Introduction

The debate about globalisation and world inequality has several dimensions, and these are often confused. Some people are concerned with absolute measures of well-being and others with relative inequality. Sometimes it is inequality between countries that is the driving force; at other times the key variable appears to be inequality within countries. Changes in income inequality may be attributed to internal structural dynamics (the “Kuznets curve”) or to the interdependence of countries (“international division of labour”). It is therefore not surprising that participants in the debate find themselves engaged in controversy and that outside observers find themselves puzzled. This paper deals with just one part of the puzzle: the relative distribution of income within OECD countries. But, in concentrating on inequality within rich countries, I am not leaving controversy behind. There are strong differences of view – both about the facts and about their explanation.

Many people are firmly convinced that the period of diminishing inequality after the Second World War has come to an end and been replaced by a period of widening differences. Harrison and Bluestone (1988) have christened it the “great U-turn”. According to Alderson and Nielsen, “after four decades of moderating inequality, income inequality in the United States began to increase

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around 1970. Since then it has risen at a steady rate” (2002, page 1246). They go on to suggest that the upswing has an “international character”. Cornia and Court describe how “the Golden Age, a period of stable global economic growth between the 1950s and early-mid 1970s, witnessed declines in income inequality in a number of countries (with some exceptions). This trend was reversed over the last two decades as country after country has experienced an upsurge in income inequality” (2001, page 7). In contrast to the “great U-turn” hypothesis stands the belief that there has been little distribitional change within countries, supported by a number of studies of the variation of inequality over time. Gustaffson and Johansson find for 16 industrialised countries that “the correlation between the Gini coefficient and the time-variable is almost zero” and that there is only “a weak U-shaped relationship” (1999, page 591). Melchior, Telle and Wiig (2000) conclude that in industrialised and high income developing countries inequality has not on average changed much between 1960 and 1990. On this view, the pace of change is glacial.

There is therefore disagreement about what is to be explained. In seeking to cast further light on the empirical picture, we need first to clarify the methods adopted to measure inequality and make more precise the hypotheses to be examined. This is the subject of Section A. I then present in Section B a summary of the evidence about changing inequality in nine OECD countries over the post-war period.

Sections C and D are concerned with some of the possible explanations for rising overall income inequality. Here again there are different views. In the field of income distribution, there are many forces at work, and these interact, as is well illustrated by two frequently discussed elements: globalization and the
welfare state. In what has become a widely accepted explanation for rising income inequality, these elements have been invoked to explain how a common force can have differing effects in different countries depending on the extent of their welfare states. Globalization and/or technological change have led to a shift in demand away from unskilled labour. The distributional consequences of such a shift depend on the form of the welfare state. Where wages are freely flexible, then the shift in demand causes increased wage dispersion. Where the welfare state provides an effective floor to wages, then the result is unemployment of unskilled workers. Thus, we have a unified “textbook” explanation of what is happening in the United States (increased wage premium for skilled relative to unskilled workers) and in Continental Europe (high unemployment). However, as I have argued (Atkinson, 1999 and 2000), this “Transatlantic Consensus” is not the only story that can be told. In Section C, I consider the supply response in terms of investment in skills, and the resulting link between the labour market and the capital market. I then describe an alternative approach to pay determination, emphasising interdependencies in the labour market, and suggest that a “tipping” model could explain episodes of rapidly changing differentials.

The literature on rising inequality has largely concentrated on the position of unskilled workers in the bottom part of the distribution faced with worsening labour market prospects. In a number of OECD countries, however, it is increased inequality at the top that is most evident. In Section D, I present evidence on changes at the top of the income distribution in five OECD countries, and describe some of the possible explanations. Factors such as globalisation and technological change may again be relevant, but their role is rather different from that in the textbook story, operating via executive remuneration or via the rents
earned by “superstars”. Moreover, focus on the very top of the distribution reinforces my belief that we need to consider what is happening in the capital as well as the labour market. The return to capital, and the transmission of wealth via inheritance, influence the shape of the upper tail of the distribution.

A Methods

Inequality of what? Among whom? Measured how? Here my primary concern is with the distribution of disposable annual income among households with total household income being adjusted for household size and/or composition and each household being counted as many times as there are individuals. This choice is open to question. Money income is only a partial measure of social welfare. It refers only to private resources, and takes no account of the benefits derived from public expenditures, such as those on education and health care. Household income may be regarded as less satisfactory than household expenditure as a measure of standard of living. Inequality of consumption may have risen less than that of income (Krueger and Perri, 2002). On the other hand, the revealed preference of governments, via the medium of their statistical agencies, is for the distribution of money income, and it is on this definition that I concentrate here. In presenting the evidence, I shall however distinguish where possible between disposable income (the final receipt of households net of taxes and transfers) and market income (income from earnings, self-employment, capital, and private transfers). Although the impact of the welfare state, and of progressive taxation, is not the focus of this article, the

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difference between the inequality in market income and the inequality in disposable income provides a measure of the arithmetic effect of tax and transfer policy. (To analyse the full effect, we have of course to examine the way in which policy changes the distribution of market income.)

Differences in definition may affect not only the level of measured inequality but also the change over time. This should be emphasised since there is a tendency to assume that differences in definition can be treated as a fixed effect. Three examples serve to illustrate this point and to underline the limitations of the concept used in the empirical results presented here. The first is the use of annual rather than permanent income. To the extent that annual income exhibits transitory variation that can be offset by borrowing and lending, it overstates inequality of permanent income. It is possible that the economic changes of recent decades have been associated with increased volatility (see Gottschalk and Smeeding, 2000, Section 5, for a review of the limited evidence), in which case the rise in annual income inequality may overstate the rise in permanent income inequality. This would not be captured by a time constant dummy variable. A second example is that the analysis makes no allowance for within household inequality. In the UK, poverty measured on a family unit basis has typically been significantly higher than poverty measured on a broader household basis. It has recently become clear (Webb, 2002) that the difference has declined over time. Poverty among families has increased substantially in the UK but by less than on a household basis. The trend in the two series is different. The third example is the shortfall of measured income from a comprehensive definition. Important sources are typically missing from official statistics, and these change over time. Capital gains, stock options, and remuneration offshore became more important in
the latter part of the Twentieth Century, leading inequality to be increasingly under-stated. Conversely, tax reductions in a number of OECD countries in the past two decades may have led to a re-arrangement of income, so that more income appears in taxable form. In the US it is argued that there has been a shift from the corporate to the personal tax base (Gordon and Slemrod, 2000). Moreover, countries differ in the degree of comprehensiveness of their income definition, and this will affect the degree to which the changes over time can be compared.

In summarising the extent of inequality in Section B, I make use of the Gini coefficient, which has a graphical interpretation as the ratio of the area between the Lorenz curve and the diagonal to the whole triangle, but which is only one particular way of reducing the whole distribution to a single number. It is perfectly possible for the distribution to change significantly but for the Gini coefficient to remain unchanged. There could be redistributive forces working in different directions at different points. Demographic change could be causing a rise in the proportion of pensioners with relatively low incomes, while at the same time progressive taxation is reducing the shares of top income groups. This is one reason why, in Section D, I turn to looking at the shares of top income groups, which could be moving in a different direction from the Gini coefficient.

Data

My time frame is the second half of the twentieth century. I believe that the recent inequality movements can only be understood in the light of the historical experience. Indeed, while attention is confined here to the period 1945-2000, an even longer perspective would be desirable. I also attach considerable weight to high frequency series. Reference to “high frequency” may sound absurd
when the term is more conventionally applied to weekly or daily financial data. What I am suggesting here is that where the underlying data are collected annually, then we should use the full set. In particular, I have serious doubts about the practice adopted recently by the OECD (for example; Förster, 2000) of taking single observations for “mid-1970s”, “mid-1980s” and “mid-1990s”. Such a procedure can misrepresent the dynamic pattern. A single year can be highly misleading.

I have therefore assembled income distribution data for nine OECD countries: Canada, the UK and the US, Italy, the Netherlands, and West Germany, Finland, Norway and Sweden. As the order of listing indicates, they may be seen as belonging to three groupings: Anglo-Saxon, mainland European, and Nordic countries. I should stress that these data are not comparable across countries. The exercise is different from that conducted by the Luxembourg Income Study, which has very valuably put income distribution data on a broadly comparable basis. Their estimates are however limited to a selection of years. My quest for annual series means that I have to use the estimates produced in the most part independently by official statistical agencies. They reflect particular national features. For example, the official US estimates of the Gini coefficient shown in Figure 1 relate to the distribution of income before tax.

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4 It would be desirable to add data for the two remaining G7 countries, but I have no expertise in Japanese income distribution data and the French data generate only a small number of comparable observations (see Hourriez and Roux, 2001).
The Hypotheses under Examination

Earlier I contrasted the “great U-turn” view with that of “glacial change”. What would constitute evidence in support or contradiction of these hypotheses? To begin with, what would represent distributional change sufficient to be “non-glacial”? This is usually considered in terms of statistical significance. For example, Statistics Canada (2002, page 25) suggests, with a sample of some 30,000 households, that a change of 1 percentage point should be considered statistically significant. But what about its wider significance? To get some idea, suppose that the tax and transfer system were approximately linear, as with a uniform tax credit and a constant tax rate. Then, if government spending absorbs 20 percent of tax revenue, a redistributive tax of 5 percentage points would reduce a market Gini of 48 percent by 3 percentage points.\footnote{A gross income of $Y$ becomes a net income of $(1-t)Y+A$, where $A$ is the value of the tax credit. Since $A$ is the same for everyone (with appropriate equivalisation), the Gini is $(1-t)$ times the value for gross income divided by the mean net income relative to the mean gross income, which is assumed to be 0.8.} Raising the tax rate from 20 percent to 25 percent would be a major political shift, so this suggests that a change of 3 or more percentage points can certainly be taken as economically significant. In what follows I take such a 3-percentage point yardstick, while recognising that it is essentially arbitrary. The mental experiment does however underline another aspect of the test implicitly being applied: that we are concerned with a sustained change, not with year-to-year transitory variation. A series of Gini coefficients that went from 25 percent to 30 percent and back over the business cycle may exhibit volatile behaviour but be essentially trend-free. Evidence in favour of the view that there had been non-glacial change would be that there is a period of a number of years when the level of inequality was 3...
percentage points or more different from a period of a similar number of years in the past.

The existence of a significant rise in recent years does not imply that the U-hypothesis is validated. The change could be a step function. Or the time path could look like that of an aircraft take-off: horizontal for a period and then a steady ascent. In examining the case for the U-hypothesis, I shall be asking whether or not there has been a period of significant decline (again I apply the 3-percentage point criterion) followed by a period of significant increase. This is a different test from the more usual practice of fitting a quadratic equation to explain the Gini coefficient (G) as a function of time (T): $G = a - bT + cT^2$. One can then test whether the coefficients on time and time squared are significant (and negative and positive respectively). Such an approach is, in my view, too restrictive. The first reason is that it imposes a particular structure on the U. It does not allow for situations where the decline and rise in inequality are separated by a period of stability: a flat-bottomed U. More importantly, the quadratic implies that the rise in inequality is continuing. It assumes a U without a serif. In contrast, a U with a serif indicates that the rise has come to an end. Given that we are especially concerned with the recent past, I add a third hypothesis to those being examined: that inequality is continuing to trend upwards in the 1990s (the continuing rise hypothesis). In Atkinson (1997), I drew a distinction between a continuing “trend” upward in inequality and a distinct “episode” during which inequality increased. Here we need to make a similar distinction between the reversal of trend, leading to a U or V without serifs, and the conjunction of two episodes, where inequality fell in the first and rose in the second episode.
The second reason why I do not simply fit a quadratic is that, as the diagrams below seek to highlight, we do not have a single consistent series for each country. There are discontinuities that cannot be simply modelled by a dummy variable. There are different series telling different stories. The evidence is of variable quality. These considerations are not readily incorporated into a purely econometric analysis. One has to apply judgment as well as statistical packages.

Finally, I should note that the hypotheses are being considered here in relation to the Gini coefficient, which is only one summary measure of the distributional change. Other measures may yield different results. This could go either way. As noted earlier, stability of the Gini coefficient may conceal significant changes in, say, the share of the bottom 20 percent. We may therefore be incorrectly rejecting the hypothesis of non-glacial change. The converse may also be true. A redistribution from the top 10 percent to the next 40 percent may reduce the Gini coefficient significantly, but a test based on the share of the bottom 50 percent would indicate no significant change.

B The Empirical Picture

Figure 1 shows that we can indeed assemble data covering many years, in this case for the US. The data are rich, but they need to be used with care. For instance, while the US Current Population Survey provides data from the 1940s, the earlier form of the official series referred only to “families”, leaving out “unrelated individuals” (i.e. people living on their own). Rather than use this partial population, I have selected the “unofficial” estimates of Budd (1970) for the earlier years, together with the OBE series constructed on a quite different
“synthetic” basis, drawing on survey information, tax data and the national accounts. In the US, as in other countries, the picture is a patchwork rather than a single seamless garment. Moreover, even what may appear to be a single series often exhibits discontinuities, as there are changes in definitions, in methods of data collection, or in data processing. In assembling the data series I have tried to identify and label the most important breaks in the series. One notable break in the CPS series was that in 1993 when the data collection changed from paper and pencil to computer assisted interviewing, and when there was a large increase in the top codes (that for earnings rose from $299,999 to $999,999). This was important, since there was a large rise in recorded inequality in that year, and estimates (Weinberg, 1996, footnote 3) indicate that these changes could account for one half of the recorded increase.

So what support do we find for the various hypotheses? Certainly there has been a rise post-1968. By 1992 the Gini coefficient had risen by some 5-percentage points – well in excess of my 3-percentage point yardstick. The nonglacial change hypothesis is accepted. What about the U-hypothesis? Visual inspection indicates an episode of falling inequality from 1961 to 1968, when the Gini fell by 2½ percentage points. This could be called the first part of the U, but falls short of the 3-percentage point yardstick, and it was preceded by a period that shows virtually no trend. To quote Lindert, “for the US, the shift to more equal pre-fisc incomes lasted only a quarter century, from 1919 to 1953. ... Then it stopped altogether” (Lindert, 2000, page 195). (The U might be clearer for the *post-fisc* distribution.) The Kennedy-Johnson years apart, the US post-war pattern looks more like an aircraft take-off: horizontal for a period and then a steep ascent. The key question concerns when it levels off. Here the break in 1993
makes it difficult to draw firm conclusions about the continuing change hypothesis. The fact that the coefficient in 2001 was 1 percentage point higher than in 1993 (allowing for the new population controls and expanded sample) suggests that cruising altitude may not have been reached, but the next few years will be watched with interest. Were the 1970s and 1980s a prolonged episode of increasing inequality that concluded in 1992 or are we witnessing a steady upward trend?

For the UK, we can see from Figure 2 that the picture looks even more like a patchwork. Evidence from household surveys effectively begins in 1961. For the earlier years, we have a synthetic series, based on income tax and other data, that suggests, like the US, little overall change up to the 1960s. Then the pattern departs from that in the US in that there appears to have been a distinct fall of 3 percentage points in the 1970s. The fall was more than reversed in the 1980s. Two features stand out about the UK experience. The first is the sheer magnitude of the rise from 1984 to 1990: the Gini coefficient in the UK rose by more than 1 percentage point a year. The U is lop-sided to the right. Overall there was an increase in the Gini coefficient of 10 percentage points. Any theory must explain why the UK was twice as severely affected as the US. Even if part of the rise was reversing the fall in the 1970s, the 1990 figure was 6.7 points higher than the highest value recorded in the 1960s. The second feature is that the 1990s did not show a continuing upward trend. Allowing for the break in the series, the 2000 Gini coefficient is the same as that for 1990. So we have an episode of rising inequality in the 1980s, not a continuing upward trend.

The UK evidence in Figure 2 demonstrates one characteristic of recent changes emphasised by the OECD: that most countries have seen a rise in
inequality of market income (income before taxes and transfers). The same story of rising market income inequality is exhibited by the Canadian data shown in Figure 3: since 1981 the Gini has risen by more than 5 percentage points. But the inequality of disposable income remained unchanged up to 1996. Until that point, the tax and transfer system appears to have been successful in offsetting any exogenous forces making for greater inequality. (I stress “exogenous” since market income itself is potentially affected by the existence of taxes and transfers.) What does the Canadian evidence tell us about the U-hypothesis? A supporter may discern a U-shape, but the magnitude of variation is very limited: the range of the disposable income Gini in 30 years is from 35 percent to 37.8 percent. On this basis, Canada is on the margins of glacial change.

Turning to Scandinavia, we find that Sweden is an example of the problems of data comparability. At face value, there is (Figure 4) a clear U-pattern for disposable income. But as far as the downward movement is concerned, a lot rests on the observation for 1967, of which Gustafsson and Uusitalo say that “because of some differences between the two data sets the comparability is less satisfactory” (1990, page 84). Gustafsson and Johansson (1999) exclude the 1967 observation from their analysis of changes in inequality over time. The official SCB series starts in 1975. From 1975 to 1981 the fall was smaller and only just sufficient (3 percentage points) to qualify as non-glacial change. The rise from 1981 to 1990 is 2.8 percentage points, so up to this juncture the U is muted. In considering the 1990s, there are definitional issues. The official “headline” series, unlike in most other European countries, includes realised capital gains, which leads the series to be much more volatile in the 1990s. This causes differences in the picture depending on the definition chosen.
From 1993 to 1999, the rise is 3.7 percentage points if realised capital gains are included, but 1.6 percentage points if they are excluded (Statistics Sweden, 2001, page 3). The judgment reached regarding the continuing rise hypothesis depends therefore on the concept of income employed.

A contrast is often drawn between Norway and Sweden. The picture (Figure 5) in Norway is however far from clear. Indeed those commentating on the Norwegian experience have reached different conclusions. According to Bojer, the period 1970-1984 in Norway showed “great stability in the distribution of personal income” (1987, page 257). According to Ringen, the distribution from 1970-1986 “has not been stable” with first a rise and then a fall in inequality (1991, pages 6 and 7). So that, while there has been a clear rise in the 1990s, by 3.3 percentage points from 1990 to 1997, it is less clear from the existing evidence that this is the second part of a U. On the other hand, Finland (Figure 6) provides much clearer evidence of a U, even allowing for the break in the series. The Gini coefficient for disposable income for 1966 was 31.8 in 1966, fell to around 20, and then rose again to 26.6 percent in 2000. The increase from 1993 to 2000 is over 5 percentage points, providing strong support for the continuing rise hypothesis.

In Continental Europe, we find a marked decline from 1959 to 1977 in the Netherlands (Figure 7). As described by van Zanden, “the CBS [Central Bureau of Statistics] figures show quite a marked fall in inequality from 1962 onwards, a fall which continues into the first half of the seventies. About ten years of stability followed, after which a slight increase in inequality can be registered, starting in 1983. ... Thus the long-term fall in income inequality which had run through the 20th century seems to have come to an end half way through the 1980s” (van Zanden,
The rise from 1983 to 1990 was 3 percentage points, so that the Netherlands just qualifies as a U-shape. It is however a U with a serif, since the 1990s indicate no continuation of the rise: the Gini coefficients for 1991 and 1999 are identical. As in the UK, there was an episode of rising inequality in the 1980s, not continued into the 1990s.

In West Germany (Figure 8), the earlier period is surrounded by uncertainty. Both the budget survey (EVS) based estimates and the DIW synthetic estimates show falls in the Gini coefficient of more than 3 percentage points, but the timing is quite different. The EVS estimates show a fall from 1962 to 1973, but this is not mirrored in the DIW synthetic estimates, which show a rise. The preference today is to use household survey data, but it is not evident that we should simply believe one series and not the other. The EVS is based on a quota sample, and a lot of weight attaches to the first observation in reaching the conclusion that inequality fell significantly. The DIW estimates incorporate information from other sources, notably the tax returns. In the more recent period, the EVS and the Panel survey show a similar upward trend, but the overall rise from 1988 to 2001 is less than 3 percentage points. The U is less than clearcut. The rise over the 1990s can only be described as “modest” (less than 2 points). Finally, the Italian picture has to be compiled from different series, with different income definitions, reflecting changes in the underlying sources (Figure 9). They certainly suggest significant change, but is not a simple U. The time path of the Gini coefficient in its homeland over this period is more like a W. As summarised by Brandolini, “from the early 1970s until 1982 ... the inequality of household incomes fell dramatically. In the mid-1980s, it showed some tendency to grow; a further decline in 1989-91 was soon reversed, and in 1995 the Gini
The coefficient was back to the value of 1980” (1999, page 222). The W appears to have a serif, since the Gini remained fairly flat from 1993 to 2000.

Conclusions

What conclusions can be reached regarding the three hypotheses of non-glacial change, U-shape, and continuing rise? As I have stressed, I do not believe that unequivocal answers can be given, as the data at our disposal are a patchwork that requires interpretation. The significance of observed changes is a matter for judgment. Moreover, conclusions may have to be revised as new data become available. These qualifications should be borne in mind when considering the summary in Table 1, where bold entries are in accord with the hypothesis, normal type entries do not support the hypothesis, and italic entries are unclear or “on the margin”. Applying the 3 percentage point criterion to the Gini coefficient, there is general support for the view that income inequality has exhibited non-glacial change, with the possible exception of Canada. What about the U-hypothesis? In three of the nine cases, a U-shape can clearly be discerned (UK, Finland and Netherlands), to which we can add the US if the Kennedy-Johnson years are treated as a significant decline, and the more muted cases of Canada and Sweden. The existing evidence in Norway and West Germany is unclear and Italy is more like a W. Where recent rises in inequality have followed earlier episodes of falling inequality, there may be a U or a U: the rise may have levelled off or be continuing. The changes over the 1990s divide into three: 3 countries where the Gini coefficient increased by more than 3 points (Norway, Finland and Italy), 3 countries where there was a modest rise (US, Canada and West Germany), 3
countries where there was no overall change (UK and Netherlands) or different series tell different stories (Sweden).

The principal conclusion that I draw is that there is something to be explained. Years ago, Solow wrote of the United States that “the relative distribution of personal income ... is a facet of economic life which changes slowly when it changes at all” (1960, page 109). Since then, we have seen more substantial changes. At the same time, the changes have differed across OECD countries, in both extent and timing. In some cases we have trends; in others we have episodes. This means that the explanations must be sufficiently rich to allow a variety of outcomes.

C Seeking Explanations

Diversity of outcome is well illustrated by the consensus view about the cause of rising inequality. The textbook explanation is that there has been a shift in demand away from unskilled towards skilled labour, associated with increased competition from newly industrialising countries (NIC) as a result of globalisation or with technical change biased towards skilled labour, or with both these factors operating in conjunction. The reduced demand for less skilled labour means that, with relative supplies of the two kinds of worker fixed in the short-run, in a free labour market there will be a rise in the premium for skilled workers and a decline in the relative wage of unskilled workers. This is taken to be the explanation of rising wage dispersion in the US. In Continental Europe, unemployment benefits and/or minimum wages place a floor and mean that the relative wage of the unskilled cannot fall. According to this view, the demand shift explains the higher
unemployment in Europe. There is a unified explanation as to how a single cause has a differential impact on the US and on Continental Europe.

For all its attractions, the standard textbook explanation is an oversimplification. As the more sophisticated international trade literature has recognised (Davis, 1998), we cannot look at two parallel universes with 2 trading regions (in one case US and NIC, and in the other Europe and NIC). We need a minimum of 3 trading regions (US, NIC and Europe). If in a unified analysis the US and Europe both produce the good that faces NIC competition, then the wage floor in Europe determines the relative goods prices (in a standard two good two-factor Heckscher-Ohlin model, where it is assumed that one good uses unskilled labour relatively intensively). If the minimum wage is unchanged, this prevents the relative price from falling. The US is therefore unaffected by increased trade. Europe bears the brunt in terms of unemployment. We have one arm of the “Transatlantic consensus” explanation, but not the other arm. As Neary has noted, the assumption of fixed relative wages in this highly simplified model “imposes an implausible degree of structure on the world economy” (2001, note 3). The result is better stated as a tendency: European unemployment tends to prop up American wages. On this basis, the outcry about globalisation should be in Europe not in the US. On the other hand, Europe may be protected to a degree because it has already become specialised in goods that use skilled labour intensively. If, in the standard trade theory model, we allow the EU to have become specialised, then the consequences of opening trade are different (see Oslington, 1998). Suppose that the NIC is specialised in the other good (which uses unskilled labour intensively). Their entry into world trade drives down its price and hence causes the relative wage of unskilled workers to fall in the US,
which produces both goods. We then have the US side of the textbook conclusion, but not the European side, since the demand for the good using skilled labour intensively is higher, causing a fall in unemployment. Either way, one or other part of the "textbook" view cannot apply. The trade explanation is not therefore a simple application of standard theory of the Heckscher-Ohlin variety. The model has to be expanded.

In the same way, authors emphasising the impact of technological change have recognised that one has to go beyond the simple introduction of skill-biased technical change into an aggregate production function. The pace of technical change is in part endogenous, reflecting decisions about expenditure on research and decisions about the speed of innovation, and technical change interacts with the organisation of firms and labour markets. As put by Acemoglu, “to explain the changes in the distribution of income ... we need to understand the forces that shape technological progress, and how technology interacts with the overall organization of the labor market” (2002, page 13). Concern with the timing of the rise in wage dispersion relative to that of technological change has focussed attention on the role of “general purpose technologies” (Bresnahan and Trajtenberg, 1995, David, 1990). It has revived interest in the vintage nature of capital (Salter, 1960) and the extent to which it can explain rising inequality within groups (Aghion, 2002). These are important contributions. Here however I would like to stress two further aspects. The first concerns the interaction of the demand-shift explanation with the capital market, via the impact on the supply of skill. The second shifts attention away from a story told in terms of shifting supply and demand intersections to one based on a “tipping” equilibrium, where interdependencies in the labour market can cause a rapid shift in pay differentials.
Interaction with the Capital Market

Tinbergen (1975) described the evolution of the skill differential in terms of a “race” between technological development, increasing the demand for skill, and education, increasing the supply of skill. Suppose that we now consider the latter relation. In the simplest form of human capital theory, acquisition of a skill requires $S$ years of training, during which the person is paid nothing, so that the earnings career is postponed by $S$ years. To provide the same present value of earnings over a fixed working life, the earnings of skilled workers have to be higher by a factor $e^{rS}$ where $r$ is the real interest rate. If there are no barriers to acquiring skills, then this factor determines the long-run equilibrium wage differential.

The expression $e^{rS}$ shows that the labour and capital markets are linked. In the absence of barriers to entry, and of innate differences in talents, the costs of acquiring skill determine the equilibrium wage premium. The extent of the compensating differential depends on the real rate of interest anticipated when individuals make decisions about human capital investment. One possible explanation of changes in wage dispersion is therefore change in the cost of borrowing. In the 1970s, long-term real interest rates were negative in several OECD countries, including the UK and the US (Atkinson, 2000, Figures 4 and 5). Real interest rates increased sharply in the 1980s. In the 1990s the real rate was lower than in the first half of the 1980s but remained well above the level of the 1960s except in Germany. This evidence refers to ex post rates, which may overstate the rise in the ex ante anticipated rate. Nonetheless, the Group of Ten (1995) concluded that the ex ante rate had increased by one third between the
1960s and the 1990s. It is not perhaps surprising therefore that the premium to skill acquisition has increased, reflecting what is happening outside the labour market.

The existence of an equilibrium skill differential does not imply inequality: it is a compensating differential equalising net advantage over the lifetime. We may have had widening wage dispersion without increased inequality. We have however assumed away barriers to entry into skilled employment, and this is the route by which wage differentials become inegalitarian. One such barrier is quantity rationing in the capital market. People may not be able to borrow to finance their education, and their parents may lack the necessary capital. Families may be trapped in a low level equilibrium (Atkinson, 1997). In this situation, initial inequalities in wealth may be maintained over time, and this inequality in the capital market may generate inequality in the labour market.

A Tipping Model

The textbook demand shift story involves the intersection of supply and demand curves shifting with the diffusion of new technology or the growth of international trade. In fact, labour markets may function differently. In his account of a period of narrowing wage differentials, Reder states that "the long-run decline in the skill margin in advanced countries has not occurred slowly and steadily. Instead, the skill margin appears to have remained constant for relatively long periods of time and then to have declined sharply within a very few years" (1962, p.408). To account for such a pattern, we may make use of the “tipping model” of Schelling (1978). An example is the analysis of social custom by
Akerlof (1980). He describes a model where individual utility depends not only on income but also on reputation that is based on conformity with the social code. The loss of reputation if one departs from the social code depends on the proportion of the population who believe in the code, which is undermined if people cease to observe it.

Such a reputational approach is applied in Atkinson (1999) to the relation between wages and productivity. Suppose that there is a social code, or pay norm, that limits the extent to which individual earnings increase with earnings potential. Where this code is followed, people are paid a fraction (less than unity) of their productivity plus a uniform amount. Such a policy involves a degree of redistribution and low productivity workers can be expected to subscribe to the pay norm. But other workers will also accept it, even where they could be paid more if they broke the norm, since - if they believe in the norm - by breaking it they would suffer a loss of reputation. The extent of the loss rises with the proportion of the population who at that time believe in the norm. Employers are also concerned with their reputations. When they create a job, it is determined in advance whether or not it is paid according to the pay norm. The profitability of the job depends not only on the pay but also on the acceptance of the job by the worker with which it is matched. Matching is assumed to follow a random process, but is only successful where employer and worker either both observe the code or both do not. Employers determine their pay policy (i.e. whether or not to observe the social code) on the basis of comparing expected profitability, which depends on the proportion, and characteristics, of workers who accept different pay offers. The expected profitability of breaking the social code has to exceed the cost of the consequential loss of reputation, which is assumed to vary across employers, so that some
employers may observe the code while others depart from it. There will therefore be a proportion of jobs which accord with the pay norm. If the proportion of the population who believe in the pay norm is less (greater) than this, then the extent of belief is assumed to grow (fall).

There is therefore a dynamic process of adjustment. Depending on the initial conditions, a society converges to a high level of conformity with the social code, or to the virtual absence of conformity. In this kind of situation, an exogenous shock may switch the society from an equilibrium with conformity to the pay norm, and relatively low wage differentials, to an equilibrium where everyone is paid on the basis of their productivity. Such an exogenous shock may have been a fall in the weight attached by employers to reputation. Or, reflecting again changes in the capital market, future profits may be discounted more heavily. We may therefore observe a discrete change in the wage distribution: an episode of increasing dispersion. This alternative approach can explain why the same shock may have different effects on different countries, depending on the extent of differences in underlying productivity.

**D Top Incomes**

The textbook story concerns the plight of the unskilled worker in a globalising world of rapid technological change. It tells us less about the impact of these forces on upper income groups. In the same way, the Gini coefficient is a convenient summary indicator, but may not be a good guide to what is happening at the top of the distribution. If we focus just on the shares of top income groups, then we can make use of longer-run data derived from income tax returns. Tax data have many shortcomings. They relate to gross (pre-tax) income. They are
affected by tax evasion and avoidance. The definitions of income and the income unit follow those of the income tax legislation, which varies both over time and across countries. Capital income is recorded to differing degrees in different countries, and the same applies to executive compensation in kind and in stock options. Income tax data do however have the merits of covering the whole second half of the twentieth century and of providing considerable detail on the top of the distribution. Figure 10 shows the results of studies for five OECD countries. To the Netherlands, US, UK and Canada, I now add France, as it was the research of Piketty (2001) for France that revived use of income tax data – which had been little used since the study by Kuznets (1953) for the US.

In order to relate the tax data to the whole population, we need reference totals for the number of tax units and total income, in order to calculate the share in total income of the top x percent of total tax units. The total of tax units is relatively easy to approximate from population statistics, but the studies cited have adopted different approaches to the income totals, particularly with regard to the inclusion or exclusion of transfer incomes. In view of this, I have concentrated here on the distribution within the top income groups: the share of the top 1 percent in the total income of the top 10 percent. (Estimates of the share of the top 10% in total income are given in the original sources.) This is in itself of considerable interest. In presenting income distribution data in terms of decile shares, we often overlook the fact that income within the top 10 percent is highly unequally distributed. In the same way, the top 1 percent cannot be regarded as a homogenous class. If one takes the UK income distribution in 1979 (a year of relatively low inequality), then according to the income tax data the share of the top 10 percent in gross income was 25.3 percent: i.e. 2½ times their proportionate
share. Within the top 10 per cent, the top 10 percent (i.e. the overall top 1 percent) had a share of 20.9 percent of the total income of the decile group: i.e. twice their proportionate share. And the top 10 percent within the top 1 percent (the overall top 0.1 percent) had a share of 22 percent of the total income of the percentile group. The similarity of these numbers reflects the fact that the upper tail of the distribution has approximately a Pareto form, and in this sense they are not surprising. They serve nevertheless to highlight the way in which – at whatever point one slices the upper reaches of the distribution – the remaining section is characterised by a similar degree of relative inequality. Assuming that the cumulative distribution $F$ within the top group is such that $(1-F)$ is proportional to $y^{-\alpha}$, where $y$ is income, then the within-group share of the top 1 percent within the top 10 percent, denoted by $S_1/S_{10}$ is given by $(0.1)^{(1-1/\alpha)}$. The larger the Pareto exponent, $\alpha$, the smaller the within-group share. This method of estimating the Pareto coefficient was proposed by Macgregor (1936), who noted that it made a bridge between Pareto and Lorenz. For this reason, to draw a distinction from other methods of estimating the Pareto coefficient, I refer to it as the Pareto-Lorenz coefficient.

Looking across the five countries, we see two striking features of the post war period in Figure 10. The first is the similarity in the downward trend in the relative shares for the first twenty-five years. The implied Pareto exponents were already quite similar, but they converged further. In 1949 the Pareto-Lorenz coefficients derived from Figure 10 are 2.24 in Canada and France, 1.96 in the

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6 As noted earlier, the income tax legislation has varied over time, leading to breaks in the continuity of the different series. In the case of the Netherlands, the study by Atkinson and Salverda (2003) has two major breaks: in 1964 when the method of estimation changed and in 1977 when we begin using the micro data from the Income Panel Survey. In the UK, there is a break in 1990 when independent taxation was introduced.
US, 1.94 in the Netherlands (1950) and 1.81 in the UK. By 1973 the Pareto-Lorenz coefficients had risen to 2.39 in France, 2.55 in the Netherlands and the UK, 2.59 in the US and 2.66 in Canada.

The second striking feature is that the latter part of the century saw a sharp rise in the relative shares (and fall in the Pareto-Lorenz coefficients) in the Anglo-Saxon countries, but not in France or the Netherlands. In the three Anglo-Saxon countries, we have a much clearer U shape, without apparent serifs. By 1998, the implied Pareto-Lorenz coefficients from Figure 10 had fallen to 2.10 in Canada, 1.95 in the UK and 1.83 in the US. The US and the UK had switched position, but the values are essentially the same as in 1949. It is true that the bottom of the U came later in the UK and Canada (around 1978), and that we have to allow for a break in comparability in the UK series with the introduction of independent taxation in 1990, but the overall time-path in the three Anglo-Saxon countries is similar. In contrast, as pointed out by Piketty (2001), France did not see a sharp upward movement in inequality. Compared with 1970, the French Pareto-Lorenz coefficient in 1998 is higher. The same is true in the Netherlands: compared with 1977, when the Pareto-Lorenz coefficient was 2.97, by 1999 it had risen to 3.47. The two Continental European countries were apparently moving to the beat of a different drum.

**Possible Explanations of Top Income Inequality**

Explaining the evidence on top incomes presents a considerable challenge. Why did relative inequality at the top fall so uniformly across all five countries during the first half of the post-war period? Why was this fall reversed in the Canada, UK and the US, and not in France and the Netherlands?
In considering possible explanations, it is useful to note that the empirical representation in terms of the Pareto exponent provides a direct link to a number of theories advanced in the past (and largely ignored today). If the upper tail can be approximated by the Pareto distribution, then the share of the top 1 percent within the top 10 percent is a linear function of $(1/\alpha)$:

$$\log[S_1/S_{10}] = b \left(\frac{1}{\alpha} - 1\right)$$

(1)

In the case of earnings, one set of theories that lead directly to predictions concerning the Pareto exponent are those dealing with executive remuneration in a hierarchical structure. The model advanced by Simon (1957) and Lydall (1959 and 1968, page 129) leads to an approximately Pareto tail to the earnings distribution, where $1/\alpha = \log_e[1 + \text{increment with promotion}]$ divided by $\log_e[\text{span of managerial control}]$. As observed by Phelps Brown (1977, page 309), plausible values for the span and increment imply values of $\alpha$ higher than observed in the actual distribution. On the other hand, the theory suggests one approach to understanding the variation in $\alpha$. The increment for promotion may have been influenced by the globalisation of the market for managers. This is one group for which movement across national borders is significant. Where mobility is easier for the upper echelons of an organisation, a rise in the increment, holding constant the entry salary, would be a natural response to increased competition for the services of top executives. Moreover, mobility may be less across language barriers, accounting for the differing experience of France and the Netherlands. The differing experience across countries in the second period could also be explained by applying a “tipping” model similar to that described above. Those at the top of a “flat” hierarchy may, in conformity with the pay norm, accept lower pay than they could secure in a firm with a “steep” hierarchy. Their adherence
may however be a function of the extent of compliance in the economy as a whole, both because this affects the potential loss of reputation from breaking the code and because it affects the chance of being better paid if they entered the market for another job. The existence of executive remuneration surveys provides in this case a powerful instrument for assessing the degree of conformity, as does the presence of external directors on remuneration committees. In this situation, an interior equilibrium may be unstable, with the economy tending to one extreme or the other. With a flat hierarchy, the pay increments are the reservation wage; with a steep hierarchy they are constrained by what shareholders tolerate. What we have observed in the US, UK and Canada may have been a progressive move from one equilibrium to another. It is possible for example that a reduction in the time horizons of firms in some countries has led to such a shift.

A second explanation of the rise in inequality in the second half of the post-war period is provided by the "superstar" theory of Rosen (1981). The expansion of scale associated with globalisation and with increased communication opportunities has raised the rents of those with the very highest abilities. Where the second-best performer’s market share is limited by the “reach” of the top performer, and this reach is extended by technical changes such as those in Information and Communications Technologies (ICT), and by the removal of trade barriers, then the earnings gradient becomes steeper. This could explain the fall in the Pareto coefficient in the past quarter century. Indeed Rosen made precisely this prediction in 1981, referring back to Marshall’s *Principles*, where Marshall identifies “the development of new facilities for communication, by which men, who have once attained a commanding position, are enabled to
apply their constructive or speculative genius to undertakings vaster, and extending over a wider area, than ever before” (1920, page 685).

*Capital Income*

What however can explain the first part of the period, when \( \alpha \) was rising? Here we have to recognise that earnings are only part of the income of the top groups. As Piketty (2001) has demonstrated for France, the composition of income changes radically within the top 10 percent. For those in the “first” 5 percent, earnings (in 1998 in France) accounted for 90 percent of their income; for those in the top 0.01 percent, capital income accounted for over 60 percent of total income. This brings us to theories concerned with the accumulation of capital. Meade (1964) developed a model of individual wealth holding, allowing for accumulation and transmission of wealth via inheritance, and this model has been analysed in a general equilibrium setting by Stiglitz (1969). With equal division of estates at death, a linear savings process, and persistent differences in earnings, in the long-run the distribution of wealth mirrors the distribution of earnings (Atkinson and Harrison, 1978, page 211). In contrast, alternative assumptions about bequests can generate long-run equilibria where there is inequality of wealth even where earnings are equal. Stiglitz shows how the operation of primogeniture in passing on wealth can lead to a stable distribution with a Pareto upper tail, with

\[
1/\alpha = \log_e[1 + sr(1-t)] / \log_e[1+n]
\]

(2)

where \( sr(1-t) \) is the rate of accumulation out of wealth, \( r \) being the rate of return and \( t \) the tax rate, and \( n \) is the rate of population growth (Atkinson and Harrison, 1978, page 213). For stability (and \( \alpha \) greater than 1), the overall population
growth rate has to exceed the rate of accumulation by the wealthy. The model is highly stylised but again provides a direct explanation for the decline and then rise of the top shares over the post war period. In the first post war decades, the net rate of return was increasingly reduced by progressive taxation and by inflation; the 1980s and 1990s then saw a recovery of the real rate of return and – in the Anglo-Saxon countries (although to varying degrees) – reductions in top income tax rates. These models treat wealth accumulation as deterministic.

Champernowne (1936, 1973) set out a rich theory of the evolution of incomes subject to stochastic shocks. This has been developed by Vaughan (1978, see also 1979), who shows that the Pareto exponent is a function of the degree of volatility. This provides a second element that can contribute to the explanation of the U shape of top income shares, if volatility first fell over the post war period, as the Golden Age became established, and then increased in the more turbulent later years of the century.

These models indicate some promising routes to the specification of econometric equations linking the share of the top 1 percent within the top 10 percent to macro-economic and other variables.

Prospects for the Future

Those drawing attention to rising income inequality are right to be concerned about the future. With the possible exception of Canada, there has been significant change in the distribution of income in all nine OECD countries examined here. In some countries, such as the UK, the increase in recorded inequality is considerably larger than the rise in the US that has attracted so much attention. At the same time, these recent changes should not be extrapolated into
an inexorable rise in inequality in the future. There are at least three reasons for
not drawing such a conclusion. First, the empirical evidence suggests that in some
countries the rise does not appear to be continuing: we have had episodes of
increasing inequality rather than an upward time trend. Secondly, the distribution
of income is a highly complex phenomenon, and it would be surprising if a single
explanation sufficed for all countries and all periods. Globalisation and ICT may
together have reduced the job opportunities of those with low levels of skill, but
there are also other forces in operation and these forces may change direction. For
example, I have suggested that part of the explanation of greater inequality is the
rise in the net rate of return to capital. If the rise is unwound in the next decade,
with investors enjoying lower yields than in the 1980s and 1990s, we may expect
the increased inequality to be reversed. Thirdly, we must not lose sight of the role
of policy. I have concentrated on the explanation of variations in inequality of
market income, but changes in tax and social transfer policy have played a major
role in increasing inequality in a number of countries.
<table>
<thead>
<tr>
<th>Country</th>
<th>Non-Glacial Change?</th>
<th>U-Turn?</th>
<th>Continuing Rise?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>Significant change.</td>
<td>Muted up to 1990.</td>
<td>Different pictures from different series.</td>
</tr>
<tr>
<td>Norway</td>
<td>Significant rise in 1990s.</td>
<td>Picture unclear.</td>
<td>3 point rise from 1990 to 1997.</td>
</tr>
</tbody>
</table>
Data Sources

Note: where no reference is made on the graph to equivalisation, the series refer to the total income of the household (or tax unit).

Figure 1:
B  Brandolini, 1998, Table A1, col 1a.
C  Budd, 1970, page 255.
E  U.S. Census Bureau, 2002, Table A-2.

Figure 2:
B  Royal Commission on the Distribution of Income and Wealth (RCDIW), 1979, page 165.
C  Atkinson and Micklewright, 1992, Table BI.1.
I  1961 to 1974 from RCDIW, 1977, page 249; 1980 from ET, January 1982, page 100; otherwise as F.

Figure 3:

Figure 4
J  Gustafsson and Uusitalo, 1990, page 85.

Figure 5:
B  Income Distribution Survey,
http://www.ssb.no/english/subjects/05/01/incdist/main.html
Figure 6:
Uusitalo, 2001, page 4; 1987 onwards from Statistics Finland website:

Figure 7:
C                     Income Panel Survey (IPO), see Atkinson and Salverda, 2003.

Figure 8:
C and D               Hauser and Becker, 2001, page 89.
E and F               SOEP results supplied by G Wagner, Tabelle 1b (see Becker et al,
                     2003, but note that the results here apply an equivalence scale equal to the square
                     root of household size).

Figure 9:
B and C               supplied by Bank of Italy.

Figure 10:
Canada: Saez and Veall, 2002, Table B1.
Netherlands: Atkinson and Salverda, 2003, Figure 3A.
US: Piketty and Saez, 2001, Table A1, and updated information supplied by
     Emmanuel Saez.
References


Figure 1  US Income Inequality 1945-2001

Gini %

CPS survey

Break

Estimates of Budd

OBE synthetic estimates
Figure 2  UK Income Inequality 1949-2000

Blue Book synthetic estimates before tax income

Blue Book synthetic estimates after tax income

IFS equivalised disposable income

ET market income

ET equivalised market income

ET equivalised disposable income

ET disposable income
Figure 4  Sweden Income Inequality 1967-1999
Figure 5  Norway Income Inequality 1970-1997

- Ringen equivalent market income
- Ringen equivalent disposable income
- Bojer disposable income
- SSB equivalised disposable income

Gini coefficient %

Figure 6  Finland Income Inequality 1966-2000

Gini coefficient %

- Equivalised market Income
- Equivalised gross income
- Equivalised disposable income

Break
Figure 8  West Germany Income Inequality 1950-2001

- DIW disposable income synthetic series
- EVS equivalised market income
- Panel equivalised market income
- EVS equivalised disposable income
- Panel equivalised disposable income
Figure 9  Italy Income Inequality 1968-2000

- Household weights disposable income
- Excluding interest and dividends
- Excluding imputed rent, interest and dividends
- Person weights equivalised disposable income
- Total income

Excluding imputed rent, interest and dividends

Person weights equivalised disposable income

Household weights disposable income

Excluding interest and dividends