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“Regional Inequalities in the European Union: Before and during the economic crisis”

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Abstract

The present study examines the regional inequalities in the EU, before and during the crisis, especially in five countries of the EU. The analysis was based on two indicators reflecting the socioeconomic dimension of the crisis. The GDP pc and the unemployment rate for the total population and by sex. The empirical analysis focus on five countries, two countries (Germany and Netherlands) which represent the “North model”, while the three other countries (Greece, Italy and Spain) the “South model”, where as it is well known the current economic crisis is very pronounced. The analysis was conducted on two levels, the national level and the regional one, in order to detect the different patterns of regional inequalities during the crisis. Our comparative, temporal and spatial analysis allowed as confirming that the crisis in Greece presents a set of features, which distinguish it from the other 2 Mediterranean countries severely affected by the crisis. For this reason a special attention was given to this country.

Key words: Regional Inequalities, Crisis, European Union

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Acronyms

EC	European Commission
ECSC	European Coal and Steel Community
EEC	European Economic Community
EU	European Union
EU-10	European Union Member States that joined the EU on 1 May 2004 (CZ, EE, CY, LT, LV, HU, MT, PL, SI, SK)
EU-15	European Union, 15 Member States before 1 May 2004 (BE, DK, DE, EL, ES, FR, IE, IT, LU, NL, AT, PT, FI, SE and UK)
EU-25	European Union, 25 Member States before 1 January 2007
EU-27	European Union, 27 Member States
GDP	Gross Domestic Product
NEG	New Economic Geography
NGT	New Growth Theory
Pc	Per Capita
PPS	Purchasing Power Standard

INTRODUCTION

The European Union (EU) is a formation of a union of states with the aim of balanced development for all states and the basic orientation of the EU is economic. With the entry into force of the Treaty of Maastricht on 1 November 1993, the European Union (EU) was formally established so that, the European Economic Community (EEC) gave way to the EU. It is a fact that there are numerous economies rising in the EU, and each one has its own characteristics. Thus, there are the western economies, which adopted the capitalistic model such as Great Britain and Germany. Respectively in the eastern part of Europe there was the socialism which was applied in countries like Bulgaria and other eastern European countries. Moreover Greece with the other Mediterranean countries of the Europe reflects a "different" situation and functioning, in part as a result of the socio-cultural specificities of these countries.

The structure of Western economies in comparison with those observed in the eastern and lesser degrees of development in the EU may explain in a satisfactory manner the marked regional disparities between the Member States of the EU. Basic feature of western economies of the EU is that state intervention has fallen over the past few decades, and the free market has prevailed, which in turn has imposed its own rules now in most economies. Especially in countries that recently joined the EU in the last few enlargements and are part of the traditionally called the former "Eastern bloc", the implementation of the free market causes unknown effects on the course of economic development. Even more, it is unknown whether these countries will be able to reduce the gap that separates them from the developed Western ones.

The EU is an innovative institution on the world stage and the basic philosophy that underpins and supports the recent decades was that the growth of the weaker economies through funding from the strongest, favors not only those who receive aid but also those who grant them. However, it appears that the free market conditions that applied in recent years, have led several countries to losses or at least they failed to substantially reduce their development gap. Moreover on a daily basis, there are new findings about the problems created by the situation of the unregulated free market in global economy. What is commonly accepted is that the recent economic

crisis came to exacerbate rather than alleviate the contradictions in the global economy. Something similar happened in the EU where regional disparities appear to have been aggravated rather than declined in recent years.

The European Union is the most important case of advanced economic integration attempt at the international level¹. This economic integration is much more than a Free Trade Area (as for example: the ASEAN Free Trade Agreement - AFTA and the North American Free Trade Areas - NAFTA) because the countries members have the obligation to harmonize their tax, monetary and fiscal policies. Moreover the EU has an institutional obligation to deal with the disparities between Member States and regions and has provided in the last decades several resources in this direction. Despite this fact, a number of analysis estimate that disparities remain still high (EC 1999).

The objective of the present work is a first examination of the EU situation over the last 10 years, with a specific focus on the between and within countries impacts of the financial crisis that emerged in 2007. Especially, we try to find out if the EU and its country members tend to follow a cyclical pattern during this last decade. We also attempt to detect (i) the presence of any peculiarities in that pattern as well as (ii) the countries with the largest discrepancies. Additionally, we try to capture in which extent the picture of the EU has changed, especially in countries like Greece, where the crisis is deeper. However, we must emphasize that this task presents some objective and practical difficulties because the current crisis is still too recent to allow us to put in evidence clear trends, especially in terms of econometric models. It is not by accident that the literature concerning the relationship between economic crisis and regional impacts is still relatively limited and mainly based on descriptive statistics (Psycharis, 2012).

In order to achieve our objectives, we proceeded to a mainly statistic approach of the socioeconomic dimension of the crisis, through the analysis of two major

¹ Among the cases of economic integration at international level, we can mention the Economic Community of Central African States (ECCAS) established in 1999 in order to promote the process of sub-regional integration through the forming of monetary union with the Central Africa Franc (CFA) as a common currency.

indicators at national and regional level: the GDP pc in PPS and the unemployment rates for the total population and by sex. The unemployment question has to be investigated for two reasons: it obviously refers to the social dimension of the crisis, but it also “feeds the economic crisis”, according to a vicious circle.

Considering that the EU is not at all a homogeneous space, we focused our analysis on five countries, representatives at least of the well-known two speed patterns. As regards the “Northern model”, we selected two countries with high level of GDP per capita (Germany and Netherlands) but different population size (a ratio about 1 to 5). As regards the “Southern Model” where the crisis is effectively deepest, we chose three countries with different level of growth as well as population size: Greece, Italy and Spain.

The present work is divided in two parts. The first part regards the brief review of the theoretical approaches of regional inequalities (Chapter 1), with extensive definition of the convergence concepts. Initially two main theories are in opposition, the convergence and the divergence one. More recently, it seems that this debate is quite outdated. There is quite a consensus about the fact that convergence or divergence depend on the structural economic situation, as well as the geographic scale and the period under study.

For this reason in Chapter 2, we briefly present the state of the most important empirical studies concerning the relationship between inequality and growth. The main result is that the above mentioned consensus is actually a reality.

The second part of the work is focused on EU and regional inequalities through an empirical approach. In the Chapter 3 the enlargement of inequalities at the EU level during the crisis is analyzed, using as main indicator of inequalities, the Weighted Coefficient of Variation. We have calculated this indicator both for GDP per capita and unemployment rate for the whole period 2001-2011.

Finally in the Chapter 4, we try to detect in which extent changes of economic trends at national as well as at regional level appear after 2007. Regarding the analysis at regional level, we focused on the case of Greece because the time series analysis revealed a trend change that appeared before the beginning of the crisis and right after the end of the Olympic Games.

Part 1.

Theoretical background

Chapter 1 - The theoretical approaches: a brief review

Since the late 1980's, we observed a renewed interest for regional inequalities due to the questioning of the neoclassical doctrine as well as the impacts of globalization and liberalization.

The maintenance or the increase of inequalities is mainly linked with internal and external agglomeration economies which tend to grow at different spatial levels and are facilitated by economic dynamics, such as technological progress, structural change, globalization of business and the process of economic integration.

On the basis of the theoretical framework related to the relationship between European integration and spatial inequalities, it is necessary to take into consideration two important facts. Firstly, it is important to notice that regional disparities within the EU countries is not a “new” challenge, it was already one of the main policy problem and academic debate prior to the new economic environment and the recent process of economic integration in the EU, especially before the last two phases of enlargement. Secondly, the type and the level of inequality in each country has always been affected by factors and dynamics associated with the geomorphologic characteristics of each country and its regions, the terrain, the level of development and infrastructure, the production structure, the size of markets as well as its cross-border relationships. Furthermore, it is not surprising that in 2004, when the 10 new member states joined the EU, the range of income disparities within the EU logically increased. This result cannot be interpreted as increasing inequalities, due to the fact that the development level of these new countries was largely lower than the European average. Obviously, disparities within the EU have once again statistically increased after the accession of Bulgaria and Romania in 2007.

For this reason, each country as well as the E.U. itself are undoubtedly conducted to adopt and implement a set of appropriate regional policies, adapted to its own specificities in order to deal with its endogenous characteristics.

The depth of European integration did not always bring the desired outcomes of convergence in living standards between regions within Europe (Novotny, 2011). As mentioned by Petrakos (2009: 25), “*Although a positive sum game, EU integration is often considered to leave winners and losers by exposing countries and regions with unequal endowments in resources and technology and different economic structure to*

international competition”. It is well known from the past that a large debate has been developed about whether inequalities between European regions are increasing or decreasing. This lack of consensus can be attributed to the fact that the different approaches differ as regards their general goals, modes of reasoning as well as their methodology (Novotny, 2011:6). The focus on the reduction of regional inequalities was one of the objectives envisioned in the EEC Treaty in 1957. Among the objectives clearly mentioned in the Article 2 of the Treaty, the first one stipulates:

“to promote economic and social progress and a high level of employment and to achieve balanced and sustainable development, in particular through the creation of an area without internal frontiers, through the strengthening of economic and social cohesion and through the establishment of economic and monetary union, ultimately including a single currency in accordance with the provisions of this Treaty”.

This objective remains till today as the pursuit of economic and social cohesion as enshrined in the Lisbon Treaty in 2007. This new Treaty is especially important because as mentioned by B. Wilson (2011:1), “for the first time, the principle of territorial cohesion appears in the EU objectives”. The role of the regions is mainly strengthened while the principle of subsidiarity is not limited to regional entities but also to local ones. Consequently, it appears that the question of more equitable distribution of incomes, basis of the territorial cohesion, has acquired a institutional status beyond the theoretical recognition.

1.1. A reflection on the concepts of Convergence and Divergence

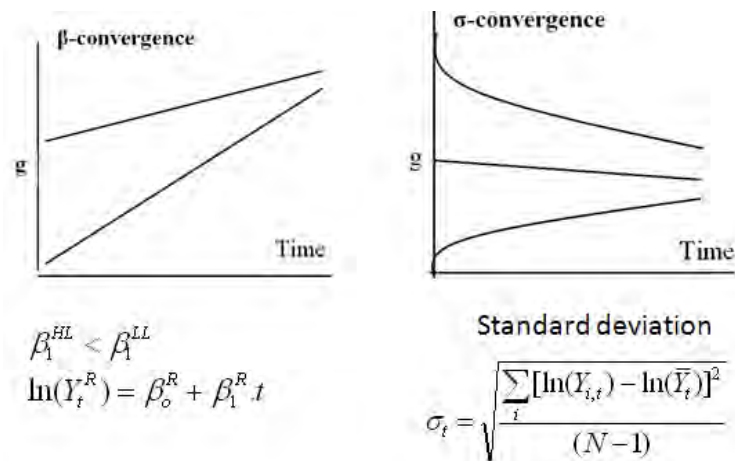
When considering the issue of regional disparities in EU, it immediately raises the question of convergence or divergence trends over time. Following Paas, Kuusk, Schlitte and Vork (2007: 6), “the concept of convergence in the most general sense is the decreasing or equalising of disparities”. This point is important because the question of convergence or divergence trends has often been used as a yardstick of theories (Boldrin, Canova, 2000).

If the issue of convergence and divergence is widely discussed by scientists and politicians, this concept is not simple. For some authors (Novotny, 2011), it is even a

“fuzzy” concept and this, because very different approaches of regional convergence have been developed during the last thirty years.

Effectively, when examining this question, we have to consider at least six different aspects, that is:

- (a) *Convergence between or within countries.* It is well-known that the geographic units employed (spatial scale) are not neutral as regards the expected results. In the same way, the time scale and the period under review also affect the conclusions. Following Fotheringham and Wong (1999), we admit that the modalities of grouping data affect the results of statistical analysis. In other words, it is essential to determine precisely the aggregation level because aggregated data pull the observations towards the average and consequently the variation existing at lower levels of aggregation is “masked”. Consequently, it is not surprising that various empirical studies emphasize that, even if we can admit that inequality between countries is reducing, inequalities within countries is increasing (e.g. Kanbur and Venables, 2005; Chen and Sapshord, 2005). The zoning process is equally important: data aggregated at the same scale level but with different zoning will probably conduct to different results (Openshaw and Taylor, 1978). This is what we call the Modifiable Areal Unit Problem (MAUP) which interferes on the convergence’s strength. If there is no “formal” solution as regards this problem, some authors suggest explaining regional convergence, taking as spatial units, Economic Areas - as for example the BEA in USA - that are considered as more appropriate geographical units because they represent functional economic areas.
- (b) The convergence can be analyzed in terms of *growth rates or income levels (or output) per capita.*
- (c) Two main type of convergence are generally examined: the β -convergence and the σ -convergence which are clearly two different forms. The β -convergence reflects the tendency for initially poorer regions to grow more rapidly than the rich ones. With σ -convergence, the differences across same level geographical units as regards outputs or pc income decline over-time. The following figure transcribes these two alternatives concepts of convergence.



- (d) We have to differentiate the *absolute* convergence from the *conditional* one: the absolute or unconditional convergence implies that the regional incomes (or output) will converge over time regardless of the region's initial economic conditions. At the contrary, the conditional convergence considers that the income growth is dependent of the underlying structure of each regional economy (Barro and Sala-I-Martin, 1991; Higgins et al., 2006). In this case, we will not observe absolute convergence but we will have conditional convergence.
- (e) The introduction or not of sub-groups of geographical units (countries for example) is also a very different way to conceive convergence. This is what we say the *Global* against *Club convergence*. In Club convergence, the spatial units will converge only if they are characterized by similar structural characteristics. Consequently, neither absolute nor conditional convergence will be observed.
- (f) Finally did the convergence a deterministic or stochastic process.

The proliferation of approaches and analytical techniques can only lead to some heterogeneity of results, making also more difficult their comparisons. In other terms, the relationship between income inequality and growth remains a very controversial issue, which can be summarized by the Shakespearian-like dilemma “is inequality good or not good for growth”? This dilemma is important because it raises the question of the well found and the legitimacy of convergence's policy.

The economists referring to the pure neoclassical theory consider that income equality with convergence at regional or international level is provided without the

intervention of any policy. On the other hand, the policy makers in the levels of the EU link the evolution of inequalities and convergence with the effectiveness of each policy. In practice, of course, it is particularly difficult to determine in which extent one is responsible for the trends of convergence or divergence of market forces or policies that apply.

Since we live under the light of globalization, which produce both winners and losers within and between countries (Benko, Lipietz, 1992, 2000), the regional dimension of income inequality and growth is attracting a considerable research and policy interest. According to theorem of Stolper-Samuelson (1941), under some economic assumptions (constant returns, perfect competition, equality of the number of factors to the number of products) a rise in the relative price of a good will lead to a rise in the return to that factor which is used most intensively in the production of the good, and conversely, to a fall in the return to the other factor. There are also many other theories and plenty empirical studies providing various conclusions that allow us to argue that globalization has not affected inequality on average. The World Bank Report (2003) concluded that globalization has mostly reduced inequality between countries while the more recent Report of this institution (2010) which examines the disparities closer concludes that a progress in the reduction of extreme poverty is observed. Nevertheless it is mentioned that even if globalization has reduced poverty in general, however ***there is still an uneven reduction within countries***, justifying policies intervention.

Moreover, considering the economic recession the whole world has been dealing with the past few years, the study of inequalities has been more complex and the approach of the relation between globalization, inequalities and development needs even more attention than before (World Bank Report, 2010).

1.2. The theoretical debate

The Economic theory does not give a clear answer and supports that both convergence and divergence may occur. As stipulated by Ravallion (2004), there are still no clear theoretical explanations and/or overall accepted empirical evidence about the relationship between growth and inequalities.

The neoclassical growth theory supports that a decrease in disparities of income is due to a decrease in returns to capital. Consequently, under the hypothesis of decreasing returns of capital, the neoclassical theory gives an optimistic point of view. Less optimistic in this respect are the implications of new (endogenous) growth theory (NGT) or New Economic Geography (NEG), which claims that location and agglomeration are playing an important role in the economic activity of a region and generate disparities. (Krugman 1991a)

The proponents of the neoclassical theory argue that disparities are bound to diminish with growth, through the activation of three convergence mechanisms.

The *first mechanism* refers to the neoclassical growth model, also known as the Solow-Swan model. This model attempts to explain the long term economic growth by examining productivity, capital accumulation, technological progress and population growth. Solow (1956) was the first who relied on the assumption that technology is a public good, also available to everyone and free of charge. Under this perspective the emphasis turns to capital accumulation as the main vehicle to reduce differences in productivity across regions or countries. Furthermore, this situation is assumed to happen more or less automatically, as long as markets are allowed to work freely. The importance of technology as a major competitive factor has been underlined by a large number of authors which give emphasis on innovation and diffusion of technology as an explanation of convergence: less developed countries faced to a large technology gap could obtain faster growth subject nevertheless that they can absorb the new technology (Dowrick, Rogers 2002). In other terms, the technology transfer is considered as the driving force behind differences in growth (Nelson and Phelps, 1966; Fagerberg, 1987; Barro and Sala-i-Martin, 1995, ch. 8). This perspective is based on a totally different view of technology, emphasizing its

public as well as private character, and its complementarities with other factors affecting the growth process.

The *second mechanism* is the well-known neoclassical trade theory developed by Heckscher and Ohlin (Heckscher, 1919; Ohlin, 1933; Samuelson, 1949). The model is determined from the initial relative factor of production endowments of each country participating to international trade. There is a strong export of products that make use of local factors, and import of products that make intensive use of factors that are locally rare. This well-known theory of comparative advantage predicts, under fairly restrictive conditions, an automatic improvement of economic convergence as well as the equalization of factors of production prices. One of the most important hypotheses of this model concerns the technology, considered as a common good, accessible with constant returns to scale.

The *third mechanism* is the neoclassical factor movement model (Rybczynski, 1955) that predicts equalization of factor prices as low-wage and less advanced regions attract capital, while high-wage and more advanced regions attract labor, under the assumption of free factor movement. Consequently through this strong assumption, the less advanced regions could gradually catch their economic lag and benefit from higher growth rates.

These three approaches are often characterized as “optimistic” because they predict automatic and sustained regional convergence, as a deterministic process.

Various researches have shown that the predictions of the traditional neoclassical model do not fit regional growth very well (Sala-i-Martin, 1996). Moreover, the assumption of technology as a (global) public good does not carry much empirical support or intuitive appeal. On the contrary, decades of empirical research on the creation and diffusion of technology within and across country borders has shown that technology is often a very local affair, embedded in firms, clusters of firms, regions and countries (Dosi, 1988).

The endogenous growth theory (Romer, 1986; Lucas, 1988; Barro, 1990) is focused on the nature of the relationship between economic growth and regional inequalities and not so much on the mechanisms, refuting the idea of deterministic process. According to this approach, economic growth is mainly the result of internal

and not external forces. Investment in human capital, innovation, and knowledge contributes significantly to economic development. Subsidies for research and development or education increases growth rate in some endogenous growth models with increasing incentives for innovation. In other terms, regional inequalities can be reduced through an endogenous process of investment and innovation, giving an optimistic dimension.

More recently, a quite different approach has been proposed and is recognized as the New Economic Geography. The purpose of economic geography is basically to investigate and to study the relationship of the economic life of every society with the natural environment and the influence of this on the territorial dimension to the decisions of individuals or society in general. The New Economic Geography approach predicts the increasing concentration of economic activity based on factors such as the interplay of agglomeration economies, backward and forward linkages, critical threshold and market size and above all, falling transport costs (Krugman, 1991). Moreover, it is the first time that geographical factors and especially distance, centrality and accessibility are clearly outlined as determinant components of the spatial organisation of activities and the slowly shaped new spatial European economic order (Petraikos, 2009). The geographical position in itself of a country and/or region has an impact on its attractiveness (Duquenne, 2009): a region close to its national gravity centre and moreover closer to the European gravity centre has a comparative advantage for attracting higher order economic functions and developing multiple strategies and cooperation (development of networks, partnerships et.c.). At the opposite, the distant countries / regions meet “objective handicaps” due to their geographical localisation. This spatial dimension would in part explain the regions’ hierarchy in terms of degree of integration and capacity to benefit from the diffusion of development (Petraikos 2000). Consequently, through this approach, an important concept is born: the hierarchical order of regions which exceeds those of inequalities.

It results from the above analysis that the theoretical debate of inequalities has been drive through years by *two main schools of thought*, known as the convergence and divergence schools.

The first school led by the Neoclassical economic theory, supported by Solow (1956) and Swan (1956), and the second one led by the cumulative causation theory which was supported by Rosestein and Rodan (1943), Perroux (1955), Myrdal (1957) and Hirschmann (1958). More specifically, the convergence school argued that it is possible to achieve low levels of inequality through high levels of development, while divergence school supported the opposite, and that is the main point which makes these two schools to differ.

Although these two schools of thought were the ones to dominate, a third approach has recently claimed that both convergence and divergence may occur and consequently the question is not anymore convergence or divergence but **under which conditions and at which spatial scale, convergence or divergence will occur?**

Several recent empirical research actually lead to the same finding, that is : both convergence and divergence may be detected at different spatial levels with different strength and in different proportions each time (Artelaris et al 2008; Petrakos 2008; Petrakos et al 2008a; Gianetti 2002; Dobson et al, 2006 Petrakos et al, 2005;). Over the years there have been numerous attempts to explain the relationship between inequalities and growth through sophisticated models, but without a clear outcome.

Finally, we may suggest that nowadays, the challenge for researchers is not so much the development of powerful empirical models (because various econometric techniques enable such a task) but much more the development of an alternative and coherent theory (World Bank Report 2010).

1.3 Conclusion

The recent expansion of the EU to the East has generated an economic space with a great variation among countries in terms of development and welfare indicators. (Petrakos, 2009) The integration of the EU seems to have a spatial dimension, as the peripheral countries or regions with weak economic structures and deficient human resources and infrastructure have a less satisfactory performance. It is also obvious that in the New Member States, convergence has been primarily achieved due to the superior performance of metropolitan areas that have driven up the national average. (Petrakos, 2009)

At the EU level, historically has been formed a pattern of regional inequality which has been characterized as the so-called model of “north-south” or “center-periphery” and has remained invariant over the last decades. The main characteristic of this model is that the most developed areas are clustered in one axis which starts in London in the north and ends in the northern Italy to the south. This cluster includes dynamic industrial and metropolitan regions such as Belgium, Netherlands, and Germany, and this axis is also called Blue Banana. It is also believed that the Blue Banana will still be the European growth pole axis over the next decades (Kallioras, 2010). At the other extreme of this axis, there are regions with relatively low levels of development and a per capita GDP lower than the EU average.

Generally, from the theory so far we know that the relationship between economic development and income inequality is not clear yet. Kuznets (1955, p. 18) stated that there was "... a long swing in the inequality characterising the secular income structure: widening in the early phases of economic growth when the transition from the preindustrial to the industrial civilisation was most rapid, becoming stabilised for a while and then narrowing in the later phases". According to this author, the economic development of a nation is intertwined with industrialization and population migration from rural to urban areas. Admitting that inequalities (in absolute terms) in urban areas are higher than in rural (even if - of course - the average per capita income in urban areas is higher), then the transition is through a quite deterministic way certain to increase the overall inequalities. Even if this fact is not always accepted, an increase in productivity due to industrialization will increase the income gap between rural and industrial areas, contributing once again to a global increased inequality.

Nevertheless, at a certain threshold, the inequality-growth relationship will be overturned. How can we explain such a reversal of situation? The common explanation is the following: the increasing wealth of a society should contribute to mutations of political and social institutions. At the same time, the workers organize themselves better to demand higher wages, the democratically elected governments promote the welfare state, and public education improves human capital of all classes while economic environment of cities generates more opportunities for everyone. All these factors will have positive direct and indirect impacts on inequalities' reduction. Kuznets has effectively suggested that there is not a monotonous trend and finally he

introduced the famous hypothesis of an inverted-U relationship between economic development and inequality, the so called Kuznets Curve. According to this hypothesis, income inequality ordinarily rises in the early stages of economic development and declines in the latter that is in the long run term.

Various latter empirical studies lead to different results. In particular, in the 1990s there was some consensus that inequality is harmful for economic growth (e.g. Alesina and Rodrik, 1994). These studies were mainly carried out at the country level and the conclusions were that the economies with a higher level of initial inequality are likely to experience lower growth rates in the long run.

Another important aspect of this debate around the growth pattern is related to the following question: whether there is some mechanism leading to convergence across countries in terms of level of income per capita. The economics of growth literature has always questioned whether there is some kind of mechanism at work leading to convergence across countries in terms of level of income per capita. Boldrin et al. (2001) distinguish four main hypotheses about convergence proposed by the literature: from a strong convergence hypothesis “à la Solow” (1956), to a non-convergence one caused by the presence of strong increasing returns, as proposed by the new growth literature (Romer 1986; Grossman and Helpman 1991), and reinforced by the role of agglomeration economies (Krugman, 1991). It is well-known that the convergence versus divergence argument has been central and remains central in the difficult question of the European integration debate. From the above analysis, it appears that (a) the different opinions expressed by the economists of growth and regional development are the results of the different theoretical approaches through which the questions are examined; (b) the empirical confirmation (or not) of regional inequalities and convergence – divergence of the processes is in a large part, dependent of the choice of the selected space and temporal scales.

Chapter 2 - The theories in the light of empirical studies

Most of the theories and economic models analysed above have also an empirical approach. Obviously there is also a debate on the findings through time but such a thing is reasonable to happen as every theory is based on different factors and examines regional inequalities from different perspectives. Given paradigms of the variety of the findings about the relationship between inequalities and growth, Bourguignon and Morrison (2002) found signs of slightly rising inequality from the 1970s to the early 1990s. Sala-i-Martin (2002) observes a tendency for inequality to fall in the 1990s, and also Milanovic (2004) finds rising inequality in some sub-periods and falling inequality in others, but with no clear trend. In fact it is often admitted that if most of the countries and regions have become much richer during the past century, the gap between the poor and rich countries has increased (Paas, Kuusk, Schlittle and Vork, 2007: 12). The true question as stipulated by Quah (1993) is to examine whether the distribution of income across countries and regions is becoming more equitable or not. Can we really assert that income levels of poorer countries are converging to those of richer countries or not (Islam, 2003)?

As regards EU, before the last enlargement, it appears that two potential opposite dynamics could be observed: on the one hand inequalities tend to diminish between the Member States while on the other hand they tend to persist or to increase within each country. This is largely due to the fact that the cohesion policy has mainly contributed to a specific type of convergence by further strengthening of metropolitan centres and other areas which have objective potentialities (EC 1999, Puga 2001).

Generally, it is admitted that the EU regions converged to late 1970's, when the convergence trend halted (Lopez-Bazo et al 1999, Neven and Claudine 1995) and growth trends in inequality occurred both in mid 1980 (Abraham and Van Rompuy 1995), and in mid-1990 (EU 1999). Of great interest is the fact that regional disparities in the European Union are mainly due to the inequalities within countries, rather than inequalities between countries (Esteban 2000).

2.1. Classification of empirical analysis

Knowing that any researcher dealing with regional disparities has its own empirical placements, we can consider that there are three main categories of empirical analysis of inequality and their classification is performed as follows:

- a) positive relationship between inequality and growth
- b) differentiation of growth based on growth rates
- c) inequalities through spatial dimension

Some authors like Deiniger and Squire (1996) by using more sophisticated research methodologies and different datasets got results that predicted *a positive relationship between inequality and growth*. Moreover, Forbes (2000) found a positive relationship between inequality and growth concluding that the results of the growth inequality relationship studies remarkably depend on the datasets and estimation techniques used.

Geppert, Happich and Stephan (2005) found that the disparities in per capita income between the regions of the EU15 are gradually decreasing. By using nonparametric data they came up with the conclusion that convergence was hardly present in the 1980s, but stronger in the 1990s. In other terms, they consider that there is a differentiation of growth which is based on the different growth rates. To be more specific, they claimed that convergence occurred both through catching-up of the poorest regions and relatively weak growth of many (erstwhile) richer regions. Other authors supporting the second category are Petrakos and Posse, who through a research of 15 member states during the period 1960-2000, came up with the conclusion that in the EU the periods of high growth rates are characterized by relatively higher inequality (especially during the decade 1960), while periods of low growth rates are characterized by relatively low inequality (decade 1990).

More recently, a large number of authors gave a special importance not only to the growth patterns but also to the spatial dimension of the inequalities. In this context they developed alternative spatial econometric models, offering a new theoretical approach. Studies by Anselin et al. (1997), Bottazzi and Peri (2003), and Funke and

Niebuhr (2005) aim at investigating the impact of spatial spillover effects on innovation, growth and regional disparities. Contrary, Fingleton (2003) argues that spillovers might give rise to spatial dependence of regional growth which has to be dealt with by spatial regression models.

With the introduction of the spatial dimension, it is admitted that space is not homogeneous and furthermore the regional convergence or divergence is in a large part, dependent of the spatial spatial heterogeneity. Quah (1996) investigates whether income growth of EU regions is characterised by the formation of convergence clubs. Moreover, analyses by Baumont et al. (2003) and Fischer and Stirböck (2004) indicate that convergence clubs exhibit specific spatial patterns. They detect different spatial regimes in Europe that are characterised generally speaking by a divide between Northwest and Southeast. Finally, Crozet and Koenig (2004) investigate whether regional growth in the EU is marked by a trade off between growth and cohesion.

2.2. Regional inequalities in the context of the EU economic crisis

In the highly competitive global economy of today, the relatively small size of European countries (comparatively to the new dynamic countries as China, India etc), the aging population, and indebtedness, coupled with the lack of energy resources and insufficient investment in research and development means that high standards of living and generous social welfare is at risk. At the individual level, each European country cannot compete with emerging markets. For this reason, it is imperative to develop a strong European Union in order to address the challenges posed by globalization.

In the past few years, the euro crisis threatens not only the eurozone, but also the entire European Union. Despite pressure from the financial markets has abated, for now, a long-term solution to the crisis remains an existential priority for the European Union.

Regional inequalities tend to follow a procyclical pattern. Developed regions grow faster in periods of expansion and more slowly in periods of recession. However, since the 2008/09 recession this relationship has been less clear. Some

regions are stagnating relative to others, both within and between member states, whilst others have benefited from an influx of educated labour as well as from a highest adaptation's capability to the new environment. Consequently the economic crisis seems to generate a new context in terms of regional inequalities.

It is obvious that there are several endogenous and exogenous factors which determine the affects of the economic crisis as a reality across Europe. By noticing the wide regional disparities and the different growth rates it is clear that the impacts of the crisis would not be the same for all countries/regions (Gaki, et al., 2012). Taking into consideration the diversity among the European Union countries and regions, due to different levels of economic and social development, it is possible to come up with the assumption that the southern European countries and some Eastern countries of Europe were initially the most exposed, since they are faced with structural problems and lower development levels comparatively to the Western and Northern countries. In other terms, it is quite pertinent to postulate ex-ante that the gap between these different regions (countries) will grow-up as the crisis will not be resolved.

Part 2.

EU and Regional

Inequalities: an empirical approach

CHAPTER 3: EU - A SPACE WITH DIFFERENT SPEED?

3.1. The EU: an entity with various speeds.

In an EU consisting of 27 members is evident that growth in these countries will be different. This leads to the conclusion that the EU is not a homogeneous one, but it is a set of diversity. The countries differ in terms of culture, civilization, religion, politics, population, etc. One of the main objectives of the EU is cohesion, which comes in from the convergence and the enlargement over time. The primary aim of the European Union policy for economic and social cohesion is to limit the differences in the economic and social development of the regions of Europe and to promote structural changes. The EU Cohesion policy is carried out through a number of instruments the most important of which are the Structural funds and the Cohesion fund. Interior market consists of free circulation of goods, services, persons and capital. For citizens of 27 states it means that in European common market they have the right to live, move, invest and start business without restraint. There is no customs tariff for inland trade and common customs tariff is applied on import from third countries.

In order to understand the impact of the crisis, it is initially very important to examine the following question: did the EU “manage” to bring cohesion before the economic crisis broke out in 2008?

This question is not a simple one because we have to take into account the main structural changes observed during the last 10 years in the EU space, especially as regards the accession of the new members. The answer depends on the space we are considering. In particular there was a certain tendency of convergence in a level of metropolitan zones and capital cities, and also in areas that had developed industry and services sectors. The gap convergence with the rest regions still exists. The conclusion we can come up here is that even among the 15 countries in the EU cohesion was and still be difficult.

The last 10 years the EU has changed its profile through the enlargement. Enlargement has led to a more heterogeneous EU in terms of innovation, capabilities and technological development (Archibugi and Filippetti, 2011), increasing obviously the disparities inside the European space. As we can see in the following table, the difference in terms of GDP per capita between the highest and lowest national values is extremely high (ratio of 7,6) while the same ratio does not exceed 2,5 in the US as well as in Japan.

Table 1: High divergences in European space

	Highest country	Lowest country	Ratio
GDP per cap (% EU27 average)	Luxembourg 251%	Bulgaria 33%	7.6
Population	Germany 82.5 millions	Malta 0,4 million	204

Source: DG Regional Policy European Commission, “EU Regional Policy: an overview”, 2010

At this point it is worth asking what the consequences of this change in disparities were; From literature it is known that there have been many efforts to achieve convergence, but the result is that convergence achieved only between the EU countries, but within countries regions tend to diverge, and as mentioned earlier convergence occur mainly in the metropolitan regions of each country.

It is obvious that we live in a time where markets determine the trends and not politics, leading to believe that in the near future there may be formed new economic-geographical zones of influence, such as in Central and Northern Europe will belong in first gear the European Union, the zone of the Eastern Europe and the zone of Mediterranean countries will belong in a secondary gear. So far, it seems that the Multi-speed Europe tends to be the most accepted point of view since the economic crisis changed the economic and political situation of each Member State. Until the

last years, it was more common to characterize the European Union as a two-speed area.

In particular, Two-speed Europe was the idea that different parts of the European Union should integrate at different levels and pace deepening on the political situation in each individual country. Especially after the end of the Cold War, the concept of Two-speed Europe entered the political discourse when an eastward enlargement of the EU began to materialize the question whether “widening” could be compatible with “deepening”. The existence of many different countries in a broad geographic area designates the regional problem at three levels. The first group consists of countries like Germany and Netherlands, which belong to the Northern part of the division of North and South model with prosperous economies.

The second group includes countries which are in the periphery of Europe with less developed economies such as Spain, Portugal, Italy, Greece or Ireland, countries which in opposite belong to the Southern part of the model. Finally, the third group includes countries of former Eastern economies, relatively weak, completing the transition from socialism to capitalism. In this group are countries such as Bulgaria, Poland, Romania, and Latvia.

In that point, we come with the conclusion that the existence of such many different countries in a broad geographic area creates a regional problem focused on three levels.

The first level concerns the groups of countries mentioned above. At a second level variation exists within countries. Finally, at a third level, in the unified Europe, differences are between regions across national borders. Thus, at NUTS 2 level, island and less favoured regions, belonging to countries with different levels of development, face common problems and difficulties. Many studies argue that while disparities between member countries are decreasing gradually the disparities within countries are increasing. As a result, the overall gap between the central, rich and developed regions on one hand and the less developed regions on the other hand are expanding (Heidenreich and Wunder 2008).

The global economic recession of 2008 is the result caused by the international financial crisis of 2007, in areas of the real economy of the international community.

The credit crisis of illiquidity became evident in indices of developed countries and major sectors of the economy were affected. These sectors include banking, insurance, real estate, commerce, and others with direct effects on economic fundamentals of the economy such as rising unemployment, new inflationary pressures, currency devaluation, etc. At that point, each country affected in a different way due to the different structure that each one has. There are others who suffered and still suffering the most and others who managed to handle the effects of the economic crisis through various mechanisms.

Regional inequalities in Europe appear to be consistently high following a mixed core–periphery, east–west and north–south pattern. On average, core, western and northern regions are more advanced than peripheral, eastern and southern regions respectively (Petraikos et al, 2004a and 2004b; Barrios and Strobl, 2005). Petraikos 2009

The European Union is grounded on three main pillars: cohesion, integration and convergence (Archibugi and Filippetti, 2011). The original idea was “[...] that rival nation states can do better by pooling some sovereignty instead of going to war” (The Economist, 2010c, p. 1). Then it became clear to the states who participated in the project of integration that the main goal was to create a political union to achieve in extent both economic and political stability. By creating a common currency, the euro, the EU made a giant step forward in the European integration since it’s beginning as the European Coal and Steel Community (ECSC) after the second World War. The creation of the euro provided several benefits for European Union member states, including access to much larger trade markets and a stronger currency with lower interest rates (Taylor, 2011). Every country entering the EU or both the EU and the eurozone automatically gained numerous advantages, and before the recession most members experienced boom economic periods.

Despite the benefits of being a member of a single currency union, the economic crisis, which showed up in 2008, brought into question the current monetary and economic union of the EU. Deep divides among the member states of the eurozone and the EU revealed. There were several states, which came to stand out as

dangerously at risk of defaulting, or becoming unable to make payments on their massive levels of national debt, regardless of their eurozone membership. At that point the Union was forced to develop policies to control the effects of the crisis with this magnitude. The crisis has spilled over to affect the global economy at all levels, threatening a lasting economic recession, affecting companies and employment, and therefore social cohesion.

3.2. The inequalities in front of the crisis

3.2.1. A brief review of the crisis

The global economic recession of 2008 is the result caused by the international financial crisis of 2007 in the sectors of the real economy of the international community. The International Financial Crisis of 2007 is a global situation which threatened the economic downturn on the wider financial and banking sector, with the operative country to be the United States of America.

Emerged after the outbreak of the problems in the mortgage market low collateral and the reckless use of structured investment products depended directly on the ability to repay loans they produce. The effort of removing the credit and interest rate risk from banks, converting stagnant capital in marketable securities and the movement of complex investment instruments in situations of specific entities, caused a "domino" of chain reactions in the American and European banking and real estate sector, especially in countries where this sector has grown quite "artificially" as for example Spain. The most important sectors of the economy have been affected, such as banking, insurance, real estate, car, commerce and others, with immediate results in the national economies as rising unemployment, new inflationary pressures, monetary depreciation, etc. In other terms, the financial crisis has turned into one of the most serious crises in the real economy unknown previously.

The collapse of the housing market caused the reduction of the activity or the shutdown of many economic sectors that produce or trade in building materials or equipment housing. In extend activity limitation or shutdown of many sectors of the economy causes unemployment and reduced income. Furthermore, a decrease in

income causes a decrease in demand for many products and services impulse leading to a second wave of unemployment and reduction of income. This process continues gradually adversely affecting almost all sectors of the economy until the recession reached its end. The crisis is transmitted sequentially and in all countries of the world, but the countries which are the most dependent as regards imports of main products and services are those who suffer the most. Then all countries in the world get affected because they form a market and each one depends upon and influenced by others in which exports goods and services.

From the above, it is obvious that the crisis has not affected all countries with the same intensity due to their different economic structure and their capacity to control and then reduce their deficits.

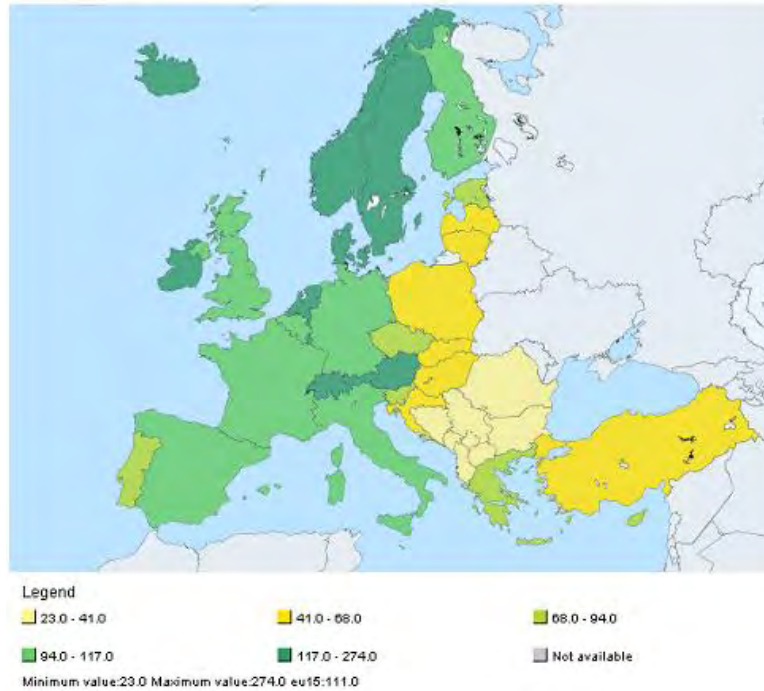
This global financial crisis brought into light many structural problems of the EU. The moment that crisis erupted the EU had not yet managed to integrate the new Member States, and in extend this has clearly shown that the EU was in a weak position. Many of the basic weakness of the EU came to light intensely. To begin with, there were the structural bases where the EU development level was low, almost nonexistent production structures in many regions and ailing infrastructure. In addition, there were the institutional weaknesses, where we have the euro as a common currency without a genuine common policy with the necessary tools. Finally, it is important to notice the gap between the political declaration of each member state, and the national practices. By political declaration it is meant not only the willingness for cohesion but also the relative policies implemented by national authorities, and how much eager is every member state to help the weaker regions to impugn economic crisis.

3.2.2. Towards enlargement of inequalities at EU level during the crisis?

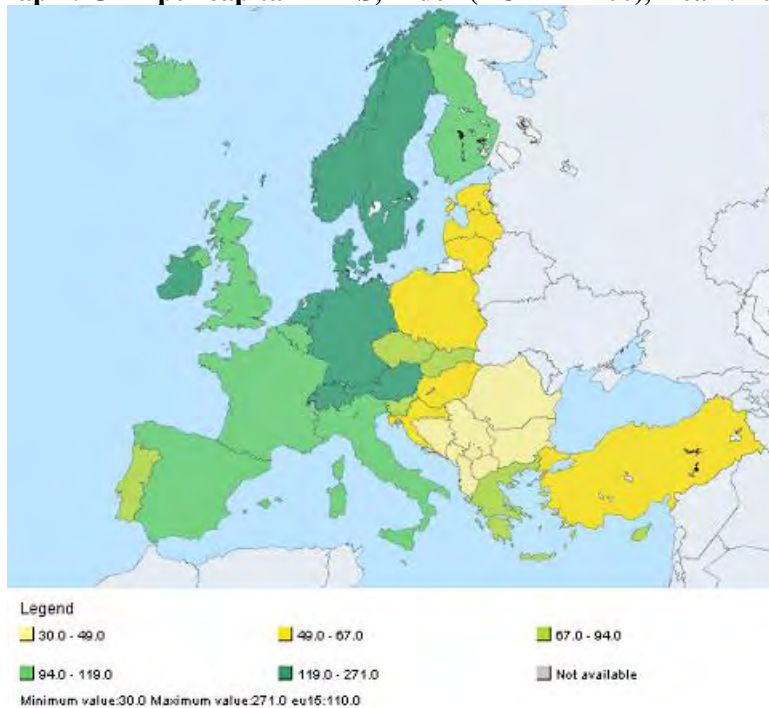
This chapter examines the evolution of some important indicators that reflect the image of the EU in terms of economic growth. The aim of this chapter is to outline the changes before and during the crisis, considering that the European Union is still in crisis. In a second time, we also try to give a different assessment of the impact of the crisis.

As well known, the average GDP per capita in PPS for the EU-15 is systematically higher than the relative indicator for EU-27 and is consistently above the average. So it is clear that the new countries led to a reduction in the average for the whole EU.

Map 1: GDP per capita in PPS, Index (EU-27 = 100), Year : 2007



Map 2: GDP per capita in PPS, Index (EU-27 = 100), Year : 2011



Source: Eurostat

Despite the fact that the two above maps have not exactly the same scale, which is a “default” for comparative analysis, we observed that after the beginning of the crisis the regional inequalities (at national level) present a modified pattern. Firstly, Germany is now clearly different from the other major countries of the EU (France, United Kingdom, Italy, Spain e.t.c), secondly two countries, Greece and Portugal tend to integrate a group clearly below average with some new member countries (Slovakia and Slovenia).

Even if the index of GDP pc reflects the growth pattern, we consider that it also necessary to examine the unemployment rates as unemployment represents the clear expression of the socioeconomic dimension of the crisis. Apart from the evolution of the indicators in themselves, we also examined the Weighted Coefficient of Variation in order to detect in what extent the crisis has created greater trends of spatial inequalities, admitting that a WCV with values lower than 10% revealed relatively low level of spatial inequalities.

The W.C.V, for any variable X is defined by:

$$W.C.V. = 100 \times \frac{\sqrt{\sum_{i=1}^k w_i (X_i - \bar{X})^2}}{\bar{X}}$$

Population Weight $w_i = P_i / \text{Pop}$

Where $i = 1 \dots k$ with $k =$ number of regions of the country

$X_i =$ value of the index (for example GDPpc) for the region i

$\bar{X} =$ average of the index

$w_i =$ relative weight, in terms of population, for the region i

$$w_i = \frac{\text{Pop}_i}{\text{Pop.}}$$

with $\text{Pop}_i =$ population of the region i and $\text{Pop.} =$ total population of the under studied area (see appendix)

Table 2: GDP per capita in PPS, Index (EU-27 = 100), 2001-2011

geo/time	2001	2002	2003	2004	2005b	2006	2007	2008	2009	2010	2011	Annual rate of variation 2008-2011
EU (27 countries)	100	100	100	100	100	100	100	100	100	100	100	
EU (15 countries)	115	114	114	113	113	112	111	111	110	110	110	-0,3%
Euro area (17 countries)	112	111	110	109	109	109	109	109	109	108	108	-0,3%
Austria	126	127	128	128	125	126	124	124	125	127	129	1,3%
Belgium	124	125	124	121	120	118	116	116	118	119	119	0,9%
Denmark	128	128	124	126	123	124	122	125	123	128	125	0,0%
Finland	115	115	113	116	114	114	117	119	114	113	114	-1,4%
France	115	116	111	110	110	108	108	107	109	108	108	0,3%
Germany	116	115	116	115	116	115	115	116	115	119	121	1,4%
Greece (p)	86	90	93	94	91	92	90	93	94	87	79	-5,3%
Ireland	133	138	142	143	144	146	147	132	130	129	129	-0,8%
Italy	118	112	111	107	105	104	104	104	104	101	100	-1,3%
Luxembourg	234	240	247	252	254	270	274	263	255	267	271	1,0%
Netherlands	134	133	129	129	131	131	132	134	132	131	131	-0,8%
Portugal	80	80	79	77	79	79	79	78	80	80	77	-0,4%
Spain	98	100	101	101	102	105	105	104	103	99	98	-2,0%
Sweden	122	122	124	126	122	123	125	124	120	124	127	0,8%
United Kingdom	119	120	121	123	123	121	117	113	111	111	109	-1,2%
Bulgaria	30	32	34	35	37	38	40	43	44	44	46	2,3%
Cyprus	90	88	88	91	93	93	94	99	100	97	94	-1,7%
Czech Republic	73	73	77	78	79	80	83	81	83	80	80	-0,4%
Estonia	46	50	55	57	61	66	70	69	63	63	67	-1,0%
Hungary	58	61	63	63	63	63	61	64	65	65	66	1,0%
Latvia	39	41	44	47	50	53	57	58	54	54	58	0,0%
Lithuania	42	44	49	51	53	55	59	61	55	57	66	2,7%
Malta	79	81	80	78	78	77	76	79	83	85	85	2,5%
Poland	48	48	49	51	51	52	54	56	61	63	64	4,6%
Romania	28	29	31	34	35	38	41	47	47	47	49	1,4%
Slovakia	52	54	55	57	60	63	68	73	73	73	73	0,0%
Slovenia	80	82	84	87	87	87	88	91	87	84	84	-2,6%
Average EU-15	123,2	124,1	124,2	124,5	123,9	125,1	125,0	123,5	122,2	122,9	122,5	
Average EU-N12	55,4	56,9	59,1	60,8	62,3	63,8	65,9	68,4	67,9	67,7	69,3	

Source: Eurostat, our own treatment

As we can see from the above table, the average of the GDP pc indexes for EU-15 does not show, from 2001 to 2011, important variations with minimum value = 122,2 (2009) and maximum value = 125,1 (2006). As regards the 12 new members states, we observe a totally different evolution with an increasing global trend from 55,4 (2001) to 69,3 (2011).

Ranking the countries (in each one of their group) from the lowest to the highest (Table 3), we observed that Luxembourg (column a) has continuously the highest value which is 2,5 until 2,7 times higher than the EU-27 average. This country also presents significant differences with the second one (column b). The absolute difference between the highest and lowest values is increasing during the period 2001 – 2007 and decreasing until 2010. The last year (during the crisis) we again observed an increase. Is it suggesting that the crisis generates new inequalities between these

countries? Until 2007, Ireland occupies systematically the second place while, with the beginning of the crisis, it is replaced by Netherlands.

Table 3: Highest and lowest values of GDP pc in PPS, Index (EU-27 = 100), for the EU-15

year	Highest Value				Lowest Value		Differences	
	(a)		(b)				(a)	(b)
2001	234	Lux	134	NT	80	PR	154	54
2002	240	Lux	138	IR	80	PR	160	58
2003	247	Lux	142	IR	79	PR	168	63
2004	252	Lux	143	IR	77	PR	175	66
2005	254	Lux	144	IR	79	PR	175	65
2006	270	Lux	146	IR	79	PR	191	67
2007	274	Lux	147	IR	79	PR	195	68
2008	263	Lux	134	NT	78	PR	185	56
2009	255	Lux	132	NT	80	PR	175	52
2010	267	Lux	131	NT	80	PR	187	51
2011	271	Lux	131	NT	77	PR	194	54

Note: Lux = Luxembourg, NT = Netherlands, IR = Ireland and PR = Portugal

Considering the 12 new member states, Cyprus is systematically at the first place while the last two new countries (Romania and Bulgaria) present extremely lowest values. The most important fact is that the absolute difference (Max – Min) declined over the years, despite the crisis. Is it suggesting that the crisis does not generate new inequalities within this second group of countries?

Table 4: Highest and lowest values of GDP pc in PPS, Index (EU-27 = 100), for the new EU countries

year	Highest Value		Lowest Value		Differences
2001	90	CY	28	Rom	62
2002	88	CY	29	Rom	59
2003	88	CY	31	Rom	57
2004	91	CY	34	Rom	57
2005	93	CY	35	Rom	58
2006	93	CY	38	Rom/Bul	55
2007	94	CY	40	Bul	54
2008	99	CY	43	Bul	56
2009	100	CY	44	Bul	56
2010	97	CY	44	Bul	53
2011	94	CY	46	Bul	48

Note: CY = Cyprus, NT = Netherlands, IR = Ireland and PR = Po

The above absolute differences offer only first information as regards the degree of inequalities. For this reason, it is better to analyse the time series variances and standard deviations. It is necessary to emphasize that when calculating the index for a

particular group of countries, such as the EU-15, the simple CV presents a statistical bias, which results from the fact that countries do not carry the same weight. For example, the indicator of GDP per capita for Luxemburg in 2001 amounted to 234, while the indicator for Germany amounted to 116, but Luxemburg corresponds to 0,1% of the whole population of the EU, when Germany corresponds to 22%. Consequently, the two indicators differ in weight, and so as to avoid this bias, we need to use the weighted indicator, CV_w . We calculated the weight for each country and for each year of the period 2001 - 2011, given the group they belong: the weight associated to Greece is the percent of its population to the total population of EU-15.

Table 5: WCV of GDP pc for EU-15 and 12 new member countries

evaluation of $w_i \times (X_i - X)^2$												
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
Austria	0.2	0.2	0.3	0.3	0.0	0.0	0.0	0.0	0.2	0.4	0.9	
Belgium	0.0	0.0	0.0	0.3	0.4	1.3	2.2	1.5	0.5	0.4	0.3	
Denmark	0.3	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.1	
Finland	0.9	1.1	1.7	1.0	1.3	1.7	0.9	0.3	0.9	1.3	1.0	
France	10.8	10.5	28.2	34.2	31.4	47.2	46.9	44.0	28.3	35.9	34.1	
Germany	11.3	17.8	14.5	19.5	13.4	21.4	21.0	11.6	10.7	3.1	0.4	
Greece (p)	39.9	33.4	28.0	26.7	31.0	31.2	34.9	26.4	22.6	36.6	53.5	
Ireland	1.0	2.0	3.3	3.6	4.3	4.7	5.3	0.8	0.7	0.4	0.5	
Italy	4.1	21.8	26.1	46.2	54.1	66.9	66.5	57.3	50.2	72.5	76.6	
Luxembourg	14.2	15.7	17.7	19.2	20.1	25.3	27.0	23.9	22.0	26.2	28.3	
Netherlands	4.9	3.4	1.0	0.8	2.1	1.5	2.0	4.6	4.0	2.8	3.0	
Portugal	50.5	52.7	55.5	61.4	54.8	57.5	57.2	55.7	47.8	49.1	54.7	
Spain	67.9	62.3	58.6	60.9	53.4	45.2	45.4	43.5	42.6	65.9	69.2	
Sweden	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.5	
United Kingdom	2.7	2.6	1.6	0.4	0.1	2.6	9.9	17.0	19.5	22.0	28.4	
Bulgaria	50.2	47.1	47.5	49.9	47.8	49.5	49.9	47.8	42.1	41.0	39.0	
Cyprus	7.9	6.6	5.8	6.4	6.8	6.3	5.9	7.1	7.9	6.8	5.0	
Czech Republic	30.2	25.4	31.5	29.3	27.7	26.2	29.1	15.9	23.0	15.5	11.6	
Estonia	1.2	0.6	0.2	0.2	0.0	0.1	0.2	0.0	0.3	0.3	0.1	
Hungary	0.6	1.6	1.5	0.5	0.1	0.1	2.4	1.9	0.8	0.7	1.1	
Latvia	6.1	5.7	5.1	4.2	3.3	2.6	1.8	2.4	4.2	4.1	2.6	
Lithuania	6.0	5.6	3.4	3.2	2.8	2.5	1.6	1.8	5.4	3.7	0.3	
Malta	2.1	2.2	1.7	1.1	1.0	0.7	0.4	0.4	0.9	1.2	1.0	
Poland	20.0	29.2	37.4	35.0	46.7	50.9	52.4	56.9	17.7	8.0	10.6	
Romania	160.6	163.6	165.4	149.9	155.4	138.6	129.6	95.6	91.0	88.7	86.0	
Slovakia	0.6	0.4	0.9	0.7	0.3	0.0	0.2	1.1	1.4	1.5	0.7	
Slovenia	11.5	12.1	11.9	13.3	11.8	10.5	9.5	9.9	7.2	5.3	4.3	
WCV (EU-15)	11.7	12.1	12.4	13.3	13.2	14.0	14.3	13.7	12.9	14.5	15.3	
WCV(EU-N12)	31.1	30.4	29.9	28.2	28.0	26.6	25.5	22.7	20.9	19.6	18.4	

Source: our own treatment

The main conclusion coming from our calculations are:

1) The index ranges approximately between 12% and 15% for the EU-15 during the decade (Table 5), which shows a relatively limited variance. Nevertheless we can observe of different evolution along the examined period: until 2007, there is an increasing trend while during the first two years of the crisis, a decreasing one. In 2009, the GDP pc diminished in most countries including Germany. As regards the last two years (2010-2011), the WCV again tends to increase: from 12,9 % to 15,3 %. Once again, the crisis seems to enlarge the inequalities between the EU-15 and this result is confirmed by the comparison of the national annual rates of growth during the period 2008-2011 (Table 4).

2) For the other countries that recently joined the EU, the index presents fairly high values at the beginning of the decade (around 30% and a little more), but over time falls sharply, reaching 18,4% in 2011, approaching more and more the EU-15 average.

Therefore it is clear that inequalities between countries of this group decreased over time, and their inclusion in the EU seems to have played a positive role. Even after the beginning of the crisis, the WCV continues to decline, which leads us to the following two primary conclusions.

At country level, crisis increases disparities in the EU-15, and this is due to a significant extent of the crisis intensity in countries like Greece, Italy and Spain. We have to note that the contribution of Italy and Spain in this global evolution is especially important, because of their respective population size (high w_i). At the opposite, at least until the year 2011, the crisis does not seem to provoke any increase of the inequalities between the 12 new countries of EU, just like mentioned above: the relative WCV declines continuously as it would be desirable.

In order to detect how the crisis has affected EU countries, we examined the unemployment rate, as this indicator represents the clear expression of the socioeconomic crisis. As it is shown in table 6, there is an increasing trend of unemployment for the EU-15 with an annual rate of variation during the period 2008-2011 generally positive, with exception two countries: Germany and Luxembourg. This annual rate of variation (last column of Table 6) presents a very strong variability. Greece, Ireland and Denmark have the highest values (increase of the annual rate of unemployment more than 30%). We can mention that the rate of

unemployment in Denmark was especially low in 2008 (3,4%). At the opposite, Austria and Belgium were not really affected by unemployment until 2011 (annual rate of growth less than 3,4% and 0,9% respectively).

If we look at the 12 other countries, we observed a decreasing trend until 2008 and then a turnaround. All the countries are confronted to unemployment and in some cases, the annual rate of variation for the last period, is especially high (42,4% for Lithuania and 31,5% for Estonia). Once again, the intensity of unemployment and the unemployment's growth are not the same between these 12 countries.

Table 6: Unemployment rate for EU-15 and 12 new member countries

geo/time	2001	2002	2003	2004	2005b	2006	2007	2008	2009	2010	2011	Annual rate of variation 2008-2011
EU (27 countries)	8,6	8,9	9,1	9,3	9,3	8,3	7,2	7,1	9,0	9,7	9,7	11,0%
EU (15 countries)	7,3	7,7	8,1	8,3	8,3	7,8	7,1	7,2	9,2	9,6	9,7	10,4%
Euro area (17 countries)	8,1	8,5	9,0	9,3	9,2	8,5	7,6	7,6	9,6	10,1	10,2	10,3%
Austria	3,6	4,2	4,3	4,9	5,2	4,8	4,4	3,8	4,8	4,4	4,2	3,4%
Belgium	6,6	7,5	8,2	8,4	8,5	8,3	7,5	7,0	7,9	8,3	7,2	0,9%
Denmark	4,5	4,6	5,4	5,5	4,8	3,9	3,8	3,4	6,0	7,5	7,6	30,8%
Finland	9,1	9,1	9,0	8,8	8,4	7,7	6,9	6,4	8,2	8,4	7,8	6,8%
France	8,2	8,3	8,9	9,3	9,3	9,2	8,4	7,8	9,5	9,7	9,6	7,2%
Germany	7,9	8,7	9,8	10,5	11,3	10,3	8,7	7,5	7,8	7,1	5,9	-7,7%
Greece	10,7	10,3	9,7	10,5	9,9	8,9	8,3	7,7	9,5	12,6	17,7	32,0%
Ireland	3,9	4,5	4,6	4,5	4,4	4,5	4,7	6,4	12,0	13,9	14,7	31,9%
Italy	9,0	8,5	8,4	8,0	7,7	6,8	6,1	6,7	7,8	8,4	8,4	7,8%
Luxembourg	1,9	2,6	3,8	5,0	4,6	4,6	4,2	4,9	5,1	4,6	4,8	-0,7%
Netherlands	2,5	3,1	4,2	5,1	5,3	4,4	3,6	3,1	3,7	4,5	4,4	12,4%
Portugal	4,6	5,7	7,1	7,5	8,6	8,6	8,9	8,5	10,6	12,0	12,9	14,9%
Spain	10,5	11,4	11,4	10,9	9,2	8,5	8,3	11,3	18,0	20,1	21,7	24,3%
Sweden	5,8	6,0	6,6	7,4	7,7	7,1	6,1	6,2	8,3	8,6	7,8	8,0%
United Kingdom	5,0	5,1	5,0	4,7	4,8	5,4	5,3	5,6	7,6	7,8	8,0	12,6%
Bulgaria	19,5	18,2	13,7	12,1	10,1	9,0	6,9	5,6	6,8	10,3	11,3	26,4%
Cyprus	3,9	3,5	4,1	4,6	5,3	4,6	3,9	3,7	5,4	6,3	7,9	28,8%
Czech Republic	8,1	7,3	7,8	8,3	7,9	7,1	5,3	4,4	6,7	7,3	6,7	15,0%
Estonia	12,6	10,3	10,1	9,7	7,9	5,9	4,6	5,5	13,8	16,9	12,5	31,5%
Hungary	5,6	5,6	5,8	6,1	7,2	7,5	7,4	7,8	10,0	11,2	10,9	11,8%
Latvia	12,9	12,8	11,3	11,2	9,6	7,3	6,5	8,0	18,2	19,8	16,2	26,5%
Lithuania	17,4	13,8	12,4	11,3	8,0	5,2	3,8	5,3	13,6	18,0	15,3	42,4%
Malta	7,6	7,4	7,7	7,2	7,3	6,9	6,5	6,0	6,9	6,9	6,5	2,7%
Poland	18,3	20,0	19,8	19,1	17,9	13,9	9,6	7,1	8,1	9,7	9,7	11,0%
Romania	6,6	7,5	6,8	8,0	7,2	7,3	6,4	5,8	6,9	7,3	7,4	8,5%
Slovakia	19,5	18,8	17,7	18,4	16,4	13,5	11,2	9,6	12,1	14,5	13,6	12,3%
Slovenia	6,2	6,3	6,7	6,3	6,5	6,0	4,9	4,4	5,9	7,3	8,2	23,1%
Average EU-15	6,3	6,6	7,1	7,4	7,3	6,9	6,3	6,4	8,5	9,2	9,5	
Average EU-N12	11,5	11,0	10,3	10,2	9,3	7,9	6,4	6,1	9,5	11,3	10,5	

Source: Eurostat, our own treatment

Considering the weighted coefficient of variation for the EU-15, it varies from 39,6% in 2001 to 52,5% in 2011 (Table 7). If it is obvious, as mentioned above, that there is an increase in unemployment during the past decade, especially after the occurrence of the crisis in the year 2009, the inequalities between the countries are

also growing up. It is important to notify that inequalities between countries had reached the lowest levels in 2007 (WCV =28,7%).

What we observe about the 12 new countries is that the WCV for unemployment was excessively high at the beginning of the decade (more than 50%) and has declined significantly from 52,7% in 2001 to 23,1% in 2011. Only for a couple of years, where the crisis was booming, the years 2009 and 2010, the rate of unemployment was 27,3% and 28,7% respectively. It is obvious, that these countries benefited from their adhesion to the EU, due to a clear tendency of delocalisation of EU-15 firms to these countries with lower wages and other general comparative advantages (taxes etc). Essentially the integration seems to have caused a growth path in these countries with a reduction of unemployment rate, for example Poland (18,3% in 2001 to 9,6% in 2007), Bulgaria (19,5% in 2001 to 6,9% in 2007) and Lithuania (17,4% in 2001 to 3,8% in 2007) . Integration allowed them to have a growth path because of their “cheap” labour.

Table 7: WCV of Unemployment rate for EU-15 and 12 new member countries

	evaluation of $w_i \times (X_i - X)^2$										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Austria	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.5	0.6
Belgium	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denmark	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1
Finland	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
France	0.6	0.4	0.5	0.6	0.6	0.9	0.7	0.3	0.2	0.0	0.0
Germany	0.6	0.9	1.6	2.1	3.4	2.5	1.2	0.2	0.1	0.9	2.7
Greece (p)	0.6	0.4	0.2	0.3	0.2	0.1	0.1	0.0	0.0	0.3	1.9
Ireland	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.2	0.3
Italy	1.1	0.5	0.3	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.2
Luxembourg	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Netherlands	0.6	0.5	0.4	0.2	0.2	0.3	0.3	0.5	0.9	0.9	1.1
Portugal	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.2	0.3
Spain	1.9	2.4	2.0	1.3	0.4	0.3	0.4	2.7	10.5	13.8	17.2
Sweden	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
United Kingdom	0.2	0.4	0.7	1.1	1.0	0.3	0.2	0.1	0.1	0.3	0.4
Bulgaria	4.9	4.0	0.9	0.3	0.1	0.1	0.0	0.0	0.5	0.1	0.0
Cyprus	0.4	0.4	0.3	0.2	0.1	0.1	0.0	0.0	0.1	0.2	0.1
Czech Republic	1.1	1.3	0.6	0.4	0.2	0.1	0.1	0.3	0.8	1.6	1.5
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.1
Hungary	3.4	2.8	2.0	1.6	0.4	0.0	0.1	0.3	0.0	0.0	0.0
Latvia	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	1.6	1.6	0.7
Lithuania	1.1	0.3	0.1	0.0	0.1	0.2	0.2	0.0	0.5	1.4	0.7
Malta	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Poland	16.8	30.1	33.0	29.2	27.4	13.5	3.7	0.4	0.8	0.9	0.2
Romania	5.2	2.5	2.6	1.0	0.9	0.1	0.0	0.0	1.4	3.3	2.0
Slovakia	3.3	3.2	2.8	3.5	2.6	1.7	1.2	0.6	0.3	0.5	0.5
Slovenia	0.5	0.4	0.3	0.3	0.1	0.1	0.0	0.1	0.3	0.3	0.1
WCV (EU-15)	39.6	36.9	34.5	33.1	33.9	31.9	28.7	32.3	42.0	45.4	52.5
WCV (EU-N12)	52.7	61.2	63.3	59.4	61.0	50.7	36.6	22.1	27.3	28.7	23.1

Source: our own treatment

Due to the fact that these countries are EU members, other countries can more easily make investments and produce in these countries and then export their products. In addition, these countries are in the common market, also close, there are no duties and institutionally investments are made easier. Thus we have a diffusion of production dynamics in these countries.

Examining the two time series of WCV for unemployment (EU-15 and EU-N12), they reveal a completely opposite trend:

Group of countries	Beginning of the period	End of the period
EU-15	“Relatively” limited WCV (less than 40%)	Highest level
12 new countries	High WCV (around 60%)	Quite limited WCV (less than 30%)

Definitively, the crisis has not the same impacts not only for the two groups of countries but also within each group.

Chapter 4 - The EU crisis: towards a deep change of economic trends?

This chapter analyzes the evolution of inequalities at the two territorial scales: national and regional (NUTS2). It was a great need to examine preliminary inequalities between countries, before going into a more analytical approach of disparities at regional level that are in part conditioned by the national situation.

In advance it is reasonable to believe that if inequality during the crisis blunt at country level, then at the regional level it should be even more intense. This is also the hypothesis of our thesis.

4.1. Changes of economic trends at national level?

Having admitted that the EU is a multi-speed space, the following analysis focuses on some countries reflecting different levels of development. Consequently, our research consists of two countries highly above the average GDP pc, two countries close to the average GDP pc and one country significantly below the average GDP pc. More specifically, we will examine Netherlands and Germany, as well as Greece, Italy and Spain.

Table 8: Comparison of GDP per capita (100= EU27) and degree of inequality for the 5 under study countries

Countries	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	GDP per capita (100=EU27): average of the regions									
Germany	116,3	115,1	115,9	115,8	116,2	115,7	115,7	113,9	112,7	116,4
Greece	81,9	84,6	86,8	87,3	81,8	82,5	80,5	82,5	83,5	77,1
Spain	95,2	97,9	98,5	98,6	99,6	102,3	102,9	101,5	100,9	97,5
Italy	115,3	109,1	107,7	103,7	101,8	101,3	100,9	101,1	101	98,5
Netherlands	126,3	126,2	122,8	121,9	123,6	124,3	125,7	128,8	125,7	125,5
	Degree of inequality at national level (Weighted Coefficient of Variation: wCV)									
Germany	22,7	22,4	22,5	22,2	22	21,5	21	22,7	22,1	22,4
Greece	16,6	18,8	18,5	18,4	27,4	28,8	29,3	30,4	31,6	31,9
Spain	23,5	22,7	21,6	21,2	20,8	20,6	20,5	20	20,9	21
Italy	27,7	27,7	27,6	27,5	27,1	26,5	26,4	26,7	26	26,7
Netherlands	14,6	15,5	15	15,3	15,6	15,2	14,1	15,3	15	15,6

By examining the table, one might say that the coefficient of variation, based on the indicators of the regions, is of great interest. Furthermore, it is known that the lower value of the indicator the lower the interregional disparities, and when the value of the index is below 10% then disparities are confined.

As we can see, for Germany and the Netherlands we do not have significant variation over time, neither after the onset of the crisis as regard not only the level of growth (GDP pc) but also its degree of spatial inequality.

In particular, the value of the spatial index in 2001 for Germany is 22,7% and in year 2010 is 22,4% while for Greece the year 2001 the spatial index is 16,6% and in year 2010 is 31,9%. In other terms, the effect of the crisis is absolutely different for Greece comparatively to the two other countries that effectively are not affected by the EU crisis.

By continuing, one can notice that Italy until 2010 has not entered into significant differences (27,7% in 2001 to 26,7% in 2010), while the index for Spain has a downward course (23,5% in 2001 to 21,0% in 2010). Definitively the case of Greece is a particular one even if we know that Spain and Italy are also two countries affected by the crisis, but from the above table it appears clearly that the intensity of the crisis in Greece is significantly deeper, while at the same time the spatial impacts are at Nuts 2 level obvious.

During the last decade the rate of growth is systematically decreasing, while at the same time we observe a positive trend for the WCV. Greece is not only faced a general economic crisis but also an intensification of spatial inequalities. With value of 31, 9% the WCV of Greece is the highest level of the country and the highest of all under study countries during the last decade. It is very important to underline the effect of the Olympic Games in 2004, an event which caused a split on the general economic trend of the country. Indeed in to 2005, the growth indicator falls almost at the 2011 levels.

Finally, for none of the countries the index is below 10%, and therefore the five countries face relative problems of regional disparities.

Table 9: Comparison of national unemployment rate and degree of inequality for the 5 under study countries

Countries	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	National rate of unemployment									
Germany	6,9	7,5	8,8	9,7	10,3	9,5	8	7,1	7,5	6,7
Greece	11,1	10,9	10,4	11,1	10,5	9,5	8,8	8,2	9,8	12,6
Spain	8,6	9,6	10	10,8	9,7	9,1	8,9	11,3	17	19,1
Italy	12,8	12,7	12,7	10,4	10,1	8,8	8	8,9	8	8,6
Netherlands	2,3	2,7	3,5	4,8	4,9	4	3,3	2,9	3,5	4,4
	Degree of inequality at national level (Weighted Coefficient of Variation: wCV)									
Germany	62,2	54,1	46,3	44,1	38,4	38,4	42,5	44,5	36,1	35,6
Greece	16,3	14,7	16,6	18,2	18,4	14,7	15,1	18,5	11,8	9,6
Spain	50,6	47,1	39,5	34,8	29,2	28,1	29,8	33,9	29,8	28,7
Italy	63,5	62	63	54	51,1	50	48,3	46,7	43,6	43,3
Netherlands	24,4	14	13	12,3	15,1	14,3	16,9	16,2	15,4	12

The examination of the unemployment rate is of great interest and gives a more clear view of the regional inequalities and the results are different for each country. To be more specific, for Germany the value of the inequality index in 2001 is 62,2% and in 2010 falls to 35,6% which means that even through the years with relatively high unemployment (2004-2006) Germany managed to reduce this type of spatial inequalities but it still remains high and one of the most important between the under study countries. Moreover, during the last three years Germany was able to reduce significantly its rate of unemployment (in 2010 this rate is lower than 7%) and the regional inequalities continue to decline. The same results appear in the case of Netherlands, a country with especially low rate of unemployment. During the last decade this rate is systematically lower than 5%! This means that this country is in a situation with no unemployment problem.

Both countries of Spain and Italy have a decline tendency in regional inequalities but the meaning is very different. For a simple reason: in Italy the national rate of unemployment is decreasing during the last decade from around 13% to 8,6%, while at the same time for Spain this rate was found more than doubled (8,6% to 19,1%).

Effectively, the economic crisis in Spain has intense impacts on some rural regions, as for example Murcia and Valenciana. Generally the less favored regions of Spain (Andalucia) are deeply facing the crisis, because even before 2008,

unemployment was still a structural problem of the economic system. As far as Greece is concerned, the situation is quite different from the four other countries in our research. From the available data it is not possible to observe important increase of unemployment at national level. It means that crisis in Greece has turned into an intense phenomenon with a temporal delay of three years and it is also well known that the rate of unemployment presents important increase after 2011. Rapidly after 2011 the rate of unemployment has increased, resulting that the raise reaches the level of Spain. As regard, the regional socioeconomic inequalities, we observe that the unemployment rates might have declined over years and the shear was may narrowed, but this leads to different conclusions. Inequalities declined but all areas are now experiencing with the same intensity the problem of unemployment, and moreover metropolitan and industrial areas are not now as attractive for jobs as before, which means that there will be no more devastation of remote areas.

It is necessary to underline that for Germany and Italy, we have some (but in a limited number) missing values for some years. In this case, the average index has been measured on the basis of the available data.

By looking closer to the tables of unemployment rates for males and females, one can say that the percentage of males is not significant different from the women's one for the countries of Germany and Netherlands. In particular, the percentage for males in 2001 is 7,3% in Germany and for females is 7,0% . For the country of Netherlands, the year 2001 the percentage for males is 1,9% and for the females 2,9%. The same pattern follows for the rest years till 2010.

On the contrary, in the three other countries, the percentage is more than doubled until the onset of the crisis. For all these three countries the difference of the percentage between males and females does not follow the same path. In Greece the percentage remains still about twice as high for women than men, while in Spain and Italy the percentage of unemployment tends to reach those of women. To be more specific, for Greece the percentage for males in 2001 is 7,4% while for females the same year is 17,0%, respectively for Spain is 6,0% and 12,9%, and for Italy the percentages are 9,4% and 18,9%.

Table 10: Comparison of unemployment rate for Male population and degree of inequality for the 5 under study countries

Countries	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	National rate of unemployment for Males									
Germany	7,3	8,1	9,4	10,6	10,8	9,8	8,1	7	8,1	7,4
Greece	7,4	7,2	6,6	6,8	6,2	5,8	5,3	5,1	6,7	9,5
Spain	6	7,1	7,1	7,7	7	6,5	6,6	9,4	15,9	18
Italy	9,4	9,3	9,4	8,1	7,7	7,3	6,6	7,6	6,7	7,5
Netherlands	1,9	2,3	3,3	4,4	4,6	3,6	2,8	2,7	3,5	4,3
	Degree of inequality at national level (Weighted Coefficient of Variation: wCV)									
Germany	64,1	54,5	47,6	45,4	44,3	44,2	48,9	50,9	37,4	37
Greece	18,1	15,1	16,4	17,6	19,7	18,3	14,9	16	15,1	14,5
Spain	55	44,4	44,5	34	29,1	28,9	28,6	35,7	32,3	31,1
Italy	80,1	78,8	79,5	74,7	73,5	69,9	69,6	68,7	48,5	47,2
Netherlands	24,7	12,4	19,7	12,7	14,9	14,8	17,6	18,3	18,3	14,1

Table 11: Comparison of unemployment rate for Female population and degree of inequality for the 5 under study countries

Countries	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	National rate of unemployment for Females									
Germany	7	7,3	8,4	9,2	10,2	9,6	8,2	7,1	7,4	6,5
Greece	17	16,9	16,5	17,6	17,1	15,3	14,2	13	14,5	17,2
Spain	12,9	14,3	14,5	15,5	13,8	12,8	12,3	14,1	18,7	20,5
Italy	18,9	18,7	18,4	14,3	14,1	12,7	11,6	12,4	9,8	10,1
Netherlands	2,9	3,3	3,8	5,4	5,4	4,5	3,9	3,2	3,5	4,5
	Degree of inequality at national level (Weighted Coefficient of Variation: wCV)									
Germany	71,4	61,8	52,8	51,3	40,4	39,9	42,3	44,4	32,6	31,2
Greece	19	18,5	19,1	21,7	22	17,9	19,5	24,3	16,5	13,1
Spain	49,3	46,8	38,5	39,1	33,2	30,4	32,8	35,5	29,5	27,6
Italy	75,7	75,3	76,1	70,6	69,9	68,9	68	67,6	43,9	44,4
Netherlands	30,8	22	14,9	17,3	17,1	16,6	18,7	16,2	13,6	10,4

In particular for Greece, the structural system is still the same with the women to be the weak groups of unemployment. Unlike Greece, in Spain and Italy the crisis heats more the group of men but the rate of unemployment is more intense than the women's one.

Spatially it is more difficult to examine the rate of unemployment. We need to examine separately the results for males and females, and moreover it is difficult to say that the spatial disparities have increased or decreased for each group.

After reviewing the five countries in NUTS II level, we come up with the conclusion that Greece is clearly distinguishable from the other countries. The

analysis of the same statistical data confirms that the crisis in Greece is more intense and follows a different pattern from the countries of Italy and Spain.

4.2. Change of economic trends at regional level: Towards a differentiated impact of the crisis for the 13 Regions of Greece?

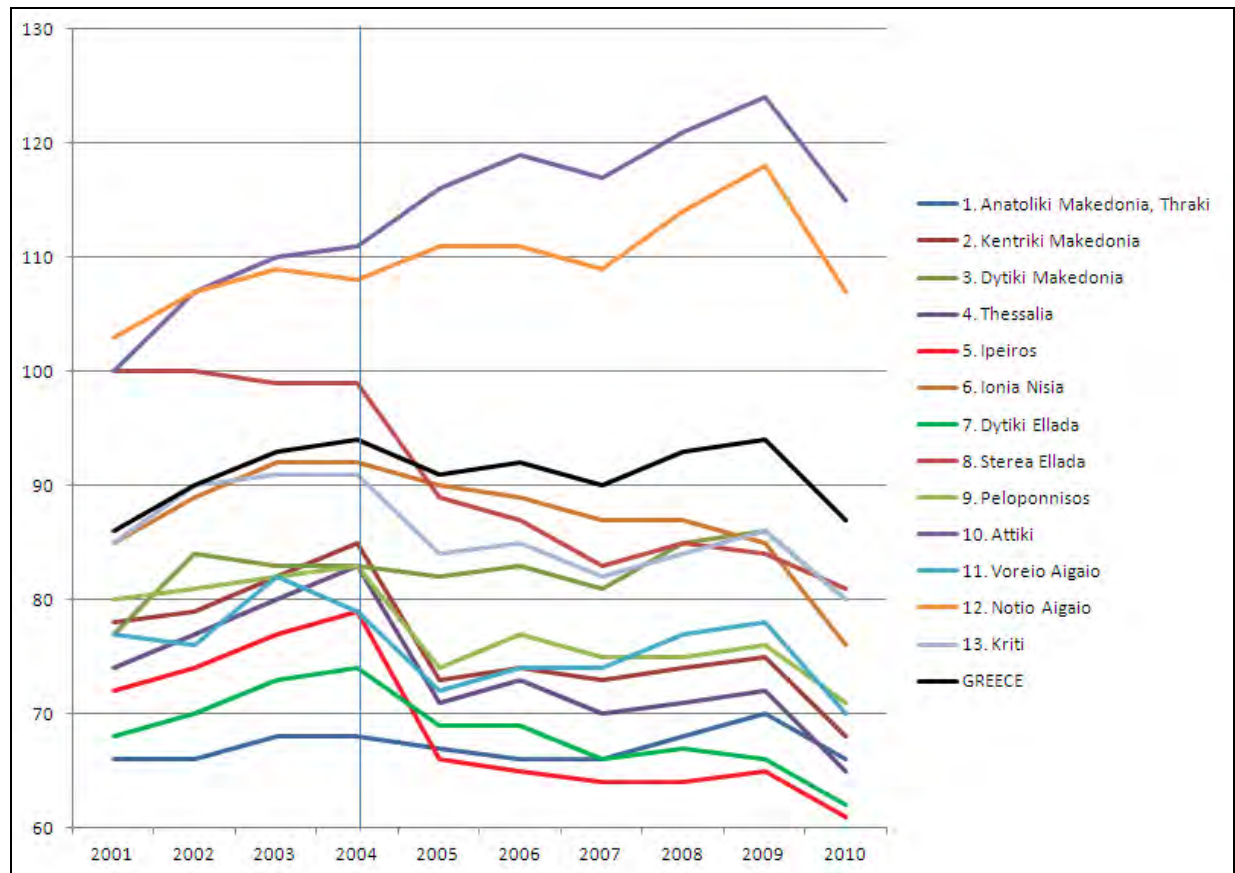
Given the fact that after examining the five countries, we observed that Greece presents the more intense problem, it would be very interesting to take a closer look at the regions who suffer the most.

To begin with, we are going to examine – comparatively with the year 2004 - which regions have the highest decrease over time, without taking into account the year 2009 which seems to not reflect the “punctiform” situation, highlighting a problems of data reliability.

By looking at the following table, we can see that the GDP pc for Greece and most of the regions reaches its highest point in 2004, a fact that was expected to happen due to the Olympic Games in Greece, and once again without taking into consideration the year 2009. This evolution of the GDP pc is valid for all regions except the regions of Attiki and Notio Aigaio, where the development continues until 2008 and then due to the crisis the downward trend begins.

Table 12: Regional GDP pc in Greece (base 100= EU-27), 2001-2010

REGIONS (NUTS2)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Percentage change 2004-2010
Anatoliki Makedonia, Thraki	66	66	68	68	67	66	66	68	70	66	-2,9
Kentriki Makedonia	78	79	82	85	73	74	73	74	75	68	-20
Dytiki Makedonia	77	84	83	83	82	83	81	85	86	80	-3,6
Thessalia	74	77	80	83	71	73	70	71	72	65	-21,7
Ipeiros	72	74	77	79	66	65	64	64	65	61	-22,8
Ionia Nisia	85	89	92	92	90	89	87	87	85	76	-17,4
Dytiki Ellada	68	70	73	74	69	69	66	67	66	62	-16,2
Stereia Ellada	100	100	99	99	89	87	83	85	84	81	-18,2
Peloponnisos	80	81	82	83	74	77	75	75	76	71	-14,5
Attiki	100	107	110	111	116	119	117	121	124	115	3,6
Voreio Aigaio	77	76	82	79	72	74	74	77	78	70	-11,4
Notio Aigaio	103	107	109	108	111	111	109	114	118	107	-0,9
Kriti	85	90	91	91	84	85	82	84	86	80	-12,1
Greece as average of Regional Indexes	86	90	93	94	91	92	90	93	94	87	-7,4

Figure 1: Evolution of Regional GDP pc in Greece: 2001-2010

In 2010 despite the downward trend, the GDP pc in Attiki remained at a level higher than in year 2004: the variation of GDP pc between 2004 and 2010 is still positive with an index varying from 111 to 115. For all the other regions, we observe a significant decline especially all over the continental Greece. Only three are the regions with limited percentage of variation between the two examined years: Notio Aigaio (-0,9%), Anatoliki Makedonia (-2,9%) and Dytiki Makedonia (-3,6%).

4.3. Identification of regional trends' patterns in Greece: curve estimation

The interpretation of the evolution of GDP pc, both for Greece as well as for regions, highlighted a clear trend change already prior the beginning of the crisis, with an indication that economic growth in Greece, like in most of its regions, followed initially an increasing trend that has been converted finally into a downward trend.

Consequently, we are going to try to evaluate if this initial observation can be confirmed.

There is no «automatic» and proven technique in order to identify the trend pattern and components in time series data. If the observed trend can be characterized as monotonous (consistently increasing or decreasing), the identification is quite easy under the hypothesis that the time series data don't contain considerable error. Otherwise, it is necessary to correct this problem through a smoothing process. With this technique, we replace each data of the observed series by local averaging of data such that the nonsystematic components of individual observations cancel each other out. The most common technique is simple or weighted moving average of k surrounding elements, where k is the width of the smoothing "window" (see Box & Jenkins, 1976; Velleman & Hoaglin, 1981). For example, we replace at time t , the observed value Y_t by the simple or weighted average of the three values Y_{t-1} , Y_t and Y_{t+1} . For the value Y_{t+1} , we replace it by the average of Y_t , Y_{t+1} and Y_{t+2} etc. This technique allows us to obtain a time series less biased by the presence of outliers. If the new time series is definitively monotonous, it can be adequately approximated by a linear function. But quite often the series present a clear monotonous nonlinear component. It is exactly the case of the national and regional GDPpc for Greece as examined in the previous chapter. For this reason, it was necessary to transform the data in order to remove their nonlinearity. Usually a logarithmic, exponential or polynomial function can be used.

The systematic identification of the GDPpc trend patterns (Through SPSS) for the period 1999-2010 allowed us to detect in most cases a polynomial pattern, especially a quadratic one, confirming the existence during the first years of an increasing monotonous trend followed by a decreasing monotonous one whose starting point occurs before the official start of the crisis.

The quadratic curve is given by:

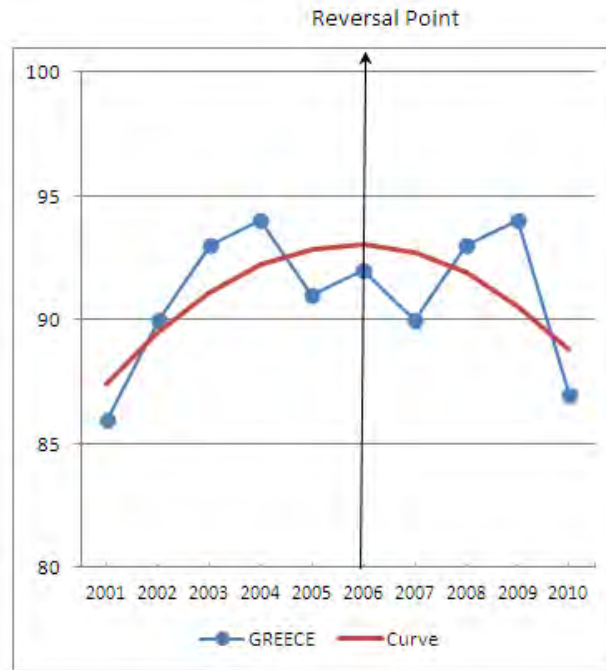
$$Y_t = \beta_0 + \beta_1 \cdot Time + \beta_2 \cdot Time^2 + \varepsilon$$

This non linear model can easily be transformed into a linear model, by setting:

$$X = Time^2$$

Moreover the interpretation of the curves' estimated coefficients allows us to “evaluate” the relative intensity of the increasing and decreasing trends for each region of Greece while the constant term is related to the initial development level. Concerning the whole country, the results of the curve's estimation is presented at the following figure.

Figure 2: Curve estimation of National GDP pc



The following table summarized the results of the regional curve's estimation. We observe that, excepted the regions of Dytiki and Anatoliki Makedonia as well as Voreio Aigaio, the R^2 coefficient reflects a quite satisfactory percent of variance, taking into account that our data are limited to 14 years ($df = 11$). We will admit that the estimated curve is pertinent for the first six (6) regions ($R^2 > 68\%$) and significant estimated coefficients (p -value $< 0,01$), especially for the second period trend (T2). We almost noted that Sterea Ellada presents a specific pattern, with a coefficient associated to the simple variable “time” which is negative. As regards Ipeiros, Dytiki Ellada, Thessalia and Kriti, the estimated coefficients are still significant but the estimated curve is less pertinent than the previous group.

Table 13: Curve estimation of Regional GDP pc (Quadratic model)

	Regions	R ²	Constant	T	T2
	Greece	0,696	78,694**	2,463**	-,116**
1	Attiki	0,947	74,177**	6,582**	-,235**
2	Stera Ellada	0,937	130,957**	-6,611**	,226**
3	Notio Aigaio	0,806	92,871**	2,795**	-,098*
4	Ionia Nisia	0,791	66,886**	5,462**	-,325**
5	Peloponnisos	0,689	78,943**	0,915	-,103**
6	Kentriki Make donia	0,682	86,963**	-1,266	-,101**
7	Ipeiros	0,593	60,809**	3,492**	-,259**
8	Dytiki Ellada	0,522	62,492**	2,192**	-,155**
9	Thessalia	0,447	72,099**	1,532*	-,137**
10	Kriti	0,413	79,102**	2,210**	-,150**
11	Voreio Aigaio	0,297	71,907**	1,117*	-,096*
12	Anatoliki Make donia	0,290	64,975**	0,167	0,004
13	Dytiki Make donia	0,222	89,001**	-1,877*	0,112

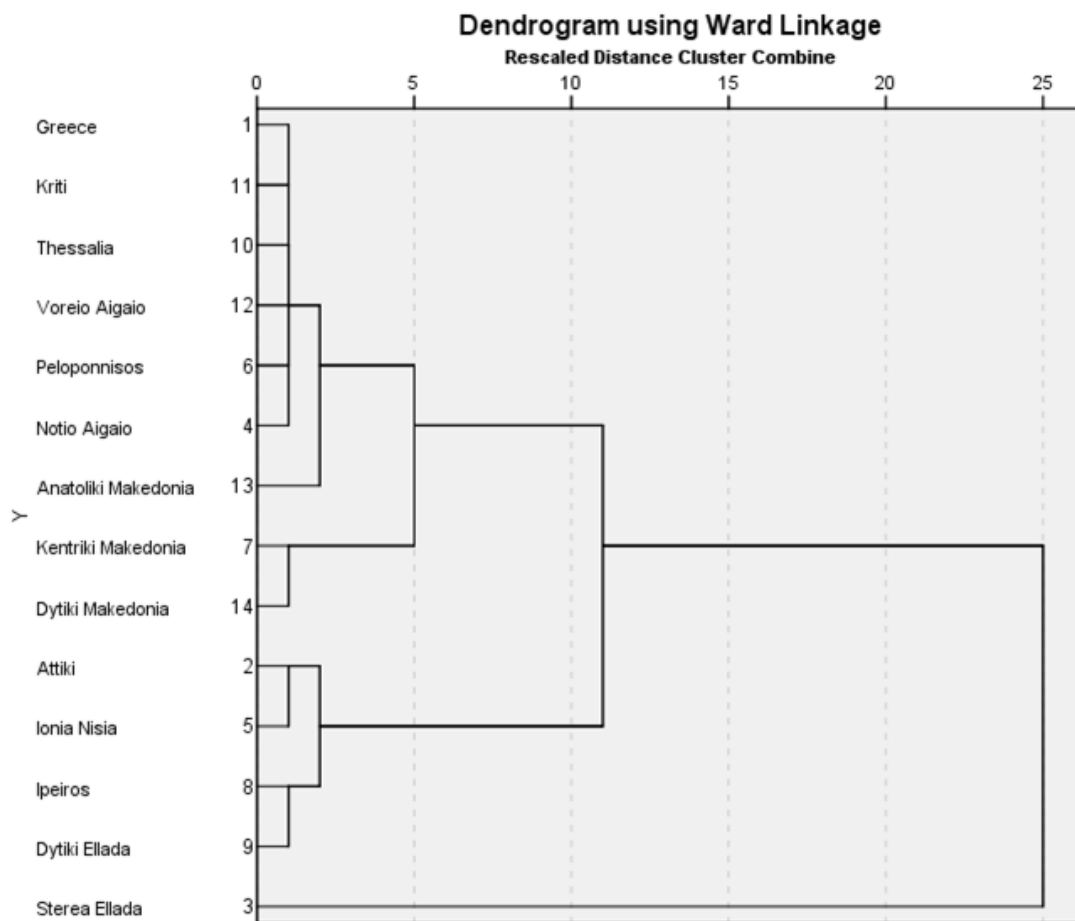
Even if we are aware that the above statistical analysis is very simple (even if we use smoothing data) and quite limited, we decided to proceed to a systematic hierarchical classification (cluster analysis) of the regions. This classification has been implemented on the basis of the above estimated coefficients that are reflecting the form of the estimated curve. Hierarchical analysis is especially appropriate for small samples (few numbers) as it is our case.

Our hierarchical classification is based on the most usual method that is the Ward's algorithm with squared Euclidian distance. At each step of the agglomeration, the two closest regions are forming a cluster. This process continues until all the regions are agglomerated in a single cluster. Generally, we admit that cluster generating a loss of information (total variance) larger than 20% is not acceptable. Following this threshold's rule, the 13 regions of Greece were grouped into 5 separate clusters (Figure 3).

Table 14: Historic of the Hierarchical classification

Agglomeration Schedule						
Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	1	11	,031	0	0	4
2	10	12	,079	0	0	3
3	6	10	,196	0	2	4
4	1	6	,452	1	3	8
5	7	14	,722	0	0	11
6	2	5	1,058	0	0	10
7	8	9	1,399	0	0	10
8	1	4	2,258	4	0	9
9	1	13	3,604	8	0	11
10	2	8	5,072	6	7	12
11	1	7	9,058	9	5	12
12	1	2	18,144	11	10	13
13	1	3	39,000	12	0	0

Figure 3: Identification of clusters



The most homogenous cluster is the one composed of the regions of Kriti, Thessalia, Peloponnisos, Voreio and Notio Aigaio. These 5 regions have an interesting characteristic: they faithfully follow the pattern of the national curve (Greece). To this group but with less pronounced way, the hierarchical classification added Anatoliki Makedonia. But looking at the data, we will conclude that this region is by itself an “outlier”.

The second group consists of the regions of Attiki and Ionia Nisia. They are characterized by an upward trend before the crisis (highest coefficient for the variable Time) and much more intense than the country. By continuing, their downward trend (coefficient associated to the variable Time²) is also more pronounced than the country.

The third group is composed of the regions of Ipeiros and Dytiki Ellada, with initially clearly positive trend (growth) and also clearly negative trend after the reversal point. Moreover, these two regions have a more pronounced negative trend than the first group. It seems that the onset of the crisis has really deteriorated the current situation of Ipeiros and Dytiki Ellada.

The last group consists of the regions of Kentriki and Dytiki Makedonia which present a peculiarity in the sense that unlike the other regions, the trend at the initial period is decreasing.

Finally, the region of Sterea Ellada is an absolute different case even if it presents the same pattern as the two previous regions but the intensity of the trends is not comparable. This region is another “outlier” and this is not so surprising if we remind that this region comprises the largest industrial zone of the country.

Conclusions

While trying to examine regional inequalities in the EU, before and during the crisis, the statistical analysis we applied led us indeed to anticipate some results. Despite the limited data availability (most of time series do not exceed 2010), it was possible to detect the first spatial impacts of the crisis, in the sense that neither each country reacted in the same way, nor within countries regions reacted homogeneously.

Actually Germany and some northern EU countries stand out, and indeed we brought out a clear differentiation after the onset of the crisis between Germany and France. While France is stagnant in terms of GDP pc (index =108 in 2010 and 2011), Germany maintains positive rates of growth (119 in 2010 and 121 in 2011).

As expected, the crisis (until 2011) concerns mainly the Southern Europe but once again we cannot say that the intensity of the crisis is similar in the different countries of this area. The magnitude of the recession in Greece is incomparable with that of the other countries such as Portugal, Spain and Italy. It is nevertheless true that Greece was the first country subjected to a very hard plan recession with an intensity never seen until today. It is likely that our results would be somewhat different, if we could have access to most recent data.

From the available data it also emerged that the unemployment's problem did not occur immediately in the case of Greece while as we stressed earlier, Spain was already facing before the crisis such a problem.

At that point we can only make the assumption (due to non available data for the last two years) that the more the crisis remains in the EU space, the more the indicators we examined, will tend to converge between the three Southern countries (Greece, Spain and Italy), even including Portugal. As we know, all these countries are now "constrained" to apply a strict recession plan. Consequently, what happened in Greece during the last years, is about to occur in these countries and may be in others!

Through the statistical treatment and analysis of the selected data, it was possible to confirm that there is actually a special pattern of crisis in Greece. Different

authors, as for example G. Colletis (2012) mentioned this fact and explained the causes that are, according to this author, directly linked with the history of this country. The objective of our work was not to analyze these causes but mainly to depict the different regional situations. Finally, we examined more analytically the regions of Greece in terms of GDP pc trends during the last decade. If these regions can be divided in four main groups with two outliers, the general tendency is that, in most cases, the Growth pattern followed a quadratic curve. Finally, we will notice that for Greece as well as some regions, the reversal point of the curve occurs before the official beginning of the crisis: in 2006-2007 for the whole country as well as regions as Notio Aigaio or Dytiki Makedonia, in 2005 for Ionia Nisia but only in 2008 for Attiki.

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APPENDIX

Total Population											
geo/time	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
EU (27 countries)	483797028	484635119	486646114	488797929	491134938	493210397	495291925	497686132	499686575	501084516	502369211
Euro area (17 countries)	315413267	316972081	318909529	320931192	323030150	324813716	326560819	328487175	329972960	330890359	331964863
Euro area (16 countries)	314046308	315610839	317553484	319580123	321682640	323469032	325218410	327146240	328632545	329550232	330624669
Austria	8020946	8063640	8100273	8142573	8201359	8254298	8282984	8318592	8355260	8375290	8404252
Belgium	10263414	10309725	10355844	10396421	10445852	10511382	10584534	10666866	10753080	10839905	11000638
Denmark	5349212	5368354	5383507	5397640	5411405	5427459	5447084	5475791	5511451	5534738	5560628
Finland	5181115	5194901	5206295	5219732	5236611	5255580	5276955	5300484	5326314	5351427	5375276
France	60979315	61424036	61864088	62292241	62772870	63229635	63645065	64007193	64350226	64658856	64994907
Germany	82259540	82440309	82536680	82531671	82500849	82437995	82314906	82217837	82002356	81802257	81751602
Greece (p)	10931206	10968708	11006377	11040650	11082751	11125179	11171740	11213785	11260402	11305118	11309885
Ireland	3832783	3899702	3964191	4028851	4111672	4208156	4312526	4401335	4450030	4467854	4570727
Italy	56960692	56993742	57321070	57888245	58462375	58751711	59131287	59619290	60045068	60340328	60626442
Luxembourg	439000	444050	448300	454960	461230	469086	476187	483799	493500	502066	511840
Netherlands	15987075	16105285	16192572	16258032	16305526	16334210	16357992	16405399	16485787	16574989	16655799
Portugal	10256658	10329340	10407465	10474685	10529255	10569592	10599095	10617575	10627250	10637713	10572157
Spain	40476723	40964244	41663702	42345342	43038035	43758250	44474631	45283259	45828172	45989016	46152926
Sweden	8882792	8909128	8940788	8975670	9011392	9047752	9113257	9182927	9256347	9340682	9415570
United Kingdom	58999781	59216138	59435480	59697037	60038695	60409918	60781346	61191951	61595091	62026962	62515392
Bulgaria	8149468	7891095	7845841	7801273	7761049	7718750	7679290	7640238	7606551	7563710	7369431
Cyprus	697549	705539	715137	730367	749175	766414	778684	789269	796875	819140	839751
Czech Republic	10266546	10206436	10203269	10211455	10220577	10251079	10287189	10381130	10467542	10506813	10486731
Estonia	1366959	1361242	1356045	1351069	1347510	1344684	1342409	1340935	1340415	1340127	1340194
Hungary	10200298	10174853	10142362	10116742	10097549	10076581	10066158	10045401	10030975	10014324	9985722
Latvia	2364254	2345768	2331480	2319203	2306434	2294590	2281305	2270894	2261294	2248374	2074605
Lithuania	3486998	3475586	3462553	3445857	3425324	3403284	3384879	3366357	3349872	3329039	3052588
Malta	391415	394641	397296	399867	402668	405006	407810	410290	413609	414372	415832
Poland	38253955	38242197	38218531	38190608	38173835	38157055	38125479	38115641	38135876	38167329	38529866
Romania	22430457	21833483	21772774	21711252	21658528	21610213	21565119	21528627	21498616	21462186	21413815
Slovakia	5378783	5378951	5379161	5380053	5384822	5389180	5393637	5400998	5412254	5424925	5392446
Slovenia	1990094	1994026	1995033	1996433	1997590	2003358	2010377	2010269	2032362	2046976	2050189

POPULATION WEIGHT OF EACH COUNTRY IN ITS OWN GROUP											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Austria	0,021	0,021	0,021	0,021	0,021	0,021	0,021	0,021	0,021	0,021	0,021
Belgium	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,028
Denmark	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014	0,014
Finland	0,014	0,014	0,014	0,014	0,014	0,013	0,013	0,013	0,013	0,013	0,013
France	0,161	0,161	0,162	0,162	0,162	0,162	0,162	0,162	0,162	0,163	0,163
Germany	0,217	0,217	0,216	0,214	0,213	0,211	0,210	0,208	0,207	0,206	0,205
Greece (p)	0,029	0,029	0,029	0,029	0,029	0,029	0,029	0,028	0,028	0,028	0,028
Ireland	0,010	0,010	0,010	0,010	0,011	0,011	0,011	0,011	0,011	0,011	0,011
Italy	0,150	0,150	0,150	0,150	0,151	0,151	0,151	0,151	0,151	0,152	0,152
Luxembourg	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001	0,001
Netherlands	0,042	0,042	0,042	0,042	0,042	0,042	0,042	0,042	0,042	0,042	0,042
Portugal	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,027	0,026
Spain	0,107	0,108	0,109	0,110	0,111	0,112	0,113	0,115	0,116	0,116	0,116
Sweden	0,023	0,023	0,023	0,023	0,023	0,023	0,023	0,023	0,023	0,023	0,024
United Kingdom	0,156	0,156	0,155	0,155	0,155	0,155	0,155	0,155	0,155	0,156	0,157
Bulgaria	0,078	0,076	0,076	0,075	0,075	0,075	0,074	0,074	0,074	0,073	0,072
Cyprus	0,007	0,007	0,007	0,007	0,007	0,007	0,008	0,008	0,008	0,008	0,008
Czech Republic	0,098	0,098	0,098	0,099	0,099	0,099	0,100	0,100	0,101	0,102	0,102
Estonia	0,013	0,013	0,013	0,013	0,013	0,013	0,013	0,013	0,013	0,013	0,013
Hungary	0,097	0,098	0,098	0,098	0,098	0,097	0,097	0,097	0,097	0,097	0,097
Latvia	0,023	0,023	0,022	0,022	0,022	0,022	0,022	0,022	0,022	0,022	0,020
Lithuania	0,033	0,033	0,033	0,033	0,033	0,033	0,033	0,033	0,032	0,032	0,030
Malta	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004	0,004
Poland	0,364	0,368	0,368	0,368	0,369	0,369	0,369	0,369	0,369	0,369	0,374
Romania	0,214	0,210	0,210	0,209	0,209	0,209	0,209	0,208	0,208	0,208	0,208
Slovakia	0,051	0,052	0,052	0,052	0,052	0,052	0,052	0,052	0,052	0,052	0,052
Slovenia	0,019	0,019	0,019	0,019	0,019	0,019	0,019	0,019	0,020	0,020	0,020

Population on 1 January by age and sex - NUTS 2 regions [demo_r_d2jan]										
Males	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1937161	1932849	1963928	1969289	1973930	1976445	1975263	1977065	1977557	1975137	1975137
1310596	1319489	1327867	1330903	1336688	1336589	1338475	1342409	1343893	1345614	1345614
1040261	1050366	1057478	1061996	1065190	1068453	1069829	1071945	1072466	1073001	1073001
869390	875352	880961	885096	887375	889419	890275	891370	891978	892194	892194
1991365	2021985	2038300	2051038	2058608	2071791	2093228	2111339	2121786	2127924	2127924
577564	583005	586057	587702	588507	589214	588249	588901	588211	587015	587015
530016	533519	535317	535632	535807	535896	535516	535158	533683	532706	532706
540453	541056	540670	539375	537855	535530	532276	529698	527124	524506	524506
822747	827951	831175	832706	833750	835429	836329	837679	837278	836239	836239
655106	657656	659678	660110	660041	658780	657369	655965	652382	650198	650198
857032	864590	869491	872446	874237	876015	876010	877657	877637	877416	877416
1643534	1648169	1651471	1651203	1653057	1659643	1665753	1672226	1680502	1686256	1686256
1283432	1280492	1276145	1272998	1270347	1266932	1261650	1255982	1249312	1244101	1244101
318267	318387	319940	320815	321206	321478	322303	321904	321814	322227	322227
831225	837726	839006	842587	843580	849467	856132	865859	865921	866623	866623
1833589	1837629	1844741	1843573	1850154	1851477	1847211	1851272	1854735	1859732	1859732
521886	522705	523057	522553	521971	520256	518045	516095	513914	512054	512054
618017	617498	616767	615385	614418	611417	607748	605279	601798	598990	598990
877698	870229	863859	858249	852143	846217	839553	832745	825124	818119	818119
814414	813845	813593	813143	812058	808054	804207	800284	796425	793603	793603
1045067	1048617	1051147	1051348	1051238	1050634	1049136	1048027	1044713	1042392	1042392
821859	827450	831683	834804	836842	837801	837633	837014	835046	833858	833858
1194656	1203396	1210533	1215918	1219237	1221469	1223809	1226220	1224868	1224774	1224774
2537070	2538473	2536370	2535094	2532507	2527975	2524661	2521459	2513984	2506100	2506100
2091309	2106633	2117801	2128024	2134413	2141228	2145632	2149142	2147102	2145882	2145882
1273170	1277760	1280622	1280646	1280314	1279954	1279059	1276585	1272174	1268659	1268659
998216	1002380	1006139	1007696	1008772	1008091	1006370	1004152	1000510	997563	997563
1856891	1857106	1857741	1851658	1847249	1839940	1831623	1823459	1812649	1801490	1801490
743721	746595	748683	747909	748285	745456	741835	739436	735512	731975	731975
250365	251123	251520	251392	251636	251486	252608	252814	252657	252069	252069
982728	987959	991128	989826	992054	993306	993110	992438	988862	986621	986621
518228	517432	517101	515641	513460	510359	507220	504079	501185	497605	497605
833848	826046	820997	818236	816063	814745	813053	808071	804586	802279	802279
1271259	1255728	1241832	1230521	1216890	1205720	1193473	1179952	1165683	1153749	1153749
1363617	1370626	1376370	1379707	1382531	1385285	1386770	1388938	1387798	1387049	1387049
1189951	1182177	1174211	1166263	1158456	1149515	1139051	1128941	1118827	1110714	1110714
303907	303566	303269	302909	303975	303725	303507	303152	303005	302855	302855
922362	928607	934888	938139	939008	942425	946356	949839	953977	958322	958322
148398	148510	148579	148429	148352	148099	147863	147704	147507	147391	147391
366852	365959	365427	364824	364904	364599	364354	363751	363533	363434	363434
166900	167111	167298	168643	169031	170483	172060	173516	175100	176825	176825
104185	105604	106982	108093	109022	110309	111608	112857	114182	115576	115576
365277	366832	368657	369597	370554	371515	372467	373319	374579	376027	376027
284958	285184	285507	284764	284216	283449	282816	282034	281615	281408	281408
304013	304417	304911	303643	303025	302146	301115	300044	298925	298263	298263
1884961	1891941	1898928	1910868	1929539	1945784	1963295	1980119	1995292	2006619	2006619
105937	105713	105430	104983	104573	104199	103886	103599	103377	103135	103135
154443	155349	156303	156503	156761	157146	157588	158000	158526	159179	159179
299953	301224	302544	303006	303672	304286	305132	305961	307122	308431	308431
1296663	1294060	1297746	1301417	1304537	1307915	1310968	1316976	1319329	1318973	1318973
509784	508698	507894	507901	507232	506634	506285	506593	506374	505760	505760
259696	260514	262987	265863	268963	272149	275467	278971	282017	282413	282413
1015233	1017654	1020742	1024383	1028228	1032757	1038035	1044490	1041279	1040971	1040971
274449	276721	281192	285467	289259	293125	297135	302207	306480	308241	308241
134733	137898	140777	143970	147343	151017	154030	156850	158590	158685	158685
591516	594767	601378	608054	616406	625260	634600	646511	655401	653215	653215
2536377	2611455	2689603	2758304	2817616	2877752	2935353	3003001	3055881	3068993	3068993
1212011	1209436	1211848	1214038	1217939	1222305	1227267	1235990	1241349	1233808	1233808
865677	876552	892646	909713	928401	948375	969026	995127	1020190	1025126	1025126
525836	524731	526324	528845	530174	531530	533120	535331	537728	536914	536914
3076936	3107775	3186610	3260892	3341698	3425726	3506658	3584002	3603317	3598280	3598280
1999326	2048100	2112009	2173306	2236321	2302259	2366053	2435164	2486037	2482106	2482106
421820	433943	451866	464935	478529	492959	507666	523605	536900	540959	540959
3596586	3624657	3671149	3721972	3785242	3852768	3919240	3985154	4038102	4063566	4063566
581663	598259	615921	632337	652170	672747	692990	715072	731883	740175	740175
35817	36030	35928	35913	35843	35838	35891	36008	36284	37408	37408
32921	33277	33266	33341	33348	33299	33438	34396	34700	36173	36173
863921	887092	910461	931338	954040	977217	999502	1021438	1038603	1042654	1042654
2037478	2033673	2044362	2066086	2099316	2105545	2111322	2134187	2149373	2154826	2154826
58422	58568	59394	60101	60534	61021	61433	61978	62451	62743	62743
744772	740150	741970	745091	753361	764076	763406	764331	767057	767593	767593
4358422	4374405	4417259	4497954	4579992	4624741	4660352	4711487	4762370	4802363	4802363
226738	227911	230188	232699	235671	238626	241234	244164	246563	248563	248563
230761	232449	235765	239553	243104	245682	248108	251279	254374	256602	256602
2193743	2205989	2233320	2269175	2301528	2321157	2338057	2367445	2392663	2404721	2404721
567123	569040	574440	578401	582267	584399	586544	591597	596265	597575	597575
1680047	1680501	1691051	1717479	1735264	1747130	1756090	1773468	1787668	1797235	1797235
398497	399354	403390	409727	415143	419662	422205	427042	431313	434058	434058
2456769	2453001	2466028	2493362	2525979	2541915	2640275	2672426	2703994	2731425	2731425
612211	612403	618062	624629	631709	634724	637046	643756	648680	650752	650752
156278	155780	156239	156685	156899	156387	155922	156183	156036	155835	155835
2783191	2777981	2788886	2803767	2815467	2814807	2812635	2820477	2820078	2824935	2824935
1953467	1950550	1952604	1961510	1975655	1977338	1976125	1978216	1979254	1980902	1980902
294722	293584	293250	293437	292973	291651	290162	289656	289275	288274	288274
988548	982770	981505	983120	981338	978457	974680	978731	978789	979003	979003
2408506	2399862	2402174	2419294	2424102	2425633	2425178	2430272	2433605	2436495	2436495
801616	798747	802403	805858	809608	812822	814695	817323	819518	819875	819875
280618	282889	284313	285230	285544	285089	284791	284678	284981	284695	284695
314591	317582	319483	320656	321235	320611	320383	321102	322911	322911	322911
235160	237335	238390	238739	239152	239540	240416	241209	242071	242778	242778
542223	546246	549597	552320	554039	556103	557539	559411	562419	564960	564960
955482	963378	969008	971768	973563	974987	976475	978683	982641	986919	986919
164560	171206	176251	180142	182935	185120	186980	189171	191912	194185	194185
546004	557097	563167	567887	5721						

POPULATION WEIGHT OF EACH COUNTRY IN ITS OWN GROUP									
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.050	0.050	0.050	0.050	0.051	0.051	0.051	0.051	0.051	0.051
0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.035	0.035
0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.028	0.028
0.022	0.022	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
0.051	0.052	0.052	0.052	0.053	0.053	0.054	0.054	0.054	0.055
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013
0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.022	0.022
0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.023	0.023
0.042	0.042	0.042	0.042	0.042	0.042	0.043	0.043	0.043	0.043
0.033	0.033	0.033	0.033	0.033	0.032	0.032	0.032	0.032	0.032
0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
0.021	0.021	0.021	0.022	0.022	0.022	0.022	0.022	0.022	0.022
0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.048	0.048
0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.015
0.023	0.022	0.022	0.022	0.022	0.022	0.022	0.021	0.021	0.021
0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.020
0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.032
0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.064
0.054	0.054	0.054	0.054	0.055	0.055	0.055	0.055	0.055	0.055
0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033
0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
0.048	0.048	0.048	0.047	0.047	0.047	0.047	0.047	0.047	0.046
0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.033	0.032	0.032	0.031	0.031	0.031	0.031	0.030	0.030	0.030
0.035	0.035	0.035	0.035	0.035	0.035	0.036	0.036	0.036	0.036
0.031	0.030	0.030	0.030	0.030	0.029	0.029	0.029	0.029	0.029
0.056	0.056	0.056	0.055	0.055	0.055	0.055	0.055	0.054	0.054
0.170	0.171	0.172	0.172	0.171	0.171	0.171	0.171	0.171	0.171
0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.026	0.026
0.068	0.067	0.067	0.067	0.067	0.066	0.066	0.065	0.065	0.065
0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.032
0.019	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021
0.067	0.068	0.068	0.068	0.068	0.067	0.067	0.067	0.067	0.067
0.053	0.053	0.052	0.052	0.052	0.051	0.051	0.051	0.050	0.050
0.056	0.056	0.056	0.056	0.055	0.055	0.054	0.054	0.054	0.053
0.348	0.348	0.349	0.350	0.352	0.353	0.355	0.357	0.358	0.358
0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018
0.029	0.029	0.029	0.029	0.029	0.029	0.028	0.028	0.028	0.028
0.055	0.055	0.056	0.055	0.055	0.055	0.055	0.055	0.055	0.055
0.065	0.064	0.063	0.063	0.062	0.061	0.060	0.059	0.058	0.058
0.026	0.025	0.024	0.024	0.024	0.023	0.023	0.023	0.022	0.022
0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.012	0.012	0.012
0.051	0.051	0.050	0.049	0.049	0.048	0.047	0.047	0.046	0.046
0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
0.030	0.030	0.029	0.029	0.029	0.029	0.029	0.029	0.029	0.029
0.128	0.130	0.132	0.133	0.133	0.133	0.134	0.134	0.135	0.135
0.061	0.060	0.059	0.058	0.058	0.057	0.056	0.055	0.055	0.054
0.044	0.044	0.044	0.044	0.044	0.044	0.044	0.045	0.045	0.045
0.027	0.026	0.026	0.025	0.025	0.025	0.024	0.024	0.024	0.024
0.155	0.155	0.156	0.157	0.158	0.159	0.160	0.160	0.159	0.159
0.101	0.102	0.103	0.104	0.106	0.107	0.108	0.109	0.110	0.109
0.021	0.022	0.022	0.022	0.023	0.023	0.023	0.023	0.024	0.024
0.181	0.180	0.180	0.179	0.179	0.179	0.179	0.178	0.178	0.179
0.029	0.030	0.030	0.030	0.031	0.031	0.032	0.032	0.032	0.033
0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.044	0.044	0.045	0.045	0.045	0.045	0.046	0.046	0.046	0.046
0.082	0.082	0.081	0.081	0.082	0.082	0.081	0.082	0.082	0.082
0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.030	0.030	0.030	0.029	0.029	0.030	0.029	0.029	0.029	0.029
0.175	0.175	0.176	0.177	0.179	0.180	0.180	0.180	0.181	0.182
0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010
0.088	0.088	0.089	0.089	0.090	0.090	0.090	0.091	0.091	0.091
0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.067	0.067	0.067	0.068	0.068	0.068	0.068	0.068	0.068	0.068
0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.098	0.098	0.098	0.098	0.099	0.099	0.102	0.102	0.103	0.103
0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
0.112	0.111	0.111	0.111	0.110	0.109	0.109	0.108	0.107	0.107
0.078	0.078	0.078	0.077	0.077	0.077	0.076	0.076	0.075	0.075
0.012	0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	0.011
0.040	0.039	0.039	0.039	0.038	0.038	0.038	0.037	0.037	0.037
0.097	0.096	0.096	0.095	0.095	0.094	0.094	0.093	0.093	0.092
0.032	0.032	0.032	0.032	0.032	0.032	0.031	0.031	0.031	0.031
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.039	0.039
0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
0.069	0.069	0.069	0.069	0.069	0.069	0.069	0.069	0.069	0.069
0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.120	0.120
0.021	0.021	0.022	0.022	0.023	0.023	0.023	0.023	0.024	0.024
0.069	0.070	0.070	0.071	0.071	0.071	0.072	0.072	0.073	0.073
0.158	0.158	0.158	0.158	0.159	0.159	0.159	0.159	0.160	0.160
0.213	0.212	0.212	0.211	0.211	0.211	0.210	0.210	0.210	0.211
0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
0.150	0.150	0.150	0.149	0.149	0.149	0.149	0.149	0.149	0.149
0.072	0.071	0.071	0.070	0.070	0.069	0.069	0.069	0.068	0.068

Population on 1 January by age and sex - NUTS 2 regions [demo_r_d2jan]									
Females									
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1998191	2011313	2021072	2025323	2029242	2030928	2030117	2030030	2028756	2025711
1373829	1381887	1388815	1391647	1394045	1395866	1395785	1396865	1396271	1394889
1097364	1106485	1113003	1116817	1119837	1122274	1123349	1124465	1123215	1123017
897623	903165	908196	911485	914112	915727	915660	915606	915370	915358
2091712	2116417	2131357	2144635	2152510	2166404	2185884	2202107	2213351	2218541
598642	602462	605419	606770	607671	607709	605571	605237	603699	602179
549201	552090	553612	554194	554482	553647	552423	551526	550097	548711
572798	572732	571985	570299	568686	565860	562249	559147	555392	551894
866319	870392	872694	873909	875222	876846	876293	876444	875127	873906
680885	683256	684622	684630	684588	682701	680507	678802	675115	671759
896415	902603	906974	909940	911929	912904	910754	910672	908846	907337
1738635	1740265	1740954	1737274	1734771	1735546	1738284	1744029	1751173	1756419
1318530	1312548	1306234	1301523	1297357	1292551	1286122	1279755	1273181	1267424
341958	341264	342158	342314	342007	341989	341676	341178	340052	339489
884167	888637	889800	891496	891250	894160	898050	904770	906179	907601
1904000	1909223	1917008	1919422	1924871	1926647	1925695	1928960	1930032	1933209
541652	542323	542852	542914	542257	541067	539508	537164	534769	532215
648985	648448	647193	645581	644094	641490	637152	633785	629705	625751
898005	898648	898765	897397	896510	896109	894201	893334	892332	891307
854189	853019	851775	849452	846860	842381	837569	833034	827224	823117
1113240	1115287	1116729	1115809	1115388	1113285	1111117	1108814	1104468	1100048
850608	855988	860509	863630	866129	866332	865305	864118	861597	859796
1232160	1238814	1244503	1249311	1253157	1253990	1253909	1254173	1252903	1251227
2717247	2716855	2712910	2710038	2705348	2698673	2692468	2686829	2677058	2666739
2190239	2203320	2213618	2222344	2229384	2237394	2239037	2241920	2239169	2237162
1339131	1342480	1345015	1345099	1344175	1342669	1340313	1337776	1333191	1328977
1057579	1060864	1063151	1064107	1063716	1061667	1059043	1055046	1050128	1045649
1949013	1946221	1942988	1934980	1929474	1920514	1910539	1900253	1887099	1874542
775840	778100	778928	780010	779222	776038	772104	768483	763945	758736
261389	261867	262182	262363	262225	261877	263211	263158	262665	261725
1020514	1023422	1025286	1027182	1027683	1030680	1029992	1029314	1024710	1021549
550475	549038	547887	545735	542957	539934	535947	532519	529139	524980
878714	869699	862141	856107	851613	847737	844061	838645	833525	829207
1344116	1324898	1307079	1292420	1277547	1263996	1248314	1232520	1216189	1202470
1426144	1433623	1440137	1443464	1446229	1447665	1447484	1448435	1446462	1444978
1241304	1229210	1217829	1206894	1196824	1185060	1172089	1160278	1148936	1139168
303128	303067	303050	302656	303872	303735	303698	303532	303617	303866
952896	960024	967042	971158	972500	976976	981467	985821	990816	996260
145933	146070	146251	146041	146156	146056	146001	145815	145665	145670
373602	373123	372829	372516	372679	372545	372680	372328	372352	372649
169545	170154	170730	172211	172820	174617	176460	178270	180075	182271
105360	107473	109273	110501	111376	112840	114271	115715	117332	118864
356472	357815	359426	360641	361738	362990	364432	365636	367459	369370
273736	274613	275261	274587	274287	273915	273625	273035	272811	272951
293914	295220	296396	296556	295131	294475	293977	293334	293092	292967
2007558	2012351	2016984	2029231	2043787	2056127	2069161	2081207	2093155	2103129
99221	98873	98641	98186	97829	97532	97197	96918	96898	96833
143690	144646	145560	146046	146353	146834	147387	147966	148702	149468
294005	295262	296352	296919	297591	298372	299337	300313	301688	303355
1400625	1399673	1402209	1404709	1407625	1410575	1412947	1418120	1419601	1419629
553411	553244	552283	552164	551901	551696	551774	551524	552549	552354
273262	274401	276614	279262	282122	285077	288144	291642	294401	296584
1061208	1064604	1067230	1070526	1075213	1080295	1086200	1094249	1094782	1097617
276968	279158	283416	287571	291357	295181	299101	304027	308046	310770
136258	138781	141297	144414	147004	149804	152224	154927	157128	157320
606802	608893	614749	620832	627058	633587	641304	651070	658334	659802
2737803	2814793	2883710	2947316	3003438	3060639	3117230	3186296	3239130	3266814
1246650	1245110	1246789	1248131	1251364	1254823	1258899	1265870	1269196	1265347
874824	883610	897790	913300	928386	944282	960921	982469	1002457	1010390
534065	533417	535043	537304	538625	539809	541299	543577	544711	545878
3208704	3236011	3306326	3376463	3442447	3510422	3578650	3654049	3686975	3702852
2073937	2114994	2171208	2227153	2281805	2338981	2393210	2457311	2505752	2512216
428166	438893	454400	466896	479424	492661	506739	521403	538166	558135
3707017	3735812	3781449	3831006	3885123	3941353	3998157	4060977	4112365	4142491
587384	600347	617065	633646	647913	662600	677812	696551	711500	720489
35519	35555	35455	35543	35529	35576	35670	35981	36277	36995
32917	33252	33381	33615	33754	33483	34118	35303	35376	36342
870238	892077	912941	933502	954658	976144	997508	1020030	1037982	1045571
2182031	2179621	2186972	2204129	2230856	2236188	2241506	2267079	2283198	2291404
60826	60978	61515	61939	62334	62957	63379	64001	64614	65123
834334	829854	830227	832383	838948	846058	844472	845491	848007	848393
4645663	4659197	4691386	4748842	4813100	4850461	4885089	4930919	4980306	5023778
234353	235296	237150	238936	241396	244024	246439	249746	252420	254871
243544	244910	247392	251276	254442	256696	258922	262078	265426	268224
2314806	2323834	2344088	2373724	2398422	2417156	2435497	2464895	2492885	2507717
614087	614563	617148	619786	622451	623879	626058	630464	634671	636504
1815030	1816541	1825245	1848592	1863005	1872742	1882121	1903580	1920150	1932895
425697	426842	430820	438295	443795	448216	450762	457408	462909	466732
2662420	2664074	2679777	2711777	2743993	2762863	2853033	2888591	2922716	2950443
649076	649976	655222	661267	667563	670583	672751	680231	685995	688146
165189	164687	164808	165012	165054	164520	164152	164655	164759	164394
2925568	2923408	2936212	2956586	2973519	2976122	2977552	2990913	2992884	2999727
2071478	2068950	2071353	2079480	2092512	2094180	2093744	2098330	2100448	2103133
304628	303884	303571	303563	303573	302435	301176	301345	301326	300605
1030857	1026853	1025887	1028218	1027930	1025958	1023372	1028976	1029920	1030327
2571141	2565807	2569950	2583968	2588979	2591579	2591683	2599411	2604194	2606497
833387	832100	835236	837238	840444	842955	844748	848294	851483	852529
285871	287591	288684	289154	289528	288953	288823	288781	289111	290173
315948	318602	320304	321410	321742	321619	321826	322087	322796	323394
239346	241464	242864	243676	244217	244941	245781	246926	247847	248203
544057	547786	551080	553192	555393	557426	558835	560583	563016	565385
978832	985855	991414	995161	998447	1000717	1002584	1005186	1008421	1012017
164376	170515	175429	179762	182924	185536	187444	189517	191537	193696
571993	582828	589051	594371	599125	603762	608855	614338	619010	624126
1288086	1299853	1306372	1313946	1320599	1324987	1328354	1336150	1344542	1356397
1735556	1736358	1744467	1750980	1754544	1755313	1753778	1756725	1765354	1776540
189183	190422	190822	191130	191810	191978	192012	191929	192019	192225
1188752	1196480	1201734	1205578	1208392	1210760	1212267	1215002	1219402	1224254
575220	575564	574880	573758	572826	570811	568919	567102	566336	566103

POPULATION WEIGHT OF EACH COUNTRY IN ITS OWN GROUP									
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.049	0.049	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.034	0.035
0.027	0.027	0.027	0.027	0.027	0.028	0.028	0.028	0.028	0.028
0.022	0.022	0.022	0.022	0.022	0.022	0.023	0.023	0.023	0.023
0.051	0.052	0.052	0.053	0.053	0.053	0.054	0.054	0.055	0.055
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
0.021	0.021	0.021	0.021	0.021	0.022	0.022	0.022	0.022	0.022
0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043
0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.031	0.031
0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.048	0.048
0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015
0.022	0.022	0.022	0.021	0.021	0.021	0.021	0.021	0.021	0.021
0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.020
0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027
0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
0.030	0.030	0.030	0.031	0.031	0.031	0.031	0.031	0.031	0.031
0.067	0.067	0.066	0.066	0.066	0.066	0.066	0.066	0.066	0.066
0.054	0.054	0.054	0.054	0.055	0.055	0.055	0.055	0.055	0.055
0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033	0.033
0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
0.048	0.048	0.048	0.047	0.047	0.047	0.047	0.047	0.047	0.046
0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
0.014	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
0.022	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.033	0.032	0.032	0.032	0.031	0.031	0.031	0.030	0.030	0.030
0.035	0.035	0.035	0.035	0.035	0.036	0.036	0.036	0.036	0.036
0.030	0.030	0.030	0.030	0.029	0.029	0.029	0.029	0.028	0.028
0.055	0.055	0.055	0.054	0.054	0.054	0.054	0.054	0.053	0.053
0.173	0.173	0.174	0.174	0.174	0.174	0.174	0.174	0.174	0.175
0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
0.068	0.067	0.067	0.067	0.067	0.066	0.066	0.066	0.066	0.065
0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.032	0.032
0.019	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.021
0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
0.050	0.050	0.050	0.049	0.049	0.049	0.049	0.048	0.048	0.048
0.053	0.053	0.053	0.053	0.053	0.052	0.052	0.052	0.052	0.051
0.364	0.363	0.363	0.364	0.365	0.366	0.367	0.368	0.368	0.368
0.018	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026	0.026
0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053	0.053
0.068	0.067	0.066	0.065	0.064	0.064	0.063	0.062	0.061	0.061
0.027	0.026	0.026	0.026	0.025	0.025	0.024	0.024	0.024	0.024
0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
0.051	0.051	0.050	0.050	0.049	0.049	0.048	0.048	0.047	0.047
0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
0.029	0.029	0.029	0.029	0.029	0.029	0.028	0.028	0.028	0.028
0.133	0.135	0.136	0.137	0.137	0.138	0.138	0.139	0.140	0.140
0.060	0.060	0.059	0.058	0.057	0.057	0.056	0.055	0.055	0.054
0.042	0.042	0.042	0.042	0.042	0.043	0.043	0.043	0.043	0.043
0.026	0.026	0.025	0.025	0.025	0.024	0.024	0.024	0.023	0.023
0.155	0.155	0.156	0.157	0.157	0.158	0.159	0.159	0.159	0.159
0.100	0.101	0.102	0.103	0.104	0.105	0.106	0.107	0.108	0.108
0.021	0.021	0.021	0.022	0.022	0.022	0.022	0.023	0.023	0.023
0.180	0.179	0.178	0.178	0.178	0.178	0.177	0.177	0.177	0.178
0.028	0.029	0.029	0.029	0.030	0.030	0.030	0.030	0.031	0.031
0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.042	0.043	0.043	0.043	0.044	0.044	0.044	0.044	0.045	0.045
0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082	0.082
0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.030	0.030
0.175	0.175	0.176	0.176	0.177	0.178	0.178	0.178	0.179	0.179
0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.010
0.087	0.087	0.088	0.088	0.088	0.089	0.089	0.089	0.089	0.090
0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.068	0.068	0.068	0.069	0.069	0.069	0.069	0.069	0.069	0.069
0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.100	0.100	0.100	0.101	0.101	0.101	0.104	0.104	0.105	0.105
0.024	0.024	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.025
0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
0.110	0.110	0.110	0.110	0.109	0.109	0.108	0.108	0.107	0.107
0.078	0.078	0.078	0.077	0.077	0.077	0.076	0.075	0.075	0.075
0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011
0.039	0.039	0.038	0.038	0.038	0.038	0.037	0.037	0.037	0.037
0.097	0.096	0.096	0.096	0.095	0.095	0.094	0.094	0.093	0.093
0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.030
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039	0.039
0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
0.067	0.067	0.067	0.067	0.067	0.068	0.068	0.068	0.068	0.068
0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121	0.121
0.020	0.021	0.021	0.022	0.022	0.022	0.023	0.023	0.023	0.023
0.071	0.072	0.072	0.072	0.073	0.073	0.074	0.074	0.074	0.075
0.159	0.160	0.160	0.160	0.160	0.160	0.161	0.161	0.161	0.162
0.215	0.213	0.213	0.213	0.213	0.213	0.212	0.212	0.212	0.212
0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.147	0.146	0.146
0.071	0.071	0.070	0.070	0.070	0.069	0.069	0.068	0.068	0.068