

# 11. Convergence, divergence and the Kuznets curve

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The study of economic growth has again become a major area of interest for both applied and theoretical economics. This chapter relates some of these developments to the empirical study of economic growth focusing on Europe. My main concern is with the distribution of income over time, not only between countries but also between regions within countries. I discuss the link between income levels and the distribution of income of individuals as depicted by the Kuznets curve (Kuznets 1955). The empirical convergence literature (see Abramovitz 1986, Baumol 1986) suggests that incomes of the richest countries in the world seem to converge, but this is not the case for the world as a whole. Barro (1991) and many subsequent studies based on an explicitly neoclassical growth model have shown that if one controls for differences in factor accumulation, countries seem to converge at the same rate but to different steady state levels of income. Thus conditional convergence is taking place. However, the distribution of income levels between regions in a steady state is not made explicit in most of these latter studies.

In this chapter I first illustrate the changes in the dispersion of income between most of those countries in Europe which today are members of the European Union. I use long historical time series of gross domestic product (GDP) per capita, relying on Maddison (1995) in order to show that there have been periods of convergence as well as divergence in incomes among these countries. Thus, care should be taken when interpreting estimated growth equations which use only a subset of observations excluding periods of divergence. This conclusion echoes the argument by De Long (1988) with regard to the subset of countries chosen for empirical growth studies that the exclusion of countries for which data series are not sufficiently long will bias the conclusion towards support for the convergence hypothesis.

The next section defines some measures of convergence and refers to theoretical arguments put forward to explain differences in the level and growth of regional incomes. Then I present some empirical evidence on

mainly European national and regional convergence. These results are then compared with the distribution of personal income in relation to the level of income; these are related through the so-called Kuznets curve.

## 1. THEORIES OF CONVERGENCE

The hypothesis of convergence of GDP per capita among countries or regions has been intensively tested in recent years. This hypothesis exists in three versions:

1. **Absolute convergence.** Regions converge in the long run irrespective of their initial conditions. This is often called absolute beta-convergence; it implies that poor countries grow faster than rich countries and that the growth rate of real per capita GDP is negatively related to the initial level of real per capita GDP. If we have beta-convergence, the dispersion of regional GDP per capita will tend to decrease, in which case we have so-called sigma-convergence. However, one may have beta-convergence without observing sigma-convergence.
2. **Conditional convergence.** Regions with similar structural characteristics converge, independent of initial conditions. This is the prediction of the traditional neoclassical growth model. If one controls for factors which characterize the steady state growth path of GDP per capita, one should still find that the growth rate is negatively related to initial income. However, one may not observe absolute convergence but still have conditional convergence.
3. **Club convergence.** Regions with similar structural characteristics converge only if their initial conditions are similar as well. In this case neither absolute nor conditional convergence is observed.

As shown by Mankiw (1995) and many others, the neoclassical model of economic growth leads to a steady state growth rate which is independent of initial conditions and where the growth rate (per person) depends only on the rate of growth of technology. If technology is a public good, then in a steady state all countries should experience the same per capita growth. However, the steady state level of income per capita depends on several structural characteristics which are not normally assumed to be equal between regions. Conditioned on these characteristics, the neoclassical model predicts convergence. The hypothesis of conditional convergence is often supported by empirical evidence which shows that initial income is negatively related to growth even after controlling for other explanatory variables. However, many have stressed that this result is supportive not just

of the neoclassical model but also of models based on technology diffusion (see Barro and Sala-i-Martin 1995). To discriminate between rival hypotheses one must either look for other empirical evidence or use other criteria such as how reasonable it is to assume that technology is a public good. However, the hypothesis of conditional convergence is rejected by many studies (see Bernard and Durlauf 1995 and studies cited therein).

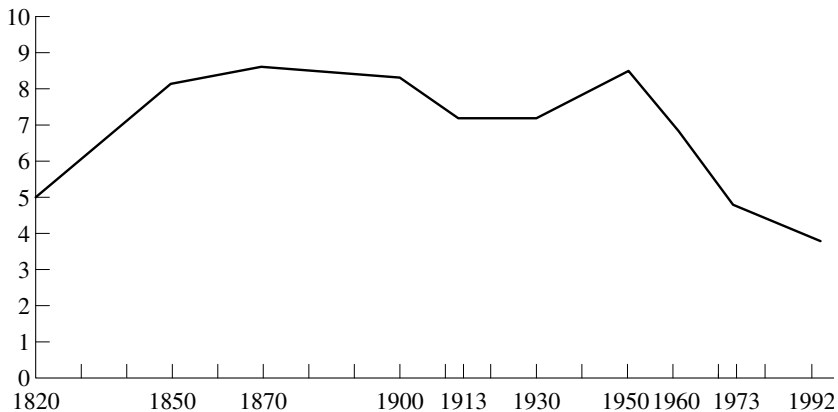
Club convergence, on the other hand, implies that even if certain structural features of economies are similar, they may not converge because of initial factors. Or, stated differently, history matters. The possibility of club convergence is ruled out by assumption in the standard neoclassical model because agents are assumed to be homogeneous. If, however, agents are allowed to be heterogeneous, the dynamic system of the neoclassical growth model could lead to multiple steady state equilibria in spite of diminishing returns to capital. This possibility is usually discussed within a model with different factor endowments between individuals (a most reasonable hypothesis, in my view) so that we have different saving ratios out of wage income and capital income. The one-sector model with overlapping generations is one example of extensions of the neoclassical model that may produce multiple equilibria (see Galor 1996 for a discussion). Durlauf and Johnson (1995) present empirical evidence in favour of multiple steady states using cross-section data.

Allowing for heterogeneous agents is reasonable if one wants to discuss the effects of human capital for economic growth. This leads one to consider income distribution effects. Galor and Zeira (1993) examine private education decisions in a simple overlapping-generations model in which initial wealth differs between individuals. They find that countries with unequal wealth distribution accumulate less human capital and experience less growth than countries in which the middle class is relatively large. Garcia-Penalosa (1995) shows that in countries where education costs are relatively low compared to average wealth (which is typically the case in rich countries) an increase in inequality reduces growth because fewer people can afford higher education. Thus countries that are similar in their structural characteristics as well as initial per capita output but differ in their initial distribution of income may converge to different steady state equilibria. This hypothesis has been supported by a number of recent empirical studies such as Alesina and Rodrik (1994), Persson and Tabellini (1994) and a study based on data for Norwegian counties (Aaberge et al. 1996).

## 2. GROWTH IN EUROPE: A LONG-RUN PERSPECTIVE

Based on national data on GDP per capita, there is substantial evidence showing that some convergence between countries took place in Europe during the twentieth century (see Verspagen 1995). However, there are few studies of how the very wide dispersion of per capita income between regions and countries in Europe came about in the first place. What factors caused per capita income to diverge between countries and regions in Europe until somewhere around 1850, before they started to converge?

In Landes (1969) the title of Chapter 4 is 'Closing the gap', and the opening sentence of that chapter reads: 'The period from 1850 to 1873 was Continental industry's coming-of-age.' This suggests that before 1850 there was divergence in incomes between European countries. The GDP per capita figures in Table 1-3 of Maddison (1995) indicate that there indeed was divergence in Europe between 1820 and 1850. The countries with per capita income significantly above the average in 1820 (the Netherlands, the UK and to some extent Belgium) increased their relative income further compared to many other countries (Finland, Germany, Italy, Ireland, Spain and Sweden) which fell behind. If we move even further backwards in history and rely on the figures in Maddison (1982), we see considerable convergence between France, the Netherlands and the UK from 1700 to 1820. Figure 11.1 shows the standard deviation of GDP per capita for all EU members except Greece and Portugal from 1820 to 1992. The increase in the dispersion in European incomes between 1820 and 1850 is striking.



*Figure 11.1 Coefficient of variation for GDP per capita in Western European (EU) countries, 1820–1992*

In a number of recent studies Williamson and colleagues (Williamson 1995, Williamson 1996, O'Rourke and Williamson 1996, and O'Rourke 1996) have compared post-Second World War convergence with similar developments in the late nineteenth century. Using their evidence along with the figures from Maddison (1995), the following epochs of European economic growth can be distinguished:

- 1820–50: Divergence
- 1850–1913: Convergence
- 1913–45: Divergence
- 1945–90: Convergence

According to Williamson (1995) the periods of convergence were ones with overall fast growth and globalization, whereas the period between the world wars was characterized by low growth and de-globalization. Most important, globalization was the critical factor in contributing to convergence in the form of mass migration and trade. It is worth noticing that according to Williamson it was not capital deepening *per se* that caused convergence (as is the case in the traditional neoclassical model) but rather factor mobility. This view is not supported by Barro and Sala-i-Martin (1995, p. 413) in their concluding section on convergence: 'The evidence here is not definitive, but suggests that migration plays only a minor role in the convergence story.'

The globalization that took place in the second half of the nineteenth century manifested itself in many ways. First, international trade increased. This was due both to policies (Europe moved towards free trade following the Cobden–Chevalier treaty in 1860) and to technological change as railways and steamships lowered transportation costs. However, again according to the figures in Maddison (1995), the growth rate in world exports was higher during 1820–70 (4.2 per cent annually) than during 1870–1913 (3.4 per cent). Thus it is not obvious that the period of divergence (1820–50) was one of low growth in exports.

Second, there was a lot of factor mobility. Emigration from Europe to countries in the New World was particularly important in Ireland, Britain, Scandinavia and Italy. International labour mobility produced large shocks to the labour force in many countries and contributed significantly to the convergence in many of the countries that were involved, according to O'Rourke (1996) and O'Rourke and Williamson (1996), whereas the lack of emigration from the Iberian peninsula caused this region to diverge. There were also large capital flows within Europe and between Europe and other regions. For a country like Norway, large inflows of capital from Europe (Britain in particular) financed the take-off of the Norwegian resource-based industrial sector.

Moving on to the period between the two world wars, the volume of world exports did not recover from its previous peak in 1913 and was actually lower in 1929 (when trade peaked between the wars) than in 1913. This happened in spite of continued large reductions in transport costs; it coincided with the reimposition of trade barriers. Thus divergence and low export growth went together during the interwar period. This is also the case after the Second World War, when world trade increased dramatically by historical standards (7.0 per cent annual growth on average between 1950 and 1973) and there was convergence of incomes between most European countries. During this post-war period tariffs were reduced and transportation costs were reduced further.

Does the view that globalization promotes growth and convergence fit recent evidence? First, the process of convergence in incomes seems to have come to a standstill; indeed, some divergence has occurred. This is not as apparent between European countries as it is on a global level. As we shall see below, even at the regional level in Europe convergence has stopped and there are signs of greater inequality in personal income distribution. Although I think it is fairly uncontroversial to state that capital markets were substantially liberalized during the 1980s both globally and within the Organization for Economic Cooperation and Development (OECD) area, labour markets have gradually become less open. However, within the EU restrictions on both labour and capital mobility have been largely eliminated. It has become more difficult for non-Europeans to enter Europe. Markets for services have gradually been liberalized, but many commodity markets may have become slightly less open during the 1970s and 1980s because of an increase in non-trade barriers. In Europe the establishment of the internal market has significantly reduced non-tariff barriers, but it may not have lasted long enough yet for the effects on GDP to be visible.

All in all, my view is that convergence in GDP per capita among the present members of the EU seems to have slowed down after 1973 and may even have stopped. This conclusion is also supported by looking at regional data for Europe. It is perhaps in this light that the reduction of regional inequality is formulated as an explicit goal of EU policy in the 1987 Single European Act. One argument in line with Krugman and Venables (1995) is that market integration may initially involve divergence, followed by convergence later, due to the interactions of economies of scale, transportation costs and their effect on industry location and relative wages.

Looking beyond the European experience, the long-term global picture is one of divergence in GDP per capita (Maddison 1995). This is due to several well-known factors. Nearly all African and Latin American countries grew slowly during the twentieth century. In Asia the growth experience is very different, with some countries hardly growing at all (Burma,

Bangladesh, India and Pakistan) while others have been growing very fast by any standard (Taiwan, South Korea and Japan). The lack of convergence in incomes is, however, underestimated by looking only at those countries for which we have more or less reliable GDP figures. We know that many countries which today are extremely poor and can barely feed their populations (Mozambique and Ethiopia, to name just two obvious examples) cannot possibly have grown at all during the last century. Going a bit further, one may 'guesstimate' a minimum sustainable level of GDP per capita that a country can have and use this as an indicator of the maximum growth rate any country might have had during the past century. Based on the figures in Maddison (1995), a level of US\$300 (in 1990 international dollars) can serve as an approximation of this minimum level. Using this figure as a level of GDP per capita for those countries where no figures are available for 1820, the United States had four times this level in that year as opposed to eight times in 1850, 14 times in 1900, 32 times in 1950 and 72 times that level in 1992 (which in fact is the observed ratio between Ethiopia and the United States that year). Narrowing the analysis of convergence to the present 'advanced' countries is obviously not a sensible way to limit one's sample, a point made forcefully by De Long (1988).

It is by now generally accepted that absolute convergence in GDP per capita has not taken place at a global level. Indeed, it is worth pointing out that even among countries within Europe, there are fairly long periods of time during which divergence in GDP per capita has occurred. Thus even for countries which are quite homogenous and where one could expect the assumption of similar structural characteristics to be reasonable as defined by the traditional neoclassical growth model, divergence may very well be observed.

### 3. THE REGIONAL DISTRIBUTION OF INCOME IN EUROPE

There is a number of empirical studies of economic growth and convergence among regions in Europe. This section summarizes some of the more recent studies rather than providing yet another study. I will present information to answer the following questions:

1. How much variation in GDP per capita is there among regions in Europe and how can this distribution be characterized?
2. Is the dispersion in GDP per capita in Europe declining, or do we observe convergence?
3. If we observe convergence, is it a steady process?

4. How does the European process of regional convergence compare with other international evidence?

In answering the first question, I shall rely on figures for GDP per capita for nomenclature of territorial units for statistics (NUTS) II regions and in purchasing power standards (PPS) based on Eurostat (1994). For 1980 these figures show that a number of regions had only 40 per cent of EU12 average income while a number of regions had income 40 per cent higher than the average (even after excluding rich regions such as Groningen due to gas, and Hamburg and Brussels due to the difference between residents and workers). The ratio between the poorest and the richest region was roughly 1:4. In 1991 the inclusion of the new German Länder increased the dispersion further, but even after excluding this group of regions the dispersion was more or less the same as in 1980 if not wider. I shall return to measures of dispersion below.

What is perhaps more interesting than this max–min distance is the form of the density distribution of GDP per capita. As is apparent in Figures 11.2 and 11.3, the cross-regional distributions of GDP per capita are far from being normal. Two conclusions can be drawn from this feature of the data. First, the distribution is not well characterized using only mean and standard deviation as is the case with the normal distribution. One of the popular measures of convergence, the so-called sigma-convergence, which is based on the standard deviation, does not have an intuitive interpretation in this case, as opposed to when distributions are normal. Second, the shape of the distribution lends some support to the hypothesis of convergence clubs. This hypothesis states that regions may converge to different income levels (Quah 1996b). My results on density distribution differ somewhat from those of Quah (1996a) because he excludes Greece and Portugal from his sample. The regions of these two countries are essential for establishing the lower end of the distributions in Figures 11.2 and 11.3.

An alternative way of interpreting the data in Figures 11.2 and 11.3 would be to say that many European regions seem to converge to their own steady states, each of which is different from that of other regions. This would be the case if we have conditional convergence. Given certain regional characteristics with regard to the saving ratio, population growth, depreciation rate and the like, the kind of distribution we see in these figures is what we will observe in a steady state. Obviously this will tell us nothing about whether the poor are catching up with the rich (Quah 1996b).

One might object to the relevance of studying the distributions in Figures 11.2 and 11.3 by saying that these are mere snapshots of the regional income distribution in a single year. Idiosyncratic shocks to income could cancel out if aggregated over several years. From a policy perspective large economic



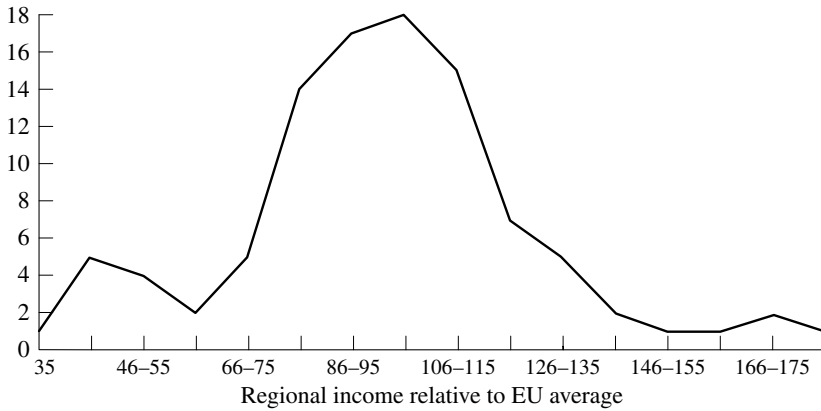


Figure 11.2 Regional GDP per capita 1991 (PPS) in EU12, excluding new German Länder and French Dept. D'Outre-mer (frequencies in %)

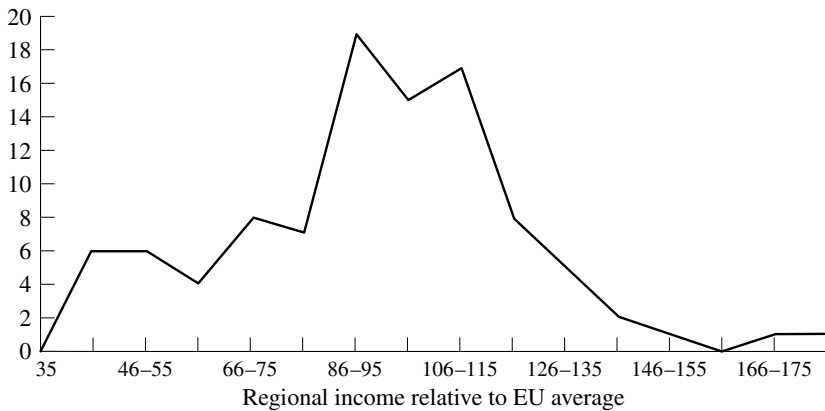


Figure 11.3 Regional GDP per capita 1980 (PPS) in EU12 (frequencies in %)

differences between regions in any one year may not be a problem if they are only temporary. One could even say that if there is much income mobility between regions, large differences could indicate that the European economies are dynamic. Friedman (1962) has expressed this view in more general terms. If this were the case, differences in average income over several years should be much smaller. However, looking at Figure 11.4, which shows the distribution of average relative income for the same regions in both 1980

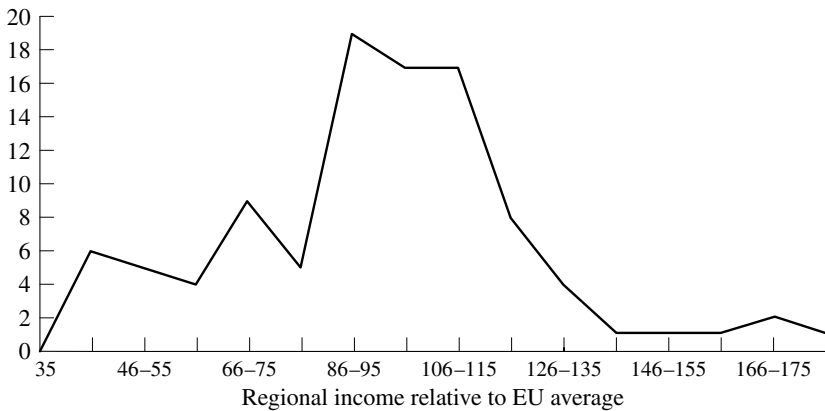


Figure 11.4 Regional GDP per capita (PPS) in EU12 (average of 1980 and 1991, frequencies in %)

and 1991, one can clearly see that this is not the case in our sample of 145 identical regions in the EU. The average distribution is not more concentrated around the mean than the 1980 distribution; it is actually very similar. Thus those regions that were poor in 1980 were also poor in 1991, suggesting that there was very little income mobility between regions in Europe during the 1980s.

Let us now turn to questions 2 and 3 on the process of convergence among European regions. An interesting way to describe the regional dynamics in Europe from 1980 to 1991 is to study whether or not low-(high-) income regions are moving towards (away from) the average EU income. Table 11.1 takes the initial (1980) relative level of income as the starting point and shows how many countries converged towards or diverged from the mean by 1991.

Of the total number of regions (five regions had stable relative income and are not included in the table) just as many converged as diverged. Slightly more than half of all movements are small in the sense that the relative change in income is equal to or less than 5 per cent of the initial relative income.

Table 11.1 Number of EU regions converging or diverging, 1980-91

Relative income in 1980	Converging	Diverging	Sum
Below average	35	50	85
Above average	35	20	55
Sum	70	70	140

The conclusion from this exercise is that nothing much happened to the distribution of relative incomes in EU12 during 1980 to 1991. At least there is no evidence of systematic convergence. This conclusion is in line with Fagerberg and Verspagen (1996), who conclude with reference to the recent development that 'the postwar trend towards convergence in levels of productivity and income levels across Europe may have come to an end'. Also there are still substantial differences in regional per capita GDP in EU12.

Neven and Gouyette (1995) use a somewhat shorter window (1980–89) and find that there is a tendency for convergence even during the 1980s as a whole but that the degree of convergence varies over time and between southern and northern regions of Europe, with less convergence in the South. They also find when estimating beta-convergence that the process of convergence tended to slow down in the later part of the 1980s when one controls for differences in industrial structure. Defining convergence as a Markov process, they conclude that poor and rich regions tend to be quite stable over time and that the mobility is low at the lower end of the income spectrum, indicating that the poorest regions in Europe are likely to stay poor. This is in line with the results of Table 11.1 even if that table is a much cruder way of describing the transitions that took place during the 1980s.

Canova and Marcet (1995) also provide support for these conclusions, using both regional data for 1980–92 and country data for a longer period. Their study is mainly concerned with estimating the rate of convergence. They use time series for GDP growth for each geographical unit (region or country) as opposed to using average growth rates for longer periods. This enables them to estimate steady state growth for each unit separately, and they find that regions do converge to their own (unconditional) steady state. They conclude that the 1980s was a decade in which heterogeneities across countries became more marked and that poor regions cannot expect to become as well off as rich regions unless some structural changes occur. They also found that in spite of some tendency towards convergence, the steady state levels of per capita income would show large inequalities.

Barro and Sala-i-Martin (1995, section 11.4) discuss convergence across European regions since 1950. Their data show clear signs of convergence for the period as a whole but also signs of convergence coming gradually to an end by 1980, in line with the data presented above. They also present data for the dispersion of regional GDP per capita within the largest European countries, which also show convergence but again with a tendency for convergence to come to a halt in the 1980s.

For some of the Nordic countries there exist regional income data based on income statistics for tax purposes. These data are not directly comparable to GDP figures, but they still measure most of GDP from the income

side. An interesting aspect of these data is that they are available for smaller geographical regions than NUTS II and also contain data for individual households or taxpayers. We can thus study the individual income distribution within the region, between regions and within the country. Persson (1995) studies 24 Swedish counties for the period 1906–90 using real per capita income net of government transfers. According to his figures the regional dispersion (measured by the standard deviation of log real per capita income) was fairly constant between the two world wars, started to decrease in the late 1930s and decreased a lot until 1950. There was a further decrease in the 1960s but no decrease at all in the 1980s. A very similar story applies to Denmark according to Dilling-Hansen et al. (1994). They use income statistics for 12 Danish counties for the period 1935–90. It is quite remarkable how similar the results are to those of the Swedish study, with a substantial convergence in income from the mid-1930s to 1950, followed by a decade of stability, and then some further reduction in regional dispersion during the 1960s and 1970s and finally stability from 1980 to 1990.

These results for European countries resemble those for US states and Japanese prefectures. Barro and Sala-i-Martin (1995) present data for US states and Japanese prefectures showing the same pattern as in Europe: little convergence (if any) between the First and Second World Wars, rapid convergence from 1940 to 1950 (and also to 1960 in the United States) and no convergence in the 1980s (there is even divergence in the United States). Thus as an answer to the fourth question raised above, regional dynamics in Europe show many common features with regional development in the United States and Japan. The regional data even seem to have some of the same features as the national data discussed earlier.

The obvious question that arises from these empirical studies is: What are the economic factors that produce similar regional results within different countries? First, it seems that these factors cannot mainly be country-specific because they apply to many (perhaps most) OECD countries. Barro and Sala-i-Martin (1995, p. 393) suggest (perhaps as a joke) that ‘The rise in dispersion was reversed at the end of the 1980s (apparently as soon as Mr. Reagan was no longer President), and dispersion fell through 1992.’ Taken seriously, however, this could suggest that there were certain policies (‘Reaganomics’) adopted by many countries that produced increased regional dispersion. Thus the results are country-specific but related to similar policies in most OECD countries. The second conclusion is that convergence is not a stable process. In fact, it seems to be much more erratic than what follows from a typical capital deepening process, which is the driving force in the neoclassical growth model.

#### 4. ECONOMIC GROWTH AND INCOME DISTRIBUTION: THE KUZNETS CURVE

Kuznets (1955) introduced the famous inverted U-shaped relationship between inequality and income, which states that the distribution of income first becomes more unequal as income increases before inequality decreases with income. This relationship received much attention in the development debate in the 1970s and was adopted by the World Bank in order to predict trends in inequality. If we use the concepts introduced by modern growth theory as presented earlier, individual incomes within a country should first diverge and then converge as the country becomes richer if the Kuznets curve is valid. Looking at data for 60 countries, Ahluwalia (1976) shows that this cross-section of countries seems to support the Kuznets curve. However, this finding has been criticized by Anand and Kanbur (1993), who find that the inverse U curve is not inverse at all – that is, the exact opposite of the Kuznets curve.

How does the Kuznets curve fit with the phases of absolute divergence and convergence presented earlier? To answer this, one really needs time series on income distribution for many countries and over long periods of time. Such data are not readily available, but they exist for some countries. A summary of some of these data are given by Lindert and Williamson (1985). Their conclusion is that it is only the falling part of curve which seems robust, whereas increasing inequality at early stages of economic development or from low levels of income is not supported by data. An alternative has been to use figures on wage differentials between different groups of skilled and unskilled labour. In Brenner et al. (1991) a number of papers on various country experiences are collected; by and large they seem to support the divergence story of the period 1820–50 followed by a long period of convergence. Data for 1854–1913 in Williamson (1996) also supports the general trend of lower wage dispersion during this period, but with large ups and downs within this time span. The divergence period between the two world wars in terms of per capita GDP is not borne out in data on income and wage inequalities.

Data on income inequality and wage dispersion for the period 1950–80 generally show decreasing inequalities in most OECD countries. However, since 1980 (the exact year varies between countries) inequality seems to be increasing. This is so both for incomes in general and for wages. Thus the long-run trend towards less inequality seems to have been broken. For a recent summary of these developments see Gottschalk and Smeedling (1997). This change may coincide with at least a tendency for the process of convergence to have halted. It is, of course, much too early to conclude that a diverging phase has started, but the data on dispersions of income on many

levels of aggregation at least show that convergence is not taking place. Looking back at history, we should not be surprised by this. The attempts to explain the relationship between economic development and the distribution of income clearly indicate that no close correlation should be expected.

Several factors have been suggested in order to explain the Kuznets curve. The movement of the labour force from agriculture and rural areas to the more modern urban and industrial sectors implies an increase in income for those who move but, at the same time, a more unequal distribution of total income. As more and more people move to urban areas the low-paid rural jobs become relatively less important and inequality then decreases. The relevance of this explanation put forward by Kuznets (1955) depends on the levels and changes in the intersectoral income differential and intersectoral inequality differential and on the proportion of the labour force that moves between sectors. Underlying a process of 'modernization' are changes in the demand and supply of various skills. The recent development towards higher dispersion of earnings in many OECD countries is partly explained by a relatively strong demand for skilled labour (the so-called capital-skill complementarity) and a more sluggish supply response, while trade and globalization more generally reduce demand for unskilled workers in these countries. This change in relative demand may also be thought of as the consequence of a change in the division of labour on a world scale without much migration of unskilled labour. The literature on the new economics of geography, which follows in the footsteps of modern trade theory, discusses this phenomenon extensively but is beyond the limits of this chapter.

## 5. CONCLUSIONS, OR WHY ARE WE INTERESTED IN REGIONAL GROWTH?

The convergence controversy can be analysed from two perspectives. Some see it as part of an empirical project concerned with testing economic theory. Does the neoclassical model of economic growth fit the facts or should it be rejected in favour of, say, endogenous growth theory or theories of technology diffusion? This is partly the line of reasoning taken by Barro and Sala-i-Martin (1995) and Mankiw (1995). The other way of approaching the debate is from the perspective of economic policy. If equality in some form is important for politicians, it is of course important for them to know whether a market economy will bring about convergence between regions of the country – or of the world, for that matter. Politicians are probably also interested in knowing what policies will promote convergence in incomes.

On the other hand, the analysis of convergence has so far been only marginally preoccupied with the distribution of individual incomes. Based on most empirical growth studies, human capital is regarded as a very important factor in explaining economic growth (and conditional convergence). If policies are geared towards promoting education, however, and wages for skilled labour for some reason increase relative to the wages of the unskilled, a process of growth and convergence between countries may well be characterized by increasing individual inequality. Indeed, rising individual inequality is generally what seems to be the case in OECD countries for the last decade or two. Thus policies to promote growth by increasing human capital, which may produce regional convergence, may at the same time lead to more inequality at the individual level. That may pose new dilemmas for policy-makers. Thus, an integration of the analysis of the regional and individual distribution of income is warranted.

## NOTE

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## REFERENCES

- Aaberge, R., Å. Cappelen and K. Gerdrup (1996), 'Regional growth and income inequality in Norway', mimeograph, Statistics Norway.
- Abramovitz, M. (1986), 'Catching up, forging ahead and falling behind', *Journal of Economic History*, **46**, 385–406.
- Ahluwalia, M.S. (1976), 'Inequality, poverty and development', *Journal of Development Economics*, **3**, 307–42.
- Alesina, P. and D. Rodrik (1994), 'Distributive politics and economic growth', *Quarterly Journal of Economics*, **109**, 465–90.
- Anand, S. and S.M.R. Kanbur (1993), 'Inequality and development: A critique', *Journal of Development Economics*, **41**, 19–43.
- Barro, R.J. (1991), 'Economic growth in a cross section of countries', *Quarterly Journal of Economics*, **106**, 407–33.
- Barro, R.J. and X. Sala-i-Martin (1995), *Economic Growth*, New York: McGraw-Hill.
- Baumol, W.J. (1986), 'Productivity growth, convergence and welfare: what the long-run data show', *American Economic Review*, **76**, 1072–85.
- Bernard, A.B. and S.N. Durlauf (1995), 'Convergence in international output', *Journal of Applied Econometrics*, **10**, 97–108.
- Brenner, Y.S., H. Kaelbe and M. Thomas (1991), *Income Distribution in Historical Perspective*, Cambridge: Cambridge University Press.

- Canova, F. and A. Marcet (1995), 'The poor stay poor: Non-convergence across countries and regions', CEPR discussion paper no. 1265.
- De Long, B. (1988), 'Productivity growth, convergence and welfare: Comment', *American Economic Review*, **78**, 1138–54.
- Dilling-Hansen, M., K.R. Petersen and V. Smith (1994), 'Growth and convergence in Danish regional incomes', *Scandinavian Economic History Review*, **42**, 54–76.
- Durlauf, S.N. and P.A. Johnson (1995), 'Multiple regimes and cross-country growth behavior', *Journal of Econometrics*, **10**, 365–84.
- Eurostat (1994), *Rapid Reports, Regions* (Luxembourg).
- Fagerberg, J. and B. Verspagen (1996), 'Heading for divergence? Regional growth in Europe reconsidered', *Journal of Common Market Studies*, **34**, 431–48.
- Friedman, M. (1962), *Capitalism and Freedom*, Chicago, IL: University of Chicago Press.
- Galor, O. (1996), 'Convergence? Inferences from theoretical models', *Economic Journal*, **106**, 1056–69.
- Galor, O. and J. Zeira (1993), 'Income distribution and macroeconomics: the human capital connection', *Review of Economic Studies*, **60**, 35–52.
- Garcia-Penalosa, C. (1995), 'The paradox of education or the good side of inequality', *Oxford Economic Papers*, **47**, 265–85.
- Gottschalk P. and T.M. Smeedling (1997), 'Cross-national comparison of earnings and income inequality', *Journal of Economic Literature*, **35**, 633–87.
- Krugman, P.R. and A. Venables (1995), 'Globalization and the inequality of nations', NBER working paper no. 5098, Cambridge, MA.
- Kuznets, S. (1955), 'Economic growth and income inequality', *American Economic Review*, **45**, 1–28.
- Landes, D.S. (1969), *The Unbound Prometheus*, London: Cambridge University Press.
- Lindert, P.H. and J.G. Williamson (1985), *Growth, Equality and History*, discussion paper no. 1052, Harvard Institute for Economic Research, Harvard University, Cambridge, MA.
- Maddison, A. (1982), *Phases of Capitalist Development*, Oxford: Oxford University Press.
- Maddison, A. (1995), 'Monitoring the world economy, 1820–1992', Paris, OECD.
- Mankiw, N.G. (1995), 'The growth of nations', *Brookings Papers on Economic Activity*, **1**, 275–326 (with discussion).
- Neven, D.J. and C. Gouyette (1995), 'Regional convergence in the European community', *Journal of Common Market Studies*, **33**, 47–65.
- O'Rourke, K.H. (1996), 'Trade, migration and convergence: An historical perspective', CEPR discussion paper no. 1319.
- O'Rourke, K.H. and J.G. Williamson (1996), 'Around the European periphery, 1870–1913: Globalization, schooling and growth', CEPR discussion paper no. 1343.
- Persson, J. (1995), 'Convergence in per capita income and migration across the Swedish counties, 1906–1990', seminar paper no. 601, Institute for International Economic Studies, Stockholm University.
- Persson, T. and G. Tabellini (1994), 'Is inequality harmful for economic growth?' *American Economic Review*, **84**, 600–621.
- Quah, D.T. (1996a), 'Regional convergence clusters across Europe', *European Economic Review*, **40**, 951–8.



- Quah, D.T. (1996b), 'Twin peaks: Growth and convergence in models of distribution dynamics', CEPR discussion paper no. 1355.
- Verspagen, B. (1995), 'Convergence in the global economy: a broad historical viewpoint', *Structural Change and Economic Dynamics*, **6**, 143–65.
- Williamson, J.G. (1995), 'Globalization, convergence and history', NBER working paper no. 5259.
- Williamson, J.G. (1996), 'Globalization and inequality then and now: the late nineteenth and late twentieth centuries compared', NBER working paper no. 5491.