INEQUALITY AND REGIONAL DEVELOPMENT WITHIN THE EUROPEAN UNION

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Abstract

The aim of this paper is to analyse changes in regional disparities in the European Union between 1977 and 1999 by calculating the level of internal and external inequality in various groupings of regions. Our calculations are based on the Theil index commonly used in the traditional literature dealing with inequality. The regions are grouped by countries, economic development level and sectoral specialisation. After observing the evolution of internal and external inequality in the different geographical groupings, we assess the impact of politics and economic development on the regional disparities.

1. Introduction

As a result of the current interest in regional growth within the European Union, the last decade has seen the publication of a whole series of papers, taking a variety of approaches to explore the dynamics of regional inequality in Europe[1].

It is an area of investigation that has grown in importance with the current process of integration now underway in Europe. The need to redress the existing imbalance in development levels between the various European regions is explicit in the basic principles upon which the Union was founded, especially since the signing of the Single Act and the Treaty of Maastricht. The project for European integration specifically is based upon the assumption that progress towards integration will boost the growth potential of all member states, and thereby help to strengthen greater economic and social cohesion[2].

It is against this background that this study, which forms part of a wider investigation, sets out to analyse the underlying causes of regional disparity in Europe in order to provide a better understanding of the issues involved. The study is based on various results taken from the traditional literature on personal income distribution. Our approach is based on Theil (0) and Theil (1) index calculations, though, due to lack of space, only the latter will be presented here.

A conditioning factor in all studies of regional inequality in the European Union is lack of regional data. Some authors [Barro and Sala-i-Martin (1991), Sala-i-Martin (1996), Armstrong (1995a), Fagerberg and Verspagen (1996)] decided to limit the number of countries included in their studies in order to obtain a longer study period. Others [Esteban (1994), Neven and Gouyette (1995), López Bazo *et al.* (1999)] preferred to increase the number of countries, even at the expense of restricting the study period. In this respect, our study reperesents a major break from previous literature on the subject. The use of data supplied by Cambridge Econometrics has enabled us to work with figures for all of the 197 NUTS 2 regions in the European

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[1] See, for example, Dunford (1993), Cuadrado (1994, 2001), Esteban (1994), Sala-i-Martin (1994, 1996), Armstrong (1995), Rodríguez-Pose (1997, 1998a, b), Paci (1997), López-Bazo *et al.* (1999) or Magrini (1999), among many more.

[2] Various articles of the Treaty on European Union make specific reference to this issue. Article 2 specifically states that: "the Community mission will be to promote … throughout the Community the harmonious, balanced and sustainable development of economic activities..., and ....a high degree of convergence of economic performance …". This idea is developed and reinforced throughout the rest of the text, where it is specified that economic growth in the EU cannot be achieved without strengthening cohesion and that the regional aspects of the problem in terms of imbalances in development, require commitment to continue and develop the lines of action undertaken in the past.

Union (a complete list is included in the appendix)[3]. Monetary variables have been converted into constant 1990 euros, by applying the necessary deflators, thus enabling us to compare data for different years in real terms.

The paper is organised in four sections. The section following describes the theoretical framework of the paper. The next section is devoted to analysing the evolution of regional disparities in the different member states. We then repeat the analysis, this time grouping the regions according to their level of economic development. We finish by presenting our conclusions.

2. Theoretical framework

Our unit of reference will be per capita income in geographical areas each comprising a variety of individuals, such as countries or regions. let us suppose, then, that we begin with data for *n* groups of cases over a specific time span, *t=1,2,...,T*[4].. Per capita income in group *i* over the period *t* is denoted by $x_i = \frac{X_i}{N_i}$, where X_i and N_i are respectively the income and population of group *i, i=1,2,...,n*, over the period *t, t=1,2,...T*. Likewise, let p_i be the relative frequency of the observation *i* over the period *t*, $p_i = \frac{N_i}{N}$ with $N = \sum_{i=1}^{n} N_i$. Therefore, the distribution of relative frequencies for the *n* groups over the period *t* will be given by $p = (p_1, p_2, ..., p_n)$[5]. Further, let us suppose that all the groups contain at least one individual, such that $N_i > 0$ for any *i=1,2,...,n* and for any *t=1,2,...,T* and, therefore, $p \in R^n_{++}$.

For the sake of greater accuracy, let us also assume that the total income ($X = \sum_{i=1}^{n} X_i$) in each period is strictly positive and that there is a non-negative amount of income for each group of individuals. Thus the space of all the possible distributions of per capita income in the different study periods for any size of population $n \geq 1$ can be defined by the set:

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[3] The only exceptions being the new German *Länder*, the French overseas territories and Spain's North African territories.

[4] Given that the various statistics used in this study are calculated from cross sections of the distribution, we are able to dispense with the temporal dimension. Henceforth, therefore, unless otherwise indicated, the subindex *t* will be omitted.

$$D^n = \left\{ x \in R^n : \sum_{i=1}^{n} x_i > 0,\ x_i \geq 0 \ \forall i,t \right\} \quad (1)$$

Therefore, $x = (x_1, x_2, ..., x_n) \in D^n$ represents the distribution of per capita income in the period *t* in the *n* groups considered. The mean per capita income, therefore, for the *n* groups over the period *t* will be $\mu = \frac{X}{N} = \sum_{i=1}^{n} p_i x_i$.

To continue with our proposed objectives, we will now examine the spatial distribution of regional inequality in the European Union from a series of alternative criteria. We will begin by dividing the total population into a series of homogenous, exhaustive and mutually exclusive groups, in order to determine the share of each group in overall inequality.

Recall that *i=1,2,...,n*, is the subindex that we have been using to refer to each group of cases considered (henceforth, these will be referred to as regions). Then, let n_g be the number of regions in each of the groups into which we have divided the total population, with *g=1,2,...,G.* Therefore, using the same notation as above, $N_g = \sum_{i \in n_g} N_i$ and by analogy $X_g = \sum_{i \in n_g} X_i$. Further, the population of group g relative to the total will be given by $p_g = \frac{N_g}{N} = \sum_{i \in n_g} p_i$. Likewise, the income of group g releative to the total will be $m_g = \frac{X_g}{X} = \sum_{i \in n_g} m_i$. Therefore, the mean per capita income of group g will be given by $\mu_g = \frac{X_g}{N_g} = \frac{1}{p_g} \sum_{i \in n_g} p_i x_i$.

In this case, an inequality index is said to be weakly *additively decomposable* if it can be expressed as the sum of an *intergroup* component and an *intragroup* component where: (a) the intergroup component, which is used to measure external inequality, is the magnitude of the inequality index when each member of the group enjoys the average per capita income for the group; and (b) the intragroup component, used to measure internal inequality, is the weighted sum of the inequality indices of all

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[5] Obviously, $\sum_{i=1}^{n} p_i = 1$, for any *t=1,2,...,T.*

the groups, where the weightings depend exclusively on the population and/or income shares of group in question. Internal inequality, therefore, is simply the weighted sum of the inequality within each group, where the weighting is meant to reflect the impact of each group in the overall total[6].

It follows from this that a generic inequality index, I, is weakly additively decomposable if it can be written as:

$$I = \sum_{g=1}^{G} w_g I_g + I_0 \tag{2}$$

where $w_g = w_g(p_g, m_g)$, with $g=1,2,\ldots,G$, denotes the weightings of the internal inequality indices of each of the groups, I_g, which will be used to obtain the intragroup component (internal inequality), $\sum_{g=1}^{G} w_g I_g$. I_0, meanwhile, is the intergroup inequality index (external inequality). Therefore, the role of internal inequality (the intragroup component) in overal inequality will be given by $\frac{\sum_{g=1}^{G} w_g I_g}{I}$. This quotient tells us what part of overall inequality can be attributed to intra-group disparities when there is no inequality between groups. By analogy, the role of external inequality (the intergroup component) will be $\frac{I_0}{I}$, which in turn indicates what part of overall inequality is a result of disparities between groups, regardless of whether there is any inequality within any of them.

As Shorrocks (1980, 1984) and Foster (1983) demonstrated, the family of Theil indices, $T(\alpha)$, is the only one that is linearly decomposable in the sense described above, while at the same time fulfilling the properties required in inequality measures[7]. In this particular case, the decomposition represented by expression (2) takes the following form:

$$T(\alpha) = \sum_{g=1}^{G} w_g T_g(\alpha) + T_0(\alpha) \tag{3}$$

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[6] See the contributions of Bourguignon (1979), Cowell (1980), Shorrocks (1980) and Foster (1983).

[7] While it is fairly simple to check that the family of Theil indices is additively decomposable, it is extremely difficult to demonstrate that they are the only indices that can be decomosed in this way.

with $w_g = p_g^{1-\alpha} m_g^{\alpha}$ and where α is a parameter that reflects the sensitivity of $T(\alpha)$ to transfers between rich and poor according to the part of the distribution in which they take place.

We will now take a more detailed look at the impact of this finding on the two measures of inequality originally proposed by Theil (1967) (Goerlich, 1998).

- For $\alpha = 1$ we have $w_g = m_g$, so that the weightings coincide with the relative income of each group.

  Taking into account that each region's share in its group's income can be written as $\frac{X_i}{X_g} = \frac{p_i x_i}{p_g \mu_g}$, the internal inequality index for each group will be given by:

$$T_g(1) = \sum_{i \in n_g} \left(\frac{p_i x_i}{p_g \mu_g} \right) \log \left(\frac{x_i}{\mu_g} \right) = \sum_{i \in n_g} \left(\frac{m_i}{m_g} \right) \log \left(\frac{m_i / m_g}{p_i / p_g} \right) \tag{4}$$

  since $\frac{x_i}{\mu_g} = \frac{m_i / m_g}{p_i / p_g}$.

  Meanwhile, given that the each group's share in overall income can be written as $\frac{X_g}{X} = m_g = \frac{p_g \mu_g}{\mu}$, the external inequality index between groups will be:

$$T_0(1) = \sum_{g=1}^{G} \left(\frac{p_g \mu_g}{\mu} \right) \log \left(\frac{\mu_g}{\mu} \right) = \sum_{g=1}^{G} m_g \log \left(\frac{m_g}{p_g} \right) \tag{5}$$

  since $\frac{\mu_g}{\mu} = \frac{m_g}{p_g}$.

  Finally, the decomposition of expression (3) can be obtained by simply weighting the internal Theil indices of each group according to its share in overall income, $m_g = \frac{p_g \mu_g}{\mu}$, and adding the between groups inequality index (Esteban, 1994):

$$T(1) = \sum_{g=1}^{G} \left(\frac{p_g \mu_g}{\mu} \right) T_g(1) + T_0(1) = \sum_{g=1}^{G} m_g T_g(1) + T_0(1) \tag{6}$$

- For $\alpha = 0$ the weightings coincide with the each group's share in the total population. In other words, $w_g = p_g$. Nevertheless, the decomposition of the overall inequality index $T(0)$ is similar to that in the case above. The internal inequality index of each group will now be given by:

$$T_g(0) = \sum_{i \in n_g} \left(\frac{p_i}{p_g} \right) \log \left(\frac{x_i}{\mu_g} \right) \tag{7}$$

since each region's share in its group's population can be written as $\frac{N_i}{N_g} = \frac{p_i}{p_g}$.

Likewise, the external inequality index between groups will be:

$$T_0(0) = \sum_{g=1}^{G} p_g \log \left(\frac{\mu_g}{\mu} \right) \tag{8}$$

In this case the weightings of the internal inequality indices for the various groups will be given by their shares in the total population, p_g, so that the decomposition of expression (3) now takes the following form:

$$T(0) = \sum_{g=1}^{G} p_g T_g(0) + T_0(0) \tag{9}$$

Given that additively decomposable measures of inequality are used to determine the role of each factor in overall inequality, we can now address the question of interpretation (Davies and Shorrocks, 1978).

As we have already established, the intragroup component (internal inequality) indicates the degree to which overall inequality can be attributed to intra-group disparities, when there are no intergroup disparities. The intergroup component (external inequality), meanwhile, tells us how much of the observed inequality can be attributed to inequality between groups, regardless of whatever disparities may exist within any individual group. This is better explained by means of an example. Our units of reference, the European regions, fall naturally into larger geographical, political and administrative groupings: in other words, countries. It may be useful, therefore, to ascertain how much of regional inequality is attributable to inequality between the various countries (external inequality) or to interregional disparities within each country (internal inequality). In this respect, according to Shorrocks (1980), the specific issue of how much inequality can be attributed to differences between the countries of the European Union can be interpreted in two different ways.

How much overall inequality would be observed if the only existing disparities were between countries? In order to find the answer to this question it would be necessary to compare overall inequality with the amount that would be observed if the internal inequality in each country were zero, while differences in per capita income between countries remained constant. Thus, for additively decomposable indices of the

type we have been using so far, this would mean omitting the intragroup component (internal inequality), since $T_g(\alpha) = 0$ for any *g*, *g=1,2,...,G.* In this situation, therefore, to answer the question posed above would be given by the term $T_0(\alpha)$, since the redistributions that might take place within each country do not affect its mean per capita income or, therefore, the intergroup component.

However, it is also worth asking to what extent overall inequality would decrease if all differences between countries were omitted, while keeping the level of inequality within each of them constant. Before answering this question, however, we need to compare overall inequality as it stands with the level it would register if per capita income in the different countries were made equal while their internal inequality were to remain unaltered. Thus, for additively decomposable indices such as those mentioned above, this would mean omitting the inter-group component (external inequality), so it appears that the answer would again be given by $T_0(\alpha)$.

Note, however, that in general the weighting coefficients for the inequality registered in each group, $w_g = p_g^{1-\alpha} m_g^{\alpha}$, depend to some extent on the procedure used to remove the inequality resulting from the the intergroup component. For the case in hand, for example, mean per capita income in the different countries could be equalised by, say, establishing some kind of mechanism for income transfers between countries. However, this would, of course, affect the relative income of each country with respect to the total and thereby the role of the intragroup component, unless w_g is independent of m_g, which only occurs when $\alpha = 0$ (in this case the weightings depend exclusively on the relative demographic weight of the various groups). Strictly speaking, therefore, only when $\alpha = 0$ do we obtain the same answer to the questions posed above, that is, $T_0(\alpha)$. Theoretically, however, it would be equally feasible to use population transfers in order to reduce external inequality to zero, which, according to the rationale we have just presented, would justify the choice of $\alpha = 1$. Thus, the weightings for the intragroup component would be based exclusively on income shares, since population transfers would affect w_g, unless the said weightings were independent of p_g. Therefore, there are, a priori, no theoretical arguments to justify the choice of $\alpha = 0$ over $\alpha = 1$.

Next we present the results of the different analyses that were performed in order to study the underlying causes of regional inequality in the European Union. Specifically, we divided the regions of interest into homogenous, exhaustive and mutually exclusive groups in order to ascertain what proportion of overall inequality can be attributed to each group. To test the robustness of the results thus obtained, all the analyses were made in terms of $T(0)$ and $T(1)$. As there were no cases among those considered that led to any major differences in conclusions, whether the weightings were based on income or population shares, we will save space by presenting only the results obtained from the decomposition of $T(1)$[8].

3. Territorial decomposition of inequality: national and geographical aspects

Since regions can easily be grouped by political or administrative criteria into countries, the first question that comes to mind is: at a given level of inequality, is inequality greater between countries (external inequality) or within countries (internal inequality)? The answer to this question has undeniably important implications for regional policy within the European Community. In fact, if overall inequality is basically due to differences between countries, there would be a lot to be said for introducing centralised policies to correct the imbalance observed. If, on the other hand, internal inequality is the main cause of overall inequality, policies to correct the balance between countries will have only a limited effect, depending on the relative weight of the external component in the index. This kind of situation would increase the need for specific redistribution policies within each country. It would also be necessary to consider the situation of each country separately, since inequality could be much greater in some than in others, thus calling for the adoption of a tailor-made policy for each case.

Table 3.1 shows the Theil index $T(1)$, decomposed as stated in expression (6) into two components: external inequality (the intergroup component) and internal inequality (the intragroup component). In overall terms, $T(1)$ decreased over the twenty-three year study-period, from 0.0322 in 1977 to 0.0254 in 1999, which is a reduction of 21%. This process did not follow a constant pattern throughout the period, however. In fact, most of the observed convergence took place in the late seventies, and the process came almost to a standstill in the decades that followed.

[8] Ezcurra (2002) includes empirical evidence obtained by decomposing $T(0)$.

Table 3.1: Decomposition of regional inequality by countries (T1).

	Total Inequ.	%	External	%	Internal	%
1977	0.0322	100	0.0234	72.87	0.0087	27.13
1978	0.0310	100	0.0217	69.79	0.0094	30.21
1979	0.0299	100	0.0214	71.42	0.0086	28.58
1980	0.0261	100	0.0176	67.23	0.0086	32.77
1981	0.0265	100	0.0175	66.13	0.0090	33.87
1982	0.0266	100	0.0179	67.15	0.0087	32.85
1983	0.0264	100	0.0177	67.21	0.0087	32.79
1984	0.0271	100	0.0183	67.70	0.0087	32.30
1985	0.0276	100	0.0183	66.29	0.0093	33.71
1986	0.0275	100	0.0183	66.56	0.0092	33.44
1987	0.0265	100	0.0173	65.29	0.0092	34.71
1988	0.0254	100	0.0163	64.08	0.0091	35.92
1989	0.0253	100	0.0160	63.34	0.0093	36.66
1990	0.0253	100	0.0159	62.66	0.0094	37.34
1991	0.0257	100	0.0163	63.45	0.0094	36.55
1992	0.0258	100	0.0163	63.24	0.0095	36.76
1993	0.0252	100	0.0154	61.26	0.0098	38.74
1994	0.0252	100	0.0154	61.35	0.0097	38.65
1995	0.0250	100	0.0152	60.66	0.0098	39.34
1996	0.0248	100	0.0147	59.25	0.0101	40.75
1997	0.0242	100	0.0140	57.97	0.0102	42.03
1998	0.0250	100	0.0148	59.01	0.0103	40.99
1999	0.0254	100	0.0149	58.70	0.0105	41.30

Source: The authors' with data provided by Cambridge Econometrics.

Note, however, that the overall trend that we have just described masks the opposing dynamics of its two components. In 1977, external inequality in fact stood at 0.0234, whereas by 1999, twenty-three years later, it had fallen to 0.0149. Internal inequality, meanwhile, had grown from 0.0087 to 0.0105 over the same period. Our results show that most of the regional inequality computed by $T(1)$ can be attributed to the intergroup component. Indeed, although the relative importance of external inequality dropped by 14% over the period considered, in 1999 it still accounted for 59% of global inequality. Obviously, at the same time, the relative importance of the intra-group component grew, accounting for 41% of global inequality by 1999. The removal of internal inequality that took place during the late nineties, therefore, brought about a reduction of roughly 40% in overall inequality. These results show, therefore, that it is possible for convergence between countries to be accompanied by divergence at regional level. Any closing of the gap between poorer countries and the European average in per capita income terms seems, therefore, on the whole, to have been concentrated mainly in more affluent regions.

Table 3.2 summarises the trends of the internal inequality indices, $T_g(1)$, for each of the member states[9]. The table shows the extraordinary fluctuations that took place in inequality between countries. In fact, only Spain and Finland come anywhere the European average for internal inequality in 1999. The remaining countries, that same year, present magnitudes of $T_g(1)$ ranging between 0.0031 for (The Netherlands) and 0.0156 for Italy, which represents a variation of almost 500%.

Table 3.2: Interregional inequality by countries.

	Belgium	Germany	Greece	Spain	France	Ireland	Italy
1977	0.0123	0.0061	0.0074	0.0066	0.0115	0.0006	0.0149
1978	0.0118	0.0065	0.0064	0.0067	0.0115	0.0008	0.0184
1979	0.0123	0.0060	0.0066	0.0061	0.0111	0.0010	0.0150
1980	0.0136	0.0065	0.0056	0.0055	0.0110	0.0014	0.0145
1981	0.0144	0.0069	0.0029	0.0073	0.0108	0.0018	0.0147
1982	0.0143	0.0071	0.0020	0.0072	0.0108	0.0020	0.0138
1983	0.0129	0.0076	0.0025	0.0072	0.0116	0.0022	0.0120
1984	0.0142	0.0077	0.0027	0.0069	0.0110	0.0022	0.0120
1985	0.0146	0.0081	0.0024	0.0072	0.0122	0.0025	0.0128
1986	0.0138	0.0080	0.0023	0.0083	0.0120	0.0029	0.0136
1987	0.0137	0.0080	0.0025	0.0081	0.0128	0.0030	0.0133
1988	0.0134	0.0075	0.0025	0.0080	0.0127	0.0031	0.0139
1989	0.0138	0.0076	0.0028	0.0089	0.0131	0.0032	0.0140
1990	0.0141	0.0078	0.0027	0.0086	0.0136	0.0037	0.0140
1991	0.0133	0.0081	0.0024	0.0087	0.0138	0.0040	0.0130
1992	0.0137	0.0081	0.0025	0.0091	0.0139	0.0034	0.0134
1993	0.0135	0.0080	0.0031	0.0091	0.0151	0.0043	0.0136
1994	0.0136	0.0079	0.0032	0.0087	0.0149	0.0044	0.0143
1995	0.0133	0.0080	0.0040	0.0094	0.0140	0.0049	0.0157
1996	0.0138	0.0083	0.0043	0.0094	0.0139	0.0047	0.0162
1997	0.0143	0.0085	0.0045	0.0098	0.0142	0.0055	0.0156
1998	0.0144	0.0085	0.0047	0.0099	0.0144	0.0057	0.0154
1999	0.0145	0.0088	0.0048	0.0101	0.0145	0.0061	0.0156

Source: The authors' with data provided by Cambridge Econometrics.

[9]There are some countries (Denmark and Luxembourg) that in themselves constitute a NUTS 2 region. Obviously, in such cases there is no internal inequality to be measured and therefore the corresponding $T_g(1)$ index is zero.

Table 3.2 (continued): Interregional inequality by countries.

	The Netherlands	Austria	Portugal	Finland	Sweden	United Kingdom
1977	0.0104	0.0103	0.0155	0.0075	0.0030	0.0037
1978	0.0079	0.0113	0.0145	0.0073	0.0031	0.0041
1979	0.0078	0.0100	0.0136	0.0066	0.0032	0.0048
1980	0.0093	0.0101	0.0128	0.0059	0.0033	0.0047
1981	0.0131	0.0108	0.0130	0.0061	0.0034	0.0049
1982	0.0117	0.0107	0.0129	0.0063	0.0035	0.0042
1983	0.0120	0.0105	0.0119	0.0068	0.0036	0.0044
1984	0.0137	0.0107	0.0113	0.0072	0.0038	0.0047
1985	0.0154	0.0115	0.0108	0.0080	0.0039	0.0047
1986	0.0072	0.0115	0.0154	0.0096	0.0044	0.0049
1987	0.0038	0.0125	0.0189	0.0077	0.0044	0.0051
1988	0.0034	0.0146	0.0097	0.0063	0.0044	0.0053
1989	0.0028	0.0140	0.0099	0.0059	0.0045	0.0053
1990	0.0026	0.0140	0.0106	0.0065	0.0045	0.0055
1991	0.0032	0.0143	0.0116	0.0071	0.0051	0.0051
1992	0.0029	0.0143	0.0092	0.0065	0.0049	0.0053
1993	0.0030	0.0148	0.0093	0.0069	0.0059	0.0053
1994	0.0026	0.0129	0.0083	0.0074	0.0051	0.0056
1995	0.0028	0.0137	0.0076	0.0067	0.0050	0.0056
1996	0.0032	0.0132	0.0074	0.0090	0.0053	0.0059
1997	0.0032	0.0129	0.0075	0.0089	0.0052	0.0065
1998	0.0031	0.0129	0.0075	0.0101	0.0050	0.0069
1999	0.0031	0.0131	0.0076	0.0106	0.0050	0.0074

Source: The authors' with data provided by Cambridge Econometrics.

Nevethless, it is important to keep in mind that this type of analysis may be sensitive to the degree of territorial breakdown that is applied, since the number of NUTS 2 regions varies considerably from country to country. In this respect, Ireland is a case in point. Since the new territorial division that took place in the second half of the nineties, this country has only two regions that qualify as NUTS 2: namely, Southern and Eastern and Border, Midland and Western. Relatively speaking, however, Ireland registers the highest increase in interregional inequality in the whole of the European Union over the period considered[10]. This is in spite of the fact that in 1977 this country had the lowest level of regional inequality in the European Union by a fair margin and, though it subsequently registered a considerable increase, in 1999, $T_g(1)$ still remained below the European average.

[10] The explanation for this has to do with the good performance of the Southern and Western region, which includes the main urban concentrations of the country, when compared with Eastern, Border, and Midland.

Nevertheless, table 3.2 reveals that in most of the countries analysed regional disparities increased between 1977 and1999. Leaving the case of Ireland to one side, it is particularly striking to observe the major increase registered by the United Kingdom and Sweden, whose indices increased by 100% and 67% respectively. Spain, Germany and Finland, meanwhile, also registered gains of some significance, though not quite as pronounced[11]. In spite of these results, none of the countries mentioned registers a level of internal inequality higher than the average for the European Union[12]. France, Austria, Belgium and Italy form a second group with more moderate increases in interregional inequality between 1977 and 1999, their indices growing by around 20% (with the exception if Italy, where $T_g(1)$ grew by a meager 5%). Internal inequality in all of these countries, however, is higher than the European average, the case of Italy being the most striking in this respect.

Regional disparities also decreased in Greece, Portugal and the Netherlands. The fact that there seems to have been no widening of the gap between rich and poor regions in Portugal and much less in Greece adds further detail to the conclusions drawn from the results displayed in Table 3.1, which can now be interpreted bearing in mind that neither Portugal nor Greece registered a very high average rate of growth during the period from 1977 to 1999.

In any event, though we do not claim our study to be in any way exhaustive, it does clearly show that there is not sufficient similarity between internal inequality levels in member countries to suggest any common trend throughout the whole of the European community. These results, therefore, underline the importance of the role of country-specific characteristics in the evolution of regional disparities within the European Union.

From the part of the study described in this section so far there emerge a series of potentially important implications for regional policy-makers within the European Union. For example, the fact that overall inequality in 1999 could still largely be accounted for by external disparities suggests the need for a centralised approach in devising policies to enhance the economic development of countries where per capita income is below the European average. This also highlights the need for some transfer mechanism that would help to reduce disparities between countries. These conclusions

[11] Recall that the new German *Länder* are not included in the analysis.
[12] The only exception is Finland, even though it is virtually level with the European average.

are further reinforced by the fact that per capita income levels in Portugal, Greece and practically the whole of Spain are lower than those of any other member country.

We did, however, detect a relative increase in internal inequality over the period considered. Policies to correct the imbalance between countries will therefore have only a limited effect. This being the case, it will also be necessary to design specific redistribution policies within each country, which will require prior assessment of the extent of regional disparities in each of the member States.

As a supplement to the above findings, we will now turn our attention to one of the most widely documented facts in the literature dealing with the evolution of regional disparity within Europe: the existence of an *core-periphery* or *North-South* divide[13]. While keeping this in mind, we will explore the possible existence of geographical groupings of regions at a supranational level. After all, in an increasingly integrated Europe where international borders are theoretically losing significance and regions are beginning to interact directly with one another, a shift from national perspectives towards new spatial patterns is only to be expected.

In order to investigate this issue, we reclassified the European regions in such a way as to add new perspective to the conventional *core-periphery* or North-South division. Thus, following criteria originally introduced by Copus (1999), we began by classifying all the regions considered according to whether their geographical location was the *central, intermediate or peripheral* area of Europe. We then divided the peripheral regions into two more groups: *peripheral North* and *peripheral South*. (the full list of regions, which is not given here due to lack of space, can be found in Ezcurra(2002).

Table 3.3: Regional inequality decomposition by geographical areas (T1).

	Total Inequ.	%	External	%	Internal	%
1977	0.0322	100	0.0158	49.16	0.0164	50.84
1978	0.0310	100	0.0165	53.31	0.0145	46.69
1979	0.0299	100	0.0158	52.76	0.0141	47.24
1980	0.0261	100	0.0118	45.09	0.0144	54.91
1981	0.0265	100	0.0116	43.97	0.0148	56.03
1982	0.0266	100	0.0118	44.27	0.0148	55.73
1983	0.0264	100	0.0117	44.23	0.0147	55.77
1984	0.0271	100	0.0118	43.52	0.0153	56.48
1985	0.0276	100	0.0122	44.24	0.0154	55.76
1986	0.0275	100	0.0123	44.72	0.0152	55.28
1987	0.0265	100	0.0115	43.51	0.0150	56.49
1988	0.0254	100	0.0112	44.17	0.0142	55.83
1989	0.0253	100	0.0108	42.86	0.0145	57.14
1990	0.0253	100	0.0105	41.53	0.0148	58.47
1991	0.0257	100	0.0103	40.27	0.0153	59.73
1992	0.0258	100	0.0105	40.52	0.0154	59.48
1993	0.0252	100	0.0105	41.68	0.0147	58.32
1994	0.0252	100	0.0108	42.78	0.0144	57.22
1995	0.0250	100	0.0107	42.56	0.0144	57.44
1996	0.0248	100	0.0107	43.22	0.0141	56.78
1997	0.0242	100	0.0103	42.38	0.0140	57.62
1998	0.0250	100	0.0105	42.00	0.0145	58.00
1999	0.0254	100	0.0104	40.87	0.0150	59.13

Source: The authors' with data provided by Cambridge Econometrics.

Table 3.3 shows the breakdown of $T(1)$ using this new criterion. External inequality, which in 1977 hovered around 0.0158 had dropped by 1999 to 0.0104. Internal inequality, meanwhile, remained almost constant over the same period, starting at 0.0164 and finishing at 0.0150. These results show overall inequality to be largely due to the intragroup component, which increased in relative importance by 10% over the period considered. These figures, when compared with those shown in table 3.1, appear to suggest that, contrary to what might have been expected, as the process of integration in Europe intensified, the grouping by countries gained relevance with respect to any kind of supranational groupings of regions. These results therefore strengthen the arguments for using countries as opposed to *core-peripheral* or North-South groupings as geographical units of reference when shaping strategies for regional policy within the community.

Table 3.4, meanwhile, shows the evolution of inequality indices in each of the four groupings considered. A striking reduction can be seen in differences between the

[13] Many studies deal with this issue in detail. The results obtained vary according to the period analysed and the chosen methodology. See, for example, Keeble *et al.* (1988), or Fingleton *et al.* (1996)

Southern peripheral regions of the EU, even though their level of internal inequality is considerably higher than the community average. Disparities in the remaining regions, though less striking than those just described, remained practically constant over the 1977-1999 period.

Table 3.4: Interregional inequality by geographical areas (T1).

	Central	Southern peripheral	Northern peripheral	Intermediate
1977	0.0124	0.0445	0.0177	0.0119
1978	0.0122	0.0290	0.0167	0.0121
1979	0.0125	0.0263	0.0170	0.0115
1980	0.0133	0.0206	0.0208	0.0121
1981	0.0143	0.0199	0.0205	0.0125
1982	0.0150	0.0208	0.0195	0.0117
1983	0.0152	0.0214	0.0183	0.0113
1984	0.0152	0.0235	0.0190	0.0118
1985	0.0154	0.0236	0.0182	0.0121
1986	0.0149	0.0253	0.0191	0.0112
1987	0.0140	0.0264	0.0198	0.0108
1988	0.0134	0.0232	0.0194	0.0107
1989	0.0137	0.0237	0.0202	0.0107
1990	0.0142	0.0236	0.0198	0.0111
1991	0.0155	0.0236	0.0164	0.0119
1992	0.0156	0.0236	0.0143	0.0122
1993	0.0147	0.0234	0.0137	0.0117
1994	0.0142	0.0242	0.0128	0.0113
1995	0.0139	0.0246	0.0128	0.0115
1996	0.0132	0.0240	0.0132	0.0115
1997	0.0130	0.0241	0.0141	0.0112
1998	0.0130	0.0275	0.0153	0.0111
1999	0.0131	0.0299	0.0162	0.0111

Source: The authors' with data provided by Cambridge Econometrics.

4. Inequality and level of development

Leaving political and adminstrative issues to one side, we will now classify the European regions according to their per capita income levels. By doing so we hope to shed some new light on the notion of a "Two-speed Europe". Our findings will enable us to discover whether the decrease in inequality registered at the beginning of the period considered, and the stagnation that followed later, did in fact occur in all areas of the European Union, regardless of differences in per capita income levels. It will also help us to find out whether the gap between more and less developed regions closed over time or in fact tended to widen.

However, faced with the fact that this exercise requires a classification criterion of some kind, we have opted to divide the European regions initially into three groups, according to their level of development: *poor regions* (those where per capita income

remained below the community average throughout the period considered), *wealthy regions* (where it stayed above average for the whole of the period) and *medium* (which includes some with above average and others with below average per capita income over the 1977 to 1999 period). It is interesting to observe how practically half of the total number of 95, classify as poor regions. 68 classify as wealthy, while only 34 fall into the medium range. These figures appear to suggest that a major gap may have developed in the distribution of per capita income throughout the regions of the EU between 1977 and 1999. This issue, however, will be dealt with in further detail later on in the paper.

Table 4.1 gives the breakdown of $T(1)$ when the grouping criterion defines a per capita income threshold. External inequality, which in 1977 stood at 0.0204, had fallen by 1999 to 0.0140, which suggests that there was some convergence between the three groups considered. Internal inequality, meanwhile, remained virtually constant throughout the whole of the period. These results are comparable to those that emerged when regions were classified by countries. It was the inter-group component, therefore, that accounted for the greater part of global inequality. Even though the relative importance of external inequality dropped by 9% over the period considered, it still accounted for 55% of overall inequality in 1999. Obviously, at the same time, the relative weight of the intragroup component increased until it reached 45% in 1999. In other words, by reducing internal inequality it was possible to reduce overall inequality by about 45% by the end of the nineties, which is an unmistakable indication of the significance of disparities between wealthy and poor regions.

Table 4.1: Decomposition of regional inequality by development level.

	Total Inequ.	%	External	%	Internal	%
1977	0.0322	100	0.0204	63.48	0.0117	36.52
1978	0.0310	100	0.0207	66.88	0.0103	33.12
1979	0.0299	100	0.0206	68.87	0.0093	31.13
1980	0.0261	100	0.0180	68.76	0.0082	31.24
1981	0.0265	100	0.0179	67.49	0.0086	32.51
1982	0.0266	100	0.0173	65.05	0.0093	34.95
1983	0.0264	100	0.0167	63.46	0.0096	36.54
1984	0.0271	100	0.0172	63.32	0.0099	36.68
1985	0.0276	100	0.0176	63.68	0.0100	36.32
1986	0.0275	100	0.0173	62.79	0.0102	37.21
1987	0.0265	100	0.0163	61.40	0.0102	38.60
1988	0.0254	100	0.0158	62.09	0.0096	37.91
1989	0.0253	100	0.0155	61.41	0.0098	38.59
1990	0.0253	100	0.0156	61.73	0.0097	38.27
1991	0.0257	100	0.0161	62.92	0.0095	37.08
1992	0.0258	100	0.0163	63.17	0.0095	36.83
1993	0.0252	100	0.0157	62.27	0.0095	37.73
1994	0.0252	100	0.0155	61.49	0.0097	38.51
1995	0.0250	100	0.0154	61.55	0.0096	38.45
1996	0.0248	100	0.0151	61.12	0.0096	38.88
1997	0.0242	100	0.0145	59.92	0.0097	40.08
1998	0.0250	100	0.0145	57.77	0.0106	42.23
1999	0.0254	100	0.0140	55.10	0.0114	44.90

Source: The authors' with data provided by Cambridge Econometrics.

Table 4.2 shows how internal inequality indices evolved over the period and enables us to make a more detailed analysis of some of the issues mentioned earlier. Thus, the wealthy regions increased their inequality almost continually throughout the period. The poorer regions, meanwhile, experienced an overall reduction in regional disparities between 1977 and 1999. This trend remained so strong up until the early nineties, that the slight increase that followed was not enough to neutralise its effect. This group nevertheless, still registers a level of inequality well above the European average. The moderately wealthy regions, for their part, appear to have maintained the same level of regional disparity. Finally, the wealthy regions registered a marked increase in inequality over the period analysed. The regions at the upper end of the distribution, therefore, appear to have followed a pattern of development different from that of the rest.

Table 4.2: Interregional inequality by development level.

	Medium	Rich	Poor
1977	0.0022	0.0054	0.0323
1978	0.0017	0.0054	0.0262
1979	0.0017	0.0048	0.0233
1980	0.0016	0.0055	0.0176
1981	0.0021	0.0061	0.0173
1982	0.0029	0.0065	0.0186
1983	0.0026	0.0068	0.0192
1984	0.0026	0.0068	0.0206
1985	0.0024	0.0070	0.0207
1986	0.0022	0.0067	0.0223
1987	0.0020	0.0066	0.0226
1988	0.0020	0.0064	0.0200
1989	0.0021	0.0067	0.0199
1990	0.0022	0.0068	0.0194
1991	0.0018	0.0069	0.0187
1992	0.0017	0.0069	0.0187
1993	0.0016	0.0068	0.0189
1994	0.0016	0.0067	0.0199
1995	0.0016	0.0065	0.0200
1996	0.0017	0.0065	0.0199
1997	0.0017	0.0065	0.0200
1998	0.0020	0.0067	0.0229
1999	0.0022	0.0072	0.0250

Source: The authors' with data provided by Cambridge Econometrics.

In order to complete the above analysis, we will now divide the European regions into the two groups into which they are traditionally divided in studies focusing on regional disparity within the European Union: i.e., *Objective 1 regions* and *the rest.* In compiling the list of Objective 1 regions, we took into account the European Commission's decision of July 1st 1999 which stated that the Objective 1 regions for the 2000-2006 planning period are (for complete list, see appendix): (a) regions with a GNP under 75% of the community average qualify as NUTS 2, (b) the Finnish and Swedish regions classed under the old Objective 6 (regions with low-density population areas) and (c) remote regions.

The breakdown of $T(1)$ by this disaggregation criterion gives the results shown in tables 4.3 and 4.4. Internal inequality stood at 0.0216 in 1977, whereas by 1999, twenty-three years later, it had dropped to 0.0138. External inequality, meanwhile, remained virtually constant over the same period, starting at 0.0106 and finishing at 0.0115, which suggests that the relative differences between these two groups of regions remained unaltered. At first sight this appears quite surprising, since Objective 1 regions became the priority of the community's regional policy from the time of the amendment

to the Structural Funds in 1988. These findings also show that overall regional inequality is mainly due to the intra-group component. Indeed, despite the fact that the relative importance of external inequality increased by 13% over the period analysed, internal inequality in 1999 continues to account for 55% of overall inequality. Removal of the intragroup component, therefore, would bring about a 55% reduction in aggregate inequality.

Table 4.3: Regional inequality decomposition into O1 Regions and the rest.

	Total Inequ.	%	External	%	Internal	%
1977	0.0322	100	0.0106	32.87	0.0216	67.13
1978	0.0310	100	0.0118	37.89	0.0193	62.11
1979	0.0299	100	0.0116	38.85	0.0183	61.15
1980	0.0261	100	0.0101	38.76	0.0160	61.24
1981	0.0265	100	0.0105	39.63	0.0160	60.37
1982	0.0266	100	0.0108	40.67	0.0158	59.33
1983	0.0264	100	0.0107	40.47	0.0157	59.53
1984	0.0271	100	0.0108	39.95	0.0163	60.05
1985	0.0276	100	0.0111	40.27	0.0165	59.73
1986	0.0275	100	0.0116	42.11	0.0159	57.89
1987	0.0265	100	0.0112	42.18	0.0153	57.82
1988	0.0254	100	0.0109	42.85	0.0145	57.15
1989	0.0253	100	0.0109	43.15	0.0144	56.85
1990	0.0253	100	0.0108	42.66	0.0145	57.34
1991	0.0257	100	0.0106	41.34	0.0151	58.66
1992	0.0258	100	0.0108	41.76	0.0150	58.24
1993	0.0252	100	0.0108	42.73	0.0144	57.27
1994	0.0252	100	0.0110	43.80	0.0141	56.20
1995	0.0250	100	0.0112	44.93	0.0138	55.07
1996	0.0248	100	0.0112	45.10	0.0136	54.90
1997	0.0242	100	0.0109	45.05	0.0133	54.95
1998	0.0250	100	0.0114	45.40	0.0137	54.60
1999	0.0254	100	0.0115	45.46	0.0138	54.54

Source: The authors' with data provided by Cambridge Econometrics.

Turning to Table 4.4, we can observe the evolution of the internal inequality indices of both groups of regions. A particularly striking reduction emerges in the disparities affecting Objective 1 regions over the period analysed, though their level of interregional inequality still remains well above the community average in 1999, which suggests a lack of homogeneity among the Objective 1 regions[14]. At any rate, dispersion among this group of regions did not decrease uniformly throughout the period. In fact, most of the reduction in inequality that took place was concentrated into the late seventies and early eighties, remaining constant or even rising slightly throughout the

rest of the period. The remaining regions, meanwhile, also underwent a process of convergence, which, though less intense, still left them with a level of interregional inequality below that of the Objective 1 regions.

Table 4.4: Interregional inequality: Objective 1 Regions -Remaining regions.

	Remaining regions	O1 Regions
1977	0.0195	0.0412
1978	0.0184	0.0275
1979	0.0176	0.0246
1980	0.0157	0.0185
1981	0.0159	0.0169
1982	0.0155	0.0182
1983	0.0153	0.0193
1984	0.0157	0.0213
1985	0.0160	0.0209
1986	0.0152	0.0222
1987	0.0143	0.0239
1988	0.0138	0.0202
1989	0.0137	0.0199
1990	0.0139	0.0197
1991	0.0145	0.0195
1992	0.0146	0.0188
1993	0.0139	0.0186
1994	0.0136	0.0191
1995	0.0133	0.0183
1996	0.0131	0.0176
1997	0.0128	0.0175
1998	0.0128	0.0209
1999	0.0128	0.0230

Source: The authors' with data provided by Cambridge Econometrics.

5. Inequality and sectoral specialisation

It is well-known that the sectors that make up the economic activity of a region have a decisive impact on its economic performance. As a first step towards obtaining a picture of sectoral specialisation in the European regions, we will now calculate the index for each region in 1977:

$$ESP_{ij} = \frac{\left[E_{ij} \Big/ \sum_{j} E_{ij} \right]}{\left[\sum_{i} E_{ij} \Big/ \sum_{i} \sum_{j} E_{ij} \right]} \qquad (10)$$

[14]This issue has been addressed in detail by Gil (2001).

where E_{ij} denotes region *i*'s number of employed in sector *j*. This index is therefore readily understood. Thus, region *i* is relatively specialised in sector *j* if $ESP_{ij} > 1$. In order to establish an alternative classification of regions according to their sectoral specialisation, each region was assigned to the sector for which it registered an index above 1.1[15]. Thus we were able to divide all the regions considered into four separate groups. (The complete lists for the groups are included in the appendix).

- *Regions specialising in the agricultural sector:* this group included most of the Mediterranean regions: the whole of Portugal and Greece (with the sole exception of Attiki) and most regions in Italy and Spain. This sector is also particularly significant in Ireland, Western France, some of the Southern regions of Germany and in the peripheral areas of Scandinavia.
- *Regions specialising in the industrial sector:* In the European Union, industry, unlike agriculture, is linked mainly to medium-sized population clusters and multicentred urban networks. This group includes most of the regions of Germany, Northern France, a particularly large number of regions in the United Kingdom, the North of Italy and some regions in the North of Spain.
- *Regions specialising in the services sector:* the regions of the European Union where economic activity depends most heavily on the services sector are those surrounding the national capitals (Brussels, Berlin, Lazio, Madrid, Stockholm, Attiki, Île de France, London, etc.). Also belonging to this group are a series of regions with either a strong tourist sector or a high degree of self-government.
- *Regions with a homogeneous sectoral mix:* this group is made up mainly of regions in Northern Europe with a sectoral mix close to the European average.

[15] Obviously a single region may obtain above 1.1 index values in two sectors. In such cases we opted to include the region in the sector for which it registered the higher index.

Table 5.1: Decomposition of regional inequality by sectoral specialisation (T1).

	Total Inequ.	%	External	%	Internal	%
1977	0.0322	100	0.0078	24.09	0.0244	75.91
1978	0.0310	100	0.0081	26.17	0.0229	73.83
1979	0.0299	100	0.0076	25.47	0.0223	74.53
1980	0.0261	100	0.0063	24.17	0.0198	75.83
1981	0.0265	100	0.0061	23.15	0.0203	76.85
1982	0.0266	100	0.0058	21.70	0.0208	78.30
1983	0.0264	100	0.0059	22.38	0.0205	77.62
1984	0.0271	100	0.0058	21.55	0.0212	78.45
1985	0.0276	100	0.0064	23.34	0.0212	76.66
1986	0.0275	100	0.0066	23.85	0.0210	76.15
1987	0.0265	100	0.0064	23.95	0.0202	76.05
1988	0.0254	100	0.0062	24.62	0.0191	75.38
1989	0.0253	100	0.0061	23.92	0.0192	76.08
1990	0.0253	100	0.0059	23.17	0.0194	76.83
1991	0.0257	100	0.0057	22.26	0.0200	77.74
1992	0.0258	100	0.0057	21.98	0.0201	78.02
1993	0.0252	100	0.0059	23.61	0.0192	76.39
1994	0.0252	100	0.0061	24.23	0.0191	75.77
1995	0.0250	100	0.0061	24.35	0.0189	75.65
1996	0.0248	100	0.0062	25.06	0.0186	74.94
1997	0.0242	100	0.0061	25.18	0.0181	74.82
1998	0.0250	100	0.0060	24.10	0.0190	75.90
1999	0.0254	100	0.0059	23.32	0.0195	76.68

Source: The authors' with data provided by Cambridge Econometrics.

Tables 5.1 and 5.2 give the results obtained when $T(1)$ is decomposed according to this grouping of regions. External inequality underwent a slight decrease throughout the period analysed, beginning at 0.0078 and ending at 0.0059. Internal inequality, meanwhile, which stood at 0.0244 in 1977, had dropped to 0.0195 by 1999. Unlike in the previous analyses, the intra-group component in this case accounts for three quarters of total inequality. Indeed, the removal of internal inequality would mean a 75% reduction in global inequality.

Table 5.2: Interregional inequality by sectoral specialisation (T1).

	Industrial	Agricultural	Services	Homog. Spec.
1977	0.0163	0.0451	0.0217	0.0130
1978	0.0148	0.0417	0.0209	0.0139
1979	0.0145	0.0377	0.0221	0.0138
1980	0.0118	0.0294	0.0224	0.0168
1981	0.0121	0.0289	0.0237	0.0175
1982	0.0112	0.0303	0.0253	0.0170
1983	0.0106	0.0295	0.0252	0.0174
1984	0.0111	0.0310	0.0257	0.0179
1985	0.0114	0.0304	0.0256	0.0184
1986	0.0102	0.0316	0.0253	0.0182
1987	0.0090	0.0309	0.0245	0.0178
1988	0.0089	0.0283	0.0234	0.0181
1989	0.0086	0.0282	0.0240	0.0182
1990	0.0090	0.0271	0.0246	0.0201
1991	0.0102	0.0260	0.0250	0.0236
1992	0.0100	0.0264	0.0250	0.0247
1993	0.0089	0.0260	0.0241	0.0230
1994	0.0084	0.0268	0.0238	0.0217
1995	0.0086	0.0272	0.0229	0.0217
1996	0.0084	0.0269	0.0221	0.0216
1997	0.0081	0.0262	0.0217	0.0211
1998	0.0080	0.0280	0.0231	0.0211
1999	0.0077	0.0289	0.0241	0.0210

Source: The authors' with data provided by Cambridge Econometrics.

The internal inequality indices are consistent with the results obtained in previous sections. As expected, over the whole period disparities decreased significantly in regions specialising in agriculture, though in 1999 these regions still continued to register the highest level of internal inequality. The relative growth of the services sector that took place throughout the European Union appears to have contributed some way towards equalising the economic performance of these regions, in terms of per capita income. In addition to this trend, of course, it is important to remember that the reduction of differences in unemployment rates also helped to reduce internal inequality in these regions. Regions specialising in the industrial sector, meanwhile, showed a similar performance, probably as result of the same factors.

While the increase in dispersion in regions specialising in the services sector is considerable, it is greater again in regions whose sectoral mix is similar to the European average. A possible explanation for both of these phenomena lies in the realtive growth of the services sector in this group of regions which may have affected quite different subsectors of production. A tourist-based services sector, for example, is not the same as one in which the main activities revolve around financial services or hi-tech

industries. Employment rates may also vary widely between regions for the same reasons.

6. Conclusions

This study analyses the causes that lead to inequality in per capita income levels across the regions of the European Union between 1977 and 1999. The results, which are based on the calculation of $T(1)$, reveal a moderate reduction in regional inequality over the period considered. Most of this reduction took place in the late seventies, the decades that followed being marked by a slowing up of the process.

Different groupings of regions reveal three distinct performance patterns. When the groupings are based on countries, geographical location or regional wealth, external inequality diminishes while internal inequality increases. We might also mention the importance of the "country effect" which is associated with greater divergence. These findings appear to suggest that the European community needs to design regional policies that combine active measures to boost the development of countries in which per capita income falls below the European average (by adopting some kind of mechanism to allow transfers between countries, for example), together with a tailor-made distribution policy for each country, for which it would be necessary to make a prior detailed analysis of the severity and evolution of regional disparities within each of the member states.

When the regions were divided into two subgroups separating Objective 1 regions from the rest, quite the contrary effect was observed, since it was external inequality that increased and internal inequality that decreased. This shows the equalising effect of the European community regional policy on Objective 1 regions, even though, their divergence from the remaining regions is actually greater. The empirical evidence that was obtained, therefore, suggests that the continuing overall regional disparity observed over the last two decades of the period is mainly a result of the impact of medium and high income regions.

When the grouping criterion is based on sectoral specialisation, there is no significant change to be seen in either internal or external inequality, though internal inequality remains quite high. We might also add that the growing predominance of the services sector that has taken place in the EU as a whole has had a differentiating effect on the regions, depending on their sectoral specialisation. Agricultural and industrial regions have brought down their internal disparity levels, while in service-based regions

and those with a sectoral mix close to the European average, internal disparity has grown. All this without mentioning the role played in these processes by changes in the employment rate.

Finally, in relation to possible future research, there are various aspects of this study that could be improved and developed further. Some of these depend directly on the enlargement of Europe's available regional data bases. Though this study has made some headway in this respect, it is worth remembering that the use of relatively short time spans makes it more difficult to make an effective assessment of the trends underlying changes in regional differences. Also, as has been shown in the preceding sections, regional disparities in the European Union are a complex and multidimensional phenomenon, occurring as a result of different economic processes, and requiring the kind of in-depth investigation that goes beyond conventional aggregate analysis.

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Appendix

The 197 regions included in this study are as follows:

- *Belgium*: Bruxelles-Brussel, Antwerpen, Limburg, Oost-Vlaanderen, Vlaams Brabant, West-Vlaanderen, Brabant Wallon, Hainaut, Liège, Luxembourg, Namur.
- *Denmark*.
- *Germany*: Stuttgart, Karlsruhe, Freiburg, Tübingen, Oberbayern, Niederbayern, Oberpfalz, Oberfranken, Mittelfranken, Unterfranken, Schwaben, Berlin, Bremen, Hamburg, Darmstadt, Giessen, Kassel, Braunschweig, Hannover, Lüneburg, Weser-Ems, Düsseldorf, Köln, Münster, Detmold , Arnsberg, Koblenz, Trier, Rheinhessen-Pfalz, Saarland,, Schleswig-Holstein.
- *Greece*: Anatoliki Makedonia, Kentriki Makedonia, Dytiki Makedonia, Thessalia, Ipeiros, Ionia Nisia, Dytiki Ellada, Sterea Ellada, Peloponnisos, Attiki, Voreio Aigaio, Notio Aigaio, Kriti.
- *Spain*: Galicia, Asturias, Cantabria, País Vasco, Navarra, La Rioja, Aragón, Madrid, Castilla-León, Castilla-la Mancha, Extremadura, Cataluña, Com. Valenciana, Baleares, Andalucía, Murcia, Canarias.
- *France*: Île de France, Champagne-Ardenne, Picardie, Haute-Normandie, Centre, Basse-Normandie, Bourgogne, Nord-Pas de Calais, Lorraine, Alsace, Franche-Comté, Pays de la Loire, Bretagne, Poitou-Charentes, Aquitaine, Midi-Pyrénées, Limousin, Rhône-Alpes, Auvergne, Languedoc-Rousillon, Provence-Alpes-Côte d'Azur, Corse.
- *Ireland*: Border-Midland and Western, Southern and Eastern.
- *Italy*: Piemonte, Valle d'Aosta, Liguria, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Abruzzi, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna.
- *Luxembourg*.
- *The Netherlands*: Groningen, Friesland, Drenthe, Overijssel, Gelderland, Flevoland, Utrecht, Noord-Holland, Zuid-Holland, Zeeland, Noord-Brabant, Limburg.
- *Austria*: Burgenland, Niederösterreich, Wien, Kärnten, Steiermark, Oberösterreich, Salzburg, Tirol, Vorarlberg.
- *Portugal*: Norte, Centro, Lisboa e Vale do Tejo, Alentejo, Algarve, Açores, Madeira.
- *Finland*: Itä-Suomi, Väli-Suomi, Pohjois-Suomi, Uusimaa, Etelä-Suomi, Aland.

- *Sweden*: Stockholm, Östra Mellansverige, SydsverigeNorra, Mellansverige, Mellersta Norrland, Övre Norrland, Smaland med oarna, Västsverige.
- *United Kingdom*: Tees Valley and Durham, Northumberland et al., Cumbria, Cheshire, Greater Manchester, Lancashire, Merseyside, East Riding, North Yorkshire, South Yorkshire, West Yorkshire, Derbyshire, Leicestershire, Lincolnshire, Hereford et al., Shropshire, West Midlands (county), East Anglia, Bedfordshire, Essex, Inner London, Outer London, Berkshire et al., Surrey, Hampshire, Kent,, Avon et al., Dorset, Cornwall, Devon, West Wales, East Wales, North East Scotland, Eastern Scotland, South West Scotland, Highlands and Islands, Northern Ireland.

The following are the lists of regions according to the different groupings used in the analysis of regional inequality by sub-groups of population.

- **Geographical areas**

- *Central:* Bruxelles-Brussel, Antwerpen, Limburg, Oost-Vlaanderen, Vlaams Brabant, West-Vlaanderen, Brabant Wallon, Hainaut, Liège, Luxembourg, Namur, Stuttgart, Karlsruhe, Freiburg, Tübingen, Berlin, Bremen, Hamburg, Darmstadt, Giessen, Kassel, Braunschweig, Hannover, Lüneburg, Weser-Ems, Düsseldorf, Köln, Münster, Detmold, Arnsberg, Koblenz, Trier, Rheinhessen-Pfalz, Saarland, Île de France, Nord-Pas de Calais, Alsace, Luxemburgo, Vorarlberg, Drenthe, Overijssel, Gelderland, Flevoland, Utrecht, Noord-Holland, Zuid-Holland, Noord-Brabant, Limburg, , Derbyshire, Leicestershire, Lincolnshire, Hereford et al., Shropshire, West Midlands (county), Inner London, Outer London, Berkshire et al., Surrey, Hampshire, Kent.
- *Southern Periphery:* Anatoliki Makedonia, Kentriki Makedonia, Dytiki Makedonia, Thessalia, Ipeiros, Ionia Nisia, Dytiki Ellada, Sterea Ellada, Peloponnisos, Attiki, Voreio Aigaio, Notio Aigaio, Kriti, Galicia, Asturias, Cantabria, País Vasco, Navarra, La Rioja, Aragón, Madrid, Castilla-León, Castilla-la Mancha, Extremadura, Cataluña, Com. Valenciana, Baleares, Andalucía, Murcia, Canarias, Corse, Friuli Venezia Giulia, Abruzzi, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna, Norte, Centro, Lisboa e Vale do Tejo, Alentejo, Algarve, Açores, Madeira.

- *Northern Periphery:* Poitou-Charentes, Aquitaine, Midi-Pyrénées. Limousin, Languedoc-Roussillon, Border-Western and Midland, Southern and Eastern, Burgenland, Itä-Suomi, Väli-Suomi, Pohjois-Suomi, Uusimaa, Etelä-Suomi, Aland, Norra Mellansverige, Mellersta Norrland, Övre Norrland, North East Scotland, Eastern Scotland, South West Scotland, Highlands and Islands, Northern Ireland.
- *Intermediate Regions:* Danmark, Oberbayern, Niederbayern, Oberpfalz, Oberfranken, Mittelfranken, Unterfranken, Schwaben, Schleswig-Holstein, Champagne-Ardenne, Picardie, Haute-Normandie, Centre, Basse-Normandie, Bourgogne, Lorraine, Franche-Comté, Pays de la Loire, Bretagne, Rhône-Alpes, Auvergne, Provence-Alpes-Côte d'Azur, Piemonte,Valle d'Aosta, Liguria, Lombardia, Trentino-Alto Adige, Veneto, Emilia-Romagna, Toscana, Umbria, Marche, Lazio, Groningen, Friesland, Zeeland, Niederösterreich, Wien, Kärnten, Steiermark, Oberösterreich, Salzburg, Tirol, Stockholm, Östra Mellansverige, Sydsverige, Smaland med oarna, Västsverige, Tees Valley and Durham, Northumberland et al., Cumbria, Cheshire, Greater Manchester, Lancashire, Merseyside, East Riding, North Yorkshire, South Yorkshire, West Yorkshire, East Anglia, Bedfordshire, Essex, Avon et al., Dorset, Cornwall, Devon, West Wales, East Wales.

➢ **Level of development**

- *Rich Regions:* Bruxelles-Brussel, Antwerpen, Danmark, Stuttgart, Karlsruhe, Freiburg, Tübingen, Oberbayern, Niederbayern, Oberfranken, Mittelfranken, Unterfranken, Schwaben, Berlin, Bremen, Hamburg, Darmstadt, Giessen, Kassel, Braunschweig, Hannover, Weser-Ems, Düsseldorf, Köln, Münster, Detmold, Arnsberg, Rheinhessen-Pfalz, Saarland, Schleswig-Holstein, Île de France, Haute-Normandie, Alsace, Rhône-Alpes, Piemonte, Valle d'Aosta, Liguria, Lombardia, Trentino-Alto Adige, Veneto, Friuli-Venezia Giulia, Emilia-Romagna, Toscana, Marche, Lazio, Luxemburgo, Groningen, Noord-Holland, Zuid-Holland, Wien, Oberösterreich, Salzburg, Tirol, Vorarlberg, Pohjois-Suomi, Uusimaa, Etelä-Suomi, Aland, Stockholm, Östra Mellansverige, Sydsverige, Norra Mellansverige, Mellersta Norrland, Övre Norrland, Smaland med oarna, Västsverige, Inner London, Outer London, Oost-Vlaanderen, Vlaams Brabant, Lüneburg.
- *Poor Regions:* Oost-Vlaanderen, Vlaams Brabant, Lüneburg, Anatoliki Makedonia, Kentriki Makedonia, Dytiki Makedonia, Thessalia, Ipeiros, Ionia Nisia, Dytiki

Ellada, Sterea Ellada, Peloponnisos, Attiki, Voreio Aigaio, Notio Aigaio, Kriti, Galicia, Asturias, Cantabria, País Vasco, Navarra, Aragón, Madrid, Castilla-León,Castilla-la Mancha, Extremadura, Cataluña, Com. Valenciana, Baleares, Andalucía, Murcia, Canarias, Basse-Normandie, Nord-Pas de Calais, Bretagne, Poitou-Charentes, Midi-Pyrénées, Limousin, Auvergne, Languedoc-Roussillon, Corse, Border-Midland and Western, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna, Friesland, Overijssel, Gelderland, Flevoland, Burgenland, Niederösterreich, Kärnten, Steiermark, Norte, Centro, Lisboa e Vale do Tejo, Alentejo, Algarve, Açores, Madeira, Tees Valley and Durham, Northumberland et al., Greater Manchester, Lancashire, Merseyside, East Riding, North Yorkshire, South Yorkshire, West Yorkshire, Derbyshire, Leicestershire, Lincolnshire. Hereford et al., Shropshire, West Midlands (county), East Anglia, Bedfordshire, Essex, Berkshire et al., Surrey, Hampshire, Kent, Avon et al., Dorset, Cornwall, Devon, West Wales, East Wales, North East Scotland, Eastern Scotland, South West Scotland, Northern Ireland.

- *Medium Regions:* Limburg, West-Vlaanderen, Brabant Wallon, Hainaut, Liège, Luxembourg, Namur, Koblenz, Trier, La Rioja, Oberpfalz, Champagne-Ardenne, Picardie, Centre, Bourgogne, Lorraine, Franche-Comté, Pays de la Loire, Aquitaine, Provence-Alpes-Côte d'Azur, Southern and Eastern, Umbria, Abruzzi, Molise, Drenthe, Utrecht, Zeeland, Noord-Brabant, Limburg, Itä-Suomi, Väli-Suomi, Cumbria, Cheshire, Highlands and Islands.

➢ **Objective 1 Regions**

- *Objective 1Regions:* Anatoliki Makedonia, Kentriki Makedonia, Dytiki Makedonia, Thessalia, Ipeiros, Ionia Nisia, Dytiki Ellada, Sterea Ellada, Peloponnisos, Attiki, Voreio Aigaio, Notio Aigaio, Kriti, Galicia, Asturias, Castilla-León, Castilla-la Mancha, Extremadura, Com. Valenciana, Andalucía, Murcia, Canarias, Border-Midland and Western, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna, Burgenland, Norte, Centro, Alentejo, Algarve, Açores, Madeira, Itä-Suomi, Merseyside, South Yorkshire, West Wales, Cornwall.

➢ **Sectoral specialisation**

- *Regions specialising in the agricultural sector*: Niederbayern, Oberpfalz, Schwaben, Kassel, Lüneburg, Weser-Ems, Trier, Anatoliki Makedonia, Kentriki Makedonia, Dytiki Makedonia, Thessalia, Ipeiros, Ionia Nisia, Dytiki Ellada, Sterea Ellada, Peloponnisos, Voreio Aigaio, Notio Aigaio, Kriti, Galicia, Asturias, Cantabria, Navarra, La Rioja, Aragón, Castilla-León, Castilla-la Mancha, Extremadura, Com. Valenciana, Baleares, Andalucia, Murcia, Canarias, Champagne-Ardenne, Centre, Basse-Normandie, Bourgogne, Pays de la Loire, Bretagne, Poitou-Charentes, Aquitaine, Midi-Pyrénées, Limousin, Auvergne, Languedoc-Roussillon, Corse, Border-Midland and Western, Southern and Eastern, Valle d'Aosta, Trentino-Alto Adige, Emilia-Romagna, Umbria, Marche, Abruzzi, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna, Friesland, Flevoland, Burgenland, Niederösterreich, Steiermark, Vorarlberg, Norte, Centro, Lisboa e Vale do Tejo, Alentejo, Algarve, Açores, Madeira, Itä-Suomi, Väli-Suomi, Pohjois-Suomi, Etelä-Suomi, Lincolnshire.
- *Regions specialising in the industrial sector:* Limburg, Oost-Vlaanderen, West-Vlaanderen, Stuttgart, Karlsruhe, Freiburg, Tübingen, Oberfranken, Mittelfranken, Unterfranken, Giessen, Braunschweig, Düsseldorf, Kóln, Münster, Detmold, Arnsberg, Rheinhessen-Pfalz, Saarland, Cataluña, País Vasco, Picardie, Haute-Normandie, Nord-Pas de Calais, Lorraine, Alsace, Franche-Comté, Rhône-Alpes, Piemonte, Lombardia, Veneto, Groningen, Drenthe, Overijssel, Zeeland, Noord-Brabant, Limburg, Wien, Kärnten, Oberösterreich, Tees Valley and Durham, Northumberland et al., Cheshire, Greater Manchester, Lancashire, South Yorkshire, West Yorkshire, Derbyshire, Leicestershire, Hereford et al., Shropshire, West Midlands (county), Highlands and Islands.
- *Regions specialising in the services sector:* Bruxelles-Brussel, Antwerpen, Vlaams Brabant, Brabant Wallon, Hainaut, Liège, Luxembourg, Namur, Danmark, Berlin, Bremen, Hamburg, Schleswig-Holstein, Attiki, Madrid, Île de France, Provence-Alpes-Côte d'Azur, Liguria, Lazio, Utrecht, Noord-Holland, Zuid-Holland, Uusimaa, Aland, Stockholm, Östra Mellansverige, Sydsverige, Mellersta Norrland, Övre Norrland, Smaland med oarna, Västsverige, Merseyside, North Yorkshire, Essex, Inner London, Outer London, Berkshire et al., Surrey, Hampshire, Kent, Avon et al., Dorset, Cornwall, Devon, East Wales, North East Scotland, Eastern Scotland, South West Scotland.

- *Homogenous sector specialitation regions:* Oberbayern, Darmstadt, Hannover, Koblenz, Friuli-Venezia Giulia, Toscana, Luxembourg, Gelderland, Salzburg, Tirol, Norra Mellansverige, Cumbria, East Riding, East Anglia, Bedfordshire, West Wales, Northern Ireland.