

The Changing Distribution of Income:

Evidence and Explanations¹

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Introduction

It is a great honour to be invited to be the first speaker in this annual Lecture series in honour of Professor Kurt Rothschild. It is also a real pleasure, since Professor Rothschild's writing - over a period of more than 50 years - has greatly enriched our understanding of issues which are central to economics. For example, I can well remember as a student reading his article in the *Scottish Journal of Political Economy* on "Some recent contributions to a macroeconomic theory of income distribution" (Rothschild, 1961).

What I want to do in this lecture, as the title suggests, is to review evidence about the changing distribution of income, and the explanations that have been advanced. What exactly has been happening to the distribution of income? As is well known, there has been an increase in income inequality in the United States; in the United Kingdom there has been an even larger

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increase, with the Gini coefficient rising by some 10 percentage points. These developments are illustrated in Figure 1, which shows the changes in the Gini coefficient since 1977. In other countries, such as Germany and Japan, the increase in measured inequality has been more modest and in Canada, France and Italy there has been no overall rise over the same period. Why have we seen such changes and why has their size differed across countries? In order to answer these questions, we need both theory and evidence, and my lecture will be a blend of these two ingredients.

Before starting, I should make clear that I shall be more concerned with raising questions than with supplying answers. Indeed, one of the main aims of the lecture is to point out some of the limitations of the existing answers - particularly what has rapidly become established as the "Transatlantic Concensus" that increased income inequality in the United States and high unemployment in Europe are due to a shift of demand away from unskilled workers.

1 The Macro-Economics of Income Distribution

The macro-economics of income distribution in terms of the distribution of national income between wages, profits and rent seems now to be little discussed. The share of wages, and whether it is constant or rising or falling, was once a central topic in macro-economics. Today, things seemed to have changed, and factor shares are not essential to macroeconomics. For instance, the widely-used textbook, *Macroeconomics*, by Mankiw (1994) includes in its inside covers 8 graphs of key statistics on the United States economy from 1900 to the present, but these do not include the share of wages or profits in national income. The share of labour income is given later in the text, but the factor share figures are apparently not regarded as of

central importance and receive relatively little attention.

The main information which students of macroeconomics appear to be given on factor shares is that they are constant over time. According to Hall and Taylor, in their text,

"these relative shares are fairly stable from year to year" (1993, p 48).

The theme of stability appears in a number of other texts, a United Kingdom example being that of Begg, Fischer and Dornbusch (1994), who note there is little change in the share in the United Kingdom between 1960s and the present.

What has in fact happened to factor shares? The movements in the non-labour share in business sector output, smoothed by taking a 5 year moving average, are shown for the G7 countries in Figures 2 and 3. In the UK, there does appear to be broad constancy, although even the moving average figures show some fluctuations. In the case of the US, Poterba (1997), whose calculations I have used in constructing these diagrams, concludes that there has been a modest increase. In Japan, the share falls and then rises; in Canada, the reverse is true. The behaviour of factor shares in Continental Europe is shown in Figure 3. In Italy and West Germany, the share fell then rose, so that it is now back to its level in the 1960s. In France, the rise since 1980 is much more marked, being no less than 10 percentage points, a very large increase which has not received the attention which it deserves.

The study by Poterba examines the rate of return on business assets and finds that

"in the 1990s, the rate of return has increased in all but one of the G-7 nations" (1997, page 22).

the exception being Japan. The rise is marked in the US and Canada, where it is distinctly above its 1960s level. For Italy, the 1990s have seen a return to the rate of return of the 1960s, for Germany they are lower (but still higher than for the 1980s), and for France returns are

higher than during the 1960s. These changes have to be seen in conjunction with the rise in the real interest rate documented in Figures 4 and 5 (again a 5 year moving average).² In the 1990s the real rate is lower than in the first half of the 1980s, but it remains well above its level of the 1960s in all countries except Germany. These rates refer to *ex post* returns, but there is good evidence that the expected real rate of interest has also risen. The Group of Ten conclude that:

"The evidence is consistent with an average secular increase in the *ex ante* real interest rate, net of inflation risk, of around [1 percentage point] between the 1960s and the 1990s" (Group of Ten, 1995, page 18).

They go on to say that

"While this increase is not especially large relative to the annual fluctuations of long-term interest rates, it does represent a significant and sustained increase in economic terms, as it implies a one-third increase in the real rate of return" (Group of Ten, 1995, page 18).

To sum up, there is therefore a variety of experience in different countries, but in the majority of the G7 there has been a shift towards non-labour income in the past two decades, and a rise in the real rate of return. This rise in capital income is a potentially important piece in the income distribution puzzle. It is relevant not just in its own right but also on account of its possible impact on the distribution of wages, on which I focus in what follows.³

² These rates are defined by subtracting the increase in the GDP deflator; in view of the fall in the relative price of capital goods and raw materials relative to consumption goods, subtraction of the increase in consumer prices would show a less marked rise in real rates. According to the Group of Ten (1995), real interest rates defined in CPI terms increased for the G10 countries from an average of 2.9 per cent in the 1960s to 4.2 per cent in the 1980s and 4.0 per cent in 1990-94. Measured in terms of the GDP deflator, the rise is 2 percentage points.

³ The direct effect of higher capital income on the personal income distribution is discussed in Atkinson (1996).

2 Conventional Wisdom: Reduced Demand for Unskilled Workers

The neglect by macro-economists of factor shares does not mean that they have ignored income distribution. The distributional issues generated by rising wage inequality now receive prominence. Indeed we seem to have moved rapidly to a consensus view of this question, where increased wage inequality is attributed to a shift in relative demand away from unskilled to skilled workers (see for example Blanchard, 1997, Chapter 25, or Lipsey and Chrystal, 1997). There is debate about the causes of the shift, which may be liberalisation of international trade and increased global competition or may be technical change biased towards skilled labour, or towards sectors using skilled labour, with the introduction of automation and Information Technology. Whatever the reason (in what follows I concentrate on the technology hypothesis), we have a shift in the relative demand of the kind illustrated in Figure 6. The demand for skilled workers, measured right to left, shifts to the left; the demand for unskilled workers shifts inwards. If the supplies of the two kinds of labour are fixed, then there is a widening of the wage premium.

Such a demand shift explanation has moreover been reconciled with the evidence that wage dispersion has not widened in all countries. The contrast of France and the US is shown in Figure 7. In the French case, the bottom decile for male workers was 59% of the median in 1977 and had actually risen slightly to 62% in 1987, whereas the US percentage fell from 50% to 44% over the same period. This divergence is commonly attributed to the existence of effective minimum wage protection (in France the SMIC) preventing wages from falling at the bottom but causing unemployment instead. According to Krugman,

"the upward trend in unemployment [in Europe] is the result of market forces

that "want" to produce greater inequality of earnings. The collision between these market forces and the attempts of the welfare state to limit inequality then lead to higher unemployment" (Krugman, 1994, p 60).

If there is a floor to wages, then the unskilled become unemployed instead of worse paid. Krugman represents the problem in terms of a continuous distribution of productivities, rather than a simple skilled/unskilled distinction, and this is reproduced in Figure 8. Changes in technology cause the earnings function to rotate. At the bottom, in the US wages fall to reflect the lower market valuation placed on low levels of skill; in Europe employers are no longer willing to employ low skilled workers at the minimum wage, so unemployment rises.

So we appear to have unified explanation for what is happening on both sides of the Atlantic: widening wage dispersion in the US and high unemployment in Europe. However, I have serious doubts on both theoretical and empirical grounds about this "Transatlantic Concensus".

3 Probing the Conventional Explanation

First, I consider the theoretical framework, beginning with the problem that, even on its own terms, it is only a partial/partial equilibrium story, partial in the sense that relatively little has been said about the supply side, and partial in the sense that it looks only at the labour market, not taking account of the capital market.

These two are connected. If differentials widen on account of demand shifts, then this may be expected to induce a supply response, since people will invest in training. However, once we bring in the costs of training, even if only the time spent acquiring the skill, then the capital market also becomes relevant. We cannot separate what is happening to wages from

what is happening to the rate of interest. Suppose that we take the simplest human capital model, and assume that the working life is the same, so that acquisition of skill means putting off the work period by S years. For the skilled wage to exactly compensate for the delayed entry into work, it has to exceed the unskilled wage by a factor e^{rS} , where people borrow at an interest rate r . People are indifferent between skilled and unskilled jobs where this wage differential holds. In the long-run, shifts in demand affect the number of skilled workers but not the wage differential, which is given by the factor e^{rS} .

This has two important implications (Atkinson, 1997). First, no lifetime inequality is introduced. This simple observation is often overlooked in the public debate. It is indeed striking how people jump instantly from wage *differentials* to wage *inequality*, whereas these are obviously not the same. Put another way, we have to remember that the figures typically presented are a snapshot of the distribution; we need to bear in mind the lifetime perspective.

Second, the compensating wage differential depends on the rate of interest, so that the rise in real interest rates can explain part of the observed widening in the wage distribution. If obtaining qualifications means investment, then the cost has risen, and we would expect the premium to increase. So we end up with the conclusion that the demand shift can only be a short-term explanation of increased wage differentials, but that the rise in real interest rates can provide a long-term explanation. At the same time, this may be moderated, or intensified, by government policy. The financing of education may be undertaken by the state, and the tax system may affect the private rate of return. We should not therefore be surprised to observe differences across countries, reflecting differences in national policies.

But we need to go further than this: we have to consider the effect of the rise in the cost of capital on the demand side too. Can the technical change explanation of the shift in demand

for unskilled workers be reconciled with the rise in the rate of return and in the capital share? This depends on the degree of complementarity between factors. To see how this argument might go, we could take a neoclassical aggregate production function, with capital as well as the two kinds of labour. Suppose that we are in a small economy open to world capital and product markets; the interest rate is therefore the world interest rate, but the wages are determined in the labour market where the demand is that of profit-maximising firms with identical production functions. In a story where labour is fully employed, and fixed in supply, we can write the equilibrium conditions in terms of the cost function. Differentiating with respect to r and a technology parameter, we can set out formally the relation which depends on the form of the cost function and the nature of technical progress. This is not a particularly intuitive relationship. Moreover, it is not clear to me that such a textbook exercise really captures the key elements of the technological change which people appear to have in mind. The impact of Information Technology is not well represented by a constant returns to scale production function. Network externalities require us to provide a dynamic treatment of the diffusion of an innovation, such as e-mail, and its increasing value as the network becomes more extensive. The rate of spread will be influenced by a number of factors, including government policies.

What I am suggesting is that we need to develop further the theoretical analysis in order to move beyond a partial model of the labour market, to provide a macro-economic explanation of changes in income distribution. If we are to do this, then it seems clear that such a macro-economic explanation is incomplete without taking account of unemployment. Here however we immediately run into the difficulty that models of unemployment do not typically allow for the heterogeneity of labour which is essential to the demand shift story. Workers are either employed or unemployed: there are no differences in the nature of their employment. This is

important because differences in skill may be associated with differences in the process of wage and employment determination. Unskilled workers may face a different labour market clearing process from skilled workers.

One approach to heterogeneity is via analyses of segmented labour markets, of which one well known version is that by Bulow and Summers (1986), where different mechanisms operate in different markets. In the less favoured secondary sector, the labour market is competitive, but in the primary sector there is an efficiency wage premium. In the shirking version of efficiency wages that they use, a firm finds it profitable to pay a higher wage than that which clears the market, since workers are not monitored continuously and are induced to supply effort only by the payment of an efficiency wage premium which is lost if they are fired. It should be noted that efficiency wages on their own do not account for the existence of unemployment in this two sector model, since employment is always possible in the competitive secondary sector. Unemployment only arises on account of the queue for jobs in the primary sector.

Can this model be used to cast light on increased wage dispersion? This raises the question of the identification of the different sectors. How do different labour market institutions relate to the skilled/unskilled divide? In fact, the potential shirking hypothesis seems more applicable to the secondary than to the primary sector of the economy. A situation where workers have to be induced to put in effort by the threat of dismissal is more likely to be found in the fast-food industry than in BMW or Zeneca. Conversely, even though union bargaining power has been suggested as one of the reasons why unskilled wages have not fallen in Europe, there are good reasons to associate union organisation with the primary, or skilled sector, as, for instance, in the work of McDonald and Solow (1985). This has led me to propose a model

(Atkinson, forthcoming) where shirking-based efficiency wages are assumed to apply in the secondary sector, whereas wages in the primary sector are governed by bargaining. In such a model, the observed shifts in the wage distribution are due not just to bias in technical progress, or in the sector in which technical progress takes place, but also to the form of wage and employment determination. If, for example, people in the primary sector are better able to capture part of the gains from productivity increase, through individual or collective bargaining power, then this will cause a rise in the skilled wage. Conversely, if IT leads to better monitoring in the secondary sector (for example in call centres employers are better able to measure speed of response), then this reduces the wage premium which has to be paid to avoid shirking. On both counts the wage differential widens.

For these reasons, I think that we need a fuller analysis of the technological shift explanation, taking account of the changes in the capital market and of the processes of employment and wage determination. I have also empirical doubts, to which I turn now.

4 Empirical Doubts

My first doubt arises from consideration as to what has been happening at the top of the distribution. Returning to the continuous representation of productivities in Figure 8, we can see that, if rotation of the wage/skill nexus were the full explanation, then we would expect to find the rise at the top in Europe, even if there were no change at the bottom. We do not have a maximum wage, so that market forces have full play at the top. However, we have not seen a major increase at the upper decile. Data for Austria reported by OECD show the top decile of male earnings as being 165% of the median in 1989 compared with 162% in 1980 (1996, page 61). From Figure 7, it may be seen that the top decile's pay did not go up

significantly relative to the median over the period as a whole, whereas in the US the top decile rose from around 1.8 to around 2.15. Of course, the ratio in France was initially higher, so that one can represent the process as "catching up", but then one has to ask why the US lagged behind France in making the adjustment - it seems rather implausible to suppose that this is linked to the technological shift explanation. (There are also issues of comparability of the data - in particular the degree to which remuneration in kind is omitted.)

A second empirical difficulty with the Transatlantic Concensus is that the data in Figure 7 reveal that in the US - the home of this explanation - the wages of the bottom decile of men have not been falling relative to the median over the last 10 years, rather they have increased. Between 1987 and 1996 the ratio increased from the 44% mentioned earlier back to 48%. It is true that the decile ratio has been widening, but this is because of what is happening at the top.

A further important feature of the changes in the earnings distribution in the US and the UK that is hard to explain on the skill hypothesis is what Krugman has called its "fractal" quality: one continues to find an increase in dispersion even if one considers narrowly defined groups. Katz and Murphy (1992) have documented in the US the increase in wage inequality within groups classified by sex, education and work experience. In the UK there has been increased dispersion even within narrowly defined occupation groups. Evidence is provided in Figure 9, which shows how the dispersion of male earnings widened between 1979 and 1990 for individual occupational groups. For comparison, I also show the economy-wide changes for the UK and four other G7 countries. As we would expect, the increases within narrowly defined occupational groups are smaller than in the UK economy as a whole, but they are sizeable - and much more concentrated than the increases by country. There are exceptions: for example, policemen, teachers, and bus drivers are exceptions. (The first two are subject to

public sector pay policies.) But widening dispersion is a feature of all other sizeable occupational groups. It is possible to attribute all of this to unobserved differences in skill, but such an approach runs the risk of becoming tautologous.

To sum up, I have three empirical doubts:

- we have not seen a significant rise at the top in mainland European countries,
- the bottom decile in the US has increased, rather than fallen, relative to the median in recent years,
- the rise in dispersion in the Anglo-Saxon countries is pervasive, affecting nearly all occupational groups.

To my mind, this indicates the need to look at other kinds of explanation.

5 Not Just Supply and Demand

I conclude that we need to look beyond the standard supply and demand story. The final chapter of Professor Rothschild's *The Theory of Wages* is entitled "The Limitations of a Purely Economic Theory of Wages". In it he says that

"For the single entrepreneur, ..., or the single worker there will be little choice but so to accept a given situation. For them the economic analysis of adjustments to given demand and supply conditions will be more or less applicable. But employers or workers as *social groups*, acting as 'political men' rather than 'economic men', will aim at fundamental changes. ... It follows that a complete theory of wages will have to range over the whole economic and sociological field in order to give a full view of the wage problem" (1954, page 173).

With the last sentiment, I fully agree. Whether or not such behaviour is necessarily in conflict with economic rationality seems to me more open to debate, as I shall explain in a moment.

How can we move beyond a simple supply and demand representation? One way forward is to suppose that supply and demand only place limits on the possible wage differentials, with other factors such as convention determining where between these limits wages actually lie. Such a "range theory" of wage differentials was advanced by Lester (1952) and has long been implicit in much institutional writing on labour economics. Within the range, there is scope for notions of fairness or equity. Within this range, there is scope for notions of fairness or equity, as has been investigated by, among others, Wood (1978), and Carruth and Oswald (1989). If the supply and demand curves coincide for an interval, this would mean that local shifts could leave equilibrium differentials unchanged, along the lines of the kinked demand curve. This could explain different reactions to the same external shock (eg the development of IT) in different countries, if the permissible range of deviation is wider in some countries, or the initial position is nearer the end of the range.

A second view sees long-run equilibrium wage differentials as determined by supply and demand, but with the forces of convention resisting adjustment, so that they influence the out-of-equilibrium wage differentials. Where the long-run equilibrium is itself shifting, social norms may have enduring consequences. As described by Hicks,

"The level of wages which is needed to attract labour quickly into an expanding trade is ... higher than that which is required to maintain the larger labour force; but, having once risen, the differential does not fall back easily. ... actual wage-systems are full of differentials that have lost their economic function, being ... the fossilised remains of historical shortages" (1963, p 320).

Another way of formalising this is to suppose that there are firm specific wage effects, which

change slowly over time, with the overall distribution of earnings depending on the distribution of workers over those firms (see Burgess et al, 1997). A speeding up of the matching process may mean that wages more closely mirror underlying productivities.

A third approach is to try and build bridges between social convention and supply and demand, as has been illustrated in theories of involuntary unemployment advanced by Akerlof (1980) and Solow (1990). Observance of social norms may be consistent with individual rationality (behaviour as 'economic man'), even where it may appear to conflict with maximising economic return. Akerlof describes a model where individual utility depends not only on income but also on reputation and, for those who believe in the social code, on conformity with the code. The loss of reputation depends on the proportion who believe in the code, which is undermined if people cease to observe it. He shows that there may be a long-run equilibrium with the persistence of a "fair", rather than market-clearing, wage.

In the present context, we could apply this to the relation between wages and productivity. Suppose that companies have a "wage policy" which involves paying a fraction α (less than 1) of a worker's productivity plus a uniform amount. Such a policy involves a degree of redistribution and would naturally attract low productivity workers, but it may also be accepted by higher productivity workers as part of their social code (where they adhere to the code). A more redistributive wage policy may raise productivity through increasing the sense of solidarity.

In this way, we are not so much suspending supply and demand as enriching the behaviour which lies behind these relations. Among the new implications is that widening wage dispersion can result not just from shifts in the demand for skill but also from changes in social norms and expectations. It may, for exogenous reasons, have become socially acceptable to

have larger differentials within the workplace. In terms of Figure 10, it may not be that people have become more productive, but that we have moved towards paying them more like salesmen. Or the exogenous shift in demand may have interacted with the endogenous determination of social norms. As more people are remunerated outside the conventional norms, so adherence to these norms becomes weaker, or the socially acceptable range widens. The demand shift may have caused a movement from an equilibrium where the norm is low differentials to a high differential equilibrium.

Conclusions

As I said at the outset, this lecture has raised questions rather than given definitive answers. I have cast doubt on the "Transatlantic concensus" that increased inequality is due to a shift in demand against unskilled labour. This explanation has not been developed adequately at a theoretical level, being too partial in its approach, and it is hard to reconcile with the empirical evidence when one looks below the surface.

I have not proposed a firm alternative, only sketching some of the alternative lines of explanation, but there are three general conclusions that I would draw:

- first, the personal distribution of income is subject to a wide variety of forces, operating in different sectors of the economy, and in different markets, so that we need to look not just at wages but also at the capital market, recognising that there has been a shift towards capital income and a rise in the real rate of return;
- secondly, the explanation should not be limited to a simple competitive supply and demand story, but should incorporate the institutional determinants of wages and employment, and recognise the role of convention and social norms;
- thirdly, for these reasons, we should not expect the same developments in all

countries, particularly given the role of national policies; put differently, the evolution of income inequality is not simply the product of common economic forces: it also represents the impact of institutions and policies over which we have choice - the future is in our hands.

In order to think about this choice, we need to re-integrate income distribution back into the mainstream of economics; and if we can succeed in doing so, then it will due in no small measure to the contribution of Professor Rothschild whom we are honouring today.

Sources of Figures

Figure 1

Canada: Gottschalk and Smeeding, 1997, Appendix Table B.
France: (1975 = 100) Atkinson, 1997a, Table FR2, Synthèses series.
(West) Germany: (1978 = 100) Becker, 1996, Tabelle 1, and Hauser, 1996, Tabelle 1, linked at 1993 using Becker, 1998, Tabelle 4.
Italy: Atkinson, 1997a, Table IT2, Bank of Italy series.
Japan: (1981 = 100) Gottschalk and Smeeding, 1997, Appendix Table B.
United Kingdom: Atkinson, 1997a, Table UK3, series constructed by Goodman and Webb (1994).
United States: US Department of Commerce, 1993, Table B-3, p B-6.

Figures 2 and 3:

Poterba, 1997, Table 8 (5 year moving averages of shares).

Figures 4 and 5:

OECD, 1997, Table 10.10.

Figures 7:

Bernstein and Michel, 1997, Table 4, and Friez and Julhès, 1998, page 43.

Figure 9:

UK: Department of Employment, 1979, Table 96, and 1990, Part A, Table 8,
Canada: OECD, 1996, Table 3.1 (1981 and 1990),
France: Friez and Julhès, 1998, page 43.
Italy: OECD, 1996, Table 3.1 (1979 and 1989),
Japan: OECD, 1996, Table 3.1.

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Figure 1 Income dispersion in G7 Countries relative to 1977

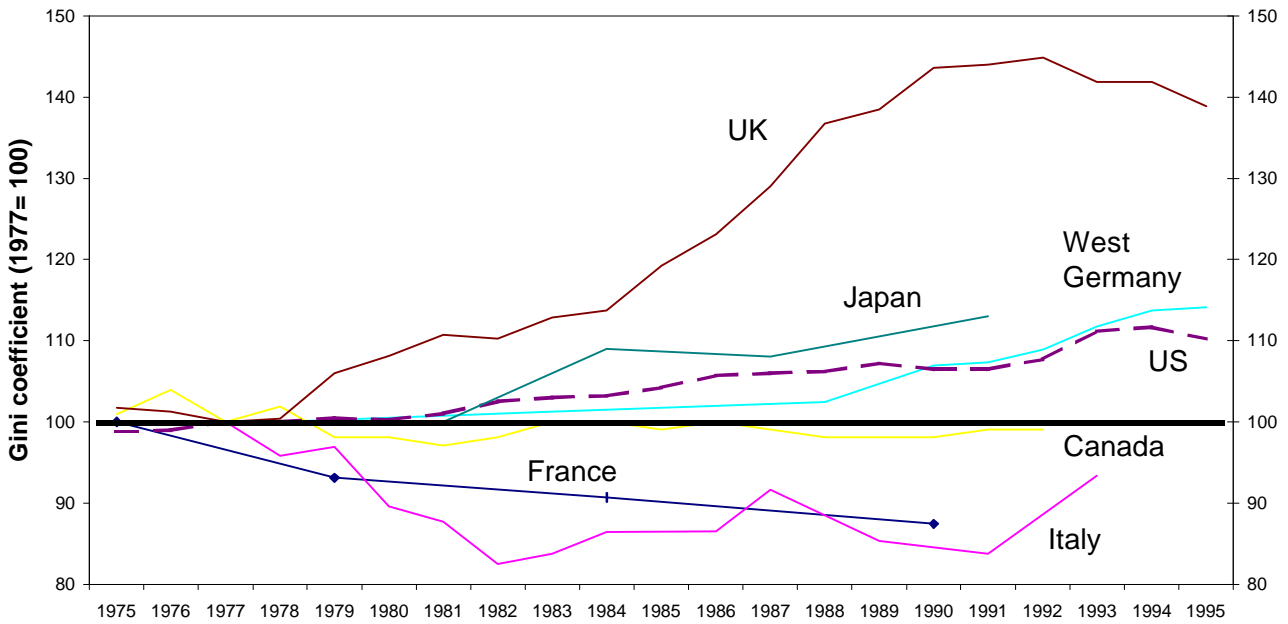
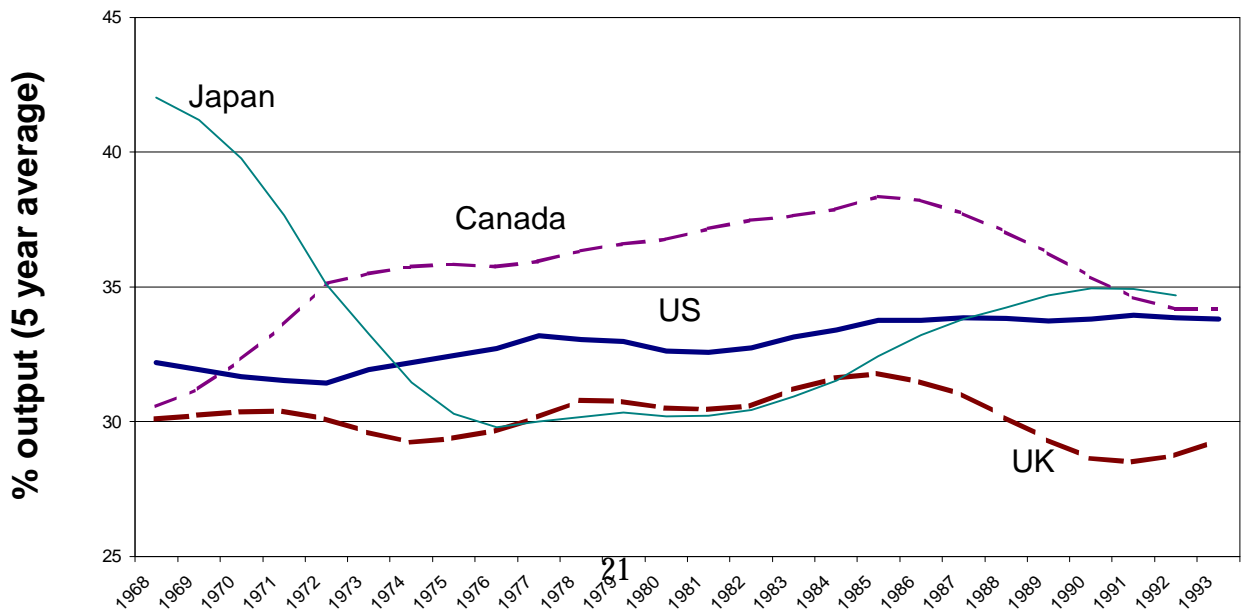
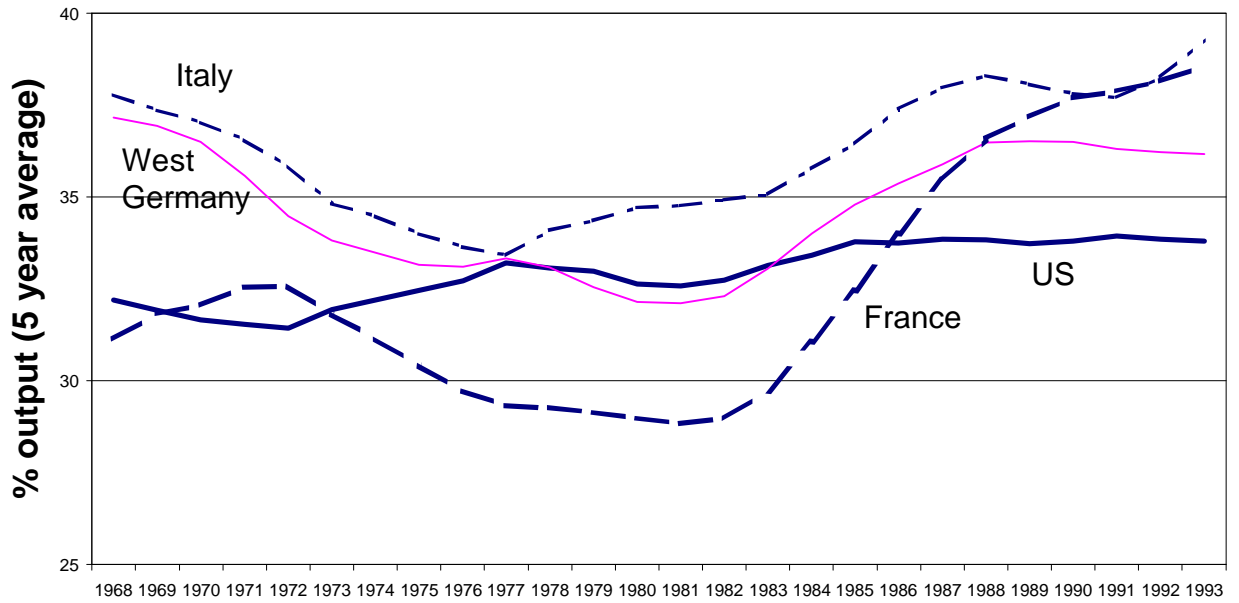


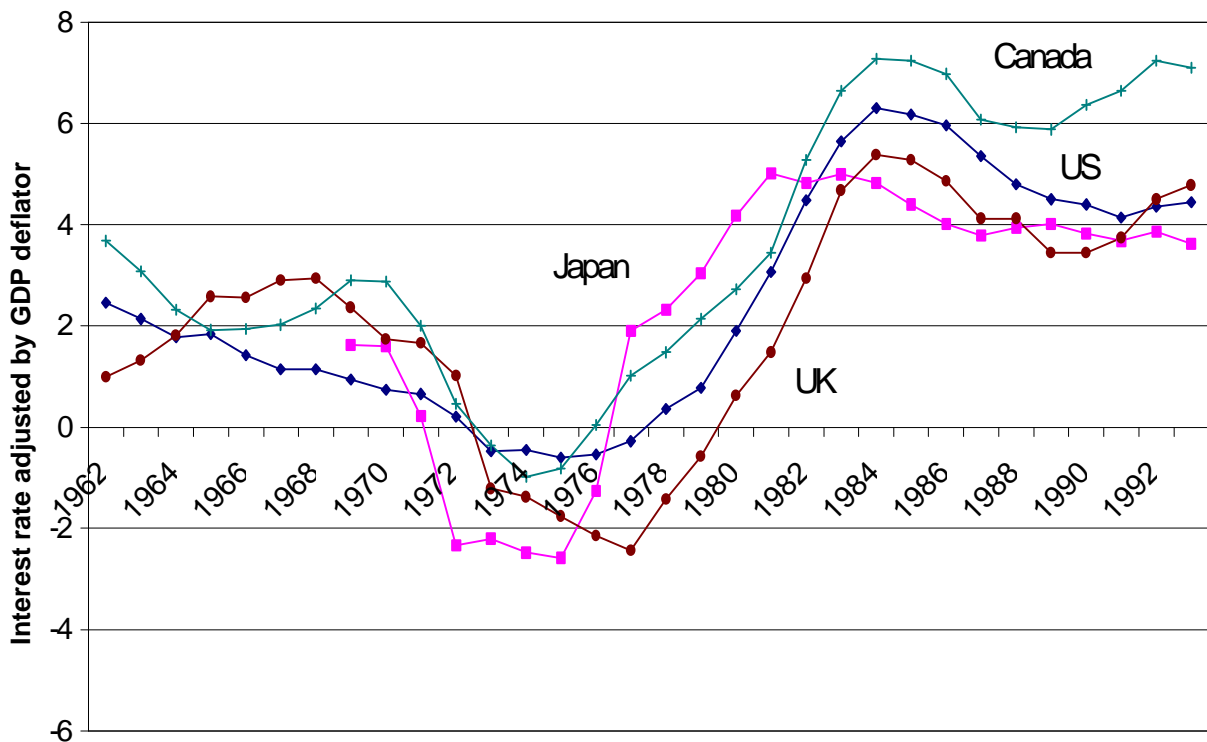
Figure 2 Non-Labour share in business sector output: Anglo Saxon countries and Japan



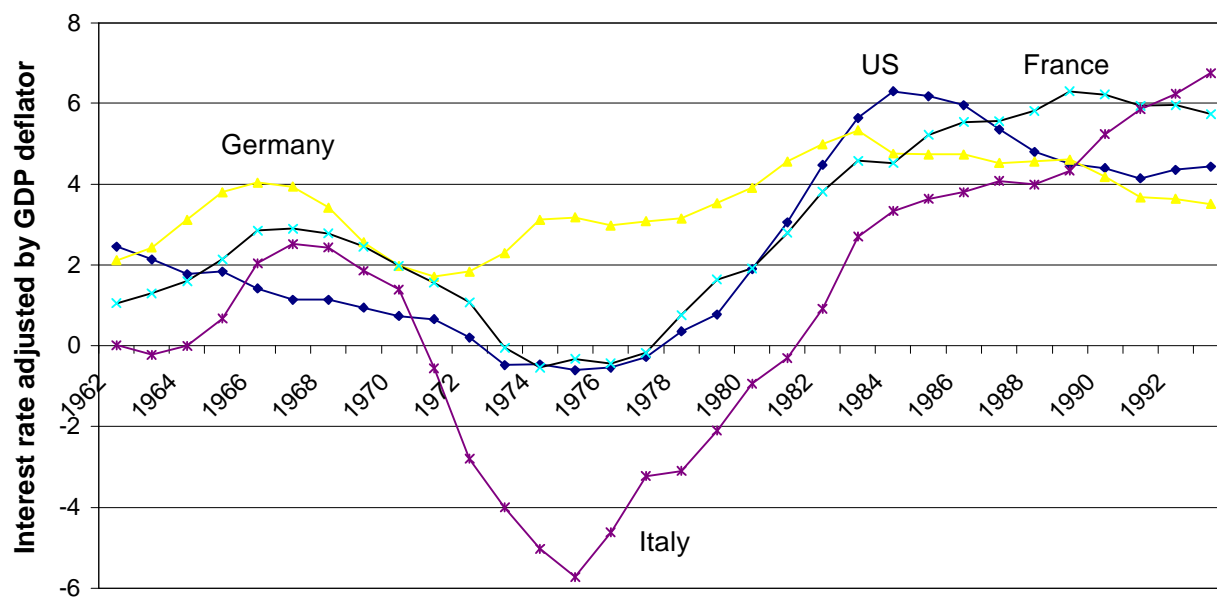
**Figure 3 Non-Labour share in business sector output:
Mainland Europe (and US)**



**Figure 4 Long Term Real Interest Rates
Anglo Saxon countries and Japan**



**Figure 5 Long Term Real Interest Rates
Mainland Europe (and US)**



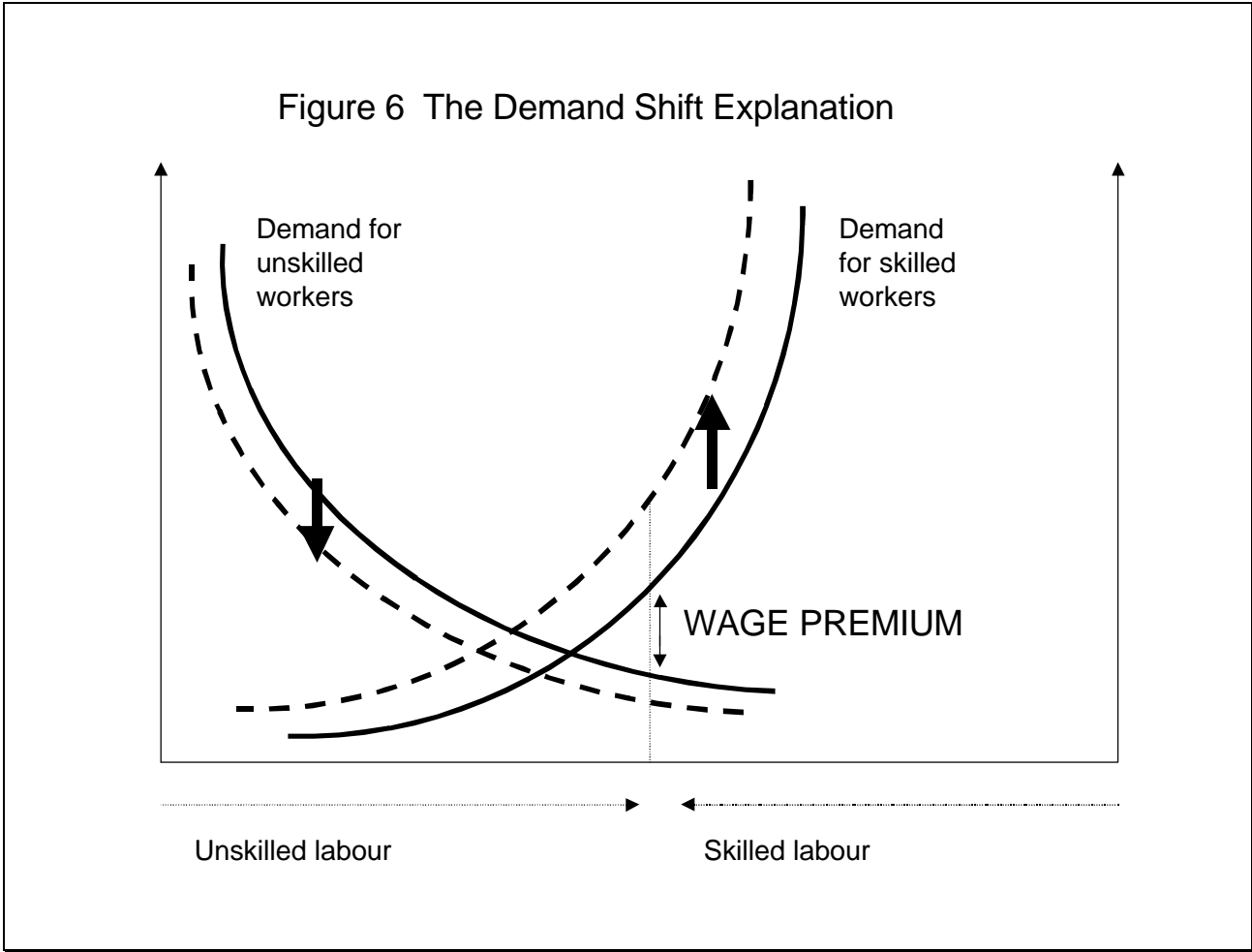


Figure 7 Male Earnings Distribution in US and France

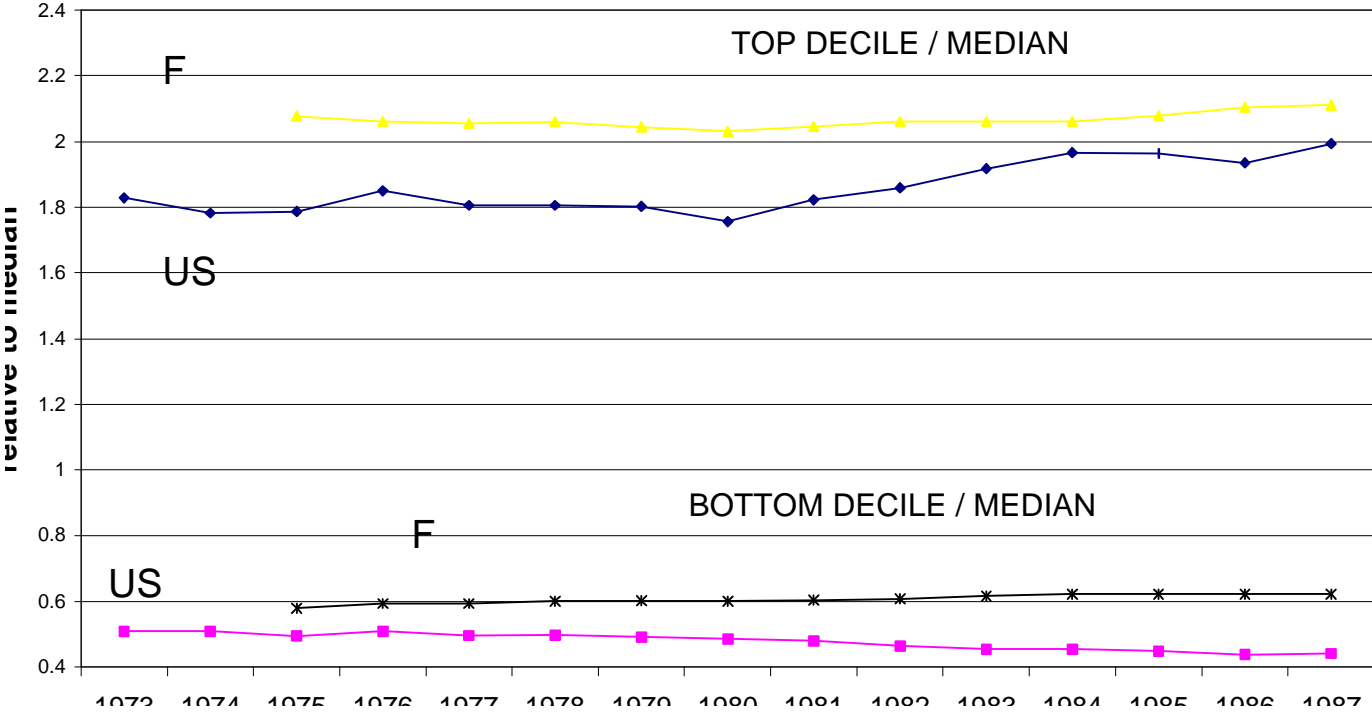


Figure 8 Shift in Earnings/productivity Profile

