREVEZA	1.2917	n/d	n/a	n/a	n/a	n/d	n/d	n/d	n/d	n/d	0.0384	n/d	n/d	n/d	n/d	n/d	n/a	**1.3301**
ARTA	1.1129	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.1632	n/d	n/d	n/d	n/d	n/d	n/d	**1.2761**

KERKYRA	0.7662	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	0.5117	n/d	n/d	n/d	n/d	n/d	n/a	**1.2779**
LEFKADA	n/a	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
KEFALLONIA	1.5479	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**1.5479**
ZAKYNTHOS	0	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
AITOLOAKARNANIA	0.3599	n/d	0.2285	n/a	n/d	n/d	n/d	n/a	n/a	n/d	0.4249	n/d	n/a	n/d	n/a	n/d	n/d	**1.0133**
EVRYTANIA	0	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
FOKIDA	1.5479	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/a	n/d	n/d	n/d	**1.5479**
FTHIOTIDA	0.1463	n/d	0.0577	n/a	-0.0049	0.1110	n/d	n/a	-0.0240	n/d	-0.0105	0.5244	-0.0124	-0.0170	n/a	n/a	n/a	**0.7706**
VOIOTIA	-0.0769	n/a	0.0023	n/a	n/d	n/a	n/a	0.1146	-0.0228	n/d	-0.0154	0.4320	0.0084	-0.0153	0.0230	0.3258	-0.0057	**0.7700**
EVVOIA	-0.0324	n/d	n/a	n/a	0.2924	n/a	n/a	n/a	-0.0131	n/d	0.5515	0.0342	-0.0104	0.0215	0.1384	n/a	n/a	**0.9821**
ATTIKI	-0.0538	0.0116	-0.0250	-0.0294	-0.0067	0.0174	0.0479	0.0046	0.0675	0.0138	-0.0234	-0.0121	0.0051	0.0095	0.0091	0.0413	0.0074	**0.0849**
ACHAIA	0.1487	n/d	-0.0265	0.0207	0.0023	0.0330	-0.0146	-0.0105	-0.0081	n/d	0.0169	n/a	-0.0138	0.2663	-0.0107	-0.0223	-0.0108	**0.3704**
ILEIA	0.6468	n/d	n/a	n/d	n/a	n/d	n/a	n/a	n/a	n/d	0.6609	n/d	n/a	n/a	n/d	n/d	n/a	**1.3077**
MESSINIA	0.4521	n/a	n/a	n/a	n/d	n/d	0.0664	n/d	n/d	n/d	0.6899	n/d	n/a	n/a	n/d	n/a	n/a	**1.2084**
ARKADIA	0.0657	n/d	n/d	n/a	n/a	n/a	n/d	n/a	n/d	n/d	0.3733	n/d	n/a	1.0375	n/d	n/d	n/d	**1.4764**
LAKONIA	1.5479	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	**1.5479**
KORINTHIA	0.1284	n/d	-0.0320	n/d	0.0937	0.0798	n/d	n/a	-0.0161	n/a	0.0876	n/a	0.0374	n/a	0.4391	n/d	n/a	**0.8179**
ARGOLIDA	0.3813	n/d	0.0755	0.0214	n/a	n/a	n/d	n/a	n/a	n/a	0.1038	-0.0120	n/a	-0.0080	n/d	n/d	n/d	**0.5620**
CHANIA	1.0598	n/d	n/d	n/a	0.4788	n/d	n/a	n/a	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**1.5387**
HERAKLION	0.2984	n/d	-0.0172	-0.0488	n/a	n/a	0.0391	0.1342	n/d	n/d	0.1478	n/d	-0.0079	-0.0039	n/d	n/a	0.0021	**0.5438**
LASITHI	0.4481	n/d	n/d	n/d	n/a	n/a	n/d	n/a	n/d	n/d	0.9457	n/d	n/a	n/d	n/d	n/d	n/d	**1.3939**
RETHYMNO	0.7129	n/d	n/d	n/a	n/d	n/d	n/a	n/d	n/d	n/d	0.5764	n/d	n/d	n/d	n/d	n/d	n/a	**1.2893**
KYKLADES	0.6705	n/d	n/a	n/a	n/a	n/d	n/d	n/d	n/d	n/d	0.6301	n/d	n/d	n/d	n/d	n/a	n/d	**1.3006**
DODEKANISA	0.4411	n/d	n/d	-0.0327	n/d	n/d	n/a	n/a	n/d	n/d	0.3613	n/d	n/a	n/a	n/d	n/d	0.1574	**0.9270**
CHIOS	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
LESVOS	0.6419	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	n/d	0.2053	n/d	n/a	n/a	n/d	n/d	0.3458	**1.1930**
SAMOS	n/a	n/d	n/a	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**

Source: *ELSTAT, Own Elaboration*

***Table 4E**: Regional Specialization at Nuts3 regions, 2000*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTAL SPEC**
EVROS	0.5738	n/d	0.0442	0.0982	n/a	n/a	n/a	n/a	n/d	n/d	n/a	n/a	-0.0026	-0.0193	n/a	n/a	0.0108	**0.7051**
RHODOPI	0.0013	n/d	0.0398	0.2613	0.0772	n/a	n/d	0.1357	n/a	n/d	0.0789	0.0406	n/a	n/a	n/d	n/d	n/d	**0.6349**
XANTHI	0.1409	n/a	0.6654	0.1597	n/d	n/a	n/d	n/a	n/a	n/d	-0.0227	n/a	n/d	n/d	n/a	n/d	n/a	**0.9432**
DRAMA	-0.0461	n/d	-0.0242	0.1892	0.0765	n/a	n/d	n/d	n/d	n/d	0.8018	n/d	n/a	n/d	n/d	n/a	0.0196	**1.0169**
KAVALA	-0.0579	n/d	-0.0006	0.5757	-0.0027	n/a	n/a	n/a	n/a	n/d	0.2297	n/d	0.0094	-0.0193	n/d	n/d	0.0176	**0.7520**
SERRES	0.4795	n/d	n/a	0.0285	0.0551	n/d	n/a	n/a	n/a	n/d	-0.0047	n/d	0.0110	n/a	n/d	n/d	0.2070	**0.7764**
KILKIS	-0.0491	n/d	0.4353	-0.0369	-0.0028	n/d	n/d	n/a	n/a	n/d	0.0023	0.3761	-0.0206	0.1055	n/a	n/d	n/a	**0.8099**
PELLA	0.4178	n/d	0.3161	-0.0271	n/a	n/a	n/d	n/a	n/d	n/d	-0.0248	n/a	0.0484	-0.0176	n/d	n/d	n/a	**0.7127**
THESSALONIKI	-0.0090	-0.0022	0.0227	0.1392	-0.0043	-0.0002	-0.0236	0.0139	-0.0095	n/a	-0.0141	-0.0105	0.0092	-0.0068	-0.0122	-0.0112	0.0061	**0.0874**
CHALKIDIKI	1.1732	n/d	n/a	n/a	n/d	n/d	n/d	n/a	n/a	n/d	0.0723	n/d	n/d	n/a	n/d	n/d	n/d	**1.2454**
IMATHIA	0.5871	n/d	0.3149	-0.0323	0.0268	n/d	n/a	-0.0125	n/d	n/d	-0.0210	n/d	n/a	-0.0159	n/d	n/a	n/a	**0.8471**
PIERIA	-0.0132	n/d	0.0820	0.7281	n/a	n/d	n/a	n/d	n/a	n/d	-0.0079	n/d	n/d	n/a	0.1193	n/d	n/a	**0.9083**
FLORINA	1.4748	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**1.4748**
KASTORIA	n/a	n/d	n/d	2.2974	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**2.2974**
KOZANI	-0.0784	n/d	n/d	0.4899	0.1792	n/d	n/d	n/d	n/d	n/d	0.7101	n/d	n/a	n/a	n/a	n/d	n/a	**1.3009**
GREVENA	n/a	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/d	**n/a**
LARISSA	0.0759	n/d	0.3345	-0.0240	-0.0064	n/a	n/a	0.0083	n/d	n/d	-0.0019	0.0064	0.0430	-0.0137	n/d	n/d	0.0343	**0.4564**
TRIKALA	0.6005	n/d	-0.0213	n/a	0.2287	n/d	n/a	n/a	n/a	n/d	0.0748	n/a	n/a	n/d	n/d	n/a	0.0921	**0.9748**
KARDITSA	0.1393	n/d	n/d	n/d	0.4959	n/d	n/a	n/a	n/a	n/d	0.8373	n/a	n/a	n/a	n/a	n/d	n/a	**1.4725**
MAGNISIA	-0.0242	n/d	-0.0215	-0.0221	n/a	0.0330	-0.0197	n/a	-0.0233	n/d	0.1819	0.1396	0.2763	0.0173	n/a	-0.0125	n/a	**0.5248**
IOANNINA	0.5309	n/d	n/a	-0.0244	0.0602	n/d	n/d	n/d	n/a	n/d	0.0090	n/d	0.1523	n/a	n/a	n/a	0.0467	**0.7747**
THESPROTIA	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	2.6550	n/d	n/d	n/d	n/d	n/d	n/d	**2.6550**
PREVEZA	1.4748	n/d	n/a	n/a	n/a	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	**1.4748**
ARTA	0.9929	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.2168	n/d	n/d	n/d	n/d	n/d	n/d	**1.2097**

KERKYRA	1.4748	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	**1.4748**
LEFKADA	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
KEFALLONIA	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
ZAKYNTHOS	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
AITOLOAKARNANIA	0.3129	n/d	0.1766	n/a	n/d	n/d	n/d	n/a	n/a	n/d	0.5665	n/a	n/d	n/d	n/a	n/d	n/d	**1.0560**
EVRYTANIA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	**n/a**
FOKIDA	1.4748	n/d	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/a	n/d	n/d	n/d	**1.4748**
FTHIOTIDA	0.2283	n/d	-0.0012	n/a	-0.0055	0.2742	n/d	n/a	-0.0243	n/d	-0.0138	0.4203	n/a	-0.0195	n/a	n/a	n/a	**0.8585**
VOIOTIA	-0.0759	n/a	-0.0159	n/a	n/a	-0.0070	n/a	0.1288	-0.0185	n/d	-0.0010	0.4119	-0.0004	-0.0177	-0.0061	0.2388	-0.0116	**0.6254**
EVVOIA	-0.0322	n/d	n/a	n/a	0.3229	n/a	n/a	n/a	-0.0062	n/d	0.3603	0.0279	-0.0089	0.0163	0.1716	n/a	n/a	**0.8517**
ATTIKI	-0.0629	0.0087	-0.0242	-0.0119	-0.0057	0.0076	0.0834	-0.0006	0.0557	0.0124	-0.0231	-0.0172	0.0005	0.0141	0.0192	0.0252	0.0110	**0.0922**
ACHAIA	0.1231	n/d	-0.0225	0.0161	0.0026	0.0451	-0.0227	-0.0066	-0.0134	n/d	0.0120	n/d	-0.0166	0.2972	n/a	-0.0225	-0.0115	**0.3803**
ILEIA	0.9462	n/d	n/a	n/d	n/a	n/d	n/a	n/d	n/a	n/d	0.2610	n/d	n/a	n/a	n/d	n/d	n/a	**1.2072**
MESSINIA	0.1635	n/a	n/d	n/d	n/d	n/d	0.2028	n/d	n/d	n/d	0.8348	n/d	n/a	n/a	n/d	n/a	n/a	**1.2012**
ARKADIA	0.5903	n/d	n/d	n/d	n/a	n/a	n/d	n/a	n/d	n/d	0.6789	n/d	n/a	n/a	n/d	n/d	n/d	**1.2693**
LAKONIA	1.4748	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	**1.4748**
KORINTHIA	0.1243	n/d	-0.0279	n/d	0.1912	0.0577	n/d	n/a	-0.0184	n/a	0.0520	n/a	0.0124	n/a	0.4175	n/d	n/a	**0.8087**
ARGOLIDA	0.4472	n/d	0.0647	0.0130	n/a	n/a	n/d	n/a	n/a	n/a	0.0844	-0.0180	-0.0067	-0.0174	n/d	n/d	n/d	**0.5672**
CHANIA	0.9271	n/d	n/d	n/a	0.5905	n/d	n/a	n/a	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**1.5176**
HERAKLION	0.3185	n/d	0.0092	-0.0313	n/a	n/a	0.0039	0.1627	n/d	n/d	0.0783	n/d	-0.0098	-0.0176	n/d	n/a	0.0014	**0.5154**
LASITHI	0.0379	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/d	n/d	0.6468	n/d	0.6453	n/d	n/d	n/d	n/d	**1.3300**
RETHYMNO	0.8788	n/d	n/d	n/a	n/d	n/d	n/a	n/d	n/d	n/d	0.3292	n/d	n/d	n/d	n/d	n/d	n/a	**1.2080**
KYKLADES	0.5328	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	0.7605	n/d	n/d	n/d	n/d	n/a	n/d	**1.2932**
DODEKANISA	0.6765	n/d	n/d	0.0211	n/d	n/d	n/a	n/a	n/d	n/d	0.2752	n/d	n/a	n/a	n/d	n/d	n/a	**0.9728**
CHIOS	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**
LESVOS	1.0200	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/a	n/d	0.1923	n/d	n/a	n/d	n/d	n/d	n/a	**1.2124**
SAMOS	n/a	n/d	n/a	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	**n/a**

Source: *ELSTAT, Own Elaboration*

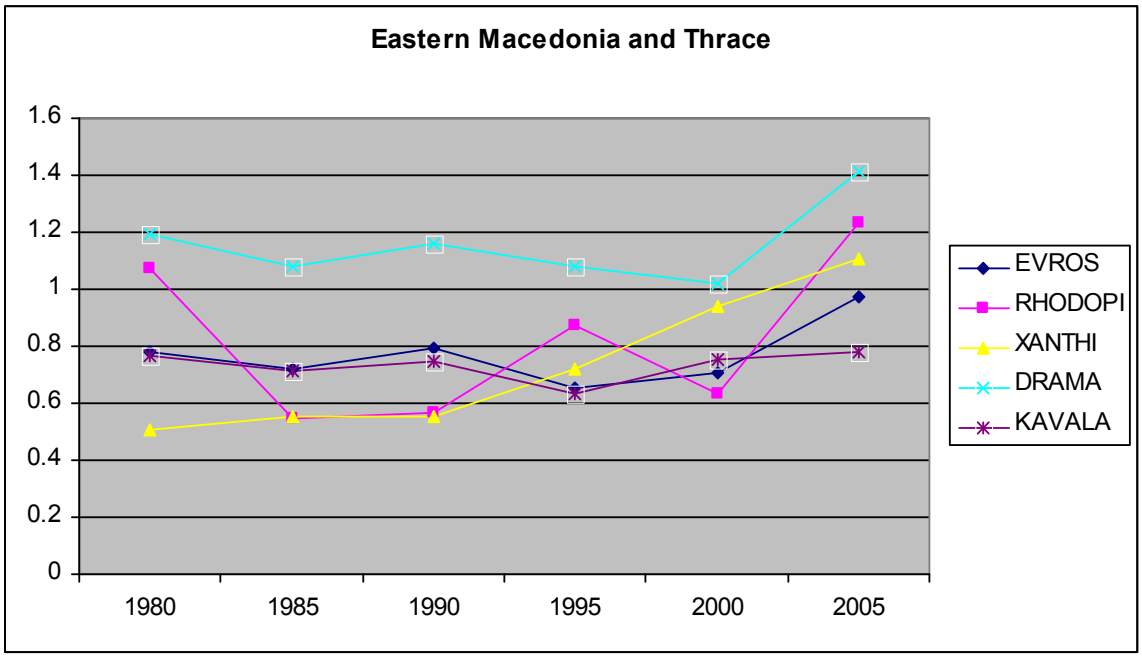
***Table 4F**: Regional Specialization at Nuts3 regions, 2005*

	SECTOR CODE																	
REGIONS	**20+21**	**22**	**23**	**24+29**	**25**	**27**	**28**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39+26**	**TOTAL SPEC**
EVROS	0.5231	n/d	n/a	n/d	n/a	n/d	n/d	0.4220	n/a	n/d	0.0005	n/a	n/a	n/a	n/a	n/a	0.0265	**0.9720**
RHODOPI	-0.0560	n/d	0.6533	n/a	0.3647	n/d	n/d	0.2162	n/a	n/d	0.0578	n/a	n/a	n/d	n/d	n/d	n/d	**1.2360**
XANTHI	0.1670	n/a	0.9284	0.0335	n/a	n/a	n/a	n/a	n/a	n/d	-0.0218	n/a	n/d	n/d	n/a	n/d	n/a	**1.1071**
DRAMA	-0.0532	n/d	n/a	0.1297	n/a	n/d	n/d	n/d	n/d	n/d	1.3394	n/d	n/d	n/d	n/d	n/a	n/a	**1.4158**
KAVALA	-0.0815	n/d	-0.0153	0.2439	n/a	n/d	n/a	0.1429	n/a	n/d	0.3903	n/d	0.0506	n/a	n/d	n/d	0.0469	**0.7778**
SERRES	0.5084	n/d	n/d	-0.0218	0.0909	n/d	n/d	n/a	n/a	n/d	-0.0116	n/d	-0.0056	n/a	n/d	n/d	0.3058	**0.8661**
KILKIS	-0.0923	n/d	0.2621	-0.0195	0.0053	n/d	n/a	0.0020	n/d	n/d	n/a	0.6380	-0.0135	0.2411	n/d	n/d	n/a	**1.0232**
PELLA	0.5694	n/d	0.2537	-0.0088	n/a	n/a	n/d	n/a	n/d	n/d	-0.0297	n/a	0.0043	n/a	n/d	n/d	n/a	**0.7887**
THESSALONIKI	-0.0030	n/a	0.0122	0.0921	-0.0026	0.0157	-0.0258	0.0200	-0.0102	n/a	-0.0166	-0.0102	0.0060	-0.0030	-0.0090	0.0006	0.0071	**0.0735**
CHALKIDIKI	0.9415	n/d	n/a	n/a	n/d	n/d	n/a	n/d	n/a	n/d	0.1249	n/d	n/d	n/a	n/d	n/d	n/d	**1.0664**
IMATHIA	0.5356	n/d	0.4566	n/a	0.0511	n/d	n/a	0.0013	n/d	n/d	n/a	n/d	n/a	n/a	n/d	n/d	n/a	**1.0447**
PIERIA	0.7505	n/d	n/a	0.1079	n/a	n/d	n/a	n/d	n/d	n/d	0.0570	n/d	n/a	n/a	n/a	n/d	n/a	**0.9154**
FLORINA	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a
KASTORIA	n/a	n/d	n/d	2.8088	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**2.8088**
KOZANI	n/a	n/d	n/d	0.5111	0.1417	n/d	n/d	n/d	n/d	n/d	0.2466	n/d	0.6839	n/a	n/a	n/d	n/d	**1.5833**
GREVENA	n/a	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/d	n/a
LARISSA	0.0692	n/d	0.2494	-0.0062	n/a	n/a	-0.0258	0.0080	n/d	n/d	0.0348	0.0148	0.0141	-0.0155	n/d	n/a	0.0255	**0.3683**
TRIKALA	0.6073	n/d	n/a	n/d	0.4135	n/d	n/a	n/a	n/a	n/d	-0.0235	n/a	n/d	n/d	n/d	n/a	0.1643	**1.1616**
KARDITSA	0.1705	n/d	n/d	n/d	0.9082	n/d	n/a	n/a	n/a	n/d	0.4060	n/d	n/a	n/a	n/a	n/d	n/a	**1.4846**
MAGNISIA	-0.0272	n/d	n/a	n/d	n/a	n/a	-0.0243	n/a	-0.0221	n/d	0.1372	0.2753	0.3083	0.0095	n/a	n/a	n/d	**0.6567**
IOANNINA	0.8702	n/d	n/d	n/a	0.0144	n/d	n/d	n/d	n/a	n/d	-0.0156	n/d	0.0753	n/d	n/d	n/d	n/a	**0.9442**
THESPROTIA	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a
PREVEZA	1.0880	n/d	n/d	n/a	n/a	n/d	n/d	n/d	n/d	n/d	0.0237	n/d	n/d	n/d	n/d	n/d	n/d	**1.1117**
ARTA	1.3220	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	**1.3220**

KERKYRA	1.3220	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	**1.3220**
LEFKADA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
KEFALLONIA	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a
ZAKYNTHOS	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a
AITOLOAKARNANIA	0.3946	n/d	n/a	n/d	n/d	n/d	n/d	n/a	n/d	n/d	0.7722	n/d	n/d	n/d	n/d	n/d	n/d	**1.1667**
EVRYTANIA	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
FOKIDA	n/a	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/a
FTHIOTIDA	0.5304	n/d	0.0050	n/d	0.0251	0.4133	n/d	n/a	n/a	n/d	0.0006	n/a	n/a	n/a	n/a	n/a	n/d	**0.9745**
VOIOTIA	-0.0890	n/a	-0.0131	n/a	n/a	0.0046	n/a	0.1441	-0.0185	n/d	0.0097	0.6537	0.0218	-0.0186	0.0006	n/a	-0.0118	**0.6834**
EVVOIA	0.1077	n/d	n/a	n/a	n/a	n/a	n/a	n/a	-0.0001	n/d	0.4281	n/a	0.0424	n/a	0.2096	n/a	n/a	**0.7878**
ATTIKI	-0.0734	0.0095	-0.0200	0.0028	-0.0041	0.0035	0.0785	-0.0090	0.0577	0.0141	-0.0257	-0.0205	-0.0056	0.0132	0.0260	0.0462	0.0112	**0.1045**
ACHAIA	0.2128	n/d	-0.0215	0.0068	n/a	0.0668	-0.0250	n/a	-0.0208	n/d	-0.0033	n/d	-0.0080	0.2789	n/a	-0.0120	-0.0118	**0.4629**
ILEIA	0.7171	n/d	n/a	n/d	n/d	n/d	n/a	n/d	n/a	n/d	0.3420	n/d	n/a	n/a	n/d	n/d	n/d	**1.0591**
MESSINIA	0.2435	n/a	n/a	n/d	n/d	n/d	0.1375	n/d	n/d	n/d	0.5872	n/d	n/a	n/a	n/d	n/a	n/a	**0.9682**
ARKADIA	1.3220	n/d	n/d	n/d	n/a	n/a	n/d	n/d	n/d	n/d	n/a	n/d	n/a	n/a	n/d	n/d	n/d	**1.3220**
LAKONIA	1.3220	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/a	**1.3220**
KORINTHIA	0.1042	n/d	n/a	n/d	0.5094	n/a	n/d	0.0606	-0.0150	n/a	0.1488	n/d	0.0947	n/a	n/a	n/d	n/d	**0.9027**
ARGOLIDA	0.5835	n/d	n/a	n/a	n/a	n/a	n/d	0.0570	n/d	n/d	0.3059	n/d	n/a	n/a	n/d	n/d	n/d	**0.9464**
CHANIA	0.4018	n/d	n/d	n/d	0.5723	n/d	n/a	n/a	n/d	n/d	0.2682	n/d	n/d	n/d	n/d	n/d	n/d	**1.2422**
HERAKLION	0.1669	n/d	0.0815	n/a	n/a	n/a	0.0079	0.1402	n/d	n/d	0.0940	n/d	0.0036	-0.0171	n/d	n/d	-0.0033	**0.4737**
LASITHI	n/a	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	0.6700	n/d	1.3204	n/d	n/d	n/d	n/d	**1.9904**
RETHYMNO	0.8486	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	0.2065	n/d	n/d	n/d	n/d	n/d	n/a	**1.0551**
KYKLADES	0.5148	n/d	n/a	n/d	n/a	n/d	n/d	n/d	n/d	n/d	0.5946	n/d	n/d	n/d	n/d	n/a	n/d	**1.1094**
DODEKANISA	0.8051	n/d	n/d	n/a	n/d	n/d	n/a	n/a	n/d	n/d	0.2489	n/d	n/d	n/d	n/d	n/d	n/a	**1.0539**
CHIOS	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a
LESVOS	0.7533	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	0.3025	n/d	n/d	n/d	n/d	n/d	n/d	**1.0558**
SAMOS	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/d	n/a	n/d	n/d	n/d	n/d	n/d	n/d	n/a

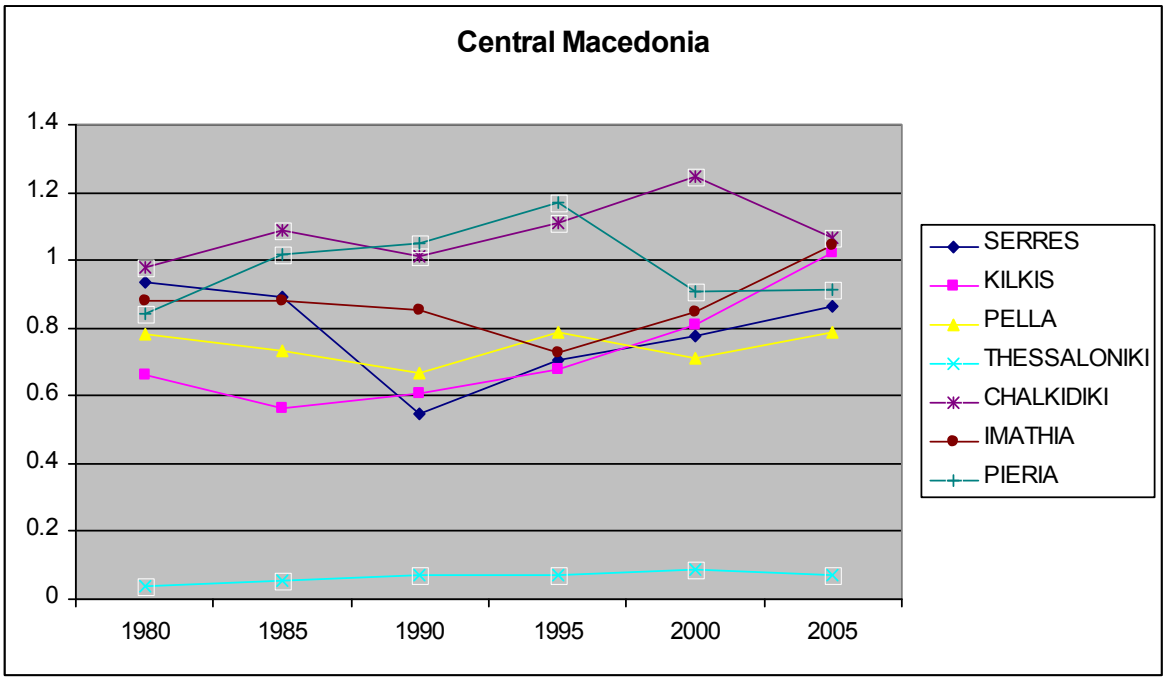
Source: *ELSTAT, Own Elaboration*

Graph 1A: *Evolution of Regional Specialization in Eastern Macedonia and Thrace, 1980-2005*



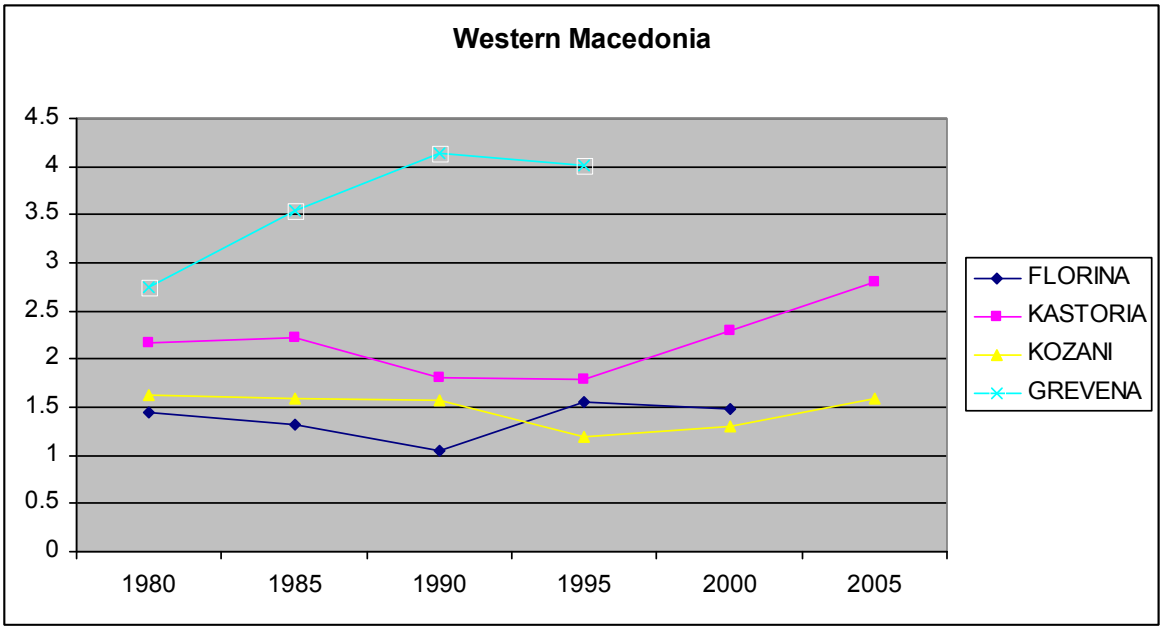
Source: *ELSTAT, Own Elaboration*

Graph 1B: *Evolution of Regional Specialization in Central Macedonia, 1980-2005*



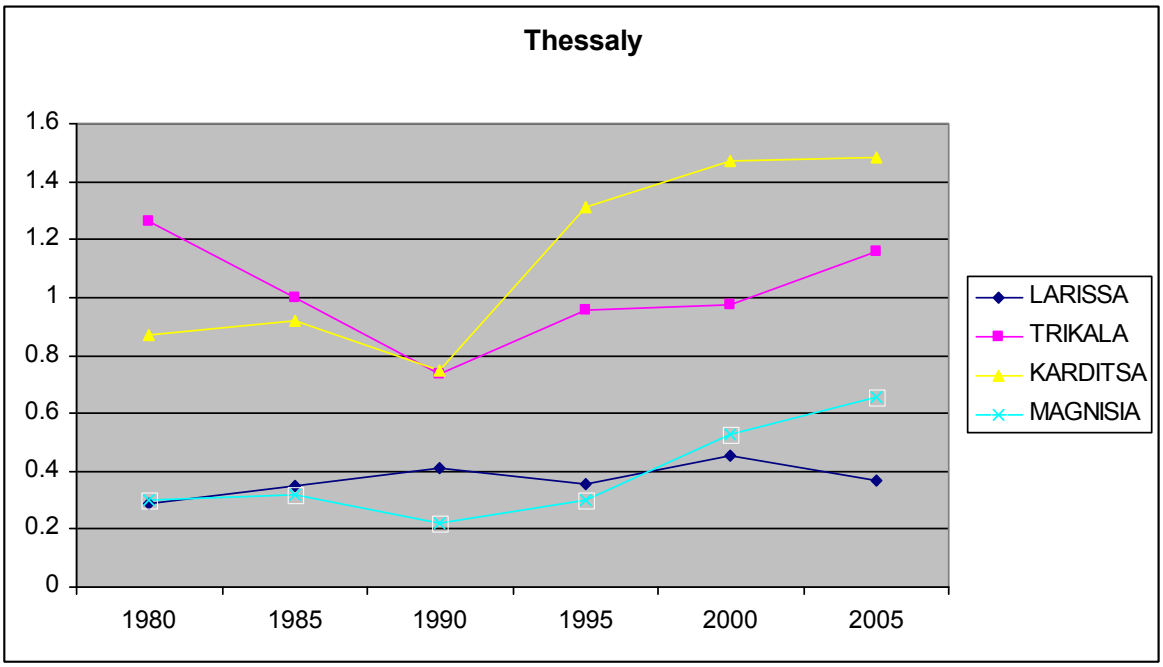
Source: *ELSTAT, Own Elaboration*

Graph 1C: *Evolution of Regional Specialization in Western Macedonia, 1980-2005*



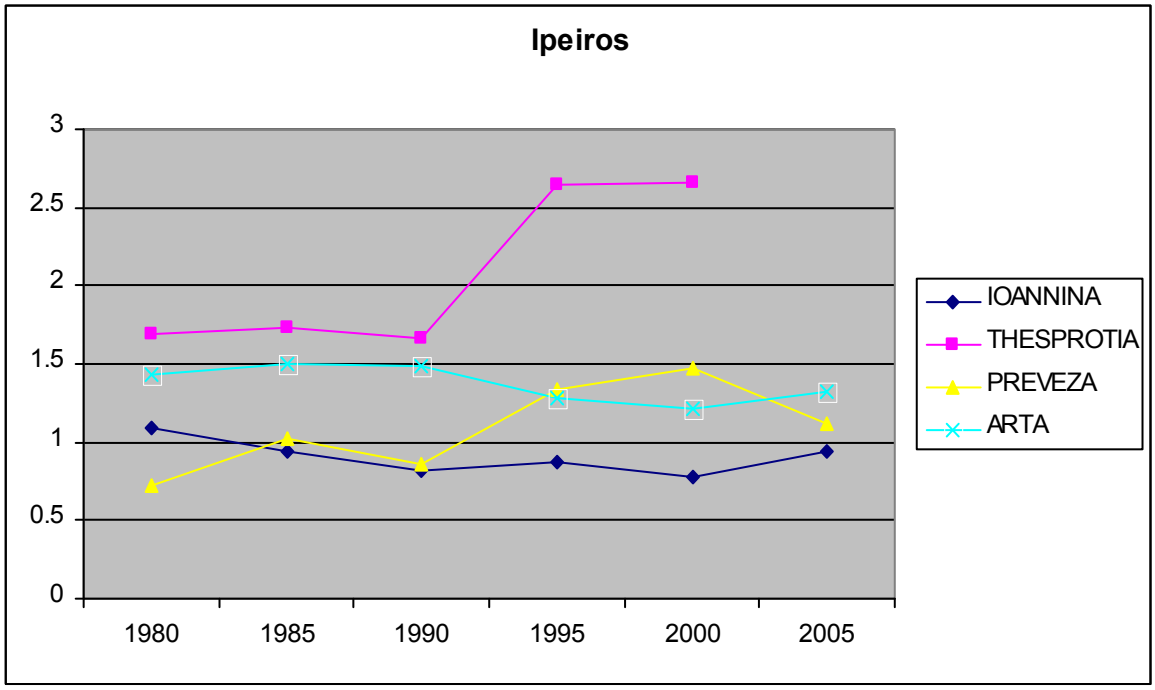
Source: *ELSTAT, Own Elaboration*

Graph 1D: *Evolution of Regional Specialization in Thessaly, 1980-2005*



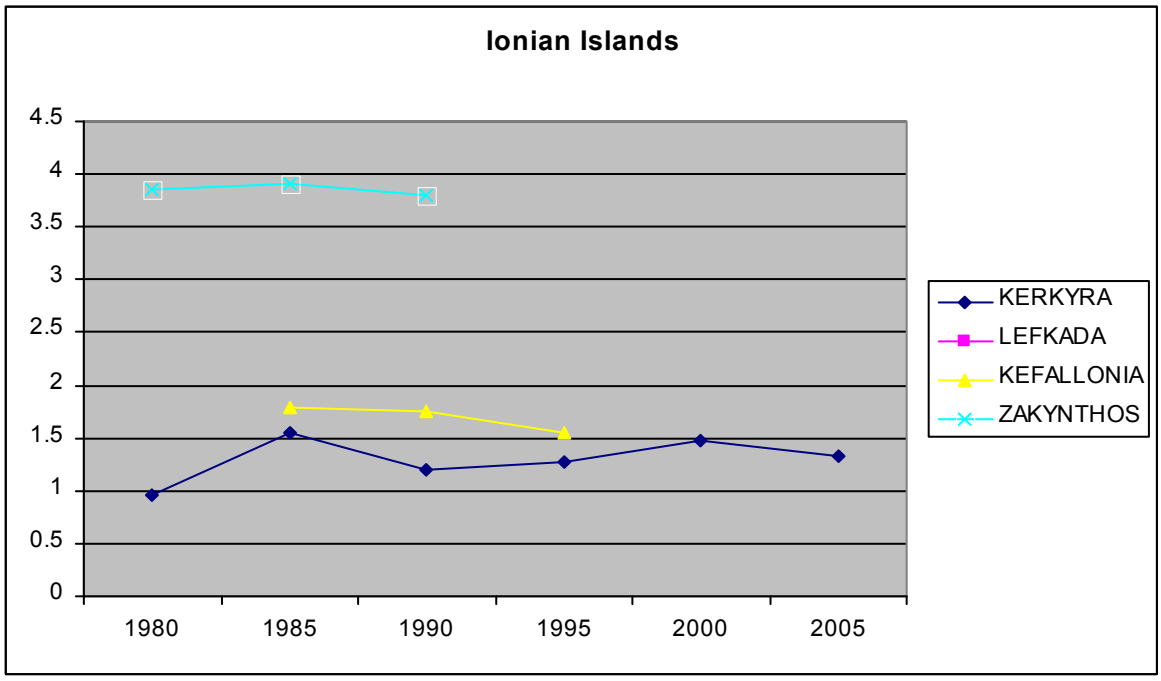
Source: *ELSTAT, Own Elaboration*

Graph 1E: *Evolution of Regional Specialization in Ipeiros, 1980-2005*



Source: *ELSTAT, Own Elaboration*

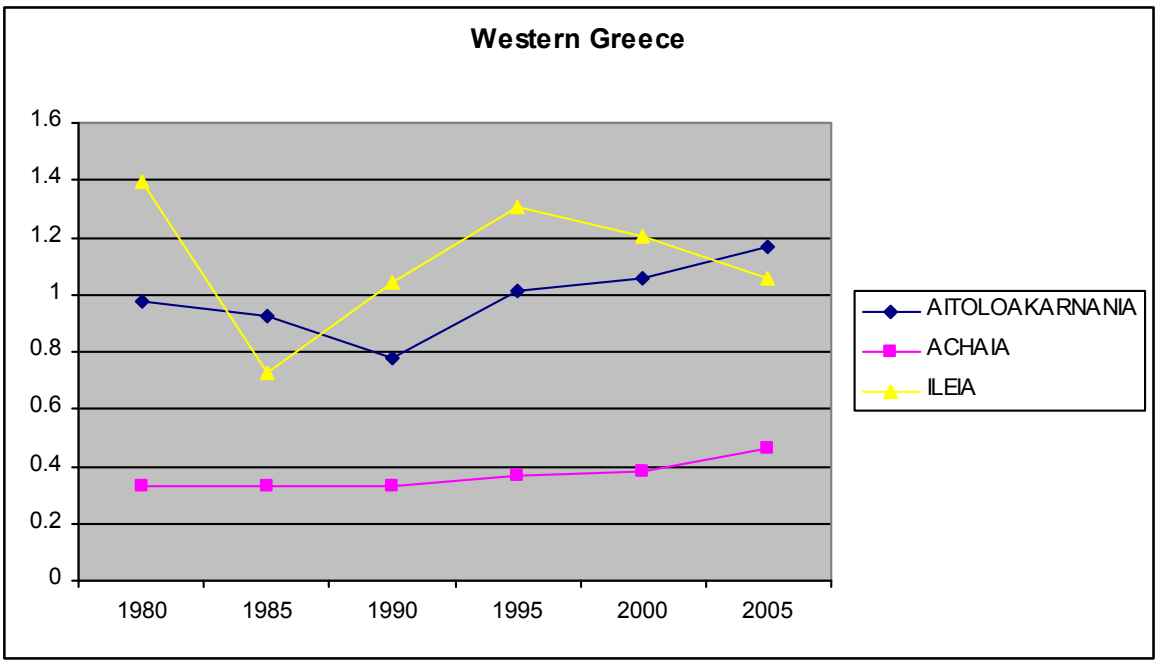
Graph 1F[32]***:*** *Evolution of Regional Specialization in Ionian Islands, 1980-2005*



Source: *ELSTAT, Own Elaboration*

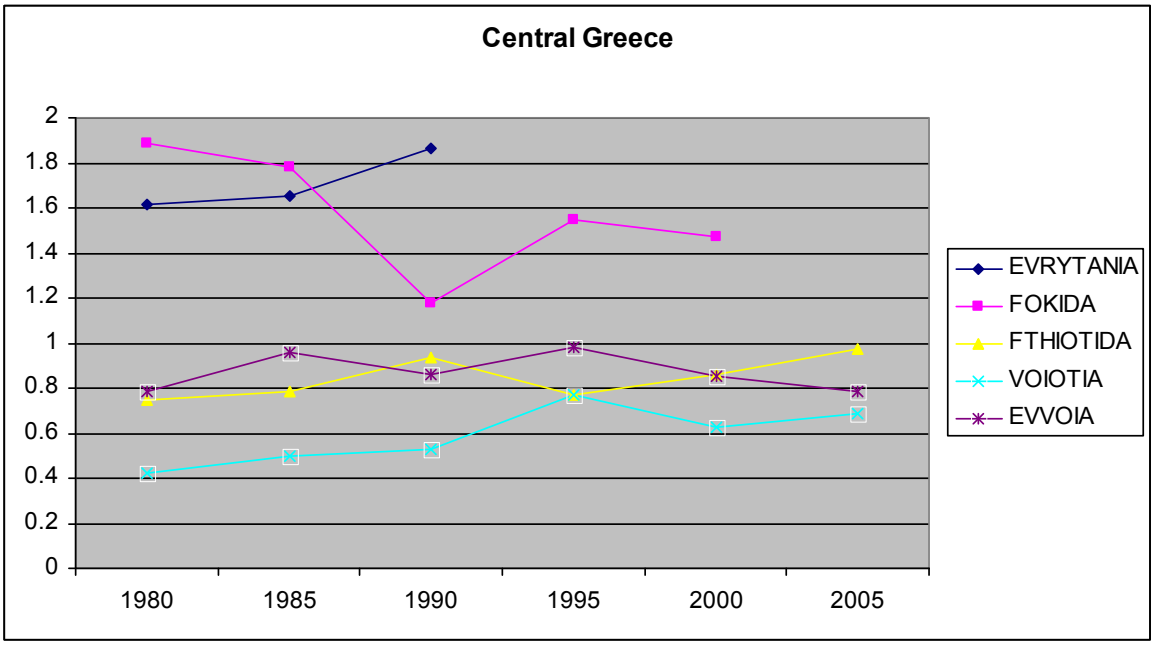
[32] The gaps, which are evident in some cases, are due to a data deficiency for certain years.

Graph 1G: *Evolution of Regional Specialization in Western Greece, 1980-2005*



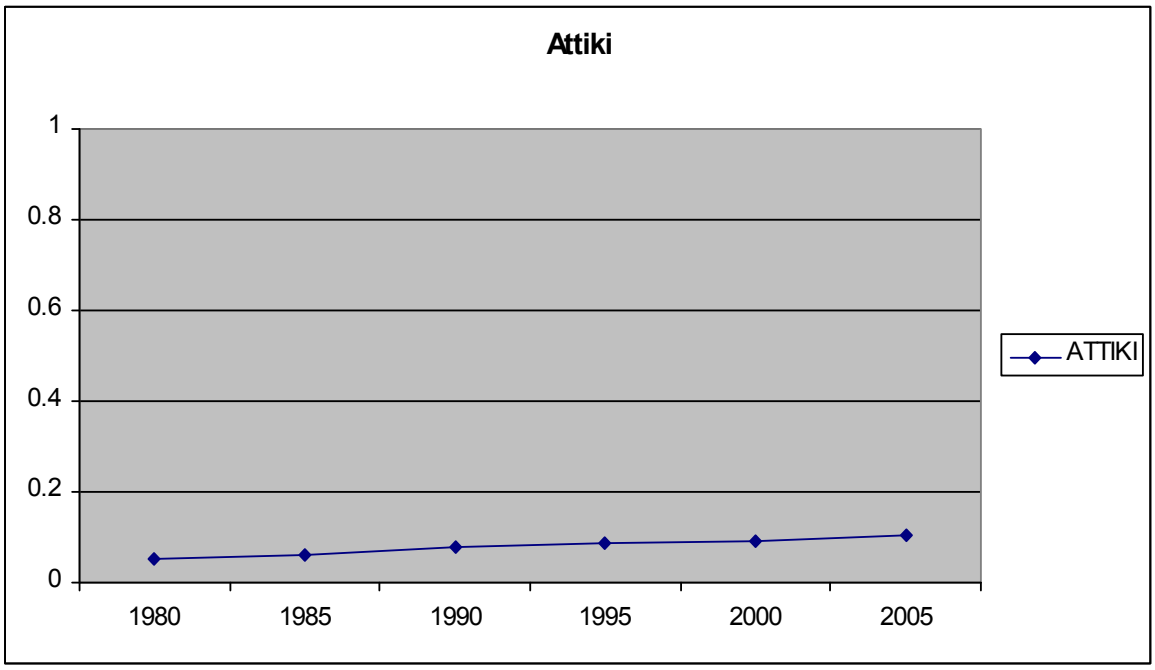
Source: *ELSTAT, Own Elaboration*

Graph 1H: *Evolution of Regional Specialization in Central Greece, 1980-2005*



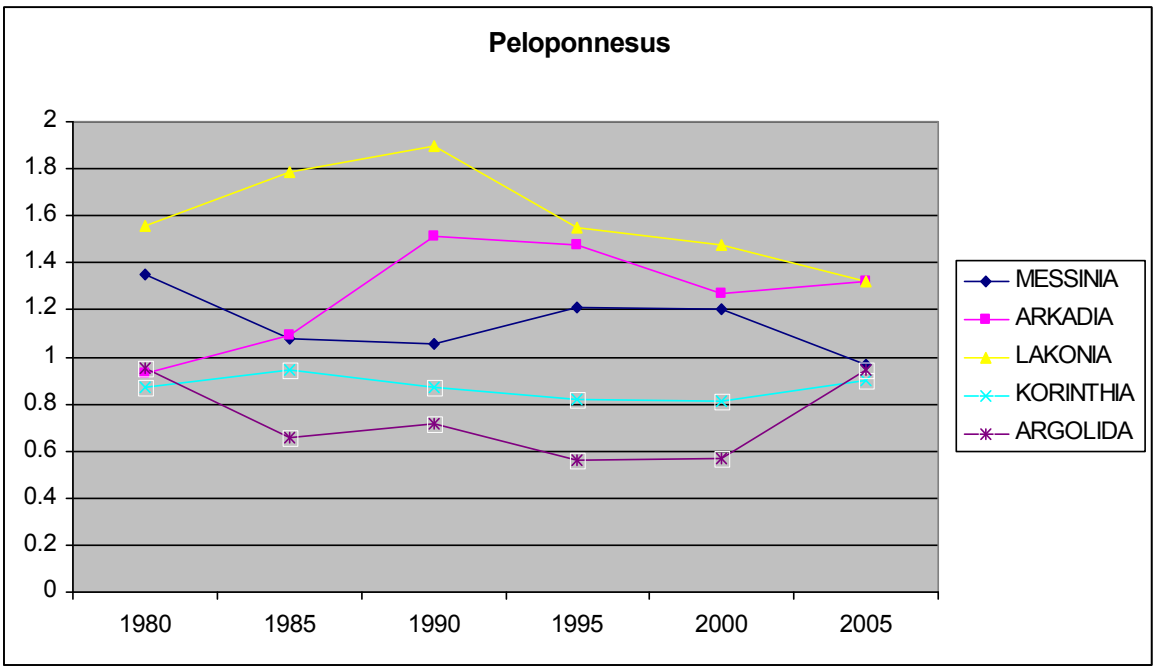
Source: *ELSTAT, Own Elaboration*

Graph 1I: *Evolution of Regional Specialization in Attiki, 1980-2005*



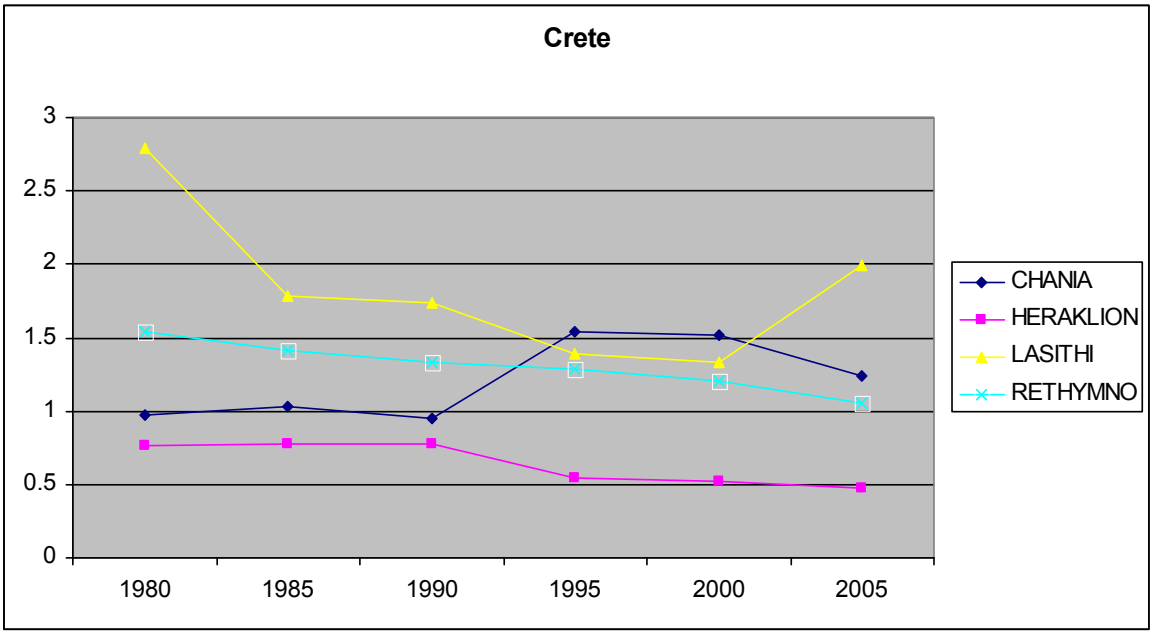
Source: *ELSTAT, Own Elaboration*

Graph 1J: *Evolution of Regional Specialization in Peloponnesus, 1980-2005*



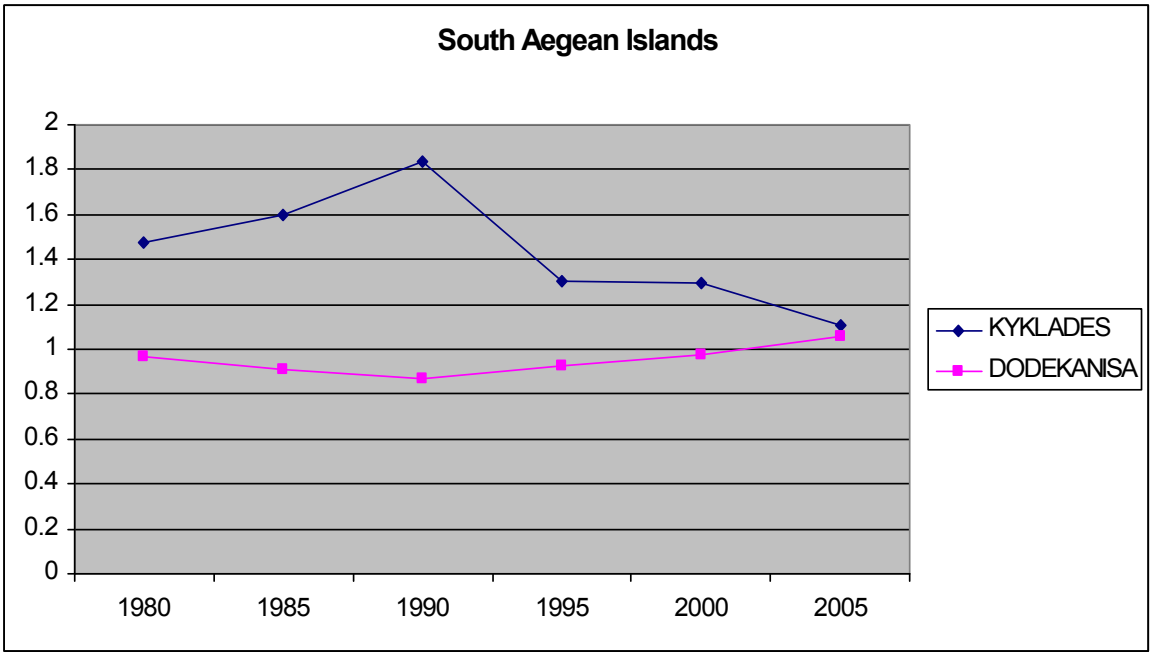
Source: *ELSTAT, Own Elaboration*

Graph 1K: *Evolution of Regional Specialization in Crete, 1980-2005*



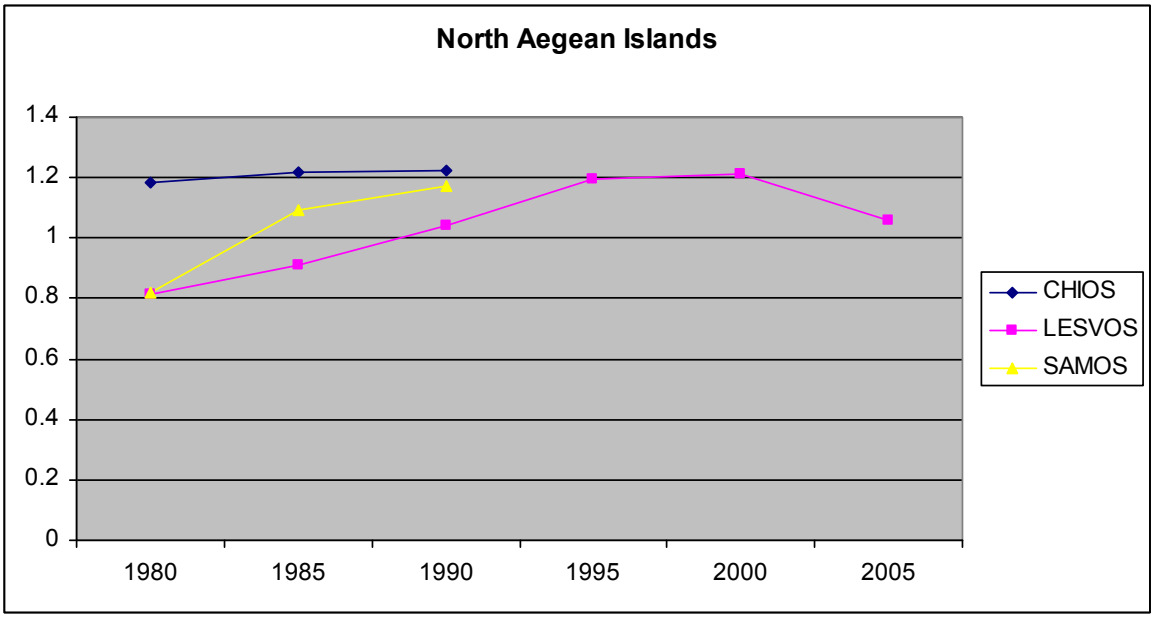
Source: *ELSTAT, Own Elaboration*

Graph 1L: *Evolution of Regional Specialization in South Aegean Islands, 1980-2005*



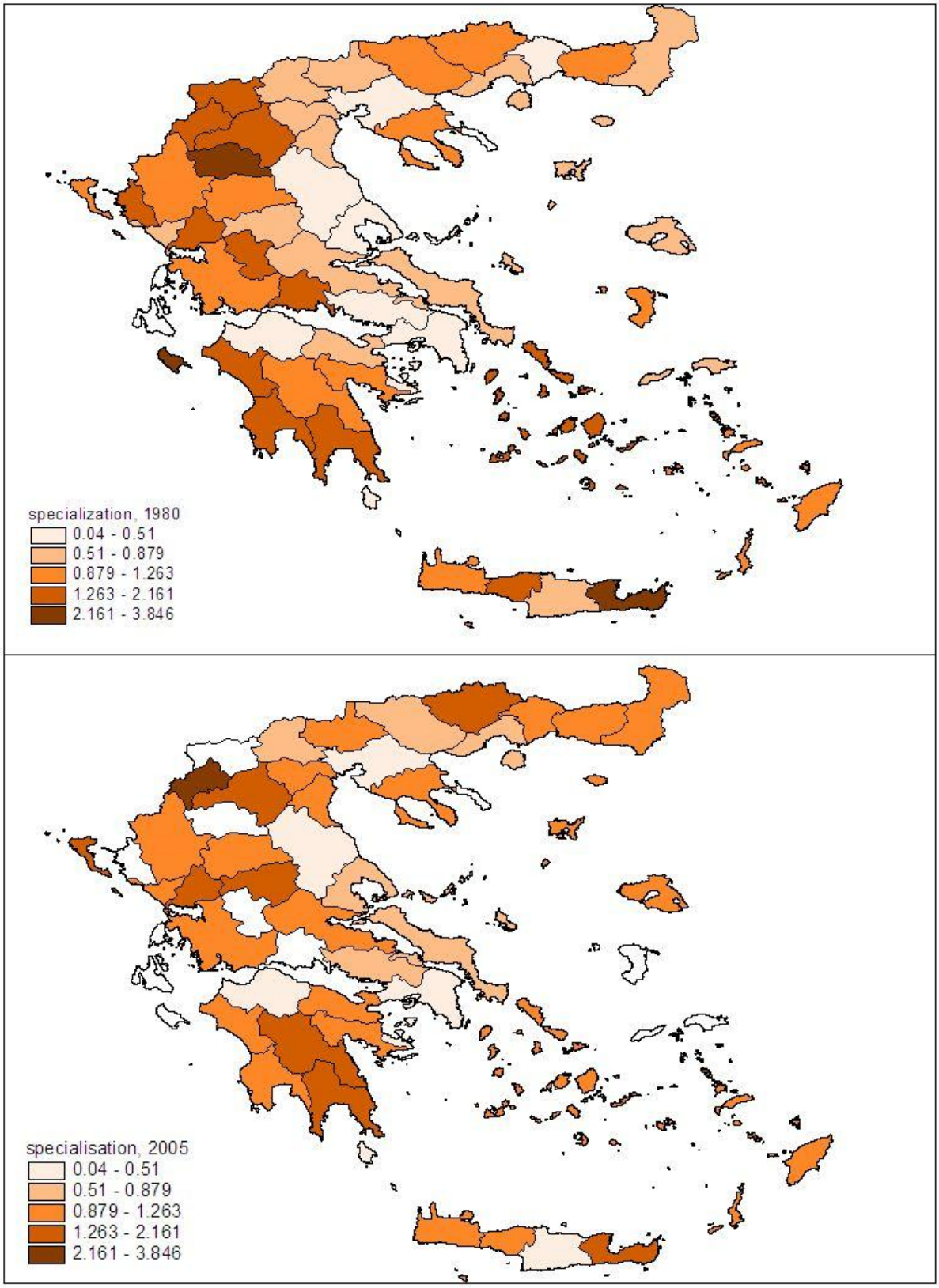
Source: *ELSTAT, Own Elaboration*

Graph 1M: *Evolution of Regional Specialization in North Aegean Islands, 1980-2005*



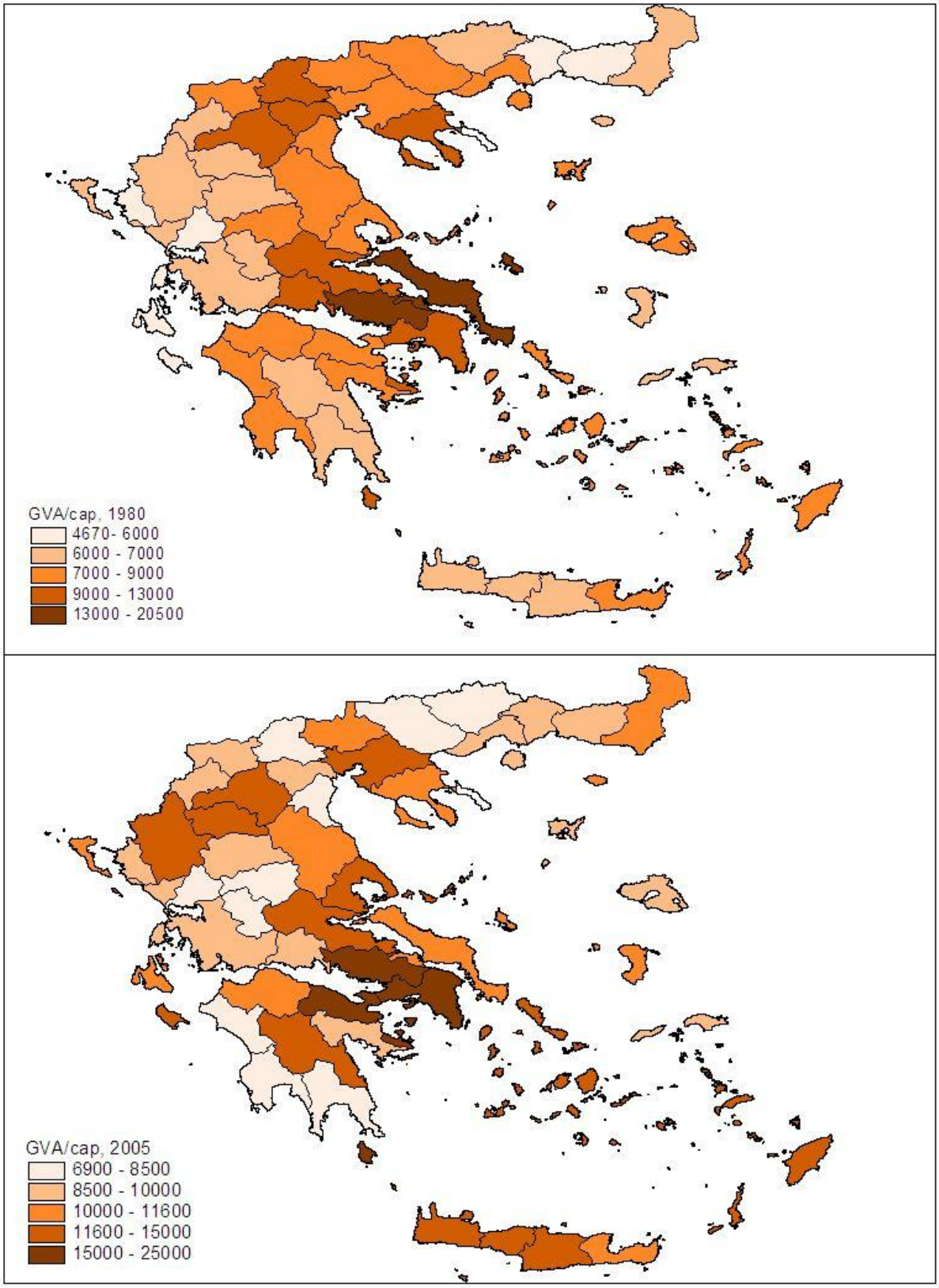
Source: *ELSTAT, Own Elaboration*

Map 1: *Specialization at NUTS3 regions of Greece, 1980 and 2005*



Source: *ELSTAT, Own Elaboration*

Map 2: *GVA per capita at NUTS3 regions of Greece, 1980 and 2005*



Source: *CAMBRIDGE ECONOMETRICS, Own Elaboration*