

Gardiner, Ben; Martin, Ron; Peter, Tyler

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Competitiveness, Productivity and Economic Growth across the European Regions

BEN GARDINER¹, RON MARTIN² and PETER TYLER³

1. Cambridge Econometrics, Cambridge
2. Department of Geography, University of Cambridge
3. Department of Land Economy, University of Cambridge

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1. REGIONAL COMPETITIVENESS AND PRODUCTIVITY

Recent years have seen a surge of academic and policy attention devoted to the notion of ‘competitiveness’: nations, regions and cities, we are told, have no option but to strive to be competitive in order to survive in the new global marketplace and the ‘new competition’ (BEST, 1990, 1998) being forged by the new information or knowledge-driven economy. Policy-makers at all levels have been swept up in this competitiveness fever. Thus the importance of competitiveness has been a recurring theme in OECD assessments of the advanced economies. Similarly, the European Commission has become much exercised by what it sees as the inferior competitiveness of the European Union, and has set as one of its goals the catch-up of EU competitiveness with that of the US by 2010. Likewise, the UK government has placed the need to boost national competitiveness at the centre of its policy agenda.

This concern with competitiveness has quickly spread to regional, urban and local policy discourse. Growing interest has emerged in the ‘regional foundations’ of national competitiveness, and with developing new forms of regionally-based policy interventions to help improve the competitiveness of every region and major city, and hence the national economy as a whole. In the UK, for example, the Government has assigned increasing importance to the competitiveness of the country’s regions and cities as part of its re-orientation of national and regional policy (HM Treasury, 2001, 2002; DTI, 2001; ODPM, 2002, 2003). In the EU, the issue of regional competitiveness has taken on particular significance not only in relation to its aim to close the ‘competitiveness gap’ with the US, but also as part of its pursuit of social and economic cohesion. Raising the competitiveness of Europe’s lagging and less prosperous regions is regarded as crucial to social cohesion, especially in the context of monetary union and EU enlargement. In fact, a still small but rapidly growing literature now exists on the topic of ‘territorial competitiveness’ (see, for example,).

However, this new focus on ‘place competitiveness’ raises a host of questions as to what, precisely, is meant by the competitiveness of regions, cities and localities. In what sense can one talk of regional competitiveness? In what sense do regions and cities

compete? Traditionally, neither economists nor economic geographers have tended to frame their discussions of regional growth and development in terms of such questions, or certainly not explicitly in the language of competitiveness. Only recently has this state of affairs begun to change (see for, example, STEINLE, 1992; CHESHIRE and GORDON, 1995; DUFFY, 1995; GROUP OF LISBON, 1995; STORPER, 1995, 1997; JENSEN-BUTLER et al. 1997; BEGG, 1999, 2002; *URBAN STUDIES*. 1999; CAMAGNI, 2003; PORTER, 1998a, 1998b, 2000, 2001, 2003). But, these contributions notwithstanding, we are still far from any general consensus about the nature and measurement of regional competitiveness. A not uncommon theme, however, is that regional (and urban) competitiveness has to do with the success with which regions and cities compete with one another over shares of national and especially global export markets. This notion would seem to underpin the European Commission's interpretation of the term:

[Competitiveness is defined as] the ability to produce goods and services which meet the test of international markets, while at the same time maintaining high and sustainable levels of income or, more generally, the ability of (regions) to generate, while being exposed to external competition, relatively high income and employment levels... (EUROPEAN COMMISSION, 1999, p. 4).

Given that regional economies are almost certain to be more open (to trade) than the national economies of which they are a part, this focus on export performance would seem to be warranted. The 'export base' of a region or city has long been viewed as key to regional and urban prosperity, as recently re-emphasised by ROWTHORN (1999):

The prosperity of a region is determined primarily by the strength of its export base ... all those activities which bring income into the region by providing a good or service to the outside world... . The alternative term 'tradables' is also used to denote such activities (pp. 22-23).

The implication of this line of argument would seem to be that a reduction in the size of a region's export base, or a deterioration in the region's trade balance, or both, would signal a decline in regional competitiveness. This approach is very similar to that found in many definitions of national competitiveness, as for example in TYSON's (1992) *Who's Bashing Whom*, where (US) national competitiveness is defined as "our ability to produce goods and services that meet the test of international competition while our citizen's enjoy a standard of living that is both rising and sustainable" (p. 10).

Yet, as KRUGMAN (1996a, 1996b) and others (such as GROUP OF LISBON, 1995) have pointed out, there may be less to this view of competitiveness than meets the eye. Thus Krugman, making frequent reference to the USA, has argued that:

Concerns about competitiveness are, as an empirical matter, almost always completely unfounded... The obsession with competitiveness is not only wrong but dangerous... thinking in terms of competitiveness leads to bad economic policies on a range of issues (KRUGMAN, 1996a, p. 5).

He raises three points of opposition to the idea of national competitiveness. In the first place, he argues that it is misleading and incorrect to make an analogy between a nation and a firm; whereas, for example, an unsuccessful firm will ultimately go out of business, there is no equivalent 'bottom line' for a nation. Second, whereas firms can be seen to compete for market share, and one firm's success will often be at the expense of another, the success of one country creates rather than destroys opportunities for others, and trade between nations is well known not to be a 'zero-sum' game. Third, if competitiveness has any meaning, then it is simply another way of saying *productivity*; that growth in national living standards is essentially determined by the growth rate of productivity.

Michael Porter, who has been amongst the most influential writers on 'competitive advantage' – of firm, industries, nations and regions and cities - also suggests that the best measure of competitiveness is productivity:

Competitiveness remains a concept that is not well understood, despite widespread acceptance of its importance. To understand competitiveness, the starting point must be the sources of a nation's prosperity. A nation's standard of living is determined by the productivity of its economy, which is measured by the value of its goods and services produced per unit of the nation's human, capital and natural resources. Productivity depends both on the value of a nation's products and services, measured by the prices they can command in open markets, and the efficiency with which they can be produced. *True competitiveness, then, is measured by productivity.* Productivity allows a nation to support high wages, a strong currency and attractive returns to capital, and with them a high standard of living (PORTER and KETELS, 2003, emphasis added).

The issue is whether this line of argument applies equally to regions and cities. CELLINI and SOCI (2002) argue that the notion of regional competitiveness is neither a macro-economic (national) nor micro-economic (firm-based) one: regions are neither simple aggregations of firms, nor are they scaled-down versions of nations. CAMAGNI

(2003) takes a similar view. He suggests that regions do indeed compete, but on the basis of absolute advantage rather than comparative advantage. A region may be thought of as having absolute competitive advantages when it possesses superior technological, social, infrastructural or institutional) assets that are external to but which benefit individual firms such that no set of alternative factor prices would induce a geographical redistribution of economic activity. These assets tend to give the region's firms, overall, a higher productivity than would otherwise be the case. As the EUROPEAN COMMISSION (1999) puts it:

[The idea of regional competitiveness] should capture the notion that, despite the fact that there are strongly competitive and uncompetitive firms in every region, there are common features within a region which affect the competitiveness of all firms located there (p. 5)

This is not to suggest that the export performance of regions is unimportant: to the contrary, the comparative advantage of a region's export sectors is still key to its overall growth and prosperity. Competition between regions (both within and between nations) may exclude a region from an industry in which it could have established a comparative advantage, or drive a region from an industry in which comparative advantage could have been maintained (especially bearing in mind that regions do not have recourse to currency devaluation, nor possess the price-wage flexibility, that might alleviate competitive disadvantage in the short run). But the basic point is that regional competitive advantage is both absolute and comparative in nature, and that productivity is not only important in influencing the comparative advantage of a region's export sectors, but is important across the whole range of its industries and services, not just to keep up with external competitors.

In the remainder of this paper, we focus attention on the pattern and dynamics of regional productivity across the European Union. As noted above, the European Commission has highlighted the importance of regional competitiveness for its goal of social cohesion. In addition, the competitiveness of the EU regions is of key significance for the success of the new Single Currency (monetary union) and the major phase of membership enlargement that is about to get underway (MARTIN, 2001; 2003). In the next section, we review some of the conceptual issues involved in thinking about regional productivity differences and evolutions. In order to undertake our empirical analysis, in

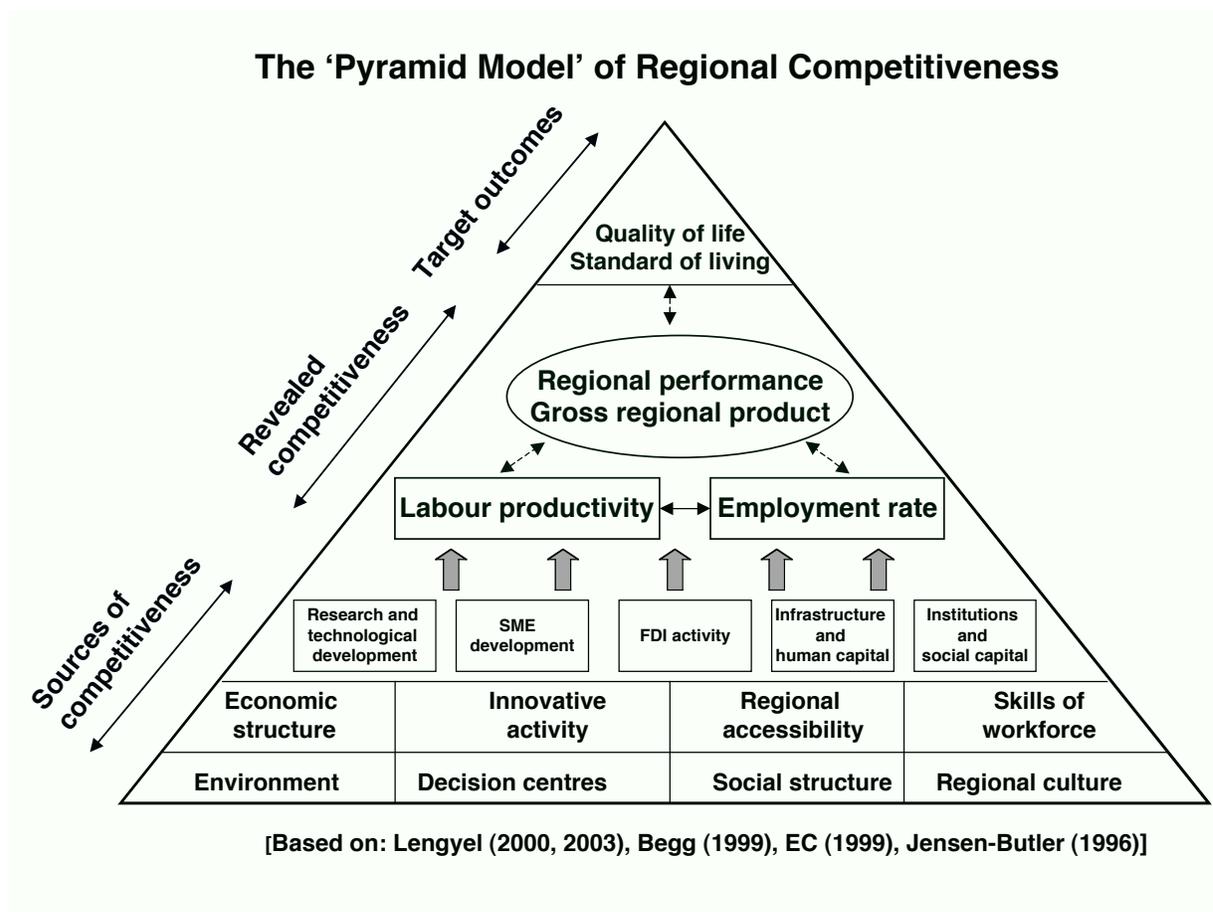
Section 3 we construct a new hours-worked measure of productivity for the EU regions, and examine the pattern and scale of regional productivity differences across the EU, including the Central and East European accession states. Section 4 addresses the important question of whether regional productivity is converging across the Union, and Section 5 relates both productivity growth and changes in employment rates to the pattern of regional per capita GDP growth across the EU. The final section outlines some of the implications of our findings. Throughout, our analysis refers to the NUTS2-level regions, and draws on historical time series data collated and compiled by Cambridge Econometrics.

2. REGIONAL PRODUCTIVITY: SOME CONCEPTUAL ISSUES

At the outset it should be stressed that the concept of productivity is itself far from straightforward. The standard notion of productivity refers to the productive efficiency of a given workforce, that is labour productivity, measured in terms of output per input of labour. This is an aggregative notion, and as Figure 1 suggests, in a regional context labour productivity is the outcome of a variety of determinants (including the sort of regional assets alluded to above). Many of these regional factors and assets also determine a region's overall employment rate. Together, productivity and the employment rate are measures of what might be termed 'revealed competitiveness', and both are central components of a region's economic performance and its prosperity (as measured say by GDP per head), though obviously of themselves tell us little about the underlying regional attributes ('sources of competitiveness') on which they depend. For it would be somewhat perverse to describe a 'competitive' region solely in terms of its productivity because a region's productivity can increase significantly if the firms located there underwent a major phase of rationalisation and downsizing, involving the closure of the least efficient firms and layoff of the least efficient workers. Such one-off rationalisation-induced increases in productivity may not be associated with any overall increase in the output of the region (nor with any improvement in the region's absolute competitive advantage), but with a rise in unemployment that may end up being very difficult to solve. In such circumstances, employment reduction is a 'negative' route to raising regional productivity, and is to be contrasted with regions that have both high productivity *and* employment.

Figure 1 suggests that productivity may differ between regions for a host of different reasons. But equally important is how such differences are predicted to evolve over time. In the standard Neoclassical model the growth of productivity (output per worker) depends on the growth of capital per worker and the (exogenous) rate of technical progress (or total

Figure 1



factor productivity) Hence, regional differences in productivity growth are explained by regional differences in the rate of (exogenous) technical progress and by regional differences in the growth of the capital labour ratio. But given that the model also assumes constant returns to scale, diminishing returns to labour and capital, and complete factor mobility - including the unimpeded diffusion of technological advance – regional productivity disparities are predicted to narrow over time, as initially low productivity regions catch up with initially high productivity ones (Table 1). Neoclassical growth

models of regional convergence have been much researched in recent years with varying empirical results (for a survey, see MARTIN and SUNLEY, 1998).

In endogenous growth models, on the other hand, where technical change is argued to be itself determined by the growth process, the implications for the evolution of regional variations in productivity over time depend on the assumptions made about the

Table 1
Three Theoretical Perspectives on Regional Productivity Growth

Theory	Explanation of regional productivity differences	Evolution of regional productivity differences
Neoclassical Growth Theory	Regional differences in productivity due to different factor endowments, and especially differences in capital/labour ratios and technology	Assumes constant returns to scale; diminishing returns to factors of production; free factor mobility and geographical diffusion of technology, so that low productivity regions should catch up with high productivity one; ie regional convergence in productivity
Endogenous Growth Theory	Regional differences in productivity due to differences in capital/labour ratios, knowledge base and proportion of workforce in knowledge producing industries	Implications for regional productivity evolutions depends on extent to which low technology regions catch up with high technology regions, and this on degree of geographical diffusion of technology and knowledge, and flows of knowledge workers. The more knowledge/technology spillovers are localised, and the more knowledge workers move to leading technology regions the more productivity differences between regions will persist, or even widen.
'New Economic Geography' Models	Spatial agglomeration/ specialisation/clustering are key sources of externalities and increasing returns (labour, knowledge spillovers, specialist suppliers, etc) that give local firms higher productivity	Economic integration (trade, factor flows) increases tendency to spatial agglomeration and specialisation of economic activity, leading to 'core-periphery' equilibria and persistent regional differences in productivity.

process of technical progress. For example, in the Romer version of the endogenous growth model, the rate of growth of technological knowledge is assumed to be a function of the growth in the numbers of workers employed in knowledge-producing activities. If it is further assumed that technological progress diffuses rapidly across geographical space, then we might expect that technical progress in any given region will depend upon the extent to which its own technology lags behind the technology of the most advanced region(s). Low technology regions should therefore experience the fastest growth in output per worker, which means that regional convergence in productivity is predicted to occur in this version of the endogenous growth model. However, there is now ample empirical work that suggests that the spatial diffusion of technology is far from instantaneous as assumed in the Neoclassical model. It is well known that certain regions appear to be innovation leaders. They are the sources of basic inventions and take the lead in applying these innovations in the form of new products and services, or more efficient ways of producing existing products. It seems that technology spillovers tend to be localised, and to be an important source of geographically-concentrated externalities and increasing returns. Regional convergence in productivity may thus be a slow process. The more so if, the leading innovative regions also attract knowledge and highly skilled workers from other regions. Under such conditions, not only may productivity differences between regions persist, they may even widen over time (see MARTIN and SUNLEY, *op cit*, for a review of regional endogenous growth models).

Not unrelated to endogenous growth theory, the ‘new economic geography’ models that have become popular in recent years (see FUJITA, KRUGMAN and VENABLES, 1999; BRACKMAN, GARRETSEN and MARREWIJK, 2001; FUJITA and THISSE, 2002; BALDWIN et al, 2003), attribute regional differences in growth to localised increasing returns arising from the spatial agglomeration of specialised economic activity and the external economies and endogenous effects such localised specialisation generates (accumulation of skilled labour, local knowledge spillovers, specialised suppliers and services, and so on). The existence of localised externalities, and hence the limited geographical range of knowledge spillovers, may be due to locally embedded socio-cultural, political and institutional structures and practices that can all

contribute to the localisation of these external economies (MARTIN, 2000). They can help to explain not only why some regions (and cities) have a higher productivity and growth rate than others (see SVEIKAUSKAS, 1975, for an early but cogent account of why productivity varies between cities), but also why such differences might not diminish over time. Many of the ‘new economic geography’ models in fact predict a ‘core-periphery’ equilibrium pattern of productivity (DAVIS and WEINSTEIN, 2001).

The different prognoses of long-run trends in regional productivity and incomes given by these various models are not simply of academic interest. All three types of model have been used to predict what is likely to happen to regional productivity and per capita incomes across the EU as the process of economic integration (EMU) deepens. As integration proceeds – and trade, factor flows, and regulatory harmonisation all increase – so Neoclassical models predict accelerating convergence. The endogenous growth and ‘new economic geography’ models, on the other hand predict increasing regional specialisation and spatial concentration of economic activity and growth, and hence no necessary convergence. The different models also carry different implications for the trajectories of regional development in the new accession states as they become exposed to and integrated with the EU market. Examining the temporal evolution of regional productivity disparities across the EU is thus crucial to resolving this theoretical debate.

3. REGIONAL PRODUCTIVITY: SOME MEASUREMENT ISSUES

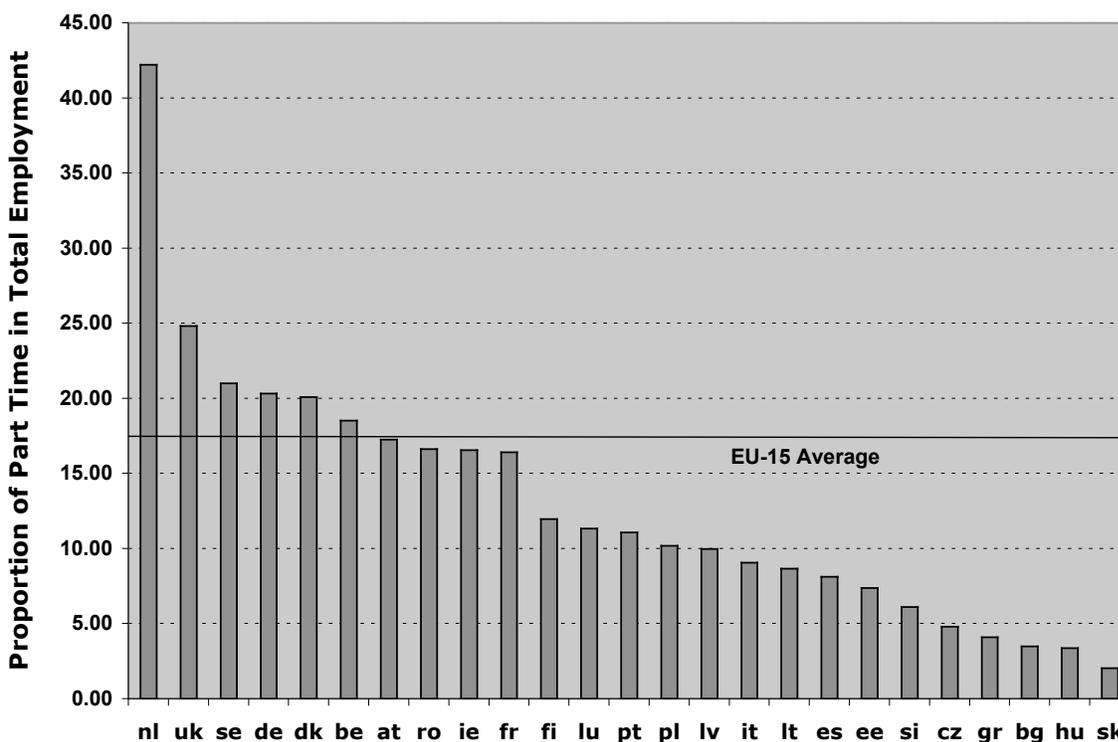
There are several measures of productivity, but the most common is output per employed worker. In the European case, this is the easiest to calculate because regional data on output and employment are readily available from Eurostat’s Regio database. However, this employment measure suffers from not being a direct measure of labour input. Hours-worked is the better indicator as people work different weekly hours in different countries and this should be taken account of when measuring productivity. In the past it has not been possible to distinguish regional productivity as output per hour – due to data limitations, but two versions of an hours-worked measure of productivity are possible. One is a new data series of regional hours work derived from the Labour Force Survey (LFS), which takes account of differences in part-time and full-time employment. These data were supplied by the European Commission. The alternative measure of hours

worked is a composition-derived estimate based on regional sectoral structure and national sectoral average hours-worked.

The sectoral hours-worked measure, calculated by applying national sectoral hours-worked data to a region's industrial structure to build up a total hours worked series, represents an improvement on just using employment, but there is still the problem of distinguishing between part and full-time employment, as the sectoral hours-worked series relates to full-time employees only. If the relative proportions of workers in each category were the same across countries/regions this would not be a problem. But Figure 2 clearly shows that significant differences exist.

The effect would be that for countries such as the Netherlands and the UK, which have a relatively high proportion of part-time employment, productivity would be artificially deflated while the employment rate would be correspondingly inflated. To correct for this distortion, an adjusted (that is, averaging across part and full-time employment categories) regional weekly hours-worked series, is used here. This has

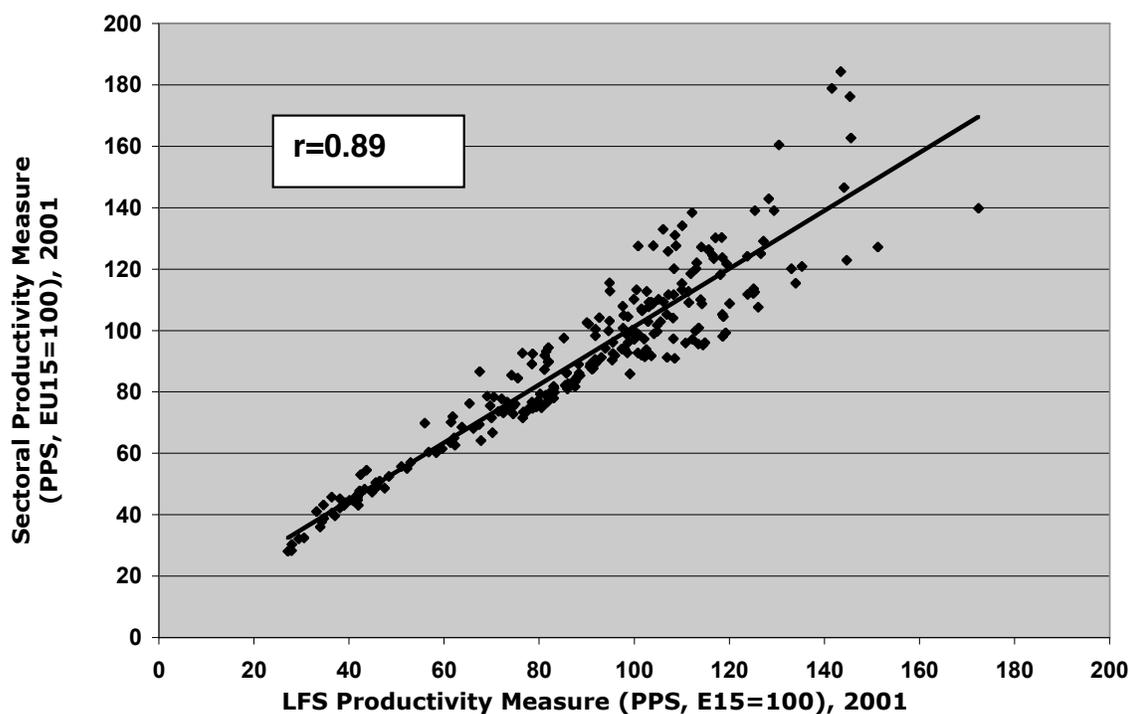
Figure 2
The Share of Part-Time in Total Employment across EU Countries
(including CEEC Accession States), 2001



been combined with the headcount employment measure to create a more accurate representation of labour input and hence productivity.

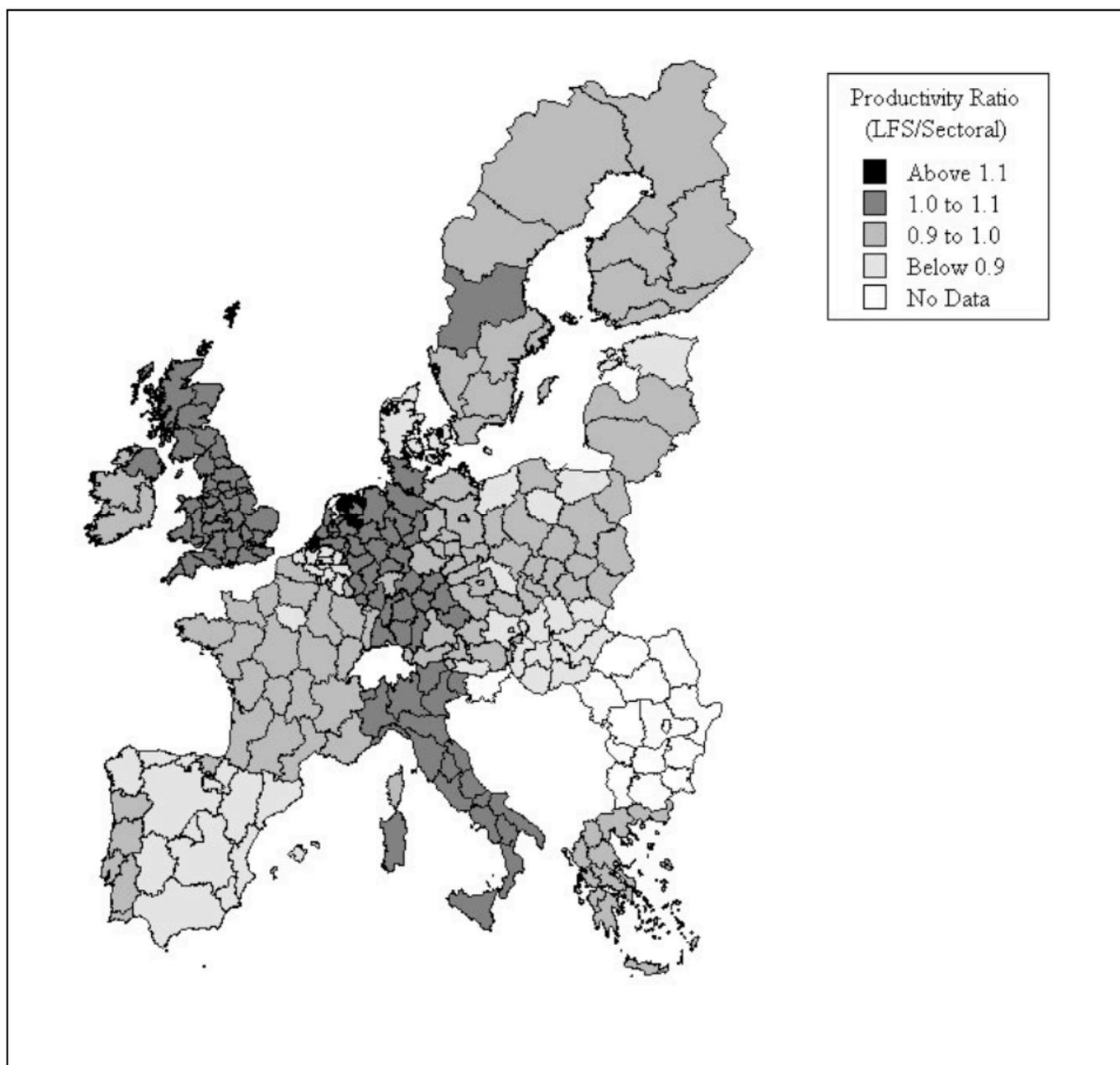
Figure 3 shows the correlation between the sectoral and LFS hours-worked measures of productivity, both based on PPS and EU15=100 normalisation. Although the correspondence between the two measures is quite close, for some regions the differences between the two definitions is quite large. As Figure 4 indicates, these differences run mainly along national lines, with regions in the Netherlands, Italy, the UK and much of Germany recording a higher productivity per hour worked using the LFS measure than the sector-based one; and vice versa for regions in Belgium, Denmark, Spain, and some new accession countries. These results are broadly in line with the national differences in the relative importance of part-time employment shown in Figure 2, and confirm that failure to take proper account of part-time employment could lead to incorrect estimates of regional productivity

Figure 3
Labour Force Versus Sectoral Hours-Worked Productivity
Measures, across EU NUTS2 Regions, 2001



The LFS hours-based measure of productivity is not without its problems, however. The LFS data refer to an individual's main job, rather than all work carried out. In addition, the LFS data are residence-based, whereas GDP data are occupation-based, so the two do not necessarily match precisely. Nonetheless, the results do seem an improvement on the sectorally constructed hours-worked series.

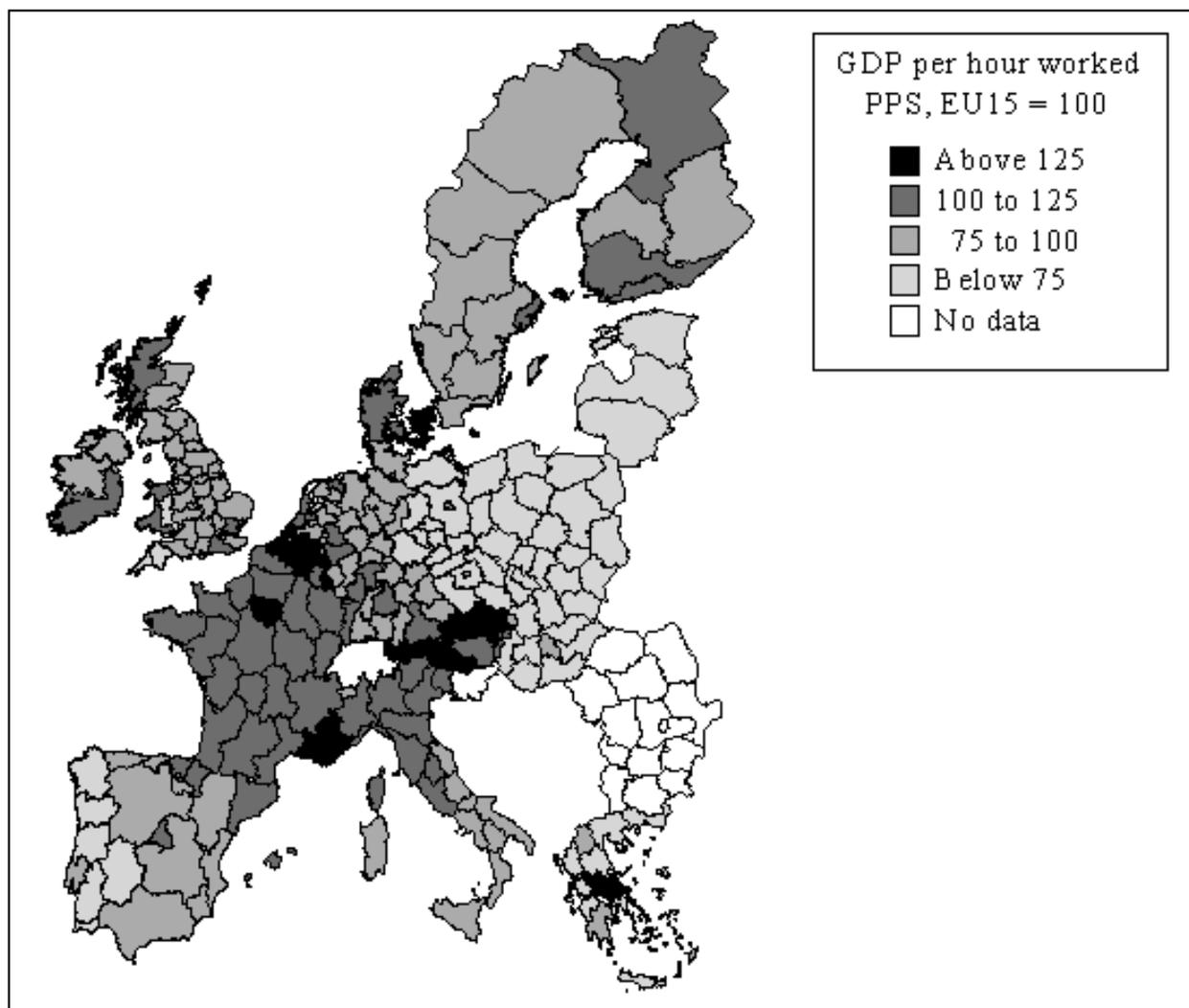
Figure 4
Ratio of Labour Force to Sector Based Regional Productivity, 2001



Estimates of regional productivity, using this LFS hours-worked measure, are shown in Figure 5. Regional differences in labour productivity across the Union are substantial. Within the EU-15 group of countries, productivity ranges from only around 50 percent of the EU-15 in some regions of Portugal and Greece, to about 150 percent of the EU-15 average in certain regions of the Netherlands, Austria, France and Belgium. Almost the whole of France, northern Italy, Austria, Denmark, much of Finland and parts of Ireland, the southeast of England, and some areas in southern Germany, emerge as having the highest productivity. These differences are only partly accounted for by regional differences in industrial structures and specialisation (see CAMBRIDGE ECONOMETRICS et al, 2003). The former East Germany, the Central and East European accession states, and Portugal have the lowest productivity. There is some indication of a broad 'core-periphery' pattern of regional productivity across the European Union, although the high productivity outliers found in southern Ireland, and Finland complicates any such generalisation.

At the same time, it is apparent that regional disparities in productivity are a characteristic feature of almost every EU-15 member state, including those in which regional productivity levels in general are high by EU-15 standards. Indeed, regional productivity disparities in productivity are noticeably wider than in the new accession states, which tend to have almost uniformly low productivity levels. In effect, the enlargement of the Union to include the Central and East European states will add a large low productivity periphery to the economic landscape of the EU, in which productivity will be only around half of the EU-15 average and in some regions only around 40 percent. The key issue, of course, is whether these regional differences in productivity across the EU have been narrowing or widening over time, and it to this question that we now turn.

Figure 5
Regional Productivity across the EU, 2001
(LFS hours-worked measure)

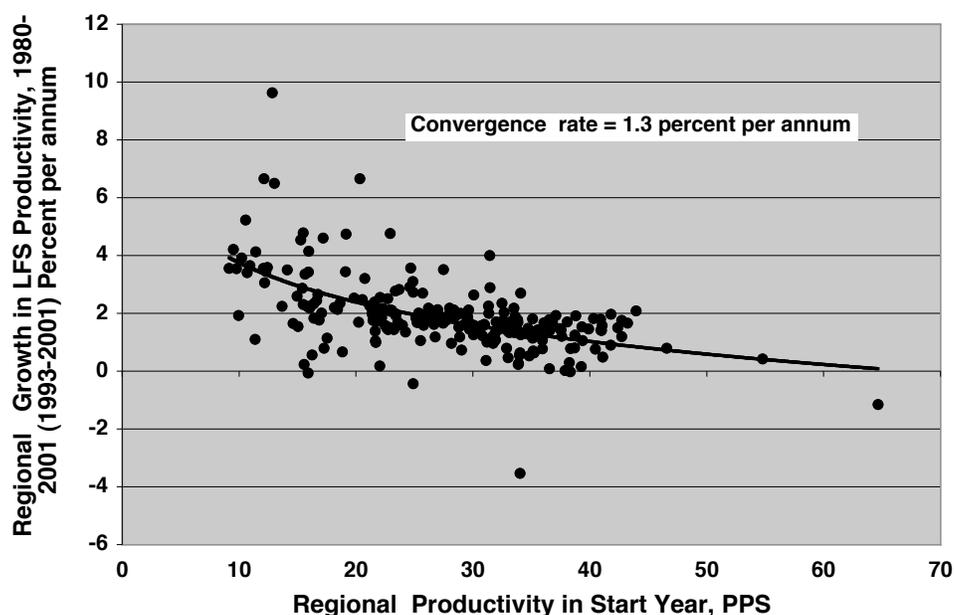


4. EVIDENCE ON THE CONVERGENCE OF REGIONAL PRODUCTIVITY ACROSS THE EU

The standard Neoclassical growth model predicts the catch-up of initially low productivity regions, on the grounds of factor price equalisation across regions, rapid technology transfer, as well as diminishing returns to labour and capital; that is to say, initially low productivity regions should record higher rates of growth than initially high

productivity regions. Other alternative models of regional growth, of the sort discussed above, do not necessarily predict any convergence at all. Almost all of the empirical analyses that have been conducted thus far have focused on regional GDP per capita, rather than regional productivity, and have tended to suggest that regional convergence in the EU is at best a very slow process typically only 1-2 percent per annum, implying that it would take several decades for any significant narrowing of regional disparities in per capita GDP to occur (see ARMSTRONG and CHESHIRE, 1996; MARTIN AND SUNLEY, 1998; BUTTON and PENTECOST, 1999).

Figure 6
Slow Convergence in Regional Productivity Across EU Regions, 1980-2001



(Data refer to 1980 and 2001 for EU-15 regions, and 1993 and 2001 for CEEC regions)

The LFS hours-worked measure of productivity for the NUTS2 regions of the basic EU-15 member countries shows some measure of convergence over the 1980s and 1990s (Figure 6). It has been the regions that had the lowest productivity levels in 1980 that have registered the highest productivity growth – in many cases of between 2-4 per cent per annum in real terms - while many of the initially high productivity regions have recorded

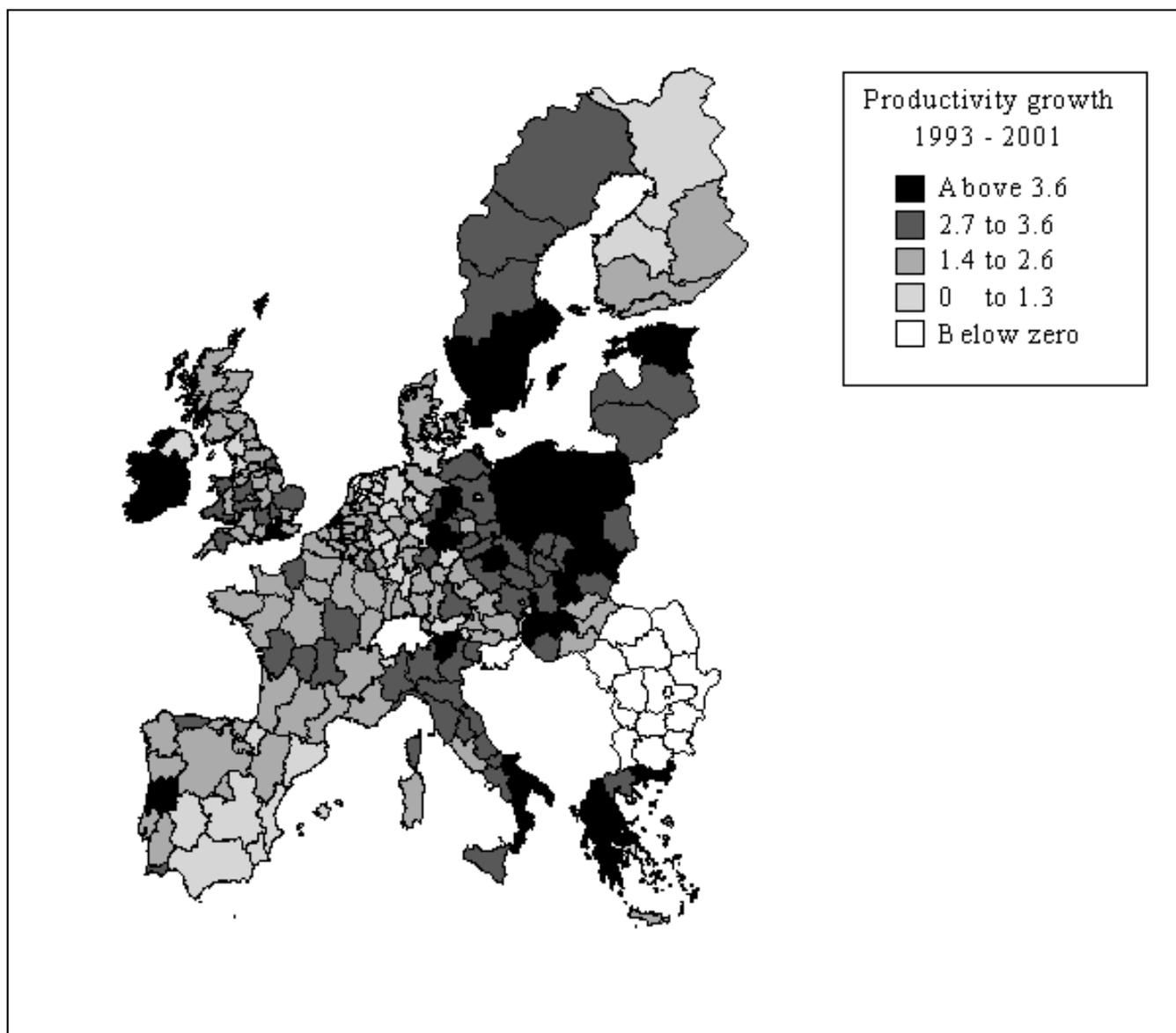
productivity growth rates of less than 1 percent per annum. The relationship between initial regional productivity relativities and subsequent productivity growth is negative, as indicated by the straightforward correlation of -0.64 . But if a logarithmic relationship is fitted – as in the Barro-type Neoclassical growth regression (BARRO and SALA-I-MARTIN, 1995) – the slope is weak, and yields an annual absolute convergence rate of 1.3 percent per annum, indicating that it would take around 35 years for initial regional disparities in productivity to be halved. Thus if regional productivity evolutions within the EU-15 are following a Neoclassical growth process, it is an extremely slow one.

If we include the CEEC states, so that our data are restricted to the more recent 1993-2001 period, it has been the regions in these countries that have experienced the most rapid growth in productivity, with real growth rates in excess of 4 percent per annum in some cases. Above average rates of growth have also been recorded by regions in Sweden, Greece, throughout much of Italy, and in Ireland (Figure 7). Thus while the regional pattern of productivity growth is rather mixed across the EU as a whole, the evidence indicates that since the dissolution of the former Communist bloc at the beginning of the 1990s, the very low productivity regions of the CEEC countries have managed to improve their labour productivity much faster than most other regions of the EU, although of course they have a very long way to go to catch up with the core regions of the EU-15.

Two issues that have received surprisingly little empirical analysis in the literature on regional convergence are whether and to what extent convergence varies with the economic cycle, and with the relative specialisation of regions in traded (export) sectors of activity as against non-traded sectors. With regard to the effect of the economic cycle, it has been noted that absolute regional differences in unemployment in EU countries rates tend to vary counter-cyclically, widening during recessions and narrowing during booms (BADDELEY, MARTIN and TYLER, 1998; MARTIN, 1998). It might be expected therefore that regional productivity disparities might also narrow during boom periods, as low productivity regions are particularly well placed to take advantage of the expansionary economic conditions and to expand output per worker accordingly. On the other hand, given such regions are also likely to be those with the highest unemployment, and hence ready pools of available labour, it could be that the main impact of general

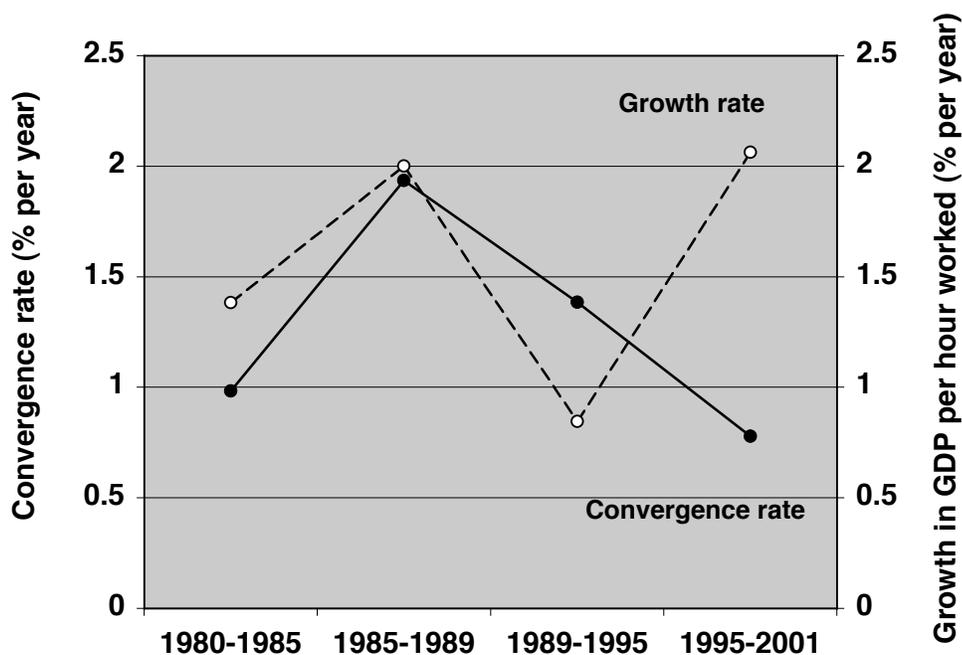
economic boom in such areas is the expansion of output via increases in employment rather than major boost in productivity. This would be consistent with the tendency for regional unemployment disparities to narrow in boom periods.

Figure 7
Regional Productivity Growth across the EU, 1993-2001
(LFS hours-worked measure)



Over the 1980-2001 period under study here, the EU experienced two major economic cycles: recession in the early 1980s, followed by a strong recovery and boom in the second half the 1980s; then another downturn in the early-1990s, followed by recovery in the second half of that decade. As Figure 8 shows, overall EU productivity growth has varied pro-cyclically, being higher in both boom periods (averaging 2 percent per annum in real terms) than in the recessionary periods (just under 1.5 percent in the 1980-1985 recessionary period, and less than 1 percent in the first half of the 1990s). The rate of convergence in regional productivity across the EU-15 also followed the economic cycle up to the mid-1990s, being lower in recession and faster in recovery, but failed to increase again in the boom of the second half of the decade. In effect, the rate of convergence in regional productivity across the EU has been falling since the late-1980, precisely the time when EU economic integration has accelerated.

Figure 8
Regional Productivity Convergence in the EU-15 over Two Economic Cycles



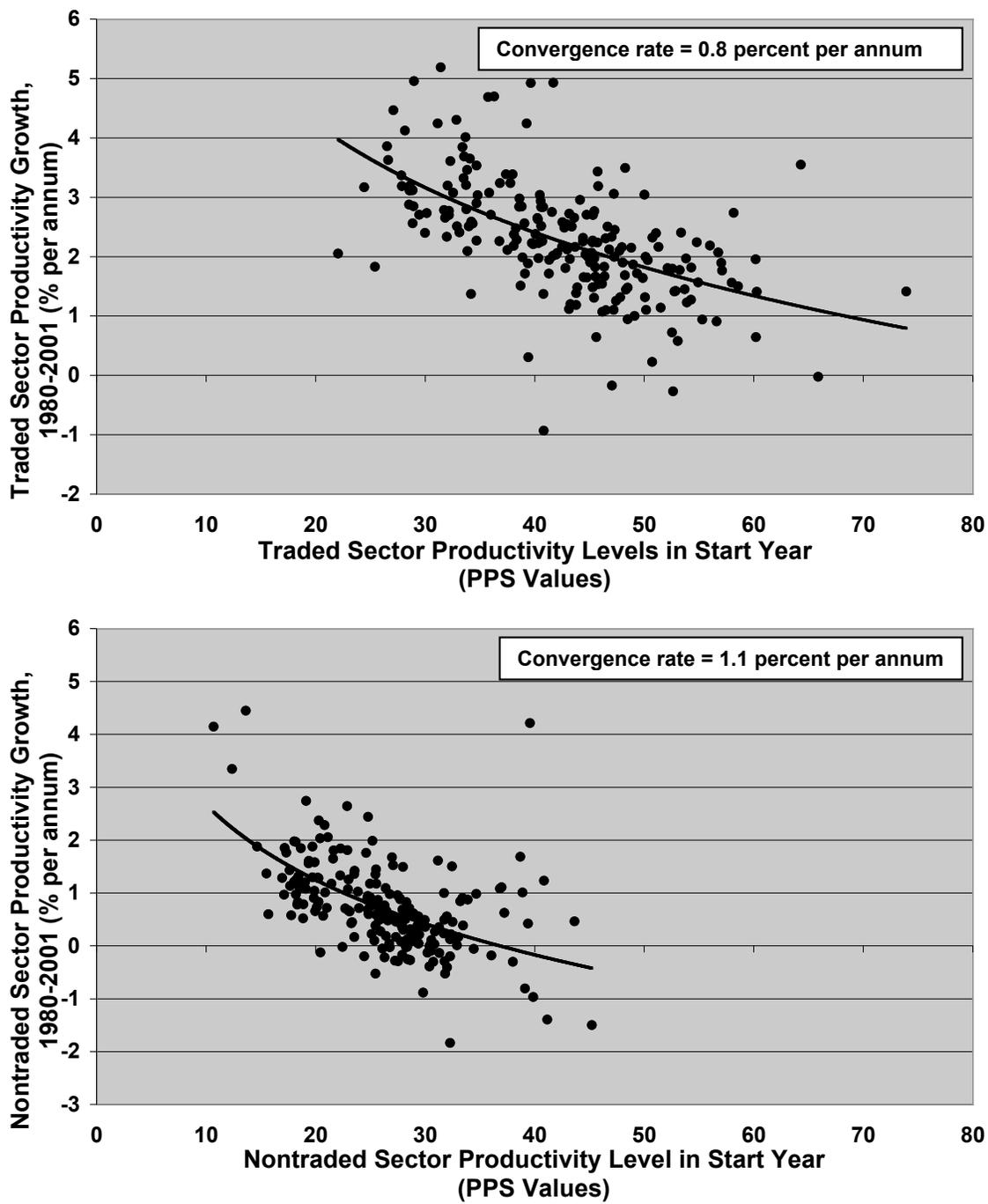
Another aspect of regional productivity convergence concerns the impact of economic structure, and in particular the relative importance of traded and non-traded sectors. Recall from Section 1 that the productivity of a region's tradable (export) base is often regarded as the key to that region's overall economic performance and prosperity. Because, by definition, a region's export activities are directly exposed to competition from similar activities in other regions, the supposition is that this openness should expose the sectors in question to pressures that make for constant improvements in technology, efficiency, investment, product design and so on if a region's exporting firms are to remain competitive. Regional non-traded activities, that serve local markets, are not exposed to such external competitive pressure. Thus the expectation is that regional convergence in productivity should be faster in traded sectors than in non-traded ones.

Sectoral data limitations at the regional level prevent a detailed evaluation of this issue, in the sense of being able to isolate the export base of individual regions, but a preliminary analysis is possible in the case of the EU-15 states by recalculating regional productivity separately for two aggregate sectors that correspond in broad terms to 'traded' and 'non-traded' activities. The former was defined to include manufacturing, energy, business services (including finance), and intermediate services; and the latter to include construction, household services, and public sector services. This is obviously only an approximate decomposition, since not all local manufacturing industries or financial services need export, while some construction activities and household services are exported out of regions. Nevertheless, our broad division should be sufficient to capture any significant productivity differences between traded and non-traded activity across regions, and whether these two sectors differ in their convergence behaviour over time.

The results are quite instructive (Figure 9). First, as perhaps expected, start-year average productivity levels in the EU-15 regions were noticeably higher in traded activities than in non-traded. Second, the evidence suggests that regional productivity convergence in traded activities has been no faster, in fact slower, than that in the non-traded sector. This is, perhaps, surprising, given that traded activities are likely to be much more exposed to external competition. On the other hand, since the composition of household and public services tends to be similar across regions, we might expect

productivity differences to be small and to diminish over time. Interestingly, productivity levels in non-traded activities were noticeably less variable across regions to begin with.

Figure 9
Regional Productivity Convergence in Traded and Non-traded Sectors, EU-15 States



Third, regional productivity growth rates have tended to be lower in non-traded than in traded activities. Clearly, these findings are highly tentative, and more detailed analysis is needed before any definitive statements can be made about the impacts of openness and the ‘export base’ on long-run regional productivity trends.

5. THE CONTRIBUTION OF PRODUCTIVITY TO REGIONAL ECONOMIC PERFORMANCE

Following the logic of Figure 1, the outcome of regional competitive success can be defined as a high level of GDP per capita. This in turn can be decomposed into four elements, each of which has a direct economic interpretation: productivity (measured as GDP per hour worked), the employment rate, the dependency rate, and the work-leisure trade off. That is:

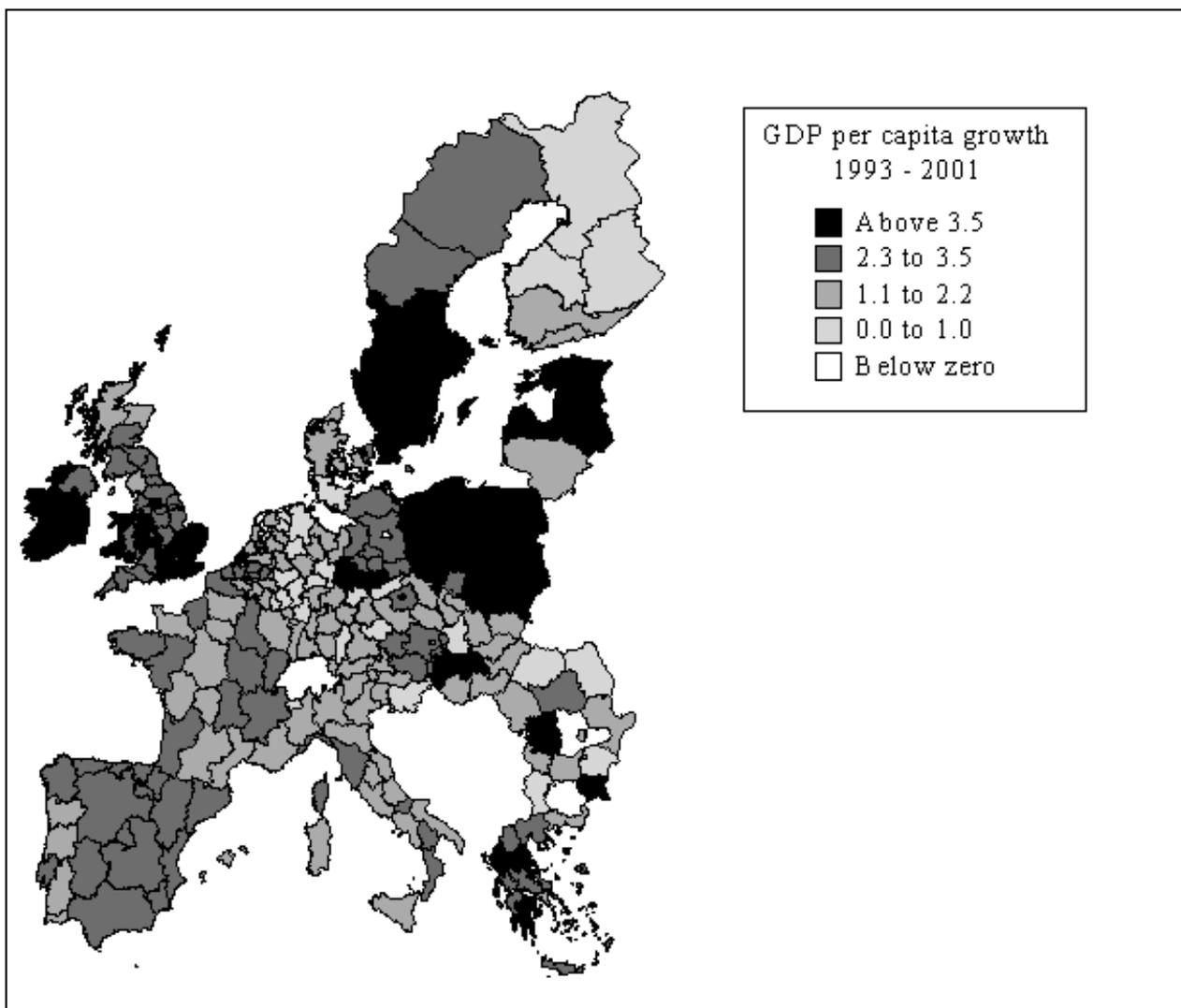
$$\frac{GDP}{Population} = \frac{GDP}{Total\ Hours\ Worked} * \frac{Total\ Hours\ Worked}{Employment} * \frac{Employment}{Working\ Age\ Population} * \frac{Working\ Age\ Population}{Population}$$

(Productivity) *(Work-Leisure)* *(Employment Rate)* *(Dependency Rate)*

As indicated earlier, productivity is one of two key measures of ‘revealed competitiveness’ – the other being the employment rate. These in turn are also two of the components of the conventional indicator of regional per capita GDP. In this section we explore the contribution of productivity and the employment rate to regional per capita GDP growth across the Union.

Since the early-1990s, growth in GDP per capita has tended to be fastest in the peripheral areas of Europe, particularly those in Central and Eastern European countries, together with Spain, Ireland, Portugal and part of Greece (Figure 10). These areas also tend to be those with lower levels of GDP per capita, with the exception of Ireland which has overtaken the EU-15 average. Notable exceptions to this rule include the South East region in the UK and southern Sweden, areas that are prosperous and that have had high rates of economic growth. Overall, the rate of convergence of per capita GDP across regions of the EU-15 has been less than 1 percent per annum over the 1980s and 1990s.

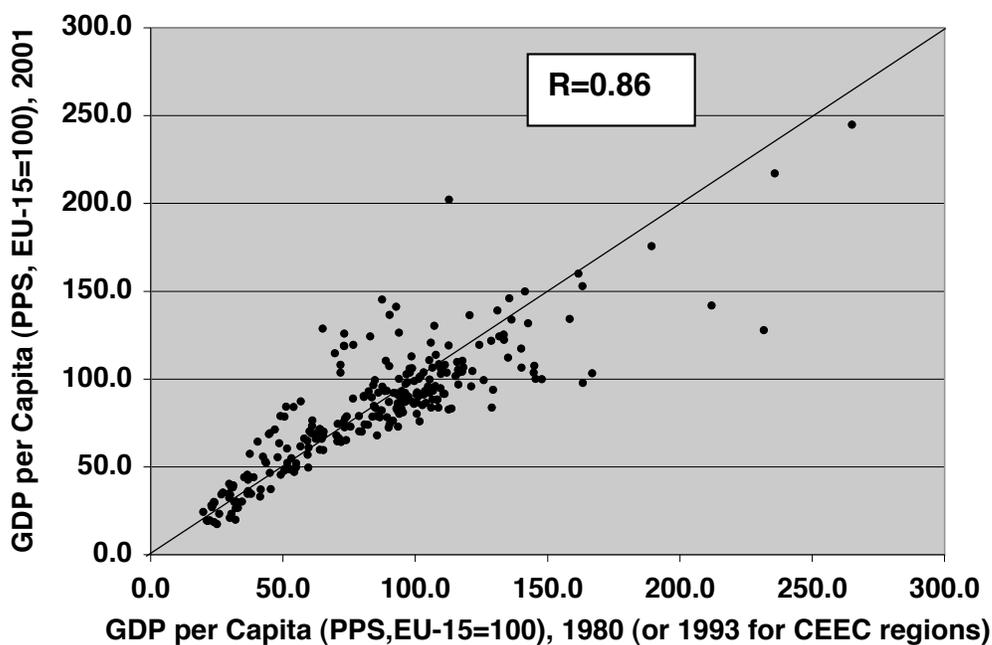
Figure 10
Real GDP per Capita Growth across the EU Regions, 1993-2001



And this seems to have been almost entirely due to the rapid convergence that took place during the pronounced economic boom of the second half of the 1980s. Outside this sub-period, convergence has been negligible or non-existent, in much the same way as for productivity. Thus regional disparities in per capita GDP across the EU display a high degree of persistence, with the pattern in 2001 bearing a strong similarity with that in 1980 (see also MARTIN, 2001): the correlation between the two is high (see Figure 11). In fact, as Figure 12 indicates, the regional dispersion of productivity within member states has not changed significantly: what is also evident is that while average

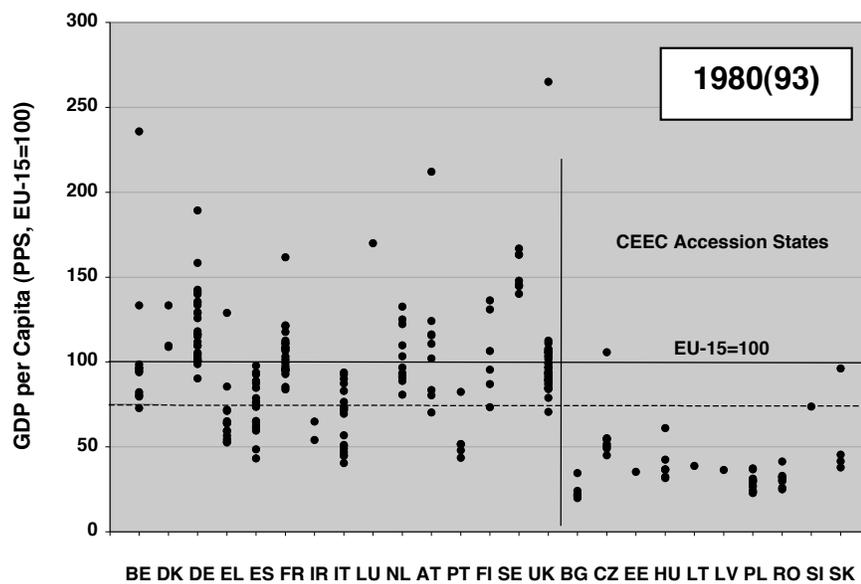
productivity levels may have become more similar between nations, within-nation regional differences have not narrowed and in some cases (UK, Italy, Netherlands, Austria, Germany) have actually increased. Also evident is the fact that the vast majority of the CEEC regions have GDP per capita levels well below 75 percent of the EU-15 average.

Figure 11
The Persistence of Regional Disparities in Economic Prosperity in the EU

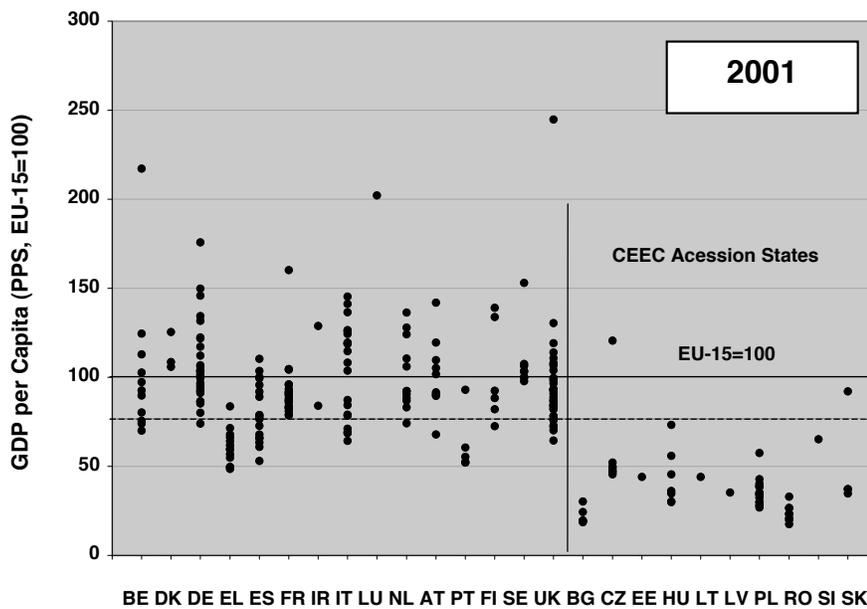


How do productivity and the employment rate influence these regional differences in per capita GDP growth? Table 2 examines the components of per capita GDP by three broad groups of regions: those with per capita GDP less than 75 percent of the EU-15 average (what has been the threshold for eligibility for Structural Fund support), those with a per capita GDP between 75 per cent, and the EU-15 average, and those with a per

Figure 12
Regional Disparities in GDP per Capita across the European Union, 1980
and 2001



(Note: data for CEEC countries are for 1993)



capita GDP greater than the EU-15 average. The dependency rate shows little variation across these three regional groups, while the hours worked component shows only minor variation, and what exists indicates a negative association with GDP per capita: that is, regions with lower GDP per capita have a higher than average level of working hours. The explanation may lie in the sectoral structure of production; for example, regions which specialise in agriculture have a higher number of weekly hours worked, and so the lower productivity of such activities leads to a lower level of GDP per capita.

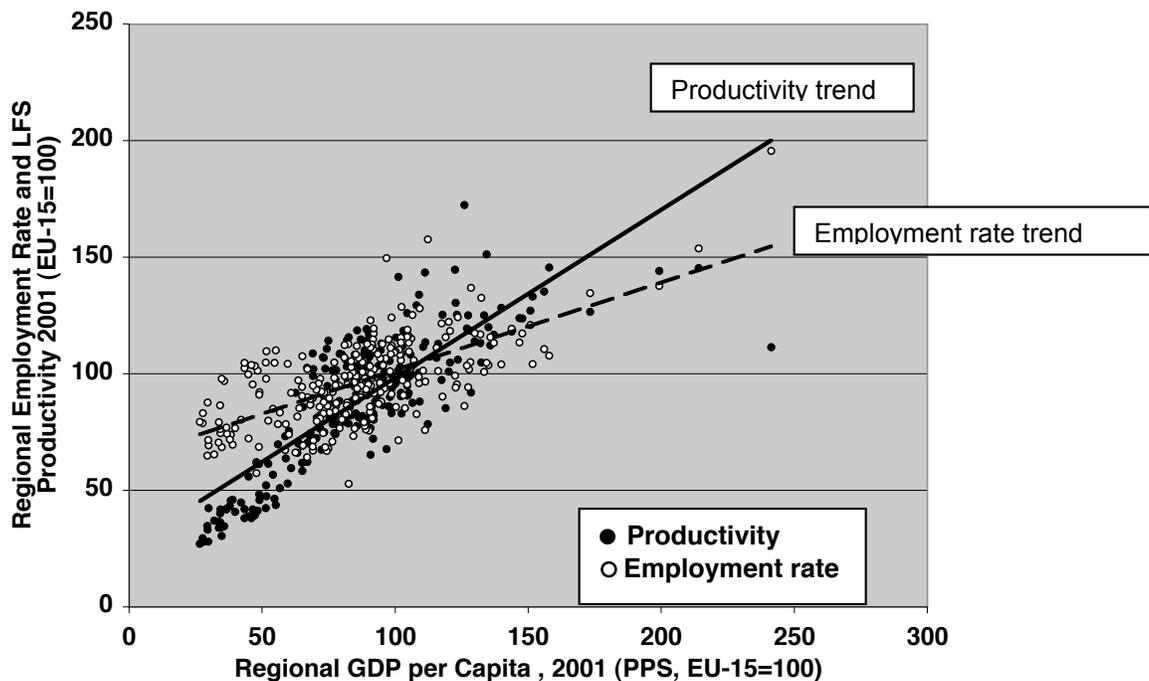
Table 2
Components of GDP Per Capita by Relative Level of Regional Prosperity,
2001

GDP COMPONENT								
Regional GDP Per Capita Group	No of Regions	GDP per capita	Productivity		Hours-Worked		Empl Rate	Dep Rate
			Sectoral	LFS	Sectoral	LFS		
Less than 75% EU average	48	64.86	76.85	73.74	102.97	107.63	84.64	99.82
More than 75% but less than EU average	87	88.07	96.59	94.85	99.05	100.26	95.86	98.53
More than EU average	71	121.78	112.92	111.37	99.68	100.21	110.53	100.12

Productivity and the employment rate clearly account for most the variation in average GDP per capita across the three regional groups. In terms of levels, both the employment rate and productivity share a common association with GDP per capita, largely because both are positively linked to economic development; that is, more successful regions have well developed economies with reasonably high labour participation rates (in particular a higher participation rate among women), and by and

large a productive workforce (see Figure 13). Once growth rates are analysed, however, it quickly becomes apparent that productivity and not employment is the main link with GDP per capita growth (Figure 14). This result supports the argument that ultimately (in the long-term) it is technological progress that drives growth. Bringing more people into the labour market can produce a short-term effect, but, migration issues aside, there is a natural constraint on how far such an effect can go. This leaves productivity as the main driver of per capita GDP.

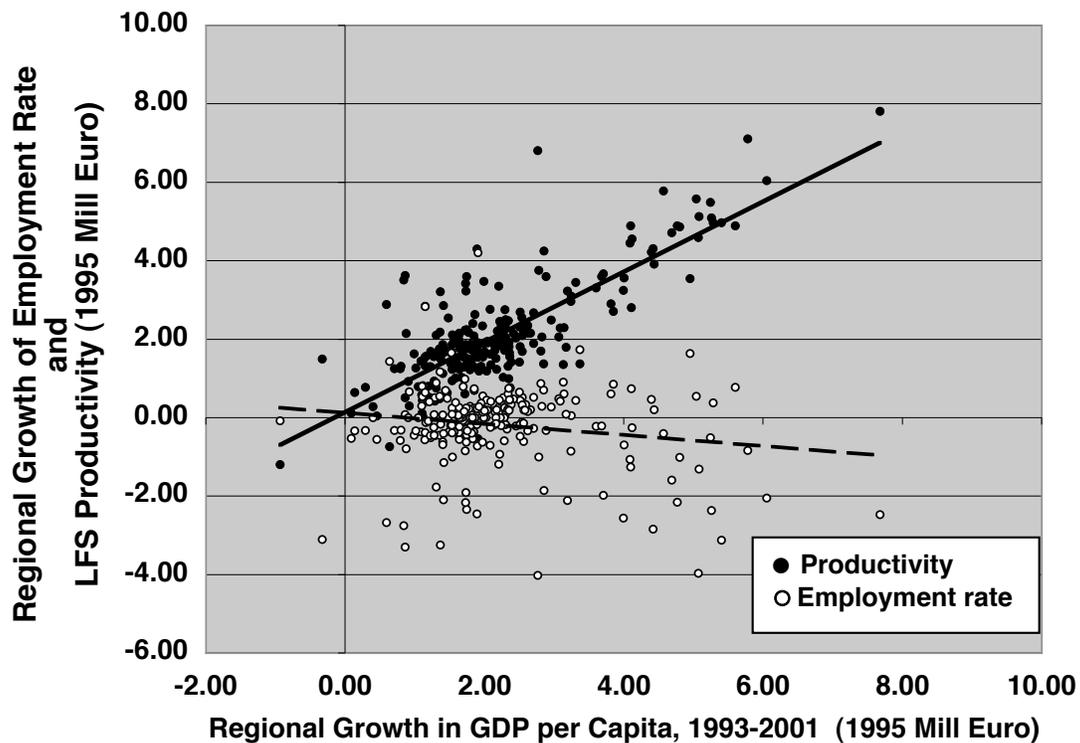
Figure 13
GDP Per Capita, Productivity and Employment across EU Regions



However, this result combines both western European regions and those in the CEEC accession states. As we have already seen, the latter have recorded some of the highest growth rates in per capita GDP across the European economic space in recent years. But this appears to have been primarily due to marked increases in productivity rather than to improvements in employment rates: indeed, employment rate growth in many of the CEEC regions is negative (Figure 15; Table 3). This implies that the high

rates of productivity growth found amongst many of the regions in the Central and East European Accession states has been attributable in part to ‘labour shake-out’ (rationalisation) effects. Such effects may give a boost to productivity over the short-run, but cannot be the source of sustained productivity growth and catch-up with the rest of the EU over the longer term. Also, of course, labour shake-out exacerbates unemployment, which in turn frustrates the pursuit of social cohesion.

Figure 14
Growth of GDP Per Capita, Productivity and Employment across EU Regions

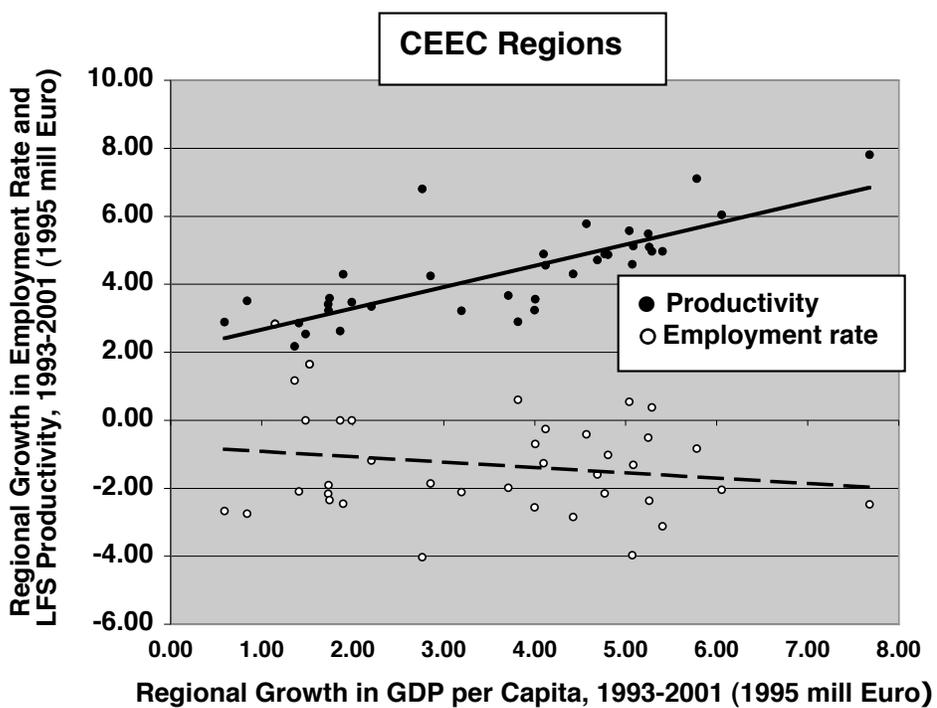
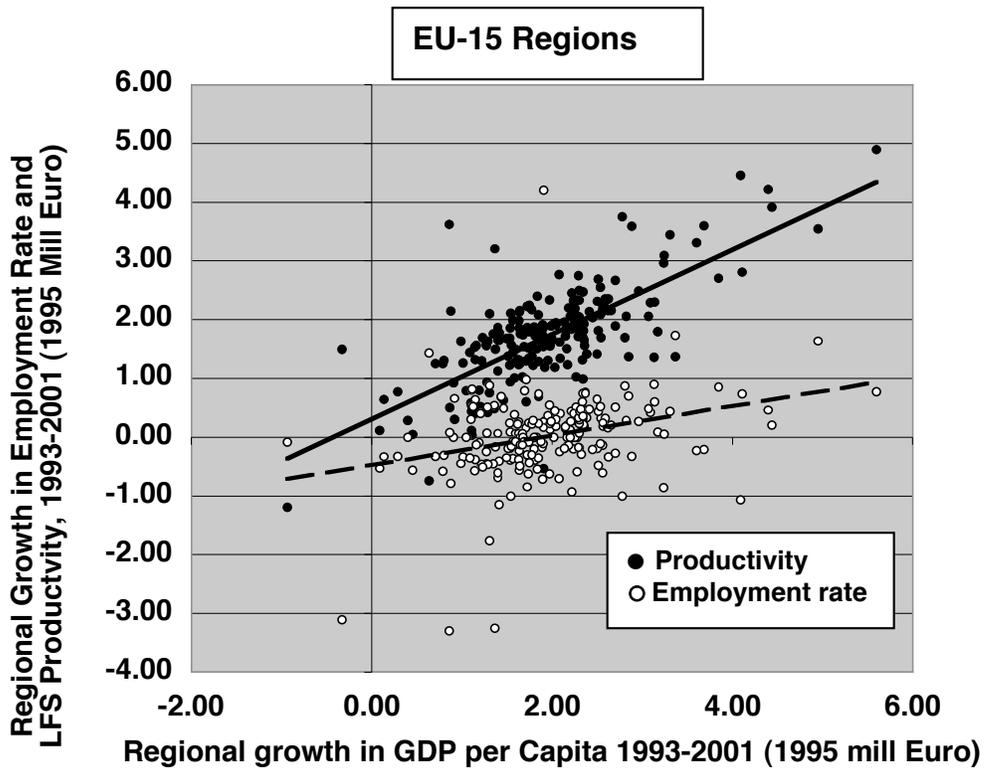


Note: Average growth (% per annum) over 1980-2001, except for some German Regions (1993-2001), Flevoland (1986-2001) and all Accession Countries (1993-2001).

7. SOME CONCLUSIONS AND IMPLICATIONS

Although there is considerable debate amongst academics and policy makers as to the precise definition of regional competitiveness, there can be little doubt that

Figure 15
Regional GDP Per Capita, Productivity and Employment In the EU-15 And CEEC Accession States



productivity represents one of its most important ‘revealed’ measures. In the light of the adoption of the Single Market from 1992 onwards and the more establishment of a single currency space, it is perhaps not surprising that policy makers across Europe have been keen to establish what has been happening to regional disparities in productivity and whether there is evidence of convergence, that is whether the weaker regions are

Table 3: Productivity Growth and Employment Rate Decline in Top Ten Growth Regions in CCEC, 1993-2001 (Annual % rates)

Country	Region	GDP/hd Growth	Productivity Growth	Emp Rate Growth
Poland	Mazowieckie	7.93	7.81	-2.48
Hungary	Nyugat-Dunántúl	5.78	6.05	-1.84
Bulgaria	Yugoiztochen	5.45	5.78	-1.96
Poland	Wielkopolskie	5.44	5.63	-2.05
Hungary	Közép-Dunántúl	5.04	4.43	-0.55
Hungary	Közép-Magyarország	4.57	4.53	-0.41
Poland	Malopolskie	4.23	4.50	-2.37
Poland	Pomorskie	4.22	3.99	-0.51
Poland	Lódzkie	4.10	3.77	-3.12
Czech Republic	Praha	4.10	3.93	-1.26

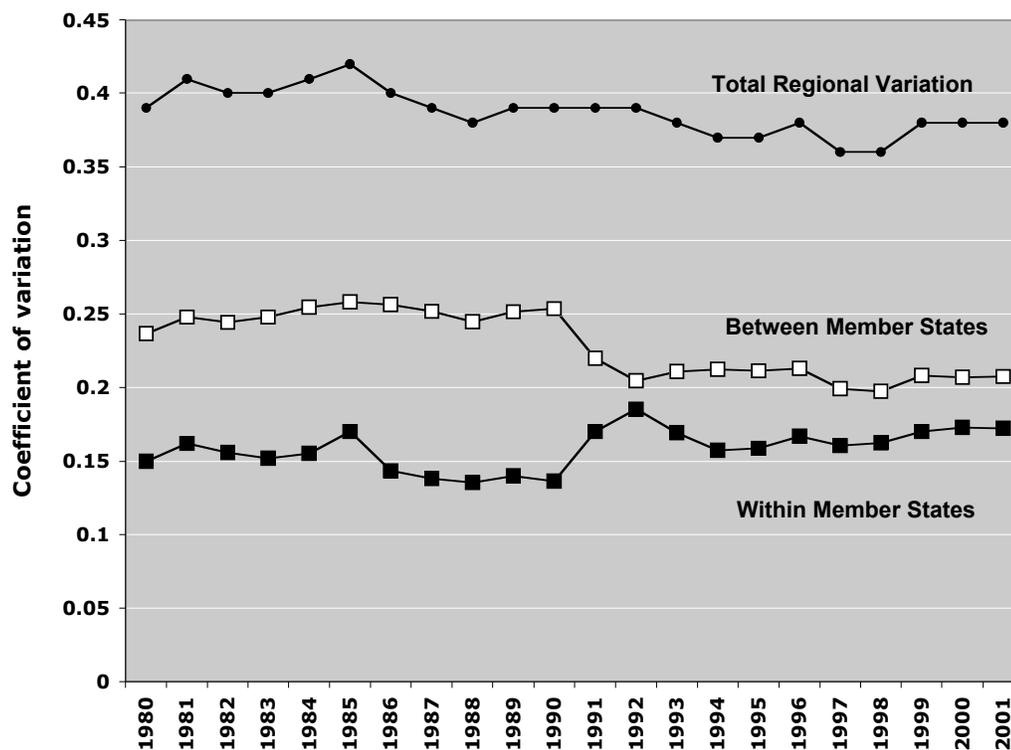
catching-up with the stronger ones. This interest reflects not only a desire by policy makers to enhance the overall efficiency of the Union so that its economic performance is more in line with that of the United States, but also a genuine concern that regions with relatively poor productivity performance should not be at a disadvantage in the context of monetary union and EU enlargement.

In this paper, we have sought to investigate some of the conceptual and measurement problems that arise in measuring regional variations in productivity and, for the first time, have used new evidence based on an output per hour worked measure that, whilst not without its own problems, does provide a better indication of the underlying concept relative to previous indicators (such as output per head, or output per employee). The output per hour worked measure reveals a number of areas of higher than average productivity: much of France, and especially the Paris sub-region and Provence-Alpes-

Coted'Azur; almost all of Belgium; northern and central Italy; almost all of Austria; Demark; much of Finland, southern Ireland, parts of southeast England; and some areas in southern Germany. The former East Germany, the Central and East European accession states, and Portugal have the lowest productivity. There is thus some indication of a broad 'core-periphery' pattern of regional productivity across the European Union, although there are high productivity outliers found in southern Ireland, and Finland. What is all too clear, however, is that the enlargement of the Union to include the Central and East European states will add a large low productivity periphery to the economic landscape of the EU.

There are widely differing views amongst economists as to the determinants of regional productivity and what happens to regional disparities in productivity over time. Standard Neoclassical theory predicts that with increasing economic and monetary integration, low productivity regions should catch up with high productivity regions. In the context of the EU, such convergence is an important dimension of the goal of 'cohesion'. However, other economic theories – which emphasise the importance of various forms of increasing returns – suggest that increasing integration does not necessarily lead to regional convergence in productivity (or GDP per head), and may in fact reproduce or even reinforce existing regional differences, leading to regional divergence or growing core-periphery patterns of productivity and competitiveness. The empirical results presented in this paper suggest that while some initially low productivity regions (most notably Ireland) have improved their relative position within the EU over the past twenty years or so, a period of accelerating integration, the general degree of catch up (convergence) has been disappointingly slow (not much more than 1 percent per annum). And much of what convergence has occurred seems to have taken place in the boom conditions of the second half of the 1980s; since then there has been very little if any convergence. Furthermore, if the total variation in productivity across the regions of the EU-15 is decomposed into within and between member state components, it appears that there has been no discernible reduction in the former, and that the slight fall in total region dispersion over the period has been entirely due to a reduction in between state differentials (Figure 16). Overall our results accord more with the core-periphery models of the new economic geography than with Neoclassical growth theory.

Figure 16: Regional Dispersion of Productivity across the EU-15, 1980-2001: Total, and Decomposition into Within and Between Member States.



What is evident, however, is that productivity growth is a key determinant of regional economic prosperity: there is a strong positive relationship across regions between productivity growth and growth in per capita GDP. Yet the rate of convergence of per capita GDP across EU regions has been even slower than of productivity. Part of the explanation seems to reside in the way in which employment growth – the other main component of per capita GDP growth – has varied across regions. In the EU-15, regions appear to fall into two main groups: those that have enjoyed growth in productivity and employment, and those that have recorded productivity growth but falls in their employment rate. This latter combination suggests that in many regions across the EU, productivity advances have come about as much through industrial rationalisation, labour

shakeout and capital substitution effects, as from efficiency raising technological progress, higher value products, and so on. This is most apparent in the CEEC regions, where high rates of productivity advance have been associated with significant falls in employment. Intense rationalisation and restructuring - that is eliminating inefficient enterprises and expelling inefficient workers - may give a marked boost to productivity over the short run, but are obviously not a viable means of securing high rates of productivity growth over the longer term. As mentioned above, regional competitiveness implies both high productivity *and* a high employment rate. Neoclassical theory would suggest that the cheap labour and low productivity of the CEEC regions (40 percent or less of the EU-15 average) makes these regions attractive to the inflow of foreign capital and investment, and thus that there is considerable scope for rapid productivity catch-up with the rest of the EU. New economic geography models, however, suggest that it is equally likely that with enlargement, economic growth could continue to concentrate and agglomerate in the existing core regions of the EU-15, and that the CEEC countries themselves could well experience increasing regional inequalities in growth, productivity and incomes as they adjust to the competitive market forces that membership of the EU will expose them to.

The lack of any sustained and significant convergence in productivity across the EU-15 regions over the 1980s and 1990s obviously raises questions about the efficacy of EU regional policy. Despite the positive assessments by the European Commission that EU regional policy has helped to narrow regional inequalities (European Commission, 2004), and the fact that there have undoubtedly been some notable individual regional improvements, in general it is difficult to claim that the empirical evidence suggests policy has been a resounding success. It is of course problematic, if not impossible, to construct a meaningful counterfactual of what would have happened to regional productivity differences across the EU-15 in the absence of the Structural and Cohesion Funds. But if the hope was that increasing integration and regional policy together would promote greater regional cohesion and enhance the competitive performance of the poorer, lagging regions, then the lack of any real substantial convergence in productivity or GDP per head must be disappointing. On the other hand it may be that the EU regional funds have served to prevent the demand and competitive shocks associated with

increasing economic integration, technological change and accelerating globalisation from exacerbating regional inequalities in productive performance. Or, again, it might be argued that the scale of EU regional aid has simply not been sufficient to make much of an impact on productivity convergence across the regions, and that a large financial commitment would have yielded the desired results. At the very time when the productive performance and competitiveness of the EU and its regions, and the integration of the new enlargement states into the Union, are rightly of central concern to the European Commission, it seems that the role, effectiveness and funding of regional policy are coming under increasingly critical review and reassessment (see, for example, BOLDRIN and CANOVA, 2001; PUGA, 2002; SAPIR, 2003). Understanding the determinants of regional productivity and competitiveness across the EU is thus a highly pertinent research task.

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