UNIVERSITY OF OXFORD

Discussion Papers in Economic and Social History

Number 43, January 2002

TOP INCOMES IN THE UNITED KINGDOM OVER THE TWENTIETH CENTURY

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TOP INCOMES IN THE UNITED KINGDOM OVER THE TWENTIETH CENTURY[1]

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[1] I am most grateful to Thomas Piketty, whose work for France (1998, 2000 and 2000a) stimulated me to put together the material I had been collecting for the UK for a number of years. I have benefited from helpful discussion at the History and Economics Seminar, Cambridge, and from valuable comments on earlier drafts by Chelly Halsey, Thomas Piketty, Emmanuel Saez, and Holly Sutherland.

Abstract

In 1909 the United Kingdom Government introduced “super-tax”, which was an additional income tax levied on top incomes. This provided information on the distribution of total incomes that had not previously been available on a regular basis, since under the ordinary income tax, the authorities did not know the total income of individuals, which could be the subject of several separate assessments. Super-tax remained in existence until 1972, by which time other income tax sources (the Survey of Personal Incomes) were in place to allow the series to be continued. The aim of this paper is to examine what can be said from the published super-tax statistics about the evolution of top incomes in the United Kingdom. The paper spells out the limitations of the super-tax information, and the problems in establishing control totals for total population and total income, but argues that it provides a unique source of evidence about the distribution of top incomes covering virtually the whole of the twentieth century.

The resulting picture, if blurred in places, allows us to draw broad conclusions about developments over the twentieth century. There is no longer the extent of inequality to be found before the First World War, with the Upper Ten Thousand receiving nearly a tenth of total income. The magnitude of the change may be need to be qualified in the light of fiscal re-arrangement, but there have been distinct periods of equalisation, notably during the two world wars, from 1946–1957 and from 1965–1972. But there is no steady trend. There have been plateaux. Since 1979, we have seen a reversal, with shares of the top income groups returning to their position of fifty years earlier. The equalisation of the post-war period has been lost.

Top Incomes in the United Kingdom over the Twentieth Century

Introduction

In 1909 the United Kingdom Government introduced "super-tax", which was an additional income tax levied on top incomes. This event was important not only for its fiscal consequences (and the constitutional crisis generated by the initial rejection of the Budget by the House of Lords) but also because it provided information on total incomes that had not previously been available on a regular basis. Under the ordinary income tax, with deduction at source and different schedules covering different sources of income, the authorities did not know the total income of individuals, which could be the subject of several separate assessments.[2] Super-tax, which was renamed "surtax" in 1927, remained in existence until 1972, by which time other income tax sources (the Survey of Personal Incomes) were in place to allow the series to be continued. The super-tax information has shortcomings, but it provides a source of evidence about the distribution of top incomes covering virtually the whole of the twentieth century. In this respect, it is unique. No other source, for example, allows us to track the effect of the Depression. No other source allows a full comparison of the distributions before and after the World Wars. The super-tax statistics were studied by Bowley (1914), Stamp (1916 and 1936), Clark (1932), Champernowne (1936), among others, but they have not been used in recent years and their potential has not been fully exploited. The aim of this paper is to examine what can be said from the published super-tax statistics about the evolution of top incomes in the United Kingdom over the twentieth century.

Interest in the United Kingdom experience arises in part from the possibilities of comparison with other countries. In the United States, the study of the shares of upper income groups by Kuznets (1953) was based on the federal income tax returns, covering the period 1913–1948. As he recognised, reference totals for the population and total income allow one to deduce from data covering top income recipients the share in total income of, say, the top 1 percent, and to put a lower bound on overall inequality. Recently, Feenberg and Poterba (2000) have used U.S. Treasury data on high-income taxpayers over the period 1966–1995 to show the upward movement in the share of the top 0.5 percent in total adjusted gross income. In France, Piketty (2000 and 2000a) has utilised the

[2] The first British income tax, Pitt's Act of 1799, did require an assessment of total income, but the schedular system, and deduction of tax at source for certain classes of income, were introduced by Addington in 1803 in response to political objections to total incomes being known (Sabine, 1966, p. 38).

income tax returns available from 1915 to calculate the shares in total gross income of top incomes. His results demonstrate the value of looking at a long sweep of history, since they show that the evolution of inequality is not "a long tranquil river", reflecting a steady economic trend. Rapid changes are followed by periods of stability, or by reversals. This paper aims to describe the long-run pattern in the United Kingdom, using data from the super-tax/surtax returns and from the Survey of Personal Incomes, in the belief that this helps us put in perspective recent developments in income inequality. Attention has tended to focus on the rise in inequality in the 1980s (Atkinson, 1993, Goodman and Webb, 1994), but how far was this a reversal of the post-war equalisation? How much equalisation took place in the twentieth century as a whole?

1. Super-Tax (Surtax) Data and Their Use

The published statistics give a classification of incomes by range of total income, by the number of "persons" and "total income assessed". To take an example at random, the Ninety-Eighth Report of the Commissioners of Her Majesty's Inland Revenue for the year ended 31st March 1955 shows that the total number of persons assessed to surtax in 1953–54 was 258,999 and the total assessed income £1,062 million. The published tables contain seventeen ranges, the highest shown being £100,000 and upwards. The lowest income range was £2,000–£2,500 a year (at that time professorships were being advertised in Oxford at a salary of £850 a year). The average assessed income of surtax payers was £4,100 a year and 37 people had reported incomes in excess of £100,000 a year. The tables for the most recent year show the division by "earned" and "investment income"; earned income accounted for 62 percent of the total, but only 35 percent of total income in the range from £20,000 a year upwards.

Nature of the Data

The data come from income tax records and suffer from potentially serious problems, even if attention is focused on top income recipients. There will be a tendency to under-report certain types of income in order to evade tax; and avoidance has been possible through the use of close companies and trusts. The definitions of income and unit follow the tax law, and may not therefore correspond to those needed to study income distribution. 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 such as household surveys are not immune from the problems just identified. Household surveys suffer from item non-reporting or under-reporting, and from differential complete 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. Users of survey data may be constrained by its design: for example to using a household unit which does not throw light on the distribution among more narrowly defined units, such as the inner family (single person or couple, with or without dependant children).

It is not therefore clear that tax data should be completely rejected in favour of household surveys, especially when it comes to top income receivers. The 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.

Previous Studies

As soon as distributional data from the super-tax returns became available, they were used by Stamp (1914 and 1916) and Bowley (1914). From the data for 1911–12 (the third year of operation), which covered 11,554 persons with a total assessed income of £145 million, Stamp plotted the logarithm of the cumulative number of incomes against the logarithm of income, a diagram referred to here as a Pareto diagram for numbers. The relation is linear if the distribution takes the Pareto form: i.e. the cumulative proportion of people with incomes y and higher, denoted by H(y), is assumed to be such that

$$H(y) = A\, y^{-á} \qquad (1)$$

where á and A are constants. (It should be noted that H(y) is the complement of the usual distribution function, measuring down from the top.) Stamp concluded that a Pareto distribution with an exponent of 1.685 fitted well except at the top and bottom, where the number of incomes was less than predicted. Using the same data, Bowley (1914) concluded that a Pareto exponent of 1.5 provided a good fit from £5,000 to £55,000. (The number of persons with income in excess of £55,000 was 214.)

The super-tax statistics were a natural tool to use in comparing inequality at the top before and after the First World War. In his study of the economic consequences of the First World War, Bowley noted that “the only definite statistics existing in connection with the distribution of income [before and after the war] are those of incomes assessed for super-tax” (1930, page 136). He

compared the numbers with *net* incomes, applying the prevailing tax rates, above £3,000, £10,000 and £50,000 per year, adjusted for inflation. He found that in each case the number had been substantially reduced: for example the number in excess of £10,000 had fallen from 4,000 in 1913–14 to 1,300 in 1924–25. He concluded that "there had been a very marked redistribution ... the very rich have less than half their pre-war income" (1930, page 160). The number with *gross* incomes in excess of £10,000 had fallen from 5,000 in 1913–14 to 3,500 in 1924–25. (This paper is largely concerned with the distribution of gross incomes.)

The most extensive use of the super-tax data was by Stamp (1936) and Champernowne (1936). Stamp took the super-tax data from 1911–12 to 1934–35, interpolating in each year to identify the gross income of the 10,000th person and the 25,000th person. He then examined the correlation between these income levels and indices of price levels. Champernowne in his Cambridge Prize Fellowship thesis (1936, published in 1973) employed both the Pareto diagram for numbers and a corresponding diagram for total income received by persons with incomes y or higher, denoted by

$$G(y) = \acute{a}/(\acute{a}-1)\, A\, y^{-(\acute{a}-1)} \qquad (2)$$

(referred to here as the Pareto diagram for amounts). Champernowne, using the super-tax data from 1912 to 1933, concluded that "for each portion of the curve, steepness has been increasing fairly steadily since 1920 (except for the *very* rich), thus indicating increasing equality, whereas before 1920 this was not the case" (1973, page 84). When his thesis was published in 1973, Champernowne added an appendix covering the period from 1912 to 1966–67, taking centred 3-year averages.[3] This is the fullest run of years in any study using the super-tax/surtax data. Described by the author as showing "a very considerable reduction of the inequality", the Pareto exponents rose particularly between 1939–40 and 1951–52. These results are again based on absolute numbers: for example, the most extensive cover the range from the 200th richest person to the 51,200th richest. The Pareto exponent for this group, estimated using numbers, increased from 1.75 in 1927–28 to 1.82 in 1939–40, then jumped to 2.34 in 1951–52 and was

[3] After the Second World War, there were a number of studies of income levelling between 1938 and 1949, including Seers (1949 and 1956), Allen (1957), Lydall (1959) and Brittain (1960), but none of these used the surtax returns even where, like Allen, they were specifically concerned with higher incomes. An exception is Rhodes (1949 and 1951a), to whom reference is made below.

2.345 in 1963–64 (Champernowne, 1973, page 88). The findings are affected by the fact that the Pareto distribution is at best an approximation. The exponents estimated using the Pareto diagram for amounts are 1.64, 1.745, 2.28 and 2.34. Whereas the last of these values is virtually identical to that obtained from the distribution by numbers, the values for earlier years are lower and tell a different story, indicating a continuing movement towards reduced inequality in the 1950s.

This review of previous uses of the super-tax/surtax data demonstrates the potential of the source, but also suggest that further exploration would be of value. A re-analysis is necessary to clarify what happened in the years that have been studied previously; and the surtax data for more recent years have not been used. The analysis needs to be taken further by relating the absolute numbers and amounts of income to the total population and total income. This would allow us to calculate the income shares of top income recipients, providing an alternative to the Pareto exponent as a summary measure of inequality.

Problems of Use

There are several ways in which the super-tax/surtax data depart from what would be desirable in measuring the annual distribution of income. The definitions of income and of income unit may not correspond to those typically employed in studying income distribution, and the actual measurements may depart from the intended definitions. Among the major problems, which have to be borne in mind when interpreting the findings, are:

(a) *Timing.* Super-tax was initially assessed in year t on the income computed for income tax purposes in year (t–1), which itself was in part based on income of the preceding year (t–2) or of an average of the preceding years.[4] This meant that "super-tax figures lag a long way behind the real profits" (Royal Commission on the Income Tax, 1920, page 124). The treatment changed however in the Finance Act 1927, when the name changed to surtax, and the surtax levied in year t was based on income assessed to income tax in that year. To avoid confusion, the super-tax years have here been renumbered to refer to the income tax year, so that the year 1909–10,

[4] Until 1926–7, Schedule D assessments for income tax were based on a three-year average of profits, so that "the profits of the years 1, 2 and 3 were averaged to make the [income tax] assessment for year 4, and this became the basis of the super-tax for the year 5" (Stamp, 1936, page 642).

for example, is labelled 1908–9 (this is the reverse of the procedure used by Stamp (1936), who post-dated the surtax years). Furthermore, to make some allowance for the lags, the data for the financial year (for example, 1928–29) are related to population and total income for the calendar year (for example, 1928). These procedures bring the dating closer to the income actually covered, but the reader should bear in mind that the income recorded in the super-tax (and surtax) statistics are to a significant degree based on income in earlier years, with the lag depending on the date, the kind of income, and the (varying) income tax treatment. These lags have to be taken into account in any investigation of the relation between top incomes and economic variables such as inflation or unemployment. In addition, the assessment could be levied up to six years after the date at which the income was received, the Revenue having the power to assess, or adjust assessments, over that period. The Inland Revenue annual reports contain initial and revised figures. For most years, we are able to use the final figures, but in a few cases during the Second World War, and at the beginning of the 1960s, these were not published.[5]

(b) *Part-Year Incomes.* The underlying tax records refer to units receiving income at any point in the tax year in question. This includes people who die during the course of the year and people who enter the relevant population, such as school-leavers. In the case of women marrying, or becoming widowed or divorced, they appear twice (once single and once as part of the couple) – see Stark (1978, page 53). This problem of "part-year units" was examined by the Royal Commission on the Distribution of Income and Wealth (1979, page 36). Adjustments to the distribution of *before tax* income indicated that in 1975/6 the exclusion of such units would have reduced the Gini coefficient from 37.3 percent to 34.7 percent, but would have had a much smaller impact on the upper income groups, reducing the share of the top 10 percent by 0.3 percentage points. For our purpose, the key element is therefore the total of tax units, and this is designed to exclude part-year units (see below).

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[5] Clark studied the reports for a number of years and applied correcting factors (1937, page 74): for example, for data four years before complete assessment due, he increases the number of taxpayers by 3.1 percent. Rhodes similarly compares the assessments for 1941–42 made four years apart and concludes that the distribution had "changed materially" (1949, page 54).

(c) *Definition of income.* The super-tax (surtax) was essentially an additional form of income tax; the data have therefore the same weaknesses as any distributions derived from income tax records. Evasion is a potentially serious problem, as is avoidance via such devices as close companies and the formation of trusts. In 1957, the *Economist* noted the small number of surtax payers and the low surtax yield, which "offend the evidence of one's eyes" (February 9, 1957, page 490). Kaldor commented at the time that "for a period of more than a decade not more than a few dozen taxpayers in the whole country had a taxed net income of more than £6,000, whilst the scale of living of the "upper ten" has remained appreciably higher than this" (1955, page 228). The tax base does not correspond to a comprehensive definition of income. Among the omissions are capital gains and losses, and certain remuneration in kind. It cannot be assumed that these departures from a comprehensive definition have a constant effect over time. The extent and the distribution of missing income vary over time. Incentives for tax avoidance were much less when the top tax rate was under 10 percent than when it was 97.5 percent. Legislation has in some cases extended the tax base (for instance, surtax directions for close companies) and in others narrowed the base (for example, cessation of the taxation of imputed rents on owner-occupied houses). These issues need to be borne in mind when interpreting the findings.

Reference Population

One of the key limitations of the earlier studies using the super-tax data is the lack of a link to the aggregate population and aggregate total income. In his discussion of Stamp (1936), Bowley commented that "there is the difficulty that we did not know the number of incomes to divide [in order to calculate percentiles]. But why not guess?" In this paper I have tried to make such a "guess" of the total reference population and total income, building on the foundation provided by the Blue Book distributional estimates constructed by the Central Statistical Office for a number of years from 1938 to 1984/85. This and the next subsection describe how they have been interpolated and extrapolated

The unit to which the income tax data relate (up to 1989–90) is the married couple, or single adult, or single minor with income in his or her own right. We need, for a reference total, the total number of such units in the whole population, whether tax-paying or not; this is referred to below as the total tax units (which should not be confused with the total number of actual taxpayers. The

method used in post-war official statistics to arrive at the control number of tax units is described by Stark (1972, page 16 and Table 1.4). If we simplify by taking the mid-year population figures (ignoring additions to and subtractions from the population during the year) and by ignoring minors aged under 15 with income, then the method involves taking the total population of all males and females, aged 15 or over, less the number of married females. Such a breakdown of the population is available for Census years and from the National Register of September 1939. The procedure used here, described in Appendix A, is to express the constructed figures for tax units as a percentage of the total population and interpolate the percentage linearly. Appendix A compares the derived totals of tax units with evidence about total tax units for the pre-war period. Taken together, different ways of looking at the estimates do not suggest that our figures for the reference population are obviously wrong in a particular direction. It should be noted that I have used throughout the married couple as the unit. This takes account neither of the increasing importance of unmarried couples who would be regarded as an "inner family", and whose incomes would be aggregated on a household basis, nor of the change to independent taxation from 1990–1. These qualifications need to be borne in mind when interpreting the estimates, and are discussed further below.

Reference total income

The Blue Book "allocated total income" is taken here as a reference standard, and is used for those years covered by the Blue Book estimates. Since the main vehicle used here to extrapolate to other years is the national accounts total for personal income, we need to consider how this differs from the Blue Book total (see Royal Commission on the Distribution of Income and Wealth, 1975, and Ramprakash, 1975):

(i) the personal sector, in addition to households and unincorporated businesses, includes life assurance and pension funds (LAPF), and private non-profit-making bodies (PNB) serving persons (such as universities, charities, churches, trade unions). In 1974, for example, total personal income was £74,841m, whereas total household income in the Blue Book series was £73,254m (National Income and Expenditure, 1975, Tables 21 and 27). These figures are close, but the small difference is the net effect of adding and subtracting larger amounts, such as subtracting employers'

contributions to LAPF and adding the pensions paid to persons by LAPF.[6] It does not follow that they will be close in all years.

(ii) not all household income is allocated by ranges in the Blue Book distributions. In most years the "allocated income" is around 80–85 percent of the total household income: for example, £64,675m in 1974/75, compared to a total household income for the income tax year of £78,676m. A sizeable part arises from differences in definitions. In that year, the Blue Book distributions did not include imputed rent on owner-occupied dwellings, employers' national insurance contributions, nor make an adjustment for the timing of self-employment income, which together accounted for over half of the difference.

For years where there is no Blue Book total, the series has been extrapolated and interpolated using a percentage of, from 1920, the total personal income (before tax) series constructed by Feinstein (1972, Table 10, column 7), and from 1919 to 1908 using the component elements from other tables in Feinstein (1972). The series is extrapolated forward from 1984 using the total personal income series from the national accounts. The treatment of these other periods, and the interpolation for 1939–1945, is described in Appendix B. The resulting income totals are undoubtedly based on judgment, but the comparison in Appendix B with contemporary estimates does not suggest that the totals used here are systematically under- or over-stating the true amount. A departure of 5 percent (some £200m in the 1920s) would appear quite large; the reader can assess the sensitivity of the results by increasing or decreasing the pre-1949 shares of top income groups by this percentage.

Interpolation

The basic data on which we are drawing are in the form of grouped distributions, showing the number of tax units, and the total amount of income, in each of a number of income ranges, denoted by $i = 1,\ldots, n$, where n is an

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[6] For example in 1974, the figures were (National Income and Expenditure, 1975, Tables 24 and 26):

–£2,656m	contributions by employers to LAPF
–£2,166m	rent, dividends and interest received by LAPF
+£4,076m	benefits paid to persons by LAPF
–£503m	rent, dividends and interest received by NPB
–£658m	transferred from public authorities and companies to PNB
+£320m	transferred from PNB to persons.

open-ended top interval, and y_i denotes the lower limit of interval *i*. Since the intervals do not in general coincide with the percentage groups of the population with which we are concerned (such as the top 0.1 percent), we have to interpolate in order to arrive at values for summary statistics such as the percentiles and shares of total income. For example, in 1968 the data show that:

> 0.55 percent had incomes above £6,000 (5.5 times the mean) and their share was 5.11 percent
>
> 0.29 percent had incomes above £8,000 (7.4 times the mean) and their share was 3.45 percent

Defining *? º G/ì*, where *ì* is the overall mean income, we have information on *?* and *H*. We want to calculate from this information the share of the top 0.5 percent, and the income level necessary to be in this group.

The standard practice, adopted by Feenberg and Poterba (1993 and 2000) and Piketty (2000), is to assume that the distribution is Pareto in form. This follows a venerable tradition: for example a Pareto interpolation was used in the report of the House of Commons Committee on Income Tax (House of Commons, 1906, Appendix, pages 222 and 245–6). This method has however problems which are not always appreciated, and which have led me to adopt a different approach here. To begin with, the information described above allows us to obtain more than one value for the share. As has been noted by earlier investigators (for example, Barna, 1945, Appendix D), and as we have seen above, in a situation where we have information on both the number and amount of income in the range, more than one value of the Pareto exponent can be fitted. We can for example use the Pareto formula to interpolate the share of total income of the top 0.5 percent from the two shares (5.11 and 3.45 percent) and two cumulative frequencies (0.55 and 0.29 percent). This is equivalent to fitting a Pareto distribution to the Lorenz curve in the interval. The Pareto exponent *á* in the example given above, calculated this way, is given by:[7]

$$á/(á-1) = \ln [0.55/0.29] \,/\, \ln [5.11/3.45] = 1.63$$

giving a value of *á* equal to 2.59, and an interpolated share of

$$5.11\ (0.5/0.55)^{(1/1.63)} = 4.82$$

and the same value is obtained using the other endpoint:

$$3.45\ (0.5/0.29)^{(1/1.63)} = 4.82$$

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[7] Eliminating y between (1) and (2), $G^{á}$ is a constant times $H^{á-1}$. By comparing two points, 1 and 2, we obtain a value for á/(á –1) from $\log[H_1/H_2]/\log[G_1/G_2]$.

This procedure does not however use the information about the range endpoints, and there is in fact no reason why these should be the same as the range endpoints implied by the interpolation. In geometric terms, the slopes at the endpoints of the interpolated Lorenz curve need not equal the interval endpoints (divided by the mean). (The slope of the Lorenz curve is equal to the income at that point divided by the mean.) In the example used above, the initial point can be calculated from the relationship, obtained from (1) and (2):

$$y_i/\hat{\imath} = (\acute{a}-1)/\acute{a}\ ?_i/H_i$$
$$= (1/1.63)\ (5.11/0.55) = 5.7 \qquad (3)$$

which is larger than the actual endpoint (5.5). Alternative Pareto procedures encounter analogous problems. Using the endpoints and the cumulative frequencies, for example, would not guarantee that the interpolated shares are consistent with the interval mean. This approach yields a value of á equal to 2.27, which is quite a lot smaller than the value previously calculated (2.59). Adopting another approach, Piketty (2000) treats interval *i* as an open upper interval, calculating the Pareto exponent from the useful "Pareto property" that mean income above y_i is a constant multiple of y_i. Reversing equation (3), this multiple may be seen to be $\acute{a}/(\acute{a}-1)$, which gives a value for *á* of 2.45. This uses all the information at y_i, but not that from the next endpoint y_{i+1}. As Piketty recognises, the results differ depending on which end of the interval is used, and he takes that corresponding to the nearer percentage.

The alternative approach adopted here is based on placing upper and lower bounds. Gross upper and lower bounds on the Lorenz curve can be obtained by joining the observed points linearly or by forming the envelope of lines drawn through the observed points with slopes equal to the interval endpoints divided by the mean (see Cowell, 1995, page 114). If, as seems reasonable in the case of top incomes, the frequency distribution can be assumed to be non-decreasing, then tighter, restricted bounds can be calculated (Gastwirth, 1972). These restricted bounds are limiting forms of the split histogram, with one of the two densities tending to zero or infinity – see Appendix C. Guaranteed to lie between these is the histogram split at the interval mean with sections of positive density on either side, as described by Cowell and Mehta, 1982). This *mean-split histogram* is employed in what follows to calculate the income shares, along with the restricted upper and lower bounds. For the percentiles, results are given as upper and lower bounds, but it is important to note that different bounds apply to percentiles than to income shares. Assuming that the density is non-decreasing, the bounds for percentiles may be calculated using a procedure

described in Appendix C, which also explains why they are different from those for shares.

Piketty (2000) rightly notes that the interpolation error is likely to be small in relation to other potential errors. Certainly, its significance depends on the fineness of the data, and the form of the underlying distribution. In the case of the French income tax data, Piketty makes comparisons with the results obtained from a sample of the micro-data and finds errors in the calculated income shares of typically less than 0.05 percentage point. The French data on top incomes are however rich in detail and appear to follow closely the Pareto distribution.

Conclusion

All of these problems in the use of the super-tax (surtax) data point to the need for careful interpretation of the results. Where possible, we give an indication of the possible sensitivity of the findings. In the case of the reference totals and the method of interpolation, I have already indicated how this can be done; in the case of the potentially larger problem of income missing from the tax statistics, I discuss later some approximate ways in which the impact can be gauged.

2. Top Incomes in the UK over the Twentieth Century

Introduction

In this section, I summarise the main findings from the super-tax and surtax statistics, and compare them with other evidence for the UK from the Inland Revenue Surveys of Personal Income, which provide a link to current distributions, hence generating a series spanning nearly the whole century. The sources of the data are given in Appendix D.

Tables 1 and 2, and Figures 1 and 2, summarise the results for the percentile incomes and percentile shares covering the following groups: top 1 percent*@, 0.5 percent*@, 0.25 percent*, 0.1 percent*@, and 0.05 percent. Those marked with * are studied in the United States by Feenberg and Poterba (1993), their top group containing some 110,000 taxpayers. Those marked with @ are studied by Piketty (2000), who also considered the top 0.01 percent, which consisted in 1998 of some 3,200 tax units. For the percentiles are shown the upper and lower bounds, as described above. The figures cover the full period from 1908 (super-tax year 1909–10) to 1972 (surtax year 1972–73) that super-tax and then surtax were in operation, including the first two years omitted in earlier studies. Stamp stated that he left out the first two years of the tax "in order to give the statistics an opportunity to "get into their stride" (1936, page 630), but it seems interesting to incorporate them here, as there is no evident difference from later years.[8]

[8] The distributional data for these two years are not published in the Inland Revenue annual reports, but in Royal Commission on the Income Tax, 1920a, Appendix, page 26.

Table 1 Shares of Top Income Groups
Evidence from Super-Tax and Surtax Data 1908–1972

	Top 1%	*Top 0.5%*	*Top 0.1%*	*Top 0.05%*	*Next 0.05%*	*next 0.5%*
1908				8.74		
1909				8.70		
1910				8.70		
1911				8.70		
1912				8.69		
1913			11.64	8.84	2.80	
1914			10.80	8.17	2.63	
1915			9.85	7.47	2.38	
1916				6.79		
1917			7.85	5.99	1.86	
1918			7.30	5.51	1.79	
1919			7.41	5.63	1.78	
1920			7.45	5.62	1.83	
1921			7.50	5.60	1.90	
1922			8.64	6.44	2.20	
1923			8.99	6.70	2.29	
1924			8.78	6.52	2.26	
1925			8.51	6.32	2.19	
1926			8.48	6.28	2.20	
1927			8.26	6.12	2.14	
1928			8.42	6.25	2.17	
1929			8.18	6.05	2.13	
1930			7.64	5.61	2.03	
1931			7.03	5.14	1.89	
1932			6.68	4.87	1.81	
1933			6.48	4.71	1.77	
1934			6.61	4.80	1.81	
1935			6.62	4.83	1.79	
1936			6.69	4.87	1.82	
1937			6.80	4.96	1.84	
1938			6.36	4.63	1.73	
1939			6.13	4.45	1.68	
1940			5.33	3.84	1.49	
1941			4.33	3.09	1.24	
1942			3.91	2.78	1.13	

	Top 1%	*Top 0.5%*	*Top 0.1%*	*Top 0.05%*	*Next 0.05%*	*next 0.5%*
1943		7.91	3.70	2.61	1.09	
1944		7.91	3.64	2.55	1.09	
1945		8.11	3.66	2.55	1.11	
1946		9.11	4.08	2.82	1.26	
1947		8.91	3.90	2.67	1.23	
1948		8.60	3.76	2.56	1.20	
1949		8.22	3.52	2.37	1.15	
1950		8.10	3.40	2.30	1.10	
1951	10.65	7.52	3.14	2.11	1.03	3.13
1952	9.93	6.96	2.87	1.92	0.95	2.97
1953	9.39	6.55	2.67	1.78	0.89	2.84
1954	9.34	6.53	2.67	1.78	0.89	2.81
1955	8.97	6.25	2.56	1.71	0.85	2.72
1956	8.48	5.85	2.35	1.56	0.79	2.63
1957	8.27	5.66	2.25	1.49	0.76	2.61
1958	8.31	5.68	2.25	1.49	0.76	2.63
1959	8.47	5.78	2.29	1.52	0.77	2.69
1960	8.49	5.82	2.34	1.56	0.78	2.67
1961						
1962	7.89	5.59	2.19	1.49	0.70	2.30
1963	7.88	5.57	2.17	1.43	0.74	2.31
1964	8.15	5.72	2.24	1.48	0.76	2.43
1965	8.47	5.88	2.33	1.55	0.78	2.59
1966	7.18	4.92	1.88	1.24	0.64	2.26
1967	7.46	5.05	1.91	1.26	0.65	2.41
1968	7.18	4.84	1.81	1.18	0.63	2.34
1969	6.94	4.71	1.77	1.15	0.62	2.23
1970	6.74	4.51	1.66	1.08	0.58	2.23
1971	6.43	4.30	1.55	1.00	0.55	2.13
1972	6.08	4.03	1.45	0.93	0.52	2.05

Sources: see text

Table 2 Top Income Percentiles
Evidence from Super-tax and Surtax Data 1908–1972
Lower bounds and upper bounds

	Top 1%		*Top 0.5%*		*Top 0.1%*		*Top 0.05%*	
	LB	*UB*	*LB*	*UB*	*LB*	*UB*	*LB*	*UB*
1908							69.9	71.8
1909							69.3	72.7
1910							67.2	72.9
1911							65.2	73.7
1912							62.6	74.0
1913					44.0	46.0	64.2	75.5
1914					40.8	43.3	59.1	70.6
1915					37.2	38.6	56.4	64.3
1916							51.8	56.7
1917					27.9	30.8	46.2	50.6
1918					25.4	28.1	43.0	48.0
1919					28.2	28.3	46.0	46.5
1920					29.1	29.3	47.1	47.6
1921					30.5	30.8	48.2	48.8
1922					35.2	35.4	55.8	56.3
1923					36.2	36.6	58.2	58.5
1924					36.1	36.4	56.8	57.4
1925					35.5	35.6	55.3	55.9
1926					35.7	35.9	55.1	55.9
1927					34.9	35.2	53.6	54.3
1928					35.4	35.6	54.4	55.0
1929					34.7	35.0	54.2	54.5
1930					33.3	33.6	50.1	51.2
1931					31.0	31.5	47.3	47.5
1932					30.0	30.3	45.0	45.4
1933					29.1	29.4	44.1	44.4
1934					29.7	30.1	44.9	45.3
1935					29.2	29.8	44.6	44.9
1936					29.7	29.9	45.5	45.6
1937					30.0	30.3	45.8	45.8
1938					28.6	28.7	43.1	43.1
1939								
1940					24.4	24.6	37.1	37.2
1941					20.3	20.6	30.7	30.8

	Top 1%		*Top 0.5%*		*Top 0.1%*		*Top 0.05%*	
	LB	*UB*	*LB*	*UB*	*LB*	*UB*	*LB*	*UB*
1942					18.8	19.0	27.5	28.3
1943			7.1	7.2	18.3	18.4	26.2	27.0
1944			7.3	7.4	18.1	18.3	26.0	26.8
1945			7.8	7.8	18.7	18.8	26.1	26.9
1946			8.5	8.6	21.1	21.6	30.4	30.7
1947			8.6	8.7	20.6	21.2	29.4	29.8
1948			8.4	8.5	20.3	20.7	28.5	28.9
1949			8.2	8.3	19.8	19.9	27.1	27.3
1950			8.2	8.2	19.1	19.4	26.4	26.6
1951	5.1	5.2	7.6	7.8	17.6	17.9	24.1	24.5
1952	4.9	4.9	7.1	7.4	16.3	16.6	22.3	22.8
1953	4.7	4.8	6.8	7.0	15.3	15.7	20.8	21.3
1954	4.7	4.8	6.8	7.0	15.2	15.6	20.7	21.1
1955	4.6	4.6	6.6	6.7	14.5	15.0	19.9	20.3
1956			6.3	6.5	13.5	13.9	18.5	18.8
1957	4.4	4.5	6.2	6.4	12.9	13.4	17.7	18.0
1958	4.5	4.5	6.2	6.4	12.8	13.3	17.7	17.9
1959	4.6	4.6	6.4	6.5	13.4	13.6	18.0	18.3
1960	4.5	4.6	6.4	6.5	12.4	13.0	18.0	18.4
1961								
1962	3.4	3.4	6.0	6.1	12.8	13.1	17.1	17.5
1963			6.1	6.2	12.9	13.0	17.0	17.3
1964	3.7	3.7	6.4	6.4	13.2	13.4	17.4	17.8
1965	4.0	4.1	6.6	6.6	13.5	13.7	17.9	18.5
1966	3.5	3.6	5.8	5.8	11.3	11.4	14.6	14.9
1967			5.9	6.0	11.5	11.7	14.8	15.3
1968	3.7	3.7	5.6	5.8	11.1	11.3	14.1	14.7
1969	3.4	3.4	5.6	5.7	10.7	11.0	13.9	14.3
1970	3.4	3.5	5.4	5.6	10.3	10.5	13.1	13.5
1971	3.0	3.1			9.7	9.9	12.4	12.8
1972	3.0	3.0	5.0	5.0	9.1	9.3	11.6	11.9

Sources: see text

Figure 1 Evidence from Super-Tax (Surtax) Data

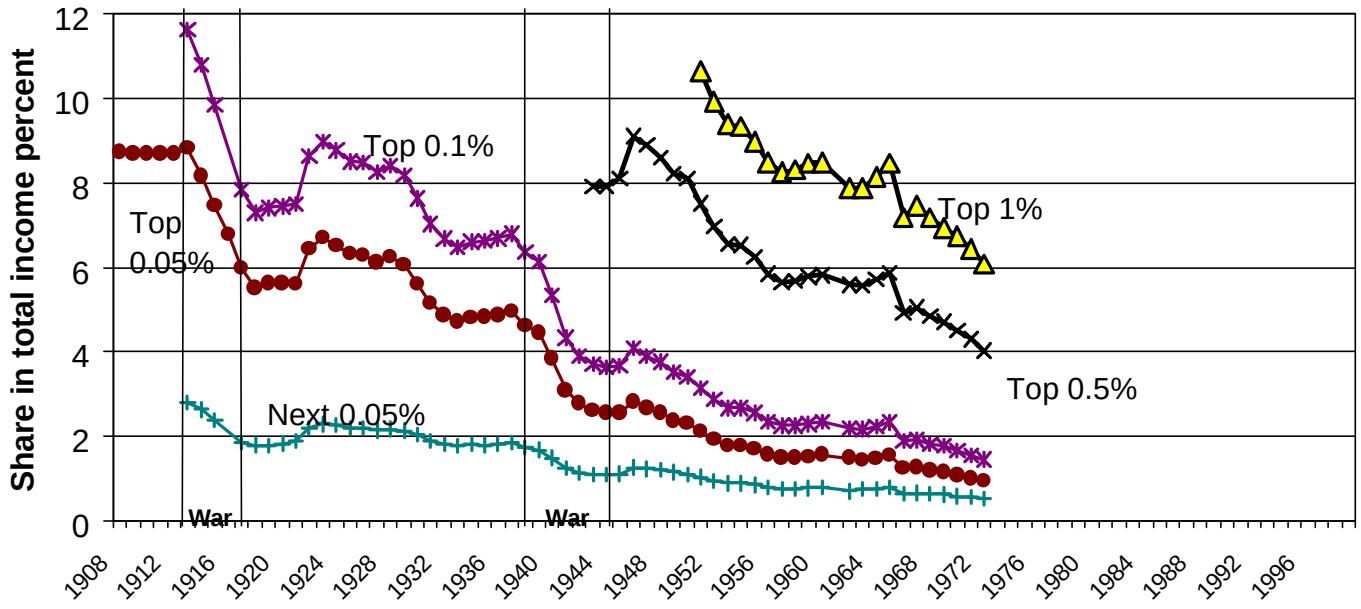
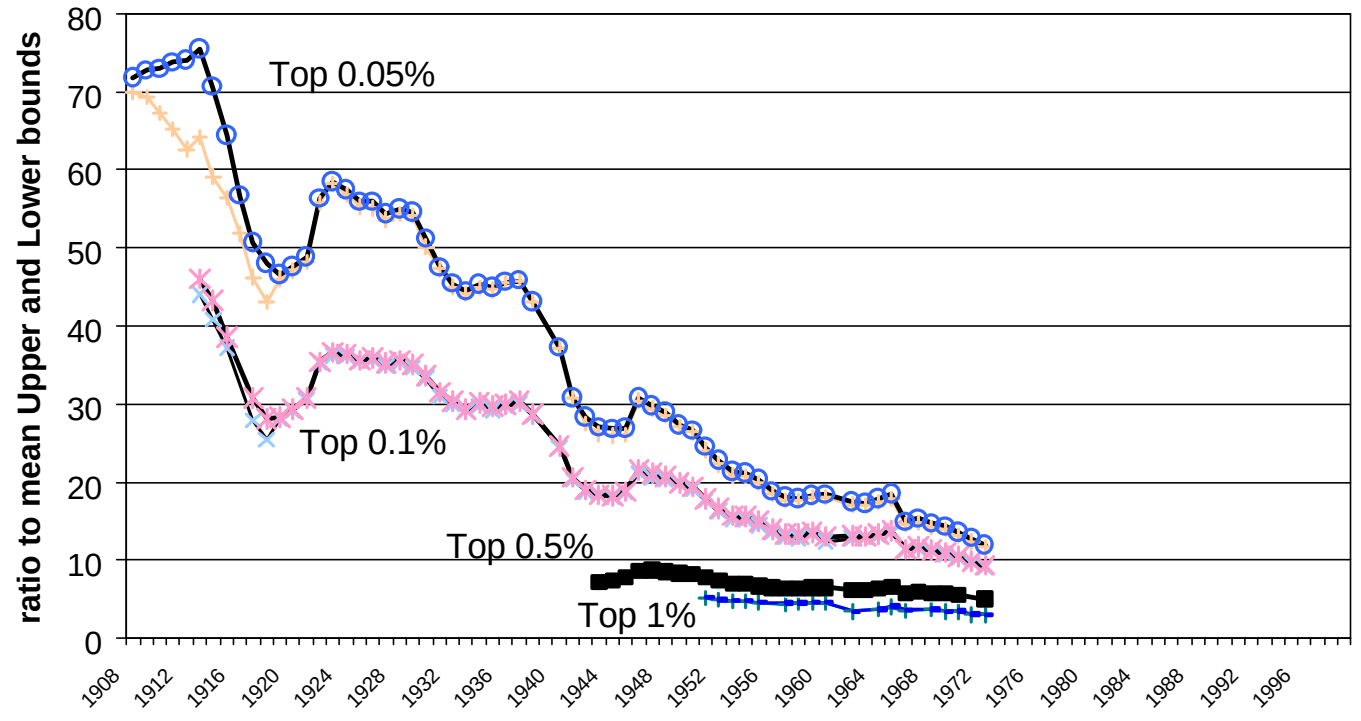


Figure 2 Percentiles from Super-tax and Surtax Data (bounds)



Sources: see text

Super-tax (surtax) payers were a small minority of the population. At the start of the series, the 1909–10 super-tax returns covered 11,328 tax units, or broadly the top 0.05 percent. At its peak, the proportion covered was less than 2 percent: fewer than ½ million. Yet super-tax payers were a class of intrinsic interest. Stark (1972) in his study of the period 1949 to 1963 devised an index of "high incomes" defined as those with equivalent incomes above the 1949 surtax threshold. He observes that it is one of the few indicators on which such a definition could be based. When the Royal Commission on the Distribution of Income and Wealth was asked in 1974 to report on "Higher Incomes from Employment" (1976), they took a cut-off of £10,000 a year, which was close to what had been the effective starting point for surtax (abolished 2 years before). Super-tax (surtax) payers constituted a major economic force, receiving typically around a tenth of total gross personal income. Half way through the century, the top 0.05 percent had incomes in excess of 25 times the mean. If one assumes a sustainable rate of return on capital of 4 percent per annum, then these people could, in Alan Clark's phrase, live off the interest on their interest.

Before and After the First World War

When super-tax began, those subject to tax coincided in size, if not in composition, with the "Upper Ten Thousand", who at that time "set new standards of conspicuous consumption" (Clarke, 1996, page 36). This term originated in the United States, but has British resonance: for example the number of landowners listed as owning more than 1000 acres in 1880 was some 10,000 (Cannadine, 1990, page 9). (Its use in Britain is illustrated by the passage cited earlier from Kaldor (1955).) There were many outside this class who were comfortably well-off: for example, in August 1914 there were estimated to be 151,000 private motor cars in use (Bowley, 1919, page 22n). But the super-tax payers were more than comfortably off. The share of the top 0.05 percent was 8.7 percent. Tax was only payable on incomes in excess of £5,000 a year, which is estimated here to be some 70 times the average income of tax units, equivalent today to some £1½ million a year. To give some idea of the position of those on the margin of being super-tax payers, we may note that Bonar Law, the businessman who became leader of the Conservative Party in the House of Commons in 1911, had an income of around £6,000 a year, of which £4,500 came from investments and the remainder from directorships (Blake, 1955, page

37). In 1913, the salary of High Court judges was £5,000,[9] as was that of the Chancellor of the Exchequer (Routh, 1980, pages 64 and 73), which might have led cynics to wonder about the choice of starting point for super-tax. The Chancellor was however soon to become liable to super-tax, as in the first war Budget of 1914 the threshold was lowered to £3,000 and in 1918 to £2,500, when "a spirit of sacrifice was in the air" (Sabine, 1966, page 154). The lowering of the threshold more than doubled the number of super-tax payers and allows us to calculate the share of the top 0.1 percent. Initially this share was some 11.6 percent of total income, and the top thousandth began at some 45 times mean income. This addition to the series allows us to distinguish between the top 0.05 percent and the "next 0.05 per cent", a distinction which is of interest since at times their shares in total income have moved differently.

The First World War, marked by vertical lines in Figures 1 and 2, saw a significant fall in the share of the top 0.05 percent (and the next 0.05 percent): from 8.7 percent to 5.6 percent, a fall of some third, between 1908 and 1920. The top 0.1 percentile fell in the same way from 45 times the mean to 30 times the mean. These are large changes. It may be noted that the bounds for the percentiles become much closer. The data prior to 1919 have quite broad ranges, such as £5,000–£10,000, whereas this range is divided into five in later data. Whereas in 1913 the bounds for the starting point of the top 0.05 percent are from 64 to 76 times the mean, by 1921 the range is only from 48.2 to 48.8 times the mean, a range which is certainly small in relation to other sources of error. The wide bounds for the 0.05 percentile in 1913 may be compared with the much narrower bounds for the income share, which are 8.81 to 8.91 percent (for 1921 they are 0.004 percentage points apart).

How far was the fall in the First World War temporary and how far a reflection of secular decline? The subsequent interwar period has been strangely neglected. In his historical study of UK income inequality, Soltow (1968) did not use any data for the interwar period, going direct from 1913 to 1962. Williamson's analysis (1985) stops in 1913; Lindert (2000) goes direct from 1911 to 1938. Tables 1 and 2 allow us to track the developments of the share and percentiles postwar.[10] The estimates show that there was some recovery in the share of top incomes in the early 1920s as prices fell sharply, reflecting the fact

[9] Their salaries remained at £5,000 from 1832 to1954. In April 2001 they were £132,603, or some 7 times average income.

[10] The figures from 1921 exclude Southern Ireland.

that a significant source of income (rents) tended to remain unchanged in money terms.[11] But the top 0.05 per cent ended the interwar period having lost a further percentage point, so that their 1939 share of total income was around a half that in 1908. In money terms, their total income had gone from £140 million in 1908 to £200 million in 1939. Two points should however be noted. First, the fall over the interwar period cannot be described as a steady downward trend. There was broad stability over the 1920s: the share in 1929 was above that in 1919. The years 1929–1932 then saw a rapid decline. The share of the top 0.05 percent fell from 6.1 percent in 1929 to 4.9 percent in 1932, a fall of a fifth in three years. The share was then maintained until 1938. We have therefore a sequence of falls and plateaux. Secondly, the next 0.05 percent saw little overall change over the interwar period: their share in 1937 was the same as that in 1917. The income required to be in the top 0.1 percent was still some 30 times the mean at the end of the 1930s. This highlights the "localised nature of redistribution", as was found by Brittain (1960) for a later period (1938–1949), to which we now turn.

The Second World War and the Golden Age pre-1973

With 1938 we come to the first year for which there are official statistics for the income distribution as a whole, allowing an examination of the impact of the Second World War. The official estimates show the share of the top 1 per cent in before tax income as being sharply reduced from 16.6 per cent in 1938 to 11.2 per cent in 1949 (Royal Commission on the Distribution of Income and Wealth, 1979, Table 2.4), with an even more dramatic change in after tax income. (These are based on the "Blue Book" estimates discussed below.) Our surtax-based estimates in Table 1 show a similar picture for those higher up the scale. The share of the top 0.05 percent fell from 4.5 percent in 1939 to 2.6 percent in 1945, and the decrease was not confined to this group: the share of the next 0.05 percent fell from 1.7 percent to 1.1 percent. The 0.1 percentile fell from 30 times mean income to 20 times – see Figure 2. The differences were still large: in 1944 the Duke of Wellington is reported to have had a gross income of £40,000 a year (Cannadine, 1990, page 630), or 135 times the mean income. At the same time,

[11] The lags in the income tax data may be important here, with the recovery partly reflecting the delayed entry of profits made during the war (a matter of considerable public concern at the time). War profits were subject to Excess Profits Duty, which further complicates the interpretation, since repayments of Duty were made where profits fell, and these repayments counted as income in the super-tax statistics (see the discussion of Allen (1920) by Bowley and Stamp).

tax rates were then highly progressive: the Duke stated that he paid all but £4,000 in tax (leaving him with some 16 times the mean disposable income).

This was not purely a step change. Figures 1 and 2 show that, post-war, the shares of the top groups and the percentiles fell steadily from 1948 for the next ten years. The share of the top 0.05 percent fell from 2.6 percent to 1.5 percent, another fall of over a third. The share of the top 0.5 percent fell from over 8 percent to under 6 per cent. The 0.1 percentile fell from 20 times mean income to some 12½ times the mean. It should be noted that these figures all relate to before tax income. The Blue Book estimates, which cover both before tax and after tax income, indicate that the share of the top 1 percent in before tax income fell more than the share in after tax income.

From the later-1950s to 1965 there was a further plateau, as is shown most clearly by the percentiles in Figure 2. It should be borne in mind that there were several changes in surtax in this period, which may have affected the lower ranges. The 1957 Budget allowed for 1956–7 and subsequent years the deduction against taxable income of the amount by which certain personal allowances exceeded the single allowance (Sabine, 1966, page 231 and Inland Revenue, 104th Report, page 89).[12] This meant that people whose total income exceeded £2,000 but who, because of allowances, were not liable to surtax, were excluded from the statistics.[13] In 1961–62 earned income relief was extended to surtax. The Inland Revenue estimated that the number excluded had risen by 1962–3 to 425,000 (Inland Revenue, 107th Report, page 98).[14] For a person with only earned income, the surtax threshold was in effect doubled to £4,000 for a single person. £4,000 was more than 5 times mean income, and about 0.6 percent had incomes in excess of this amount. The recorded share of the top 1 percent may therefore have been negatively affected. Allowance for these fiscal changes strengthens the conclusion of broad stability in this period.

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[12] The Inland Revenue tables refer to "total income" and "assessed income", where the latter is equal to the former minus the deductible allowances. The statistics here are based on total income.

[13] The numbers were estimated at 45,000 for 1956–57 with £95 million income (Inland Revenue, 101st Report, page 93). Since in this year the top 1 percent includes some people in this range, these numbers have been added back.

[14] For 1961/62 we only have assessments up to 30th June 1964, and the figures were apparently substantially adjusted (the final number of assessments is some 15,000 higher – see Inland Revenue, 110th Report, page 110). I have not used the data for this year.

Moving on to the mid-1960s, we may note the temporary rise in the income shares in 1965. This is believed to be due to the payment of unusually large dividends in 1965–66 in anticipation of the introduction of Corporation Tax (*Inland Revenue Statistics*, 1970, page 61). From 1966 to 1972 there was a further significant fall in the share of top incomes. The share of the top 0.05 percent fell from 1¼ percent to under 1 percent; the starting point of the top 0.1 percent fell from 11 times average income to 9 times.

The patterns revealed by the super-tax/surtax data are summarised in Table 3. There is a rich picture of alternating periods of change and of stability. Before considering its interpretation, we need to consider the other main Inland Revenue source, which both overlaps and continues to the present-day.

Link with the Survey of Personal Incomes and the Final Quarter of the Twentieth Century

Separate assessment for income tax meant that only in the case of super-tax/surtax did the authorities assess the total income of individuals, but the Inland Revenue has from time to time sought to combine the schedular income tax information to arrive at a distribution of income among taxpayers. It should be noted that this required a major input of statistical effort, and in the days before computers was a substantial undertaking. One person may have been assessed under several different schedules, and may have appeared more than

Table 3 Summary of Super-tax/Surtax Evidence on Top Income Shares

Period	*Change*	*Fall in share of top 0.05%*
Pre-1914	Stability	
1914–1918	Fall	35%
1919–1929	"Stable over period as a whole"	
1930–1933	"Fall for very top, less for next groups"	20%
1934–1938	Stability	
1939–1945	Fall	45%
1946–1957	Steady fall	40%
1958–1964	Stability	
1965–1972	Steady fall	33%

once under a particular schedule (so that the distribution for a schedule cannot even be treated as giving the distribution of income from that source).[15] These special statistical enquiries now take the form of the annual Survey of Personal Incomes, and I refer to earlier inquiries by the same title, abbreviated to SPI. This source is discussed in detail in Atkinson (2001). The estimates of the income shares derived from this source are shown in Table 4 and in Figure 3, where the SPI data are shown by dots joined by dashed lines and the super-tax/surtax data are shown by continuous lines. (These SPI figures are based on the published tabulations; in the more recent years, less detail has been given on the top income ranges, so that we are no longer able to calculate the very top income shares.)[16]

[15] The Inland Revenue Annual report for 1914-15 gives the hypothetical example of an income of £5,000 (which would appear as such in the super-tax statistics) consisting of ten elements, assessed under schedules A, B, C and E, and 6 times under Schedule D.

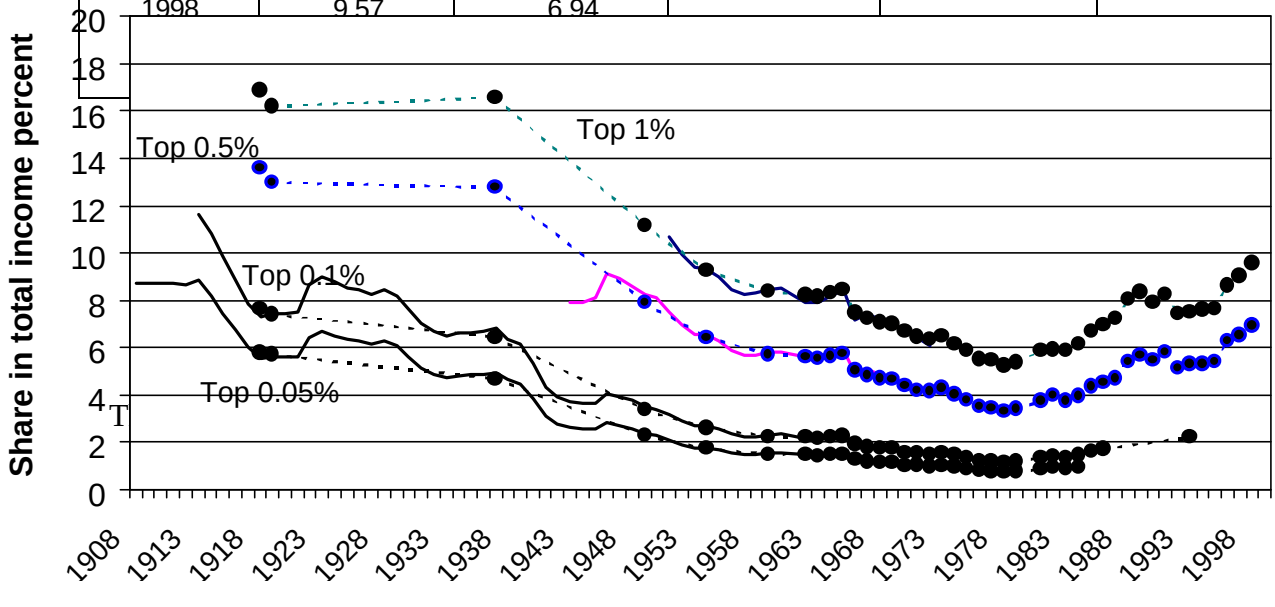
[16] The published reports do not contain the total income by ranges for two years (1980–81 and 1981–82); the Inland Revenue has kindly supplied the missing data for 1981–82, but those for the earlier year do not appear to be available. 1980–81 is therefore missing.

Table 4 Top Income Shares: Evidence from Survey of Personal Incomes Data

	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%
1918	16.9	13.58	7.63	5.78
1919	16.2	12.98	7.42	5.70
1920				
1921				
1922				
1923				
1924				
1925				
1926				
1927				
1928				
1929				
1930				
1931				
1932				
1933				
1934				
1935				
1936				
1937	16.58	12.77	6.44	4.67
1938				
1939				
1940				
1941				
1942				
1943				
1944				
1945				
1946				
1947				
1948				
1949	11.18	7.91	3.36	2.28
1950				
1951				
1952				
1953				
1954	9.27	6.44	2.61	1.73
1955				
1956				
1957				
1958				
1959	8.37	5.70	2.24	1.48
1960				
1961				

	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%
1962	8.21	5.62	2.23	1.48
1963	8.16	5.55	2.15	1.42
1964	8.31	5.65	2.21	1.47
1965	8.45	5.73	2.25	1.50
1966	7.47	5.02	1.92	1.29
1967	7.25	4.82	1.80	1.18
1968	7.07	4.69	1.75	1.14
1969	6.99	4.65	1.74	1.14
1970	6.71	4.37	1.56	0.99
1971	6.46	4.20	1.53	1.02
1972	6.38	4.15	1.48	0.96
1973	6.51	4.28	1.56	1.01
1974	6.13	4.02	1.48	0.96
1975	5.86	3.77	1.34	0.88
1976	5.50	3.50	1.22	0.80
1977	5.46	3.45	1.17	0.76
1978	5.24	3.30	1.14	0.73
1979	5.37	3.40	1.18	0.75
1980				
1981	5.86	3.75	1.35	0.87
1982	5.92	3.98	1.39	0.92
1983	5.88	3.75	1.36	0.90
1984	6.17	3.95	1.44	0.95
1985	6.68	4.36	1.64	
1986	6.95	4.52	1.71	
1987	7.24	4.69		
1988	8.05	5.42		
1989	8.34	5.68		
1990	7.90	5.47		
1991	8.25	5.79		
1992	7.43	5.13		
1993	7.52	5.29	2.22	
1994	7.60	5.29		
1995	7.66	5.39		
1996	8.62	6.26		
1997	9.02	6.52		
1998	9.57	6.94		

Figure 3 Super-Tax/Surtax estimates and Survey of Personal Income (SPI)



4 and in Figure 3, where the SPI data are shown by dots joined by dashed lines and the super-tax/surtax data are shown by continuous lines.

The first such enquiry in the twentieth century[17] was when, at the request of the Royal Commission on the Income Tax, estimates were made for 1918–19 (and published for the price of 1 penny). A revised version is contained in the Inland Revenue 63rd Report (1920). The estimates covered around a quarter of the population, but here I concentrate on the top 1 percent and smaller subgroups. These figures related to incomes assessed in the year, and therefore in some cases incomes which accrued in earlier years, but, as with the super-tax returns, we take them as relating to 1918. An estimate for 1919–20 was similarly prepared at the request of the Colwyn Committee (1927) and published as Appendix XIV of their report. These immediate post First World War SPI figures have tended to be dismissed. Lydall (1959) in his historical study referred to the data for 1919–20 but discarded this year as "abnormal". Bowley said of the SPI data that "its utility was never great", since it was a time of very rapid changes in income (1942, page 113). In this regard, the availability of super-tax estimates on an annual basis helps us put the immediate post-war years in perspective.

In that the SPI data cover a larger fraction of the population, they may be regarded as a superior source to the super-tax/surtax data for those years where we have both.[18] Moreover, for those covered by both sources, the Inland Revenue initially expected the SPI figures to give more complete coverage, reflecting "the deficiency [in the super-tax statistics] attributable to the leakage which is inherent in a system of direct assessment as opposed to a system of collection of duty at the source" (Inland Revenue, 1920, page 69; see also Stamp's discussion of Allen (1920)). Operating in the opposite direction is that

[17] One distribution exists for the nineteenth century. The income tax introduced by Pitt in 1799 required returns from all individuals showing their total incomes from all sources, and those for 1801 were classified by range of income (Stamp, 1916, Appendix IV).

[18] The SPI also provide more detail. Beginning with the 1937–38 enquiry, the SPI data contain a breakdown by family circumstances and by type of income – see Atkinson (2001). The surtax statistics have provided some breakdown, but this is restricted. The tables began from 1944–45 to include information on the ratio of earned income to total income by range of total income (Annual Report for 1944–45, Table 46), but there are limits to what can be derived from this classification (Rhodes, 1949). A classification by range of earned income began with effect from 1946–47, but it should be noted that the definition of "earned income" includes not only salaries and wages but also pensions and income from self-employment.

the super-tax/surtax figures used here are, in general, based on the final assessment, whereas the SPI do not incorporate all adjustments. The super-tax data for 1918–19 used here were not published until 1924. Or, to take a more recent example, the 1967–68 SPI was based on figures available at the end of 1967/68, whereas the surtax assessments were based on the fuller information obtained up to 30 June 1970 (*Inland Revenue Statistics 1971*, page 224). Moreover, in the SPI, in cases where current figures are not available, it has in the past been the practice to substitute those for the previous year. This was one reason for the observed deficiency of total investment income in the SPI (Inland Revenue 109th report, page 93): where investment income is rising, this will cause the SPI to understate the shares of top incomes. In fact the SPI and super-tax/surtax figures are close. For 1918, the SPI data show the share of the top 0.05 percent to be 5.8 percent compared with 5.5 percent in the super-tax data; the share of the top 0.1 percent is 7.6 percent, compared with 7.3 percent. For 1919, the shares of the top 0.1 percent are virtually identical. In general, the differences are scarcely perceptible in Figure 3.

The annual super-tax/surtax data help us understand the interwar period. First, we may note that the next Inland Revenue SPI inquiry, that relating to 1937, also produced results for the very top groups that are close to those we obtained. For the top 0.5% and top 1%, not covered at that time by the super-tax/surtax data, the SPI showed the shares to be virtually unchanged over the interwar period. This takes further the earlier finding that the redistribution did not extend to the “next 0.05 percent”, and indicates that some of the loss by the very top groups was recouped by those immediately below. Such a pattern is consistent with the re-arrangement of asset-holding within families, or it could be explained by the arrival of new rich. Figure 3 also brings out the value of annual data. From the SPI, one learns about the endpoints of the interwar period, but misses the periods of recovery, stability, sharp fall and then stability. Drawing a linear trend, as with the dashed line, conceals much of interest during the interwar period.

The SPI as such officially began in 1949–50, when the Inland Revenue began a series of quinquennial inquiries (1954–5, 1959–60, 1964–5, and 1969–79) based on the information contained in the income tax records for a sample of taxpayers. From 1963–4 this was supplemented by smaller annual surveys with a sample size of around 125,000, and this is now the sole source. The SPI distribution was combined by the Central Statistical Office with information from other sources to produce the distribution of income series published for many years annually in the *United Kingdom National Accounts* (referred to as

the “Blue Book” series). Data from the Family Expenditure Survey were used to add in non-taxable income not covered by the SPI and to augment the SPI sample for those tax units which are not included in the tax records (*Economic Trends*, November 1987, p. 100). As noted earlier, the Blue Book estimates of total tax units and total income are the foundation for the totals used here. The methods by which the sources are combined are described in detail by Ramprakash (1975) and Stark (1972 and 1978). Here I concentrate on the pure SPI distribution, in part because the Blue Book series was last published for 1984/85 and is “now missing presumed dead” (Cowell, 1995, page xi).

For the 1950s, the value of annual data is again demonstrated. The quinquennial surveys in 1949, 1954 and 1959 give results which are in agreement with the surtax data, but they do not bring out the timing of the fall. When the SPI becomes annual, then the two move closely together, and it seems reasonable to treat them as a continuous series. We can then take the story forward to 1998. At the same time, we should bear in mind that the series has been affected by methodological developments and by changes in tax legislation. For instance, *Inland Revenue Statistics 1988* describes the improvements made in the analysis, which meant that from 1985 employees’ superannuation contributions were added back to earned income and that an estimate had been included of investment income not recorded in the income tax returns because tax had been paid at source. This latter change is less important for higher rate taxpayers, but the former may be expected to have contributed to the upward movement in the income shares in 1985 shown in Figure 3.

A change of particular importance was the introduction of independent taxation for husbands and wives. Until 1990, the incomes of husband and wife were aggregated in the SPI data (this applied even where there had been election for separate taxation). The data now relate to individuals, and this change means that the estimated share of the top x percent of tax units is lower than it would otherwise be: the same total income is received by an increased number of taxpayers (no adjustment is made here to the total). As may be seen from Figure 3, there was a distinct fall in 1990. When we take this into account, it seems safe to conclude that the shares of top incomes are now broadly back where they were in 1950. The last quarter of the twentieth century saw an almost complete reversal of the decline in observed inequality at the top that had taken place in the preceding twenty five years. Of particular note is the continued rise in top shares in the second half of the 1990s. Whereas the household survey based estimates of Clark and Taylor (1999) show the top decile as being fairly stable as a percentage of the median in the 1990s, the top income shares in Figure 3 first

fall and then rise, to end in 1998 with distinctly higher shares than in 1990 for the top 1 and 0.5 percent. This is not inconsistent, but reflects the differential movement at the very top of the distribution. The entry level for the top 1 percent is not significantly different (the top percentile was 4.1–4.4 in 1990 and 4.0–4.7 in 1998) but the income share is about a fifth higher.

Robustness of the Conclusions

The results indicate that the shares of top income units in the UK have returned to broadly the level of 50 years ago, but that the degree of concentration is considerably reduced when compared with that before the First World War. At that time, around 9 percent of total income was received by the top 0.05 percent of tax units; in 1998 the group of recipients was some 20 times bigger (the top 1 percent).

It seems unlikely that these conclusions would be over-turned by variations in the reference totals for total tax units or total income. A variation of 5 or even 10 percent in the income shares would not change the comparison of 1908 and 1998. The totals for the second half of the century are relatively well established. Nor are the revisions to Inland Revenue statistics likely to be sufficient to reverse the broad conclusions drawn. The recorded rise in 1985, for example, in the share of the top 1 percent is less than 1 percentage point.

Where the conclusions may be at risk is from an increasing departure of taxable income from total income. With the advent of high marginal tax rates, the decline in observed income shares may be in part a reflection of increasing conversion of income into forms which do not appear in the income tax statistics. This thesis was powerfully argued by Titmuss in his book *Income Distribution and Social Change* (1962). The retention of profits in private companies was a continuing matter of concern to the Revenue, as in the celebrated William Morris surtax cases in 1926 and 1929 (Andrews and Brunner, 1959, Chapter IX). Investment in public companies that paid low dividends but generated high capital growth allowed return to be converted into tax-free capital gains. In the 1940s and 1950s a number of studies examined the effect of imputing to persons the undistributed profits of businesses. Barna (1945, Table 17) in his estimates for 1937 adds 22.6 percent to the incomes of those with £8,000 a year or more (broadly the top 0.05 percent), and 5.9 percent to total income. This would imply adjusting the share upwards by a factor of 1.158, raising it from 5.0 percent to 5.75 percent. The impact of allocating to individuals the undistributed profits of companies on changes over time was examined by Seers in his study of the levelling of incomes since before the

Second World War. The effect on those with incomes above £2,000 (broadly the top 0.5 percent) of his estimates (1949, Tables I and II) would be to raise the share by a factor of 1.24 in 1938 and 1.56 in 1947. As his results show, on this basis, the pre-tax share of the top income groups would be little different pre and post-war. On the other hand, this calculation assumes that the top group retained the same share of equity as in 1937, whereas, as argued by Lydall (1959), the share of the top 1 percent in total equity had declined, in which case there would remain a fall in the income share compared with the pre-war level.

The link between the undistributed profits of UK companies and top incomes is one which must have become less close over time; moreover, we have to bear in mind that the top 1 percent is a heterogeneous group. An alternative approach is that adopted by Kaldor (1955), who compares the investment income recorded in the surtax returns with the wealth of top wealth-holders, assuming that these two groups can be equated. As he shows, the recorded return for the top 20,000 investment income recipients of 2¾ percent or less app eared low in relation to average asset yields (1955, page 229). This approach was developed by Stark (1972) who made estimates of the accrued capital gains on all asset classes for 1954, 1959 and 1964. He concluded that "if we compare the [distributions] before and after the inclusion of capital gains ... there is little doubt that the shape of the distributions is changed substantially" (1972, page 77). The Gini coefficient was estimated to be some 4–5 percentage points higher in 1954 and 1959. These were years in which capital appreciation was large, but the size of the difference serves as a warning. Insofar as capital appreciation was less important in earlier periods, the surtax figures may overstate the postwar decline in the shares of top incomes.

More recently, top tax rates have been reduced. The top rate on investment income has fallen from 98 to 75 percent in 1979, from 75 to 60 percent in 1984, and from 60 to 40 percent in 1988. This 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). The same factors may have operated in the UK, although there are other reasons to expect the shares to be understated, including the replacement of earned income by stock options

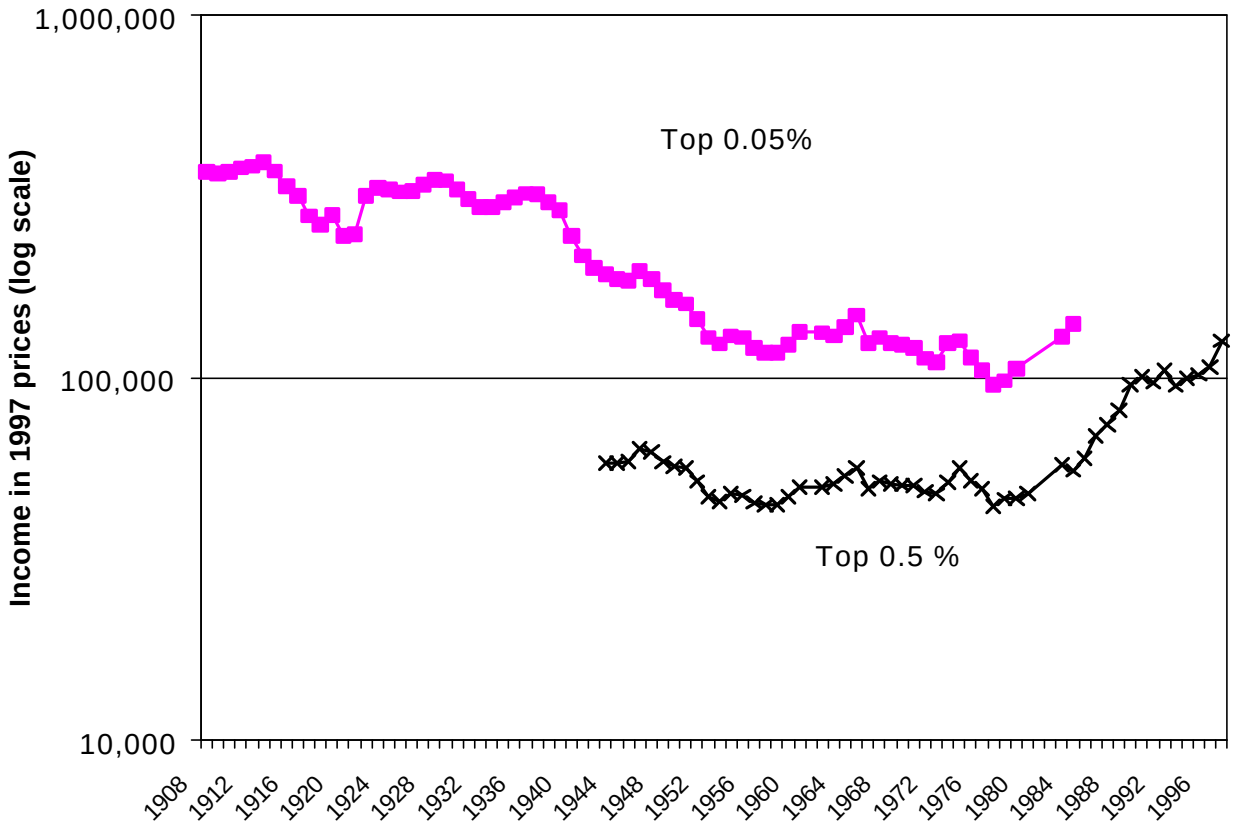
Alternative Presentations of the Results

The results have so far been presented in terms of income shares and percentiles defined relative to the mean. These are relative measures of the position of top income recipients, whereas we may also be interested in the purchasing power enjoyed by the top income groups. In Figure 4 are plotted the average incomes of the top 0.05 and 0.5 percent inflated to 1997 values by the index of retail prices given by Feinstein (1972, Table 65),[19] linked at 1965 to the present-day official retail price index. Real average incomes were broadly stable from 1922 to 1937. They fell during the Second World War, and this decline continued until 1957, after which they recovered somewhat and at the end of the 1970s were little different from three decades earlier. Since 1980, the average real income of the top 0.5 percent has risen sharply.

A different perspective is provided by the Pareto diagrams, which give an indication of the shape of the upper part of the distribution and are of interest

[19] Extrapolated forwards with the All Items Retail Price Index. I use the Feinstein index since there are good reasons for believing that the official price index understated inflation during the Second World War.

Figure 4 Real average incomes



for historical reasons. In Figure 5 are shown the Pareto distributions for numbers, covering the top 1 percent and above, for a selection of years. A proportionate rise in money incomes leads to a rightward shift of the curve. This is what is observed in the upper part of Figure 5, where the curves are in the order of mean (money) incomes, 1933 correctly being to the left of 1922. At the same time, the shift is less than would have happened if all incomes had risen equally: between 1922 and 1972 mean incomes increased by a factor of 10, but the shift is clearly less. Moreover, the shape has changed. The curves have become steeper, to the extent that the proportions with £100,000 are virtually the same in 1972 and 1922. In Figure 6 are shown the Pareto diagrams for amounts, covering the top 10 percent of income and above. Once again the curves appear to swing round clockwise.

Figure 5 Pareto Diagram for Numbers

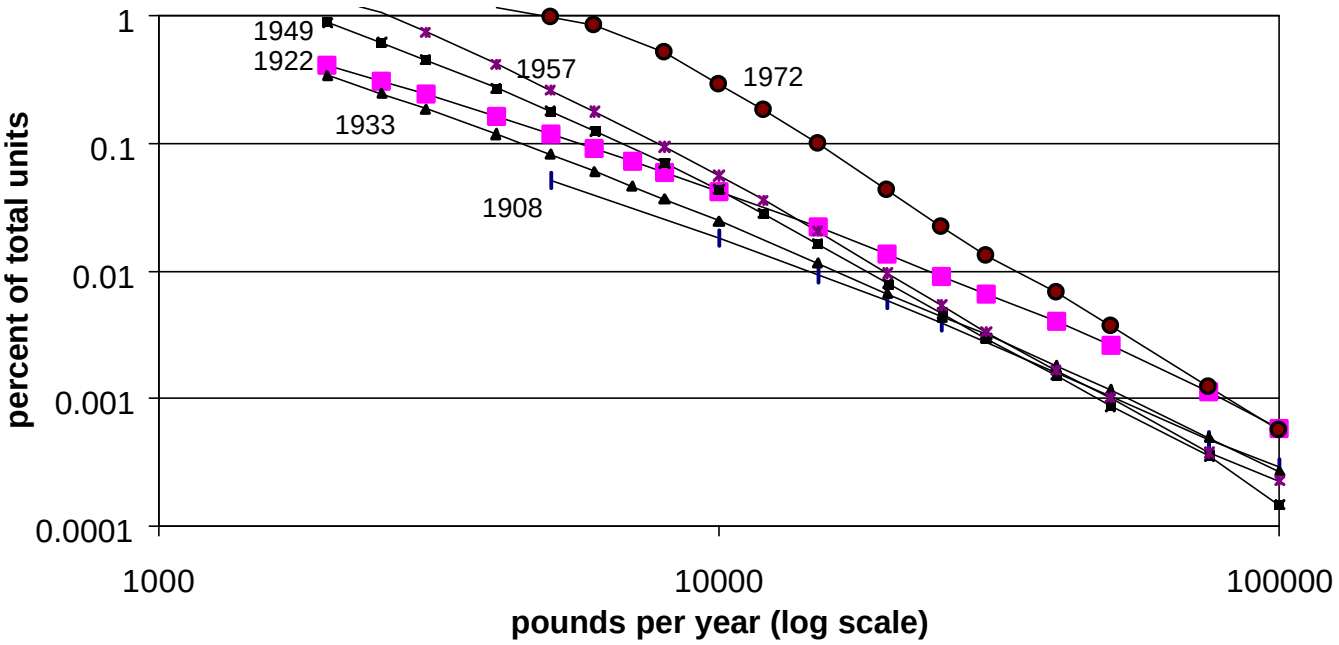
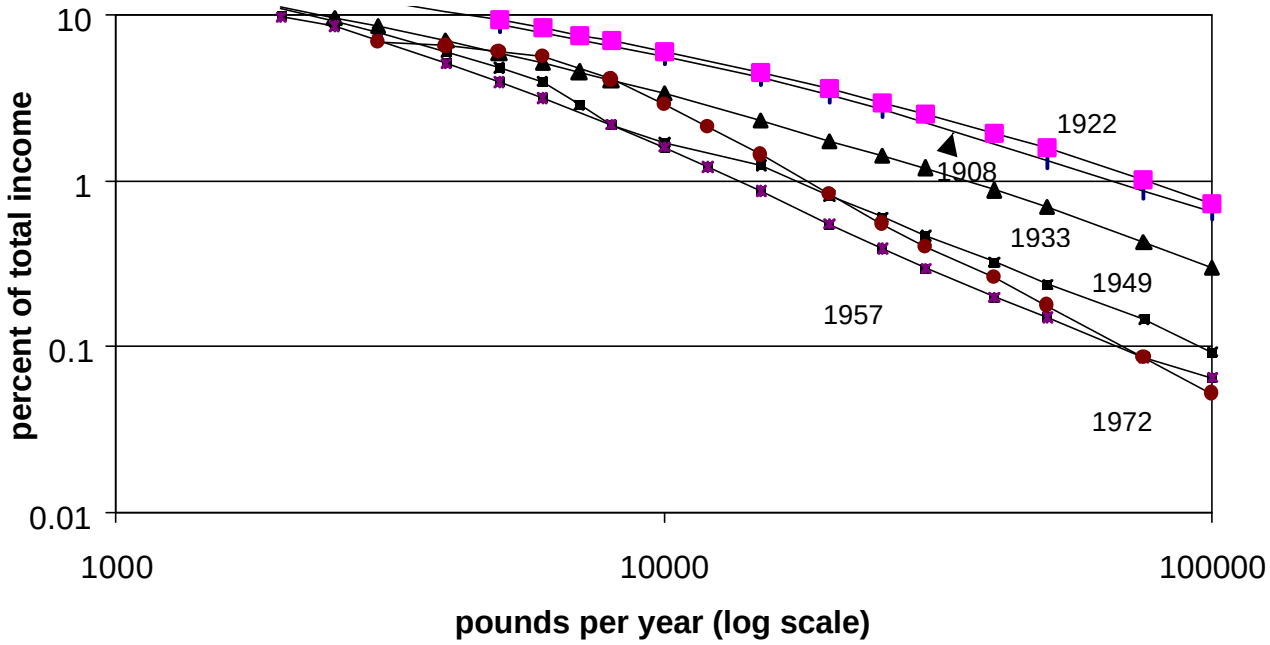


Figure 6 Pareto Diagram for Amounts



Conclusions

The income tax statistics on top incomes in the UK provide a picture which, if blurred in places, allows us to draw broad conclusions about developments over the 20th century. There is no longer the extent of inequality to be found before the First World war, with the Upper Ten Thousand receiving nearly a tenth of total income. The magnitude of the change may be need to be qualified in the light of fiscal re-arrangement, but there have been distinct periods of equalisation, notably during the two world wars, from 1946–1957 and from 1965–1972. But there is no steady trend. There have been plateaux. Since 1979, we have seen a reversal, with shares of the top income groups returning to their position of fifty years earlier. The equalisation of the post-war period has been lost. The next challenge is to use the long run of data to begin to understand more fully the forces at work.

Appendix A
Construction of Reference Population (Table A1)

Our aim is to construct reference totals for the total number of tax units in the population (taxpayers and non-taxpayers). Unless otherwise stated, the figures relate to the United Kingdom, which up to 1920 included what is now the Republic of Ireland.

The Blue Book totals for the number of tax units are used where these exist: see the second column of Appendix Table A1.[20] The source is Atkinson and Micklewright (1992, Table BI1) except for:

1952	*National Income and Expenditure (NIE)* 1953, Table 16;
1953	*NIE* 1954, Table 18;
1955	*NIE* 1959, page 26;
1956,1957	*NIE* 1960, page 20;
1958	*NIE* 1961, page 20;
1960, 1961	*NIE* 1962, page 26.

The constructed figures for total tax units for the period prior to 1949 and post-1984–85 are the total number of males aged 15 and over, plus the total number of females aged 15 and over, less married females. The sources are:

1901	*Annual Abstract of Statistics (AAS)* 1935–46, Table 9;
1931	*AAS* 1935–46, Table 9, Great Britain figures adjusted proportionately to UK using Northern Ireland totals (Table 6);
1939	*National Register 1939*, Table M, Great Britain figures adjusted proportionately to UK using Northern Ireland totals (page ix);
1951	*AAS* 1981, Table 2.8;
1961	*AAS* 1992, Table 2.6;
1971, 1981 and 1991	*AAS* 2000, Table 5.4.

[20] A figure for the total number of tax units in 1938 appears in the Report No 7 of the Royal Commission on the Distribution of Income and Wealth (1979), page 23, but this is simply assumed to be equal to that in 1949 (see paragraph 2.26). For some years in the 1950s and early 1960s, the CSO extrapolated the distributional data from the most recent Survey of Personal Incomes. While the distributional data are open to question (Stark, 1972, page 19), the total number of tax units and total income (allocated and unallocated) contain independent information, and have been used here.

Table A1 Derivation of Reference Total for Tax Units

	(1) Total Population	(2) Blue Book estimates of Total Tax Units	(3) Constructed Total Tax Units	(4) Interpolated from column (3) on basis of fraction of total population	(5) Reference total tax units
	million	million	million	million	million
1908	44.12			22.646	22.128
1909	44.52			22.885	22.361
1910	44.92			23.125	22.595
1911	45.27		23.339	23.339	22.805
1912	45.44			23.461	22.924
1913	45.65			23.604	23.063
1914	46.05			23.845	23.299
1915	46.34			24.031	23.480
1916	46.51			24.154	23.601
1917	46.61			24.241	23.686
1918	46.58			24.261	23.705
1919	46.53			24.270	23.714
1920	46.82			24.456	23.896
1921	44.07		23.053	23.053	22.525
1922	44.37			23.312	22.778
1923	44.60			23.535	22.997
1924	44.92			23.808	23.262
1925	45.06			23.985	23.436
1926	45.23			24.180	23.626
1927	45.39			24.370	23.812
1928	45.58			24.577	24.014
1929	45.67			24.730	24.164
1930	45.87			24.944	24.373
1931	46.07		25.159	25.159	24.583
1932	46.34			25.249	24.670
1933	46.52			25.289	24.710
1934	46.67			25.312	24.733
1935	46.87			25.363	24.782
1936	47.08			25.418	24.836
1937	47.29			25.472	24.889
1938	47.49			25.521	24.937
1939	47.99		25.730	25.730	25.141
1940	48.23			25.814	25.223
1941	48.22			25.764	25.174
1942	48.40			25.815	25.224
1943	48.79			25.978	25.383
1944	49.02			26.055	25.458
1945	49.18			26.094	25.497
1946	49.22			26.070	25.473
1947	49.52			26.183	25.583
1948	50.01			26.395	25.791
1949	50.31	25.9		26.507	25.900
1950	50.57				25.767
1951	50.29		26.403		25.633
1952	50.43	25.5			25.500
1953	50.59	25.3			25.300
1954	50.77	26.25			26.250
1955	50.95	26.2			26.200
1956	51.18	26.15			26.150
1957	51.43	26.1			26.100

	(1) Total Population	*(2) Blue Book estimates of Total Tax Units*	*(3) Constructed Total Tax Units*	*(4) Interpolated from column (3) on basis of fraction of total population*	*(5) Reference total tax units*
	million	*million*	*million*	*million*	*million*
1958	51.65	26.25			26.250
1959	51.96	26.5			26.500
1960	52.37	26.7			26.700
1961	52.81	26.9	27.019		26.900
1962	53.31	27.2			27.200
1963	53.64	27.4			27.400
1964	54.01	27.5			27.500
1965	54.36	27.6			27.600
1966	54.64	27.7			27.700
1967	54.96	27.8			27.800
1968	55.21	28.091			28.091
1969	55.46	28.161			28.161
1970	55.63	28.206			28.206
1971	55.93	28.240	28.328		28.240
1972	56.10	28.351			28.351
1973	56.22	28.123			28.123
1974	56.24	28.274			28.274
1975	56.23	28.341			28.341
1976	56.22	28.549			28.549
1977	56.19	28.892			28.892
1978	56.18	29.076			29.076
1979	56.24				29.390
1980	56.33				29.704
1981	56.35	30.018	30.894		30.018
1982	56.32				30.484
1983	56.38				30.950
1984	56.51	31.416		31.477	31.416
1985	56.69			31.743	31.743
1986	56.85			31.998	31.998
1987	57.00			32.249	32.249
1988	57.16			32.507	32.507
1989	57.36			32.788	32.788
1990	57.56			33.071	33.071
1991	57.81		33.383	33.383	33.383
1992	58.00			33.493	33.493
1993	58.19			33.602	33.602
1994	58.40			33.724	33.724
1995	58.61			33.845	33.845
1996	58.78			33.943	33.943
1997	59.00			34.070	34.070
1998	59.20			34.186	34.186
1999					

The calculated units are expressed as a percentage of total population, and the percentages interpolated linearly (assuming a constant percentage beyond 1991), the results being multiplied again by total population to give figures for all years. The sources for total population are:

1900–1965	Feinstein, Table 55, column 1, mid-year home population of Great Britain and Ireland (up to 1920) and Great Britain and Northern Ireland (from 1921), except years 1915–1920 and 1939–1945 when total population including those serving overseas;
1966–1995	mid-year residential population from *AAS* 1997, Table 2.1;
1996	*NIE* 1997, Table 17.1;
1997–8	*NIE* 2000, Table 1.5.

Applying the resulting interpolated percentage to the total population, I arrive at the figures shown in column (4). For 1984 the constructed figure essentially coincides with the Blue Book figure; for 1949 the constructed figure is some 2 percent higher. The final series, shown in the fifth column, is obtained as follows:

(i) for 1908–1948, constructed tax units from column (4) adjusted proportionately in line with the 1949 Blue Book figure (ie multiplied by 0.977);

(ii) for 1949–1984, Blue Book figures (interpolated linearly for 1950 and 1951);

(iii) for 1985–1999, constructed tax units from column (4).

How do the derived totals of tax units compare with evidence about total tax units for the pre-war period? For 1938 the figure of 24.9 million is rather higher (by some 4 percent) than the estimate of 24 million of Lydall (1959, page 6), since he takes the population aged 18 or over (rather than 15 or over). Seers (1949, page 254) arrived at the still lower figure for 1938 of 23½ million by a different route:

units above income tax exemption level from tax records	10 million
employees, excluding wives, earning below exemption level	11½ million
self-employed below exemption limit	½ million
rentiers, excluding wives, below exemption limit	1½ million

The latter number seems rather low for the total of units who are retired or unoccupied and below the exemption level (in 1939 there were aged 65 and over in Great Britain 1.845 million males and 1.572 million non-married females (National Register September 1939, Table M)). In contrast, the calculations given in the Beveridge Report show for Great Britain in 1939 a total of persons aged 15

and over, minus "housewives", of 27.6 million (Beveridge, 1942, page 123), which is higher than our estimate. Our estimate is therefore bracketed by these earlier figures.[21]

In the 1920s and first half of the 1930s, there was considerable interest in deriving numbers for the total occupied population, as a basis for estimating national income. Clark (1934), for instance, describes the way in which he moves from numbers of taxpayers to the size of the occupied population. Here we are interested in what can be learned about the reverse process: working back from the occupied population to the number of tax units. For 1931, Clark (1937, page 32) gives an estimate of the total occupied population in Great Britain of 21.27 million (Bowley estimates that there were 20.4 million incomes from occupation (1942, page 117)). To obtain the number of units, we have to subtract married women in the occupied labour force and add retired or unoccupied men and single women. Calculations from the 1931 Census of Population give an adjustment of plus million. Our figure for tax units in the United Kingdom in 1931 is 24.6 million, which would be reduced to some 24 million for Great Britain. For the 1920s, Clark (1932, page 76) gives the number of incomes in the UK for 1924 as 19.065 million and for 1928 as 20.145 million. Our figures for tax units are 23.3 million and 24.0 million, but the Census of Population 1921 indicates an adjustment of 4.4 million, so that there is close agreement. For the pre-First World War period, Bowley (1919, page 11) gives a total of 20.15 million for the total number occupied in 1911 (this includes Southern Ireland). This is in line with our total of 22.8 million for all tax units in 1911, since calculations from the 1911 Census of Population suggests that the number of units exceeded the number occupied by 2.4 million.

[21] An alternative approach is adopted by Barna (1945, page 65). He calculates that in 1937 each tax unit above the exemption limit has an average of 2.57 members. We can apply this to the surtax figures and then divide by the total population. The top 0.1 percent in 1938 would then be 47,500 people or 18,500 tax units; this may be compared with the 24,900 tax units we obtain. On the other hand, this has shifted the definition to a population basis (rather than tax units), which will give a different result if non-taxpayers have smaller family size.

Appendix B
Construction of Total Income Series (Table A2)

The Blue Book "allocated" and "total" income series are shown in the first two columns of Appendix Table A2. The sources are (the figures vary slightly depending on the source used):

1938 and 1949:	*NIE* 1958, Table 31;
1952:	*NIE* 1953, Table 16;
1953	*NIE* 1954, Table 18;
1954	*NIE* 1964, page 27;
1955	*NIE* 1959, page 26;
1956,1957	*NIE* 1960, page 20;
1958	*NIE* 1961, page 20;
1959	*NIE* 1969, page 27;
1960,1961	*NIE* 1962, page 26;
1962	*NIE* 1965, page 31;
1963	*NIE* 1967, page 32;
1964	*NIE* 1969, page 27;
1965	*NIE* 1967, page 33;
1966,1967	*NIE* 1969, page 28;
1968/9–1971/2	*Economic Trends*, May 1978, pages 82–85;
1972/3	*Economic Trends*, August 1975, page 91;
1973/4	*Economic Trends*, June 1976, page 100;
1974/5	*Economic Trends*, April 1977, page 101;
1975/6	*Economic Trends*, May 1978, page 93;
1976/7	*Economic Trends*, February 1979, page 88;[22]
1977/8	*Economic Trends*, February 1980, page 99;
1978/9	*Economic Trends*, February 1981, page 88;
1981/2	*Economic Trends*, July 1984, page 105;
1984/5	*Economic Trends*, November 1987, page 103.

The figures for other years are derived using total personal income, as described in the text. The total personal income (before tax) series is that constructed by Feinstein (1972, Table 10, column 7) for 1920 to 1938 and 1946 to 1965, extended forward using the Blue Book, and extended backward (and interpolating 1939–1945) using elements from other tables in Feinstein. The treatment of these other periods is described below.

[22] The data from this year are for incomes adding back mortgage interest paid.

Table A2: Derivation Of Reference Total For Income

	(1) Blue Book estimates Allocated Total Income *£ million*	*(2) Blue Book estimates Total Personal Income* *£ million*	*(3) Personal Sector Total Gross Income* *£ million*	*(4) Allocated as % of Personal Sector Total*	*(5) Extrapolated Total Income* *£ million*
1908			1,789		1,583
1909			1,824		1,614
1910			1,900		1,681
1911			1,978		1,750
1912			2,070		1,832
1913			2,145		1,898
1914			2,231		1,974
1915			2,675		2,367
1916			3,287		2,909
1917			3,975		3,517
1918			4,688		4,149
1919			5,153		4,561
1920			5,288		4,680
1921			4,590		4,062
1922			4,121		3,647
1923			4,010		3,549
1924			4,137		3,661
1925			4,242		3,754
1926			4,193		3,711
1927			4,365		3,863
1928			4,409		3,902
1929			4,479		3,964
1930			4,426		3,917
1931			4,258		3,768
1932			4,172		3,692
1933			4,220		3,735
1934			4,320		3,823
1935			4,493		3,976
1936			4,730		4,186
1937			4,909		4,344
1938	4,463	5,078	5,043	88.5	
1939			5,213		-
1940			5,876		-
1941			7,106		-
1942			7,853		-
1943			8,403		-
1944			8,625		-
1945			8,727		-
1946			8,845		-
1947			9,442		-
1948			9,981		-
1949	8,960	10,560	10,552	84.9	
1950			11,051		9,283
1951			11,983		10,066
1952	10,722		12,785	83.9	
1953	11,483	13,584	13,574	84.6	

	(1) Blue Book estimates Allocated Total Income	*(2) Blue Book estimates Total Personal Income*	*(3) Personal Sector Total Gross Income*	*(4) Allocated as % of Personal Sector Total*	*(5) Extrapolated Total Income*
	£ million	*£ million*	*£ million*		*£ million*
1954	12,310	14,375	14,343	85.8	
1955	13,340	15,790	15,555	85.8	
1956	14,390	17,003	16,701	86.2	
1957	15,250	17,987	17,600	86.6	
1958	15,786	18,618	18,583	84.9	
1959	16,447	19,594	19,685	83.6	
1960	17,766	21,099	21,206	83.8	
1961	19,374	22,803	22,939	84.5	
1962	20,257	24,122	24,159	83.8	
1963	21,255	25,497	25,601	83.0	
1964	22,622	27,672	27,654	81.8	
1965	24,509	29,846	30,051	81.6	
1966	26,780	32,059	32,190	83.2	
1967	28,179	33,565	33,840	83.3	
1968	30,516	36,168	36,463	83.7	
1969	32,958	38,821	39,242	84.0	
1970	36,543	43,311	43,418	84.2	
1971	40,674	48,049	47,835	85.0	
1972	45,764	54,308	54,501	84.0	
1973	52,219	63,515	63,539	82.2	
1974	64,675	78,749	76,209	84.9	
1975	78,854	97,880	96,622	81.6	
1976	93,082	113,158	111,972	83.1	
1977	103,902	127,127	124,450	83.5	
1978	119,610	145,613	143,449	83.4	
1979			169,836		142,662
1980			200,922		168,774
1981	181,578	207,374	222,681	81.5	
1982			241,824		203,132
1983			260,884		219,143
1984	236,324	268,217	282,408	83.7	
1985			307,081		257,948
1986			333,126		279,826
1987			359,411		301,905
1988			400,551		336,463
1989			441,505		370,864
1990			485,836		408,102
1991			516,919		434,212
1992			548,213		460,499
1993			572,973		481,297
1994			598,913		503,087
1995			636,097		534,321
1996			672,406		564,821
1997			708,268		594,945
1998			744,129		625,069
1999			783,577		658,205

Pre-1920

Personal income (before tax) is defined as (Feinstein, 1972):

Income	*Source*	*Comment*
Income from employment	Table 1, column 1	
Income from self-employment	Table 1, column 2	1914–1919 interpolated from sum of columns 2 and 3 using 1913 ratio
Rent, dividends and interest	See below	
Current grants from central government and local authorities	Table 12, columns 10 and 11, plus Table 13, column 8	
Transfers abroad	Not included	very small
Current transfers to charities from companies	Not included for 1920–1953 by Feinstein; not included here	very small

The main problem is Rent, dividends and interest. The composition of this item is set out in Feinstein (1972, Table 2.7, page 44). The basic principle is to calculate the total payments made, subtract those received by other sectors, and obtain the personal sector as a residual. The elements in the calculation are:

Total payments:	
Rent	Table 1, column 6
Interest and dividends paid by companies	*
Interest paid by central government	Table 12, column 10
Interest paid by local authorities	Table 13, column 9
Company profits due abroad and taxes paid abroad	*
Property income (inc taxes) paid by non-residents	Table 15 columns 3+4
Receipts by other sectors:	
Companies	*
Central government	Table 12, column 2
Local government	Table 13, column 2
Property income (inc taxes) paid abroad	Table 15, col 11 + 12

The starred items are those where there is no figure directly available from Feinstein. The net contribution of these items for the period 1922–1929 has been

used to extrapolate, taking a fraction of gross trading profits (Table 1, column 3) equal to the average over the period 1922–1929.

1939–1945 (Second World War)

The personal gross income series is interpolated from 1938 using the GNP series, which rose by a similar percentage from 1938 to 1946: source Feinstein, Table 1, column 11.

Post-1965

Total personal before tax income from *United Kingdom National Accounts 1997*, Table 3.1 for 1975 to 1996, *NIE* 1980, note to Table 4.1 for 1969 to 1974, *NIE* 1975, note to Table 21 for 1966 to 1968.

The personal sector total is shown in column (3) of Table A2. It may be seen that the Blue Book allocated total has over the post-war period been a relatively stable percentage (around 84 percent) of the personal sector total (see column (4)), and this percentage is used when extrapolating forward in column (5) of Table A2. The sole pre-1949 figure is higher (88.5 percent),[23] and consideration of the reasons for the difference between the two series (see text) suggests that the difference may have been less before 1945: for example, pension funds were less important, and the imputed rent of owner-occupied houses taxed under Schedule A of the income tax (and hence already included) was rather higher (see Clark, 1937, page 60). For these reasons, when extrapolating backward in column (5), the fraction is adjusted from 84 percent in 1949 to 88.5 percent in 1938, interpolating the percentage linearly over time, and then 88.5 percent is applied in all earlier years.

In comparing these figures with contemporary estimates, we have to bear in mind that our starting point – the Feinstein estimates – built on the earlier work on national accounts. Moreover, the main concern of Bowley, Stamp, Clark and others was with constructing national accounts, rather than arriving at a total for personal income comparable with the figures for taxpayers. If we take the estimate of Bowley (1919, page 14) for 1911, for example, then his total "national income" of £2,090m is very close to Feinstein's total for GNP of £2,128m. It does, however, include items which do not enter the definition of allocated income, such as the income of charities, and the undistributed income

[23] The total allocated income in 1938 has varied. In *National Income and Expenditure 1953*, Table 16, for example, the total is £4,352m, compared with £4,463m in the 1958 publication. Seers (1949, Table I) has a total of £4,436m.

of companies. We should allow £115m for the latter (Bowley and Stamp, 1927, page 47), and £20m for the income of charities etc. We have to subtract the estimated income evading tax and agricultural income in excess of that declared (these two combined contributing some £63m: Bowley, 1919, page 14)). Hence, we arrive at a figure of £1,892m. We have also to make an adjustment for the timing of self-employment income and fact that income assessed under Schedule D was an average of three or five preceding years (see Bowley and Stamp, 1927, page 16, Clark, 1932, page 67, and Clark, 1937, page 56). The extrapolated figure in Appendix Table A2 of £1,750m may not therefore be unreasonable as a total to compare with the income of taxpayers. If it is too low, then it seems unlikely that the error is more than 5 percent (which would make it £1,837.5m).

For 1924, Bowley and Stamp have a total UK income of £4,164m (1927, page 45), which is in excess of Feinstein's estimate of national income, and from which, as for 1911, a number of deductions need to be made. Subtracting £205m for the undistributed profits of companies and £90m for non-personal income (Clark, 1932, page 73) gives a figure of £3,869m. From Clark (1937, pages 60, 88 and 141) one can assemble a total for the same year of:

income above exemption limit	£2,108m
wages	£1,399m
taxable agricultural income	£39m
earned and unearned income below exemption limit	£310m
social security	£187m
less income of charities and evaded income	– £105m

which gives a total of £3,938m for 1924. Again certain adjustments need to be made (for example, Clark increases the figures for imputed rents between re-assessments). Clark (1932, page 76) also gives an estimate of £3,488m for total personal income in 1924, although this appears to exclude certain forms of income, such as social security benefits. Adding £187m for social security gives a total of £3,675m, which is very close to the extrapolated figure used here, £3,661m.

Appendix C
Interpolation

It is assumed that we have data on *n* ranges of income. The range, or interval, *i* runs from y_i to y_{i+1}, and the *n*–th range from y_n and upwards, this being an open interval. For each interval *i*, we are assumed to know the total number of income units and the total income, and hence the interval mean denoted by $ì_i$. This is accompanied by information on the overall mean income and on the total number of tax units. Since our concern here is with top incomes, we cumulate downwards, so that H_i is the proportion of the population with income in the range *i* or higher.

The interpolation problem is illustrated in Figure A1. We want to find the implied share corresponding to a specified cumulative frequency H*, by joining H_i and H_{i+1} in such a manner as to generate a known mean income. This means that there is a constraint on the area integrating y(H) from H_i to H_{i+1}. Suppose that the density is non-increasing, so that the interval mean, $ì_i$, lies to the left of the midpoint. We can then identify the point Q which is the same distance to the right of $ì_i$ as y_i is to the left. One way of generating the required mean is to have a uniform density over the interval $[y_i, 2ì_i–y_i]$; this is given by the heavy line H_iQH_{i+1}. Subject to the requirement that the implied density be non-increasing, this gives a lower bound to the interpolated share, since it gives the least to those above any specified H*. This lower bound may be seen as a split histogram, with constant density up to $(2ì_i–y_i)$ and then a zero density for the rest of the interval. If we now draw QP parallel to $H_{i+1}H_i$, then any triangle with $H_{i+1}H_i$ as a base, and an apex on PQ, has the same area, and hence preserves the mean. At the other extreme is the dashed triangle which, by massing as many people as possible at y_i, gives an upper bound on the share, subject to the density being non-increasing. Midway between these, is the triangle with vertex on PQ at the mean shown by dotted lines. This *mean split histogram* is used here. The resulting Lorenz curve is piecewise quadratic.

The same diagram makes clear why the bounds do not apply to the percentiles. For any H*, we can generate a lower bound, subject to the condition that the density be non-increasing, by either H_iP or by the appropriate split histogram with vertex on PQ (so that PQ gives the lower bound). The upper bound for the percentile is found from the maximum of H_iR and RH_{i+1}.

In a few cases the non-decreasing density condition is not satisfied, in that the mean is above the interval midpoint. In these cases, the “mean split histogram” interpolation is still used, but the percentile bounds are not given.

Appendix D: Sources of super-tax/surtax data

The data are taken from published tabulations, mostly from the Annual Reports of the Commissioners of Her Majesty's Inland Revenue, referred to as AR, or in the more recent years from *Inland Revenue Statistics*, referred to as IRS.

Income year	*Super-tax/surtax year (where different)*	*Source*
1908–09	1909–10	Royal Commission on the Income Tax, 1920a, page 26
1909–10	1910–11	Royal Commission on the Income Tax, 1920a, page 26
1910–11	1911–12	AR 1914–15, page 134
1911–12	1912–13	AR 1914–15, page 134
1912–13	1913–14	AR 1915–16, page 49
1913–14	1914–15	AR 1917–18, page 19
1914–15	1915–16	AR 1918–19, page 19
1915–16	1916–17	AR 1919–20, page 85
1916–17	1917–18	AR 1920–21, page 136
1917–18	1918–19	AR 1921–22, page 145
1918–19	1919–20	AR 1922–23, page 98
1919–20	1920–21	AR 1923–24, page 110
1920–21	1921–22	AR 1924–25, page 109
1921–22	1922–23	AR 1927–28, page 96
1922–23	1923–24	AR 1928–29, page 94
1923–24	1924–25	AR 1929–30, page 88
1924–25	1925–26	AR 1930–31, page 95
1925–26	1926–27	AR 1931–32, page 82
1926–27	1927–28	AR 1932–33, page 83
1927–28	1928–29	AR 1933–34, page 81
1928–29		AR 1933–34, page 81
1929–30		AR 1934–35, page 80
1930–31		AR 1935–36, page 67
1931–32		AR 1936–37, page 67
1932–33		AR 1937–38, page 65
1933–34		AR 1938–39, page 71
1934–35		AR 1939–40, page 44
1935–36		AR 1940–41, page 35
1936–37		AR 1941–42, page 36
1937–38		AR 1942–43, page 29
1938–39		AR 1942–43, page 29
1939–40		AR 1942–43, page 29
1940–41		AR 1943–44, page 27
1941–42		AR 1946–47, page 83
1942–43		AR 1947–48, page 44

Income year	*Super-tax/surtax year (where different)*	*Source*
1943–44		AR 1948–49, page 98
1944–45		AR 1949–50, page 57
1945–46		AR 1950–51, page 136
1946–47		AR 1951–52, page 154
1947–48		AR 1953–54, page 81
1948–49		AR 1954–55, page 78
1949–50		AR 1955–56, page 105
1950–51		AR 1956–57, page 144
1951–52		AR 1957–58, page 96
1952–53		AR 1957–58, page 96
1953–54		AR 1958–59, page 82
1954–55		AR 1959–60, page 84
1955–56		AR 1959–60, page 84
1956–57		AR 1960–61, page 92
1957–58		AR 1961–62, page 207
1958–59		AR 1962–63, page 99
1959–60		AR 1963–64, page 101
1960–61		AR 1963–64, page 101
1961–62		Not used
1962–63		AR 1964–65, page 100
1963–64		AR 1965–66, page 86
1964–65		AR 1966–67, page 111
1965–66		AR 1967–68, page 86
1966–67		IRS 1970, page 48
1967–68		IRS 1971, page 53
1968–69		IRS 1972, page 53
1969–70		IRS 1973, page 56
1970–71		IRS 1974, page 24
1971–72		IRS 1975, page 22
1972–73		IRS 1975, page 22

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