

GROWTH, TAXATION AND THE LONG-RUN EVOLUTION OF TOP INCOMES

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Introduction

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Introduction

The subject matter of this meeting is central to economics – both to economics as an academic subject and economics as it affects the everyday life of citizens. Ever since the classical writers, economists have been concerned with the relation between growth and distribution, and with how this relation is influenced by public policy. The relation goes both ways. Growth affects distribution, and distribution affects growth. Here I shall be particularly talking about the former. How does the distribution of income evolve with the development of the economy? Do societies become less unequal as they grow richer? Has this been reversed in a great U-turn? What role is played in this process by progressive income taxation? But the interaction cannot be forgotten. When we consider taxation, we have to recognise that the incidence of the tax may depend on behavioural reactions, and these may include reactions, such as reduced accumulation, that lower the rate of economic growth.

I begin by considering in Section 1 the theory of growth and income distribution. There is an enormous literature on this subject – indeed many books with this title. Little of this literature however is concerned with the role of taxation and public policy. In Section 2, I consider how taxation can be introduced into the

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theoretical analysis, and describe some of the main developments in personal income taxation over the past century, taking the United Kingdom as a case study. In Section 3, I investigate the evidence about the long-run evolution of the distribution of income, capital and earnings, again focusing on the country I know best – the UK.

Our concern is naturally with the distribution as a whole, but throughout the lecture I concentrate on the top of the income distribution. I do this for three main reasons. The first is that the top of the distribution has received much less attention than the bottom. Yet the two tails are inter-connected. As it was put by the famous British economic historian, R H Tawney, “what thoughtful rich people call the problem of poverty, thoughtful poor people call the problem of riches”. The second reason is that, as the later empirical evidence will demonstrate, there has been much more change at the top in the last fifty years than in the distribution as a whole. The third reason is that we have evidence about the very top of the distribution (the top 1% and top 0.1%) for a much longer run of years than for the distribution as a whole, allowing us to go back to almost the start of the twentieth century.

1 The Theory of Growth and Distribution

Much of the very large literature on growth and distribution deals with the distribution by factor shares (the shares of wages, capital and land), whereas my concern here is with the distribution among persons, families and households. The emphasis on factor shares reflects the classical origins. At the time that Ricardo wrote that “To determine the laws which regulate this distribution is the principal problem in Political Economy”, the factor distribution was seen as directly relevant to the personal distribution, in that the different sources were identified with particular classes of people. As Richard Musgrave has described it,

"For classical economists, this scheme was doubly attractive. For one thing, it was an analytically convenient grouping, the pricing of various factors being subject to different principles. For another, it was a socially relevant grouping, as the division of society into capitalists, landlords, and workers gave a fair picture of social stratification in the England of the early nineteenth century" (1959, p 223).

Simplifying by combining income from land and capital into "property income", and approximating by assuming that the propertied class is an infinitesimal fraction of the total population, we can draw the Lorenz curve shown by the straight line in Figure 1 and calculate the Gini coefficient as equal to the share of property income. There is a very direct link between factor shares and personal income inequality. If the share of property rises, then so does the Gini coefficient.

Today, however, this is scarcely adequate, for several reasons. First, we need to explain the distribution of factor incomes *within* classes, such as the size distribution of wages. Why do corporate Chief Executive Officers receive many times more than head teachers in schools? Why do airline pilots get paid more than train drivers? In terms of Figure 1, the Lorenz curve now takes the bowed shape. There are some very high paid workers whose income approaches that of the propertied class. The Gini coefficient can be approximated by the share of property plus the share of wages times G_w , where G_w is the Gini coefficient for wage income. If the latter is, say, 30%, then a rise of 10 percentage points in the share of property causes the overall Gini to rise by 7 percentage points.

Secondly, rather than people being identified with a single source of income, they now receive income from a range of sources, so that one individual may be in receipt of wages, interest income, dividends, and rent (for example through owning a

house). A worker is not simply reliant on wages. This was the important contribution of Luigi Pasinetti's famous 1962 article, where he pointed out that if workers save, then they acquire capital, and that we need to take account of the multiple sources of income. His primary concern was with the macro-economic implications in terms of growth and the rate of profit. But, as James Meade pointed out (1964), the Pasinetti (1962) article provided an important insight into the determination of the personal distribution of income. Applying the same logic to person i , rather than class i , the income of person i is generated by < or >

$$y_i = w_i + r k_i$$

Over time, the dynamics of capital accumulation are assumed to be such that

$$dk_i/dt = [s_i r - n - \delta] k_i + s_i w_i + \Omega_i$$

In other words, there is a constant propensity to save out of capital income and wages, but the capital is reduced each year on a per capita basis in order to allow for population growth at exponential rate n , and each year a fraction δ of each person's capital is dissipated. Finally, in each year there is "new capital" arising from self-made fortunes. I am adding here to the original specifications of Pasinetti and Meade.

With the aid of this framework, we can begin to address the question of the dynamics of the income distribution. In particular, we can see that the evolution of the position of the rich depends on whether the "internal rate of accumulation" $s_i r$ is greater or less than the forces of dissipation $(n+\delta)$. Larger properties will be adding to their lead, in absolute if not in proportional terms, if $s_i r$ is greater than $(n+\delta)$, whereas they will be converging towards a level proportional to w_i if the reverse is true.

If we now set the model in a general equilibrium context, then the factor prices become endogenous. Individual capital accumulation will lead to changes in the aggregate capital stock, and hence in the rate of return. Joe Stiglitz, working in the

same building as Pasinetti and Meade in the mid-1960s in Cambridge, England, brought a Cambridge, Massachusetts, approach to bear. Stiglitz (1969) set the process within a Solow neo-classical growth model. If we set all savings rates to be identical, equal to s , and if the rate of return is equal to the marginal product of capital, then over time the economy will converge to a steady state level of capital per head – see Figure 2. At that steady state, sr is less than $(n+\delta)$, as may be seen from the fact that sr is equal to the slope of $s f(k)$ where $f(k)$ is the production function. It therefore follows that, eventually, wealth holdings converge to a level proportional to w_i . The only inequality is that associated with wages. The Gini coefficient for income becomes simply G_w .

This “equalisation theorem” is a strong result. It indicates that the distributional issue, at least as far as capital is concerned, is a transient one. How should we react? How should we then consider the evolution of top incomes? Is it indeed a disappearing subject?

Top Earnings

One response is that capital income is indeed less significant than in the past. In 1908, the first year to which UK super-tax data relate, the 17th Earl of Derby had annual taxable income from his landed estates of some £100,000 (Churchill, 1959, page 95). The mean tax unit income at that date was some £75 a year. Today there are relatively few such people. His great-grandson the 19th Earl was reported in 1999 to be working for Fleming Asset Management (Debrett’s, 1999). Even among the rich, most have earned income as well as property income. Moreover, much of property income accrues, not to individuals directly, but to institutions. The model referred to above does not explicitly allow for the existence of institutions such as corporations,

financial intermediaries or pension funds, which stand between the production side of the economy and the receipt of household incomes. Kaldor (1966) argued that a different savings propensity applied to property income because such income was received largely by corporations. Corporations receive profits, part of which is paid out in dividends, but part is retained for further investment. Pension funds act as intermediaries. They own shares, real property, and other assets, receiving the income from these assets and paying it out, or accumulating it, on behalf of the members of the pension schemes. It is therefore the case that the share of property income in total personal income is less than the share of profits and rent in national income. Figure 3 illustrates this for the post-war UK, where I have added an estimated capital component of self-employment income. The diagram also shows the growing importance of income from private pensions.

On this view, whereas in the past top incomes may have been explained largely by accumulation and transmission of wealth, this has been displaced by earned incomes. We therefore need to explain the upper tail of the earnings distribution. One set of theories that lead directly to predictions concerning the upper tail is that dealing with executive remuneration in a hierarchical structure. The model advanced by Herbert Simon (1957) and Harold Lydall (1959) generates an approximately Pareto tail to the earnings distribution, with a Pareto exponent given by $\alpha = \log_e[\text{span of managerial control}] / \log_e[1 + \text{increment with promotion}]$. The Pareto distribution is such that the cumulative proportion of people with income above y , denoted by $H(y)$, is proportional to $y^{-\alpha}$, where α is the Pareto exponent. It is a property of the Pareto distribution that the mean income above y is a constant multiple $\alpha/(\alpha-1)$ of y , so that if $\alpha = 3$ implies that on average people above you earn 50% more.

More recent theories, such as tournament theory (Lazear and Rosen, 1981), have provided an explanation of the size of the necessary increment. If one considers the position of people at particular level in an organisation, deciding whether or not to be a candidate for promotion to the next rank, then they are comparing the certainty of their present position with the risk of taking a new position in which they may fail, and lose their job. The higher rank job also involves greater effort. In the very simplest case, people weigh the mean gain against the variance, as a measure of risk.

There are obvious limitations to this approach. First, it applies to hierarchical organisations but not to other parts of the economy. Secondly, if applied to firms, it takes no account of the size distribution of firms. It seems reasonable to suppose that the more concentrated is industry the larger the resulting pay differences. At any particular earnings level, we might find the top executives of small companies, middle-ranking executives of middle-sized companies, and relatively junior executives from large companies. Suppose that the size distribution of companies has also a Pareto upper tail, with exponent β , then the shape of the overall distribution depends on whether α is greater or less than β . The distribution with the fatter, more spread out, upper tail (smaller Pareto exponent) dominates in the limit. This may provide one explanation for the observation by Phelps Brown (1977, page 309), that in the hierarchical model plausible values for the span and increment imply values of α that are high relative to those observed in the actual earnings distribution. For example, a span of 4 and an increment of a third imply a Pareto exponent of 4.8. But if the distribution tends to a limit with an exponent equal to the minimum of α and β , then it may be consistent with the evidence if the exponent for the size distribution of hierarchical firms is closer to those observed, although the exponent for overall firm size may be closer to 1 than the case for earnings.

The model just sketched is only one route of several that could be followed in seeking to explain the evolution of top earnings, but it provides a laboratory within which to examine the impact of taxation, to which I turn in a moment. Before that, I want to consider the possibility that capital accumulation continues to play a role.

Interplay between New and Old Wealth

The second response to the equalisation theorem is that we need to re-examine the assumptions of the Stiglitz model that led to the prediction of long-run convergence. One such assumption is that of a declining return to capital. This may not apply if there is learning by doing, as in the AK production function of endogenous growth theory. But even within the neoclassical production function framework, variations in the assumptions can yield different results. Stiglitz himself shows, for example, how different assumptions about the division of estates can lead to enduring inequality. In the same way, Francois Bourguignon (1981) has shown how a non-concave savings function can generate locally stable equilibria with persistent inequality among otherwise identical people.

To simplify, let us assume that there is no population growth ($n=0$). Convergence to the aggregate steady state implies that the internal growth rate of capital (sr) is less than the rate of dissipation (δ). Suppose however that the dissipation takes the form of a proportion δ wealth-holdings disappearing at each instant, with the surviving wealth-holdings continuing to grow relatively to the (constant) per capita wealth. Each dynasty gets smaller but richer per person. (This is analogous to Stiglitz' assumption that estates are unequally divided as with primogeniture, where younger children inherit nothing.) If we assume that all initially created wealth is equal, this

can be shown to generate a distribution with a Pareto upper tail, the exponent being equal to δ/sr .

The problem with this model is that it implies that the largest wealth-holdings are the oldest. The Earl of Derby has a head start on the Earl of Leicester: his earldom was created in 1485 whereas the Earl of Leicester is a much more recent creation (1837). More realistic is the assumption that wealth at all levels is a blend of inherited and self-made money, where this may take the form of earnings or self-employment income. Suppose then that there is a distribution of new money, generated by successful new businesses or by the rents earned by outstanding performers (what Sherwin Rosen has called “superstars”). The term Ω_i is then distributed, we assume, also with a Pareto upper tail, with exponent γ . At any wealth level, there will be a mixture of smaller original fortunes that have grown for more generations and of larger new money. The structure is the same as with the model described in the previous section, and the outcome again depends on which distribution has the fatter, more spread out, upper tail (smaller Pareto exponent). If δ/sr is less than γ , then inherited wealth dominates in the limit, and δ/sr is the overall exponent. If over time the distribution of new money becomes more unequal – if globalisation allows superstars to scoop even more of the pool of royalties – then we may observe a shift to a situation where γ is dominant.

2 Taxation and Inequality at the Top

So far, taxation has not entered the story. Yet progressive taxation of income and wealth are intended to achieve significant redistribution. Moreover, these taxes have evolved considerably, as is illustrated by the experience of the UK.

A Brief History of Income Taxation in the UK

The personal income tax in the UK dates back to that imposed by William Pitt in 1799. As one history describes it, the income tax was “the tax that beat Napoleon” (Sabine, 1966). In 1816, the income tax was abolished. So unpopular was the tax that Parliament ordered that, on its abolition, all records held by the tax commissioners should be destroyed. There was a big bonfire outside Parliament, but the civil servants had cunningly kept copies. It is not clear that they were useful 26 years later when the tax was introduced again in 1842, but the episode demonstrated the power of a bureaucracy relative to that of the legislature.

The income tax was re-introduced in the UK in Peel’s Budget of 1842. At first, the high exemption level ensured that only a small minority of the population paid income tax. As incomes rose, more people were brought into the tax net. There was a single rate of tax (moderated by the operation of various systems of abatement), but towards the end of the nineteenth century, there was increasing pressure for a graduated rate structure. This pressure culminated in the Lloyd George Budget of 1909 that introduced supertax, later called surtax, from which developed a stepped structure, with increasing marginal rates of tax. The progressive income tax, in the sense of increasing marginal rates, in the UK is only around a century old.

Before the First World War, the exemption level for income tax was around twice the average tax unit income, and taxpayers were a minority of the population: some 5% of all tax units. The income tax was however to become a mass tax over the course of the twentieth century. By 1930 the exemption level was around average tax unit income, and in 1937 tax was paid by some 40% of the total tax units. After the Second World War, the exemption level had fallen to under half average tax unit income, and the majority of the population had become payers of income tax.

In the decades following the Second World War, the income tax threshold in the UK fell further to around a quarter of average income for tax units. The rate structure was graduated, so that, in 1973, for instance, the marginal rate for earned income went from 30% to 75% by steps of first 10% and then 5%. There was an investment income surcharge of 15%. The income tax was a mass graduated tax. In this form, income tax might have appeared to have reached maturity. But the 1980s saw a further twist in the story, with a reduction of the top rate, first to 60% and then to 40%, and the abolition of the investment income surcharge. The changes in the 1988 Budget, introducing a two-rate structure of 25% and 40%, were undoubtedly a major step in the direction of making the system less progressive. The subsequent introduction of reduced rate bands has moderated the effect, but the system remains much less progressive at the top. The income tax in the UK has come to resemble a flat(tish) tax.

Here I am particularly concerned with the upper part of the distribution. For this reason I show in Figure 4 the top marginal tax rate on investment income. This shows that the current top rate of 40% is lower than for much of the preceding century. Rates were increased to 50% in 1918 and remained above this level until 1986. And in 1918 a rate of 50% was more redistributive, since it has to be compared with a marginal income tax rate for the median person of zero, whereas today the median person faces a marginal rate of 22%.

Incidence of Taxation

How can such an inverse-U shaped time path of top tax rates affected the evolution of top incomes? Has the differential taxation of high incomes reduced their shares? This is the aim of progressive taxation, but it is possible that the tax is, at least in part, shifted. The standard analysis of an income tax shows a supply and a demand

curve for labour. If the supply is reduced, then part of the tax is shifted to the demand side via a rise in the gross wage. Should we not therefore expect the inequality of gross wages to rise when the tax rate is increased, and to fall when top taxes are cut? The answer depends on the underlying explanation of the income distribution. Here the models set out in the previous section, although highly stylised, provide a framework for analysing the impact of first rising and then decreasing top tax rates. If we start with the managerial hierarchy model, then we have to ask how taxation affects the pay increment needed to motivate people to seek promotion. If people weigh the mean gain against the variance, with a linear trade-off between mean and variance, equivalent to a quadratic utility function, the required gross of tax increment to make the person indifferent is a function of the tax rate that contains a mean term which increases with the tax rate and a variance term that decreases with the tax rate. There are two competing effects. On the one hand, progressive taxation reduces the financial gain from promotion and more is needed to compensate for the increased effort. On the other hand, the tax reduces the risk of the new job: the government shares part of the risk. If the latter effect dominates, then a rise in the tax rate reduces inequality of gross incomes.

What about the model based on accumulation? In this case, the Pareto exponent is given by $\delta / sr(1-t)$, where t is the tax rate applicable to this level of income. A larger tax rate implies a larger Pareto exponent, which for a given mean income implies a lower level of inequality. In this case, the tax again reduces inequality of gross incomes. The behaviour of the gross shares reflects the impact of past taxes in reducing accumulation: the rich at time t have smaller shares because taxes reduced their capacity to save in years prior to t . On the other hand, we need to allow for the effect of taxation on the rate of return via the impact on total capital

accumulation. The Stiglitz model, by assuming that savings are proportional to income, assumes away any feedback from the changing distribution of wealth to the rate of return, but once we introduce graduated rates of taxation, we lose the linearity. Even with only two rates of taxation, we need to allow for the changing amount of income above the kink in the tax schedule. One aspect of progression can however be introduced if we allow for the tax rate, t_i , on investment income to be higher than that, t_e , on earned income. This generates a model with differential savings propensities out of gross investment and earned income, as in the Kaldor (1961) model, although with the propensities reversed. If λ denotes $(1-t_i)/(1-t_e)$, the net of tax income from investment relative to that from earnings, and θ denotes share of wages relative to profits in national income, then in steady state the gross rate of return is given by

$$r s (1 - t_e) [\theta + \lambda] = r s (1 - t_i) [\theta/\lambda + 1] = \delta$$

An increase in the tax on investment income reduces λ and hence raises the steady state rate of return. To some degree therefore the effect of the tax is shifted. It may be seen, however, from the second form of the expression that the net of tax return is reduced, so that the shifting is less than complete.

What about new money? The author of *The Winner Take All Society* (Frank and Cook, 1995), Robert Frank (2000) has argued that the effect of progressive income taxation is to reduce the number of people entering occupations where the most talented collects the whole rewards. Talent is not known ex ante, and the anticipated rewards for the winner, $V(N)$, increase (at a diminishing rate) with the number entering, N . If entrants compare the expected gain, $V(N)/N$, with the wage in an alternative occupation, then a graduated tax that imposes a higher rate on the winner will reduce the number of entrants and hence the size of the final rewards.

This is a third example of a situation in which the shares of the top groups in gross income is a decreasing function of the tax rate.

Tax Avoidance

Finally, it is quite possible that taxation has affected the reported income shares but not the underlying distribution. This may have happened where taxes cause people to change the form in which income is received. It does indeed seem plausible to assume that there is indeed greater opportunity, both because investment income constitutes a larger proportion and because of the selective nature of remuneration packages.

The thesis that the decline in top shares reflected income re-arrangement was powerfully argued by Richard Titmuss in his book *Income Distribution and Social Change* (1962). Investment in public companies that paid low dividends but generated high capital growth allowed return to be converted into capital gains that were either tax-free or taxed at a lower effective rate. Evidence is naturally hard to obtain, and is largely circumstantial. Atkinson (2002a) examines the effect of imputing to the top 1% their estimated share of retained earnings, allowing for the declining share of personal holdings as the holding of pension funds and life assurance companies increased over the post war period. The results show that the decline in the share of top 1% in total income is reduced but is still to be observed. Re-arrangement is part, but not all, of the story.

More recently, top tax rates have been reduced. These cuts may have worked in the reverse direction. In the United States, a large increase in the top shares was observed after the Tax Reform Act of 1986. Feenberg and Poterba note that "it might in part have been the result of high-income taxpayers responding to lower marginal tax

rates by reporting more of their 'true' income as taxable income ... for example, through a decline in nontaxable employer-provided benefits or through a reduction in tax evasion" (2000, page 267). Gordon and Slemrod argue that "the jump in the observed income of the high-income individuals during the 1980s could in part reflect the effects of a reduction in income shifting [between corporate and personal tax bases] and an increased use of wage compensation in response to the drop in personal tax rates relative to corporate rates" (2000, page 245). In their analysis of top income shares in the US, Piketty and Saez (2003) note the surge that happened after 1986, but point out that the average increase from 1885 to 1994 is not significantly higher than the increase from 1978 to 1984 or from 1994 to 1998. Again, it appears that income re-arrangement may have played a role, but cannot provide a full explanation.

3 Long-Run Empirical Evidence on the Distribution of Income

I have just referred to the empirical evidence on top income shares in the US. I would like to turn now to the evidence for the UK. I should however emphasise that the experience of the UK differs from that of other countries, and they too differ among themselves. The UK timepath has considerable similarity with that in the US (see Piketty and Saez, 2003), but departs in certain time periods. The recent experience of the UK and the US is very different from that in France, as Thomas Piketty (2001 and 2003) has shown. The findings for a range of countries, including Germany, the Netherlands, Switzerland, Australia, Canada, India, Ireland, and New Zealand, are contained in a forthcoming book (Atkinson and Piketty, forthcoming).

Overall Distribution

I begin with the overall distribution, illustrated in Figure 5 by the Gini coefficient. For the distribution as a whole, we have evidence covering the post-war period. For the first 40 years, up until the mid-1980s, the series for after tax or disposable income are broadly stable. There is very little overall change in the Gini coefficient. The value in 1984 was identical to that in 1964. This is all the more remarkable because over the same period the Gini coefficient for market income, before taxes and transfers, rose by some 10 percentage points, reflecting the ageing of the population and the rise in unemployment. The welfare state appeared to be stemming the tide.

Just as remarkable is the subsequent rise in inequality of disposable income from 1984 to 1990, when the coefficient increased by 8 percentage points. As may be seen, the rise in market inequality was less sharp, only 3 percentage points. Over this period, tax and benefit policy was becoming less redistributive. As we have already seen, the top tax rate was cut from 60% to 40% in 1988.

The top income groups to which I turn in a moment are only a small fraction of this population. As I earlier assumed was the case for the propertied class, the top 0.1% are scarcely distinguishable at the end of the Lorenz curve. Yet they can have a significant impact on the overall inequality as measured by the Gini coefficient. Applying the formula given earlier, re-interpreted, the Gini can be approximated by the Top share + (1-Top share) x G_{rest} , where G_{rest} is the Gini coefficient for the rest of the population. Where G_{rest} is say 40% for gross income, a rise in the top share of 5 percentage points would lead to an increase of 3 percentage points in the overall Gini. This is clearly a significant change in overall inequality.

Income Tax Data

The top shares are not only significant in the overall distribution, they are also a group for whom we have evidence over a much longer period. The evidence comes from income tax data, which have tended to be neglected in recent years. Indeed, they tend to be scorned. The index to Morgenstern's book *On the Accuracy of Economic Observations* (1963) contains the entry "income tax, as reason for lying", and this summarizes well the general scepticism. Income tax data do indeed have many shortcomings. There is a tendency to under-report certain types of income in order to evade tax; and, as we have just discussed, avoidance has been possible through the use of employer benefits and the conversion of income into capital gains. There is little or no contextual data to help understand the determinants of the distribution, and in this respect the tax records compare unfavourably with micro-data from household surveys. At the same time, alternative sources are not immune from the problems just identified. Household surveys suffer from item non-reporting or under-reporting by respondents, and from differential non-response, which reduces the representativeness of the observed sample and is especially likely to generate problems at the top end of the distribution. There are shortcomings that arise on account of failure to tailor questions asked to the chosen definitions, particularly when making use of surveys conducted for other purposes. The applicability of survey data may be constrained by its design: for example to using a household unit that does not throw light on the distribution among more narrowly defined units. Tax data have therefore points in their favour, especially when it comes to top income receivers. Income tax data have to be used with caution, and are limited in their content, but they have a role to play, particularly when no other sources exist for the years in question.

For recent years, the estimates are based on micro-data, of a kind familiar to applied economists, but for earlier periods we have only tabulations. Moreover, these tabulations cover only tax payers. For this reason, we have to construct control totals for the total population and total income. First we need a total for the population, so that we can know how many people make up the top 1%. Such a control total is relatively easy to calculate from population statistics. The control total for income is more difficult. We cannot use the total from the income tax returns, since many people did not pay tax in the earlier years, and even today there are people with incomes below the exemption level. In general, it is possible to make estimates from the national accounts, but there is a risk of circularity, since the accounts make use of the tax data. I should therefore recognise that the control totals for income are subject to significant error. Finally, we have to interpolate, although the potential error here is usually quite small, since the tabulations are often quite detailed.

Long-Run Evolution of Top Shares

In Figure 6 is shown the evolution of top shares over the twentieth century in the UK. The groups covered are indeed small – the top 0.1% consists of some 25,000 people – but they had a significant fraction of total income – around 10% before the First World War. I refer to “people”, but the data relate to tax units, combining the incomes of husbands and wives, up to 1989. The switch to independent taxation, and hence individuals, in 1990 is indicated by the “Break” in the series in Figure 7.

The graph reveals an intriguing history of decline in the top shares up to the end of the 1970s, intriguing since it is far from a steady downward trend. The First World War saw a significant fall in the share of the top 0.1%. There was some recovery immediately after the War but the top 0.1% ended the interwar period having

lost further percentage points, so that their 1939 share of total income was around a half that in 1913. The impact of the Second World War was similar to that of the First World War in that the shares in total income of top income recipients fell: the share of the top 1% in before tax income was reduced from 16.6% in 1938 to 11.2% in 1949. The inequality was still large: in 1944 the Duke of Wellington was reported (Cannadine, 1990, page 630) to have a gross income of some 150 times the mean income. Post-war, the shares of the top groups fell steadily from 1948 for the next ten years, but there was then a plateau, followed by a further fall from 1965 to the late 1970s.

The story of the first three-quarters of the last century was therefore one of significant, if intermittent, declines in top income shares. The overall thrust was firmly in the direction of reduced inequality. But the last quarter century saw a dramatic reversal of direction. Top income shares began to rise steadily and sharply. The share of the top 0.1% in 2000 was 4.8%, well above its 1945 value of 4.2%. Account has to be taken of the move to independent taxation of husbands and wives in 1990 but the share of the top 1% rose by 3 percentage points between 1978 and 1989 and by a further 3 percentage points between 1990 and 2000.

This refers to incomes before tax. The rise in inequality is before allowing for the effects of the reductions in top tax rates. What happened to incomes after income tax? We cannot go so far back in time in this case, but Figure 7 shows the distribution of net incomes from 1937. The rise in after tax inequality is even more marked. Even subtracting 1 percentage point for the break in 1990, the share of the top 1% has risen from 4.2% in 1978 to 9.4% in 2000. The increase has continued after the election of the Blair Government in 1997, and if the trend continues the share will soon reach that

observed in 1937. Indeed, in the case of the top 0.1%, we have precisely returned to the situation pre-Second World War.

Shares within shares and the Pareto Coefficient

The behaviour of the share of the top 1% depends on what is happening both to the distribution *between rich and poor* and to the distribution *among the rich*. In order to focus on the latter, we can look at the “shares within shares”. 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% in gross income was 25.3%: i.e. 2½ times their proportionate share. *Within* the top 10%, the top 10% (i.e. the overall top 1%) had a share of 20.9% of the total income of the decile group: i.e. twice their proportionate share. And the top 10% within the top 1% (the overall top 0.1%) had a share of 22% 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. If the distribution were exactly of the Pareto form, the within-group share of the top 1% within the top 10%, denoted by S_1/S_{10} is given by $(0.1)^{(1-1/\alpha)}$. The relation can be written $\alpha = 1 / [1 + \text{Log}_{10} [S_1/S_{10}]]$. The larger the Pareto exponent, α , the smaller is the within-group share. The implied Pareto coefficients obtained from two sets of shares in the UK are shown in Figure 8. This graph brings out the almost inverted V shape, with a sharp reversal after 1978. Over the period, the coefficient rose from 1.5 in 1918 to over 3 in the late 1970s; it then fell back to a value around 1.8 in 2000 (a small part of the rise is due to the switch to independent taxation).

Sources of Inequality

When considering the theoretical impact of taxation, I considered separately models of earned income and property income. In order to relate these explanations to the empirically observed top shares, a simple decomposition may be helpful. The contributions of earnings and property income to the share of the top 1% in the UK from 1949 are shown in Figure 9, where I also distinguish the contribution of other income (from self-employment and transfers). Over the first part of the post-war period, the contribution of investment income was the largest, but it fell between 1949 and 1959 while the contribution of earned income remained unchanged. The further fall in the overall share between 1965 and 1979 was associated with a substantial fall in the contribution of investment income (some 2½ percentage points), but there was also a modest contribution (around ¾ percentage point) from employment income. From 1979, however, the contribution of employment income to the overall share increased sharply and steadily over time. By the end of the century, employment income was contributing nearly 8 percentage points to an overall share of 12 percent. Earnings appear to have become the dominant influence. At the same time, the fall in the contribution of investment income had come to an end, and there was a modest increase from the low point of 1979. The changing role of investment income may be summarised by saying that in 1979, if the top 1 percent had only investment income, then they would have their proportionate share of total income. Thirty years earlier, investment income alone would have given them 5 times their proportionate share; 20 years later, it would have given them twice their proportionate share.

Further evidence about the behaviour of the components is provided by Figure 10, which shows the distribution within types of income. The share of top 1% of individual earners exhibits the same post-war pattern as the overall distribution, with a

steady reduction in inequality from the mid-1950s to the late 1970s, and then a definite reversal. By 2001 the share of the top 1% of earners is above that for 1954, particularly when allowing for the break in the series. The time path of the share of top wealth-holders in total wealth is rather different, exhibiting a substantial long-run decline from 1923 that continued until around 1990. The share then began to increase.

Conclusions

Top taxes rates in the UK first rose, remained high for the period from 1918 to 1979, but have been significantly reduced for the last two decades of the twentieth century. While a simple supply and demand framework might lead one to expect taxes to be partially shifted, and for gross and net shares to move in opposite directions, this has not been the case. Both gross and net shares have followed the inverse U- pattern. We have seen that a capital accumulation model could explain how the cumulated effect of past tax rates could have caused the decline in the observed top shares (rise in the Pareto coefficient); this is consistent with the declining contribution of investment income to the overall share, and with the observed large decline in the concentration of wealth-holding. To the extent that inherited wealth has been replaced by new money, and investment income has been displaced by earned income, theories of hierarchical earnings or of superstars could also explain a negative association between tax rates and top shares.

The observed decline in top shares is no doubt in part due to re-arrangement of income, but this seems only to be part of the story. The same applies to the rise post-1979. Here the rising contribution of earned incomes appears to be the dominant force. The earlier explanations again come into play. In particular, the globalisation of the world economy and the IT revolution – both factors often evoked when seeking to

explain rising inequality – are likely to have steepened the distribution of superstar rewards. This may have been intensified by the reduction in top tax rates. Lower top rates may have induced more people to attempt to become superstars, pushing out the extreme value distribution. Lower rates may have led to a steeper managerial pay hierarchy. Finally, investment income remains part of the story, and inherited wealth may be rising once again in importance.

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Note on Sources of Figures

Figures 3 and 9: The derivation of these is described in Atkinson (forthcoming).

Figure 4: from *Annual Reports* of the Inland Revenue, various years (for example, the 111th Annual Report for the year ending 31 March 1968 contains the standard rate of tax from 1938-39 to 1968-69 (Table 25), to which has to be added the top rate of surtax given in Table 52). The tax rate relates to investment income.

Figure 5: See Atkinson (2003).

Figures 6-8: The approach is described in Atkinson (2002); the current (revised) estimates are given in Atkinson, forthcoming. The sources are also described in Atkinson and Salverda (forthcoming). The data relate to the United Kingdom, and up to 1920 included what is now the Republic of Ireland.

Figure 10: *Wealth data* up to 1980 from Atkinson, Gordon and Harrison, 1989, Table 1, from 1980 to 1985 from Inland Revenue Statistics 1997, Table 13.5, from 1986 onwards from IR website Personal Wealth T13.5, 29 July 2003, data for 1999 and 2000 provisional. There are potentially three breaks in the wealth series. The first is in 1938. The estimates up to 1938 relate to England and Wales; those from 1938 relate to Great Britain. The estimates for the year of overlap (1938) are identical, and the series have therefore been shown as continuous. The second break is in 1960, when the coverage of the underlying estate data was extended and more accurate estimates became possible of the wealth of the excluded population. The estimates of Atkinson and Harrison, 1972, page 166, suggest that the share of the top 1% was reduced by some 7-percentage points. The third break is in 1980, when the series switches to the official Inland Revenue estimates. The overlap for that year suggests little apparent difference. *Earnings data* from Atkinson and Voitchovsky, 2004, Table 2. The earnings data from 1954 to 1979 are from the series on individual annual *principal source Schedule E income* published in the IR Annual Reports; the definition of earnings includes occupational pensions (but not National Insurance pensions) in addition to employment income, although relatively few of the top earners are in current receipt of occupational pensions. The earnings data from 1968 are from the New Earnings Survey, a survey of employers that provides information on earnings in the current pay period. The sample used excludes those whose pay was affected by absence during the survey period. The estimates from 1975 onwards are derived from micro-data.

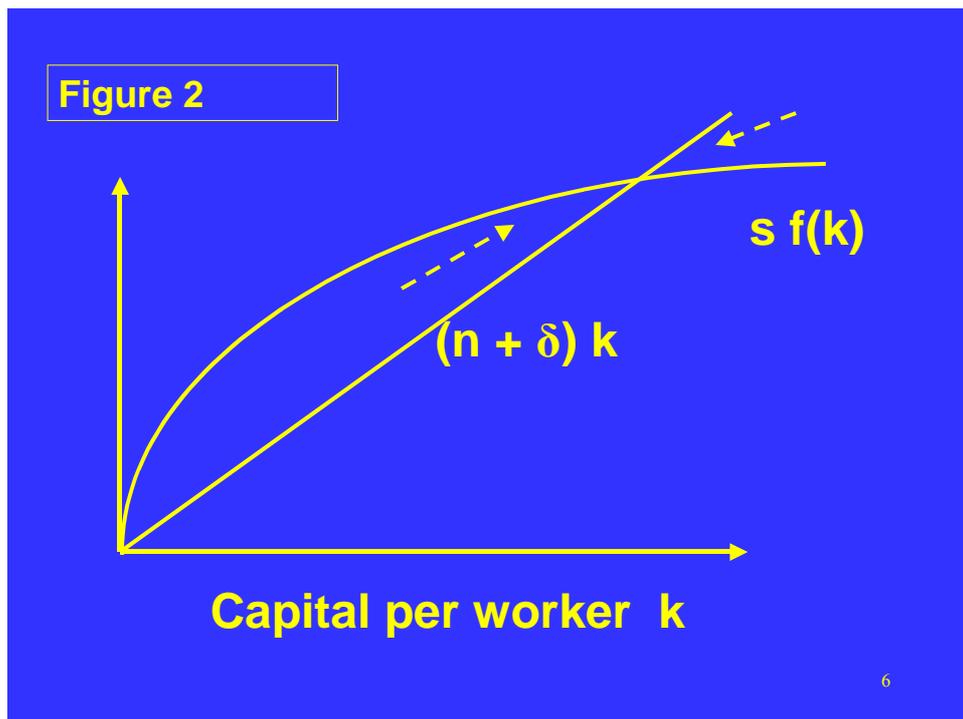
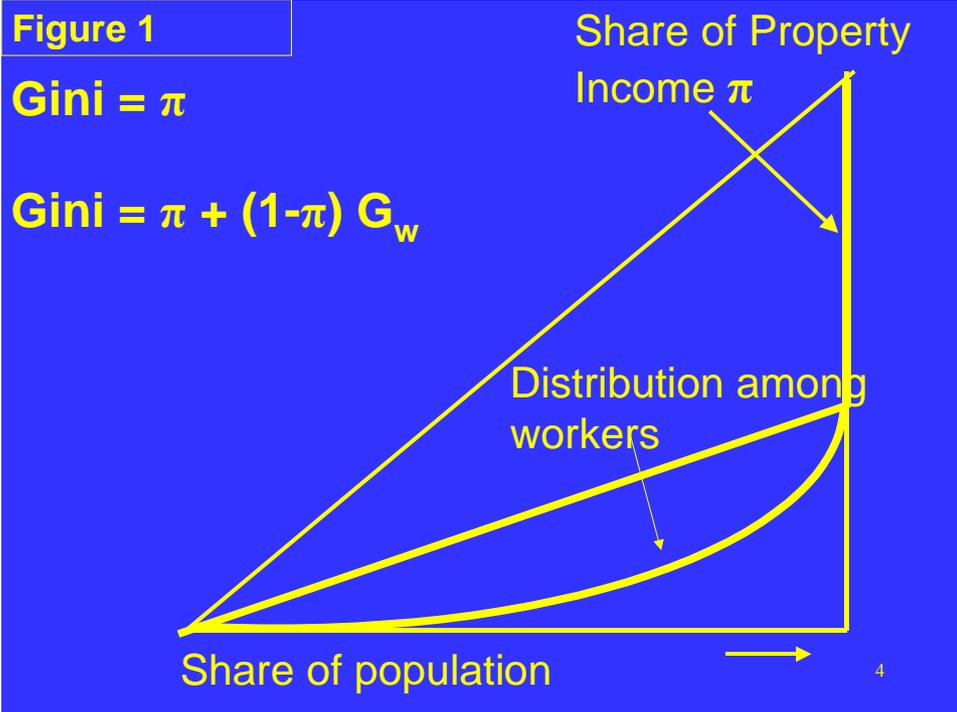


Figure 3 Composition of total income in UK 1949-2000

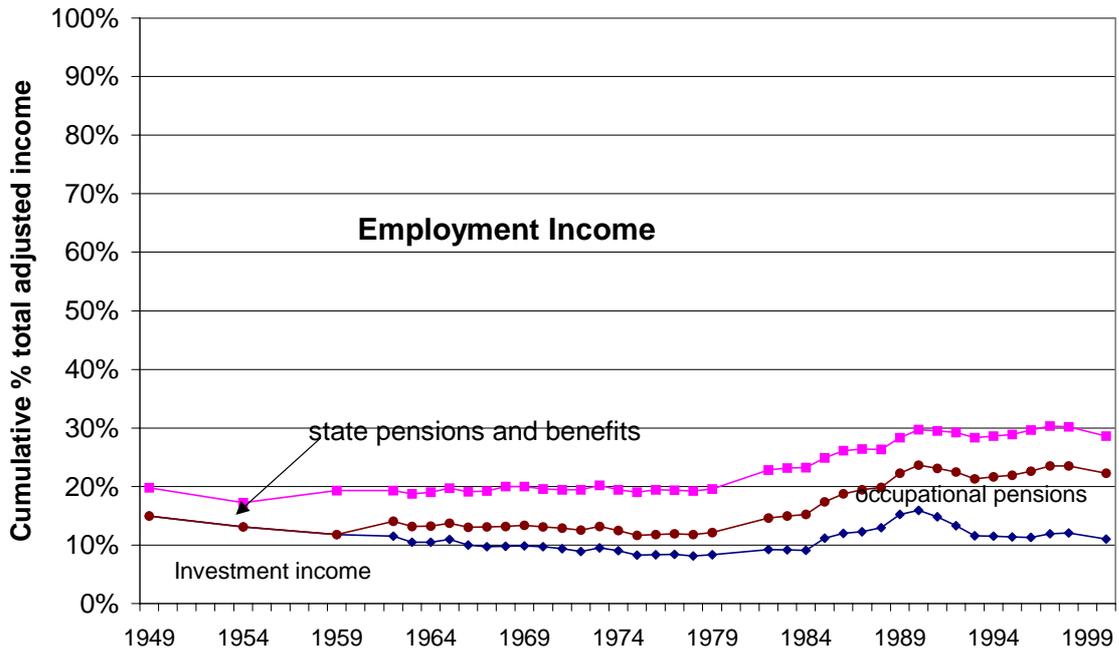


Figure 4 Top tax rate on investment income in the UK

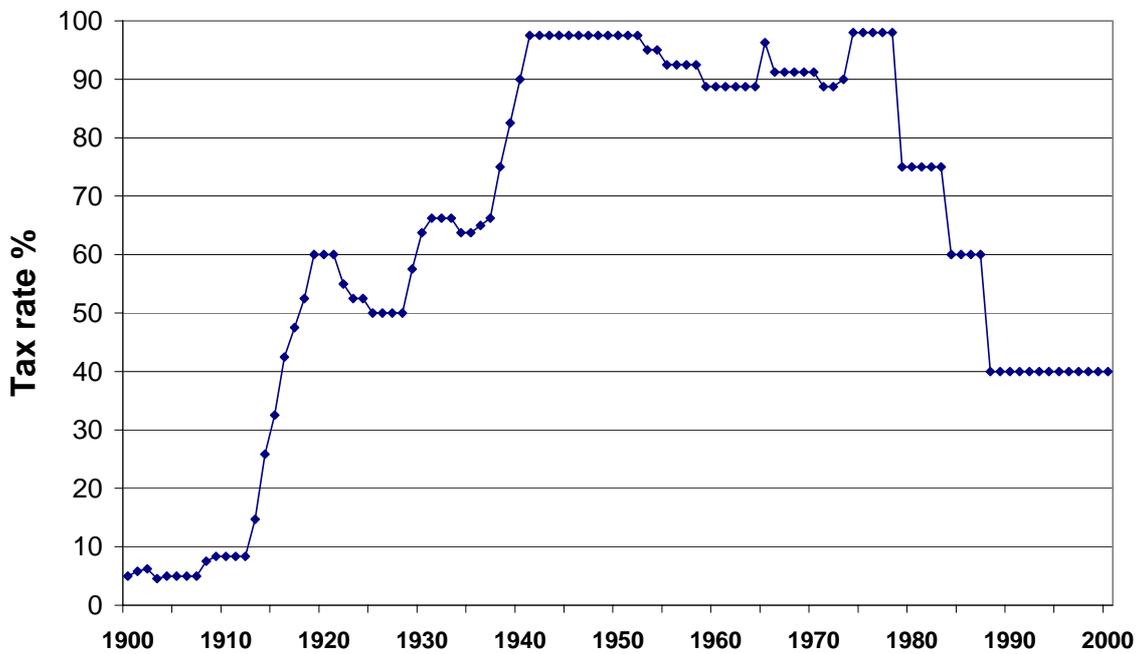


Figure 5 UK Income Inequality 1949-2002

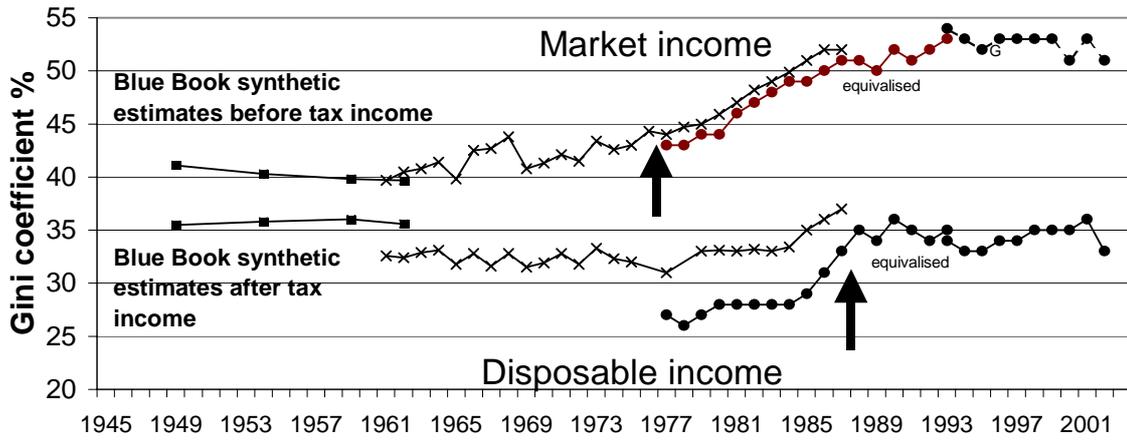


Figure 6 Shares of top income groups in total gross income in UK

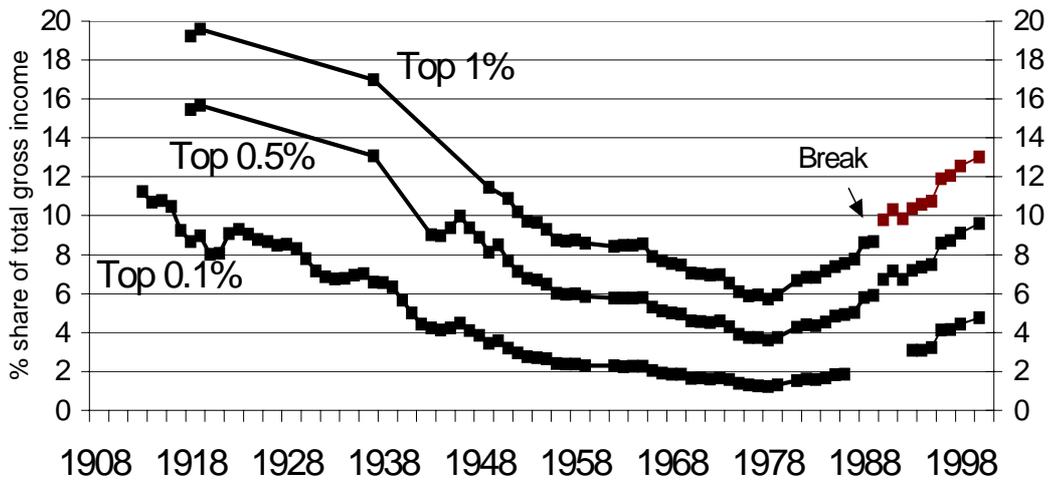


Figure 7 Before and After Tax Top Shares in UK

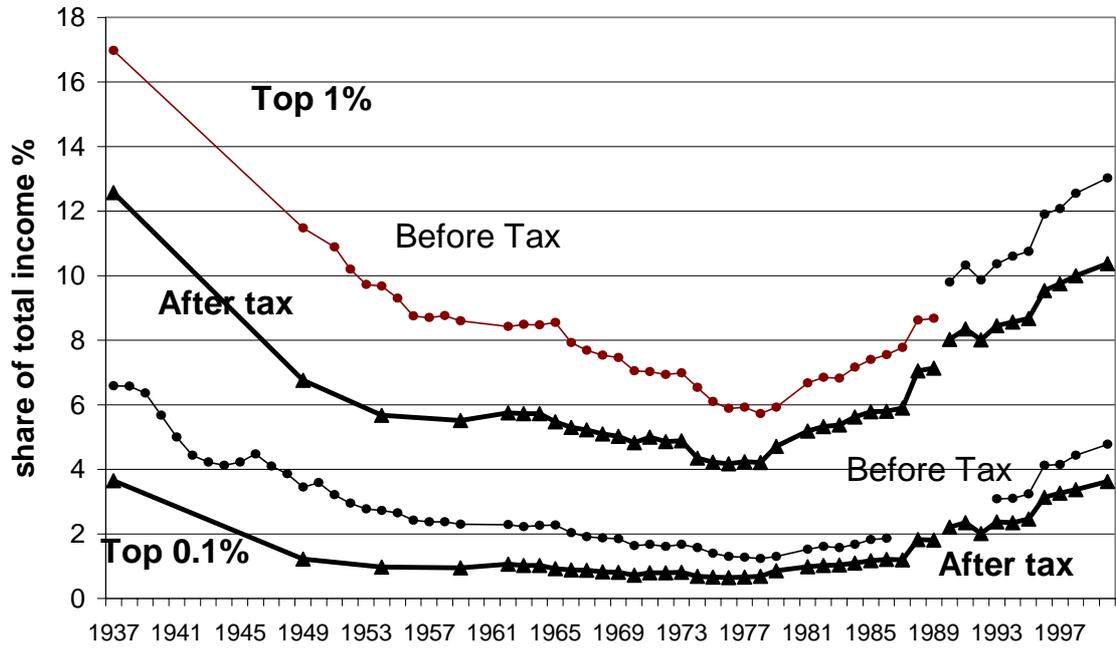


Figure 8 Pareto Lorenz Coefficients for the UK

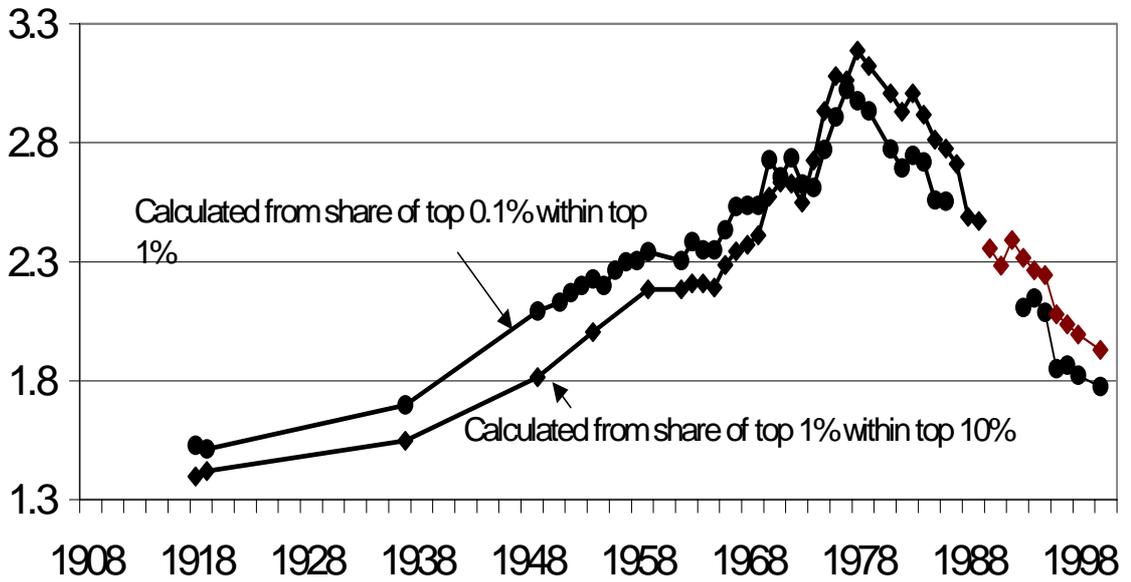


Figure 9 Contributions to share of top 1%

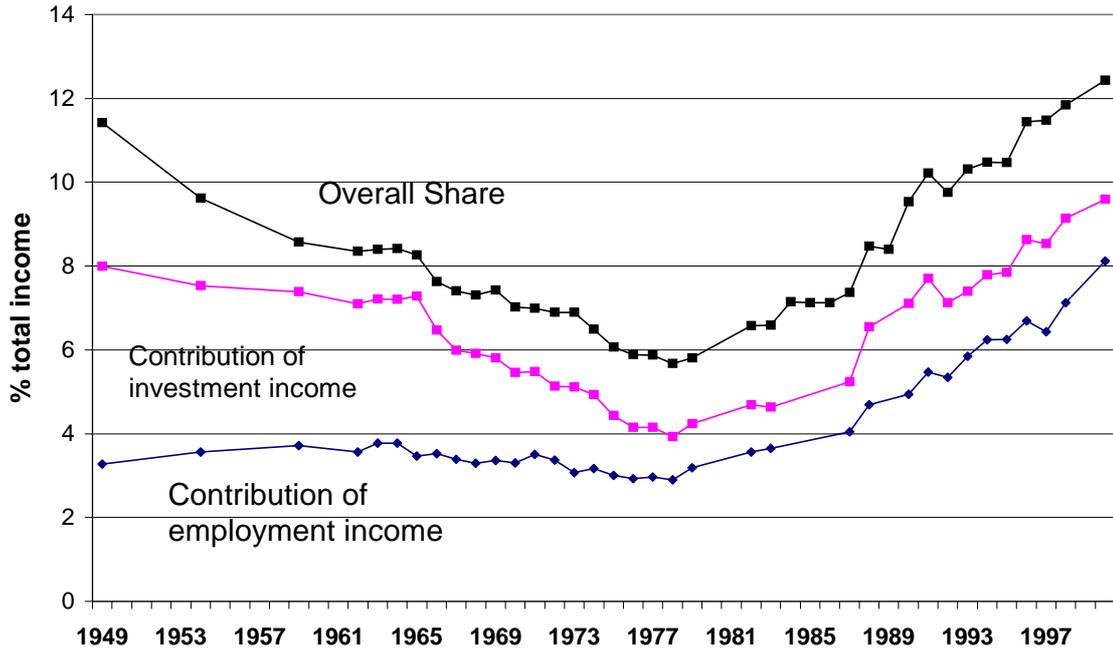


Figure 10 Shares of Top Earners and Top Wealth-holders in UK

