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1. Introduction

This paper presents new historical evidence about the distribution of income in the three former British colonial territories of Central Africa: Malawi, Zambia and Zimbabwe. Zimbabwe in its colonial period, under its then name of Southern Rhodesia, was a highly unequal country, but little is known about just how unequal it was. According to Kuznets (1963, Table 3), in 1946 the white settlers made up some 5 per cent of the population and received 65.3 per cent of total income. But how was this distributed among the settler population? How did the distribution change over the colonial period? What was the distributional impact of the Unilateral Declaration of Independence (UDI) and the ensuing civil war? Northern Rhodesia, now Zambia, featured in Table 3 of Kuznets (1963) as having a share of the top 5 per cent in 1946 of 45.3 per cent, exceeded only by Southern Rhodesia. The Kuznets figure for Northern Rhodesia was based solely on total non-African and African incomes, and, as he clearly recognises, understates the true inequality. It tells us nothing about the inequality within these groups. Europeans in the mining industry may well have been paid considerably more than those in the government service. Equally, in the case of Malawi, previously Nyasaland, we know little about the extent of income inequality before and after the country became independent in 1964.

As in other former British colonies in Africa, the raw materials for making estimates of the historical distribution of income are very few. There are no household surveys covering these years. The aim of this paper is to make use of a source that is both limited and imperfect – the tabulated income tax data – to see what can be extracted from these data in conjunction with approximate estimates of total population and total personal income. The income tax data – which date back to 1917 in the case of Southern Rhodesia - are described in Section 2. They have not been much used, and there do not appear to be any recent data with which they can be compared. The income tax data can only be effectively used in conjunction with control totals for the number of tax units in the country.

Section 3 discusses the problems that arise in the construction of control totals for population. In order to produce results on income shares, control totals are also needed for total income, and this is the subject of section 4. The numbers and characteristics of those paying income tax are described in section 5. The results regarding the shape of the upper tail are presented in section 6, and those concerned with income shares and income levels in section 7.

The three colonial territories were at first administered separately as the self-governing colony of Southern Rhodesia and the protectorates of Northern Rhodesia and Nyasaland. They were brought together as the Federation of Rhodesia and Nyasaland on 1 August 1953, which remained in existence until 31st December 1963. In the course of 1964, Nyasaland became independent as Malawi, and Northern Rhodesia became independent as Zambia. Southern Rhodesia became Rhodesia, and in 1965 made a Unilateral Declaration of Independence (UDI). Independence was achieved legitimately in 1980 as the republic of Zimbabwe. The countries are in general referred to here by their current names.

2. Income tax data

The income taxes in the three countries had similar forms, and for the period of the Federation of Rhodesia and Nyasaland were under common administration. The tax was assessed in year (t+1) on the total income accruing in year t. The latter is referred to here as Income Year t (IYt). The introduction of the tax in each of the countries is described in each case below, together with a summary of the published statistical information.

The key data are the tabulations of taxpayers by ranges of income, showing the total numbers in each range and their total income. Since the data are grouped in this form, and 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 per cent), we have to interpolate in order to arrive at the shares of total income. In the results presented here, the interpolation is based on the mean-split histogram. The rationale is as follows. Assuming, as seems reasonable in the case of top incomes, that the frequency distribution is non-increasing, then restricted upper and lower bounds can be calculated for the income shares (Gastwirth, 1972). These bounds are limiting forms of the split histogram, with one of the two densities tending to zero or infinity - see Atkinson (2005). Guaranteed to lie between these is the histogram split at the interval mean with sections of positive density on either side.[1][2]

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[1] In a few cases where the relevant percentile is close to the lower limit of the open top interval, the estimates have been obtained by extrapolation, assuming a Pareto distribution with a coefficient determined by the cumulative distribution for the top two intervals.

[2] The refined bounds do not apply to percentiles, since the argument involving mean-preserving transfers does not apply (see Atkinson, 2005). The percentiles have been

Zimbabwe

The income tax was introduced in 1918. It was first levied on incomes accruing in the year from 1st April 1917 to 31st March 1918, referred to here as the income year 1917, or IY1917. The sources of the tabulated data are listed in Appendix A1. From the outset, information was published on the distribution of taxpayers by ranges and amounts of income. Actual income is total income after permissible deductions, such as those for interest paid, passage money and losses incurred. In calculating the tax liability, there were abatements, initially £1,000 for married persons (later reduced to £800 with effect from the year IY1930), and £500 for other persons (reduced to £360 in IY1930), with additions of £50 per child or other dependant, and for premiums not exceeding £100 per year on policies of life assurance or annuities *(*Report of the Commissioner of Taxes, For the year ended 31st March, 1921,* page 1). Information was supplied as to the amount of abatements, and on the basis of this information certain lower ranges were not used in the analysis. In this adjustment, a guide has been taken from the work of Shaul, who stated of IY1936, when the married allowance was £800, that "owing to family allowances it is considered that the statistics of taxable incomes fail to embrace all individual incomes below the level of £1,100 a year" (1941, page 375). With the Income ranges available here, the data below £1,500 have been discarded for IY1918 (£2,001 in IY1917) to IY1929, and those below £1,000 for later income years.

In general the data are published allowing for the delays in making assessments. For example, the *Report of the Commissioner of Taxes for the year ended 31st March, 1936,* contained data for the IY1933 ending on 31st March, 1934. But the only data for IY1934 ending on 31st March, 1935 were those contained in the same report. The information from years based on only the first-assessment year is probably somewhat less complete, and these years are indicated in Appendix Table A1.

The income tax was levied on income excluding dividends, which were taxed in the hands of companies. In a number of years, there was in addition Supertax, where the tax base included dividends paid. (This system resembles that in South Africa – see Alvaredo and Atkinson, 2012.) Separate tabulations are available for Supertax for the years 1953 to 1968.

Malawi

The income tax was introduced in the Income Tax Ordinance, 1921, for the financial year 1921-22 (Murray, 1932, page 290). Tax was assessed on income accruing in the previous calendar year, referred to here as the

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calculated by Pareto interpolation applied to each interval using the cumulative distribution.

income year t, or IYt. It should be noted that here, as in Northern Rhodesia, the tax was levied only on non-Africans (Hailey, 1957, page 646) until 1963. The Income Tax Ordinance of 1963 integrated Africans into the income tax system (Baker, 1975, page 60).

Information about the number of taxpayers classified by group was published in the *Financial Report* for IY1929 to IY1935. In IY1929, for example, there were 2,578 taxpayers, of whom a half (1,290) were classified as "Asiatics". The remainder included 314 company employees, 262 civil servants, military and pensioners, and 250 missionaries. The first published information on the distribution of taxpayers by ranges of assessable income that I have located is that made available to Phyllis Deane (1948, pages 69 and 70), covering Europeans and Asiatics separately. Strictly, the data relate to those assessed in 1938, but are taken here as relating to IY1938, since that is the year covered by Deane's income totals. Similar information for 1945 is given in Deane (1952, pages 79 and 308). From IY1953 onwards, data on incomes by ranges were published in the report produced by the Central Statistical Office (CSO) of the Federation of Rhodesia and Nyasaland, *Income tax statistics for the income years 1953/54-1958/59*. From IY1959 up to IY1961, the series is continued in the annual *Report of the Commissioner of Taxes* for the Federation, but the information on the distribution is only given for the constituent countries in the case of Supertax payers (for example, Appendices VIII and IX in the Seventh Report for the year ended 30th June 1961).

With the breakup of the Federation, the data from IY1964 covering Malawi were published in the *Annual Report of the Commissioner of Taxes* for the Malawi Government, the first report being that for the period 1 January 1964 to 31st March 1968. The data continued to be published in the annual reports, but also appeared in the *Statistical Yearbook* (SY) for various years and in *Public sector financial statistics,* published in 1970. The most recent data located are those for IY1980 in SY1983. The sources are summarised in Appendix Table A2.

The income tax was levied on income excluding dividends, which were taxed in the hands of companies. As in Zimbabwe, there was in certain years an additional Supertax, where the tax base included dividends paid. Separate tabulations are available for Supertax for 1953 to 1961(for IY1959 to IY1961 these are the only data available). The system was modified in 1964 with the introduction of Pay as you earn (PAYE), but the tabulations appear to include those on PAYE: the class A in IY1965 is defined as those with main income from employment (*First Report of the Commissioner of Taxes for the period 1st January, 1964 to 31st March, 1968,* page 19).

Zambia

The income tax was introduced with 1919-20 as the first year of assessment, referring to IY1918. The income tax data published on a regular basis in the annual reports of the Northern Rhodesia Income Tax Department

cover the income years 1929 to 1953, with a hiatus in the war years 1938 to 1942 inclusive. From IY1953 they were published in the report produced by the Central Statistical Office (CSO) of the Federation of Rhodesia and Nyasaland, *Income tax statistics for the income years 1953/54-1958/59.* After the break-up of the Federation, the information was published in annual reports of the Commissioner for Taxes and later by the Ministry of Finance, although only for a small number of years ending in 1970. The sources are listed in Appendix Table A3.

As for the other countries, there are Supertax data, where the income data include dividend income, covering the period 1953 to 1961.

Tax administration

The strengths and weaknesses of income tax data have been extensively discussed in the recent literature on top incomes initiated by Piketty (2001). The data are drawn from an administrative process and reflect in their definitions of income and the tax unit the underlying legislation rather than any concept of equity. The administrative process doubtless had many shortcomings, and tax data are affected by avoidance and evasion. Incomplete coverage of both taxpayers and income is likely to be important in the countries studied here.

The extent of tax compliance depends on the resources allocated, which were very limited. The *Report of the Income Tax Department* of Northern Rhodesia for 1933 lists (page 4) the staff as consisting of the Commissioner, the Assistant Commissioner, the Assessor, one Grade I clerk and two Grade II clerks. The accuracy of the information supplied by taxpayers depends on their record-keeping. The *Report of the Commissioner of Taxes for the year ended 31st March, 1922* in Southern Rhodesia notes that "considerable difficulty is experienced by the majority of farmers in preparing their income tax returns, owing to their not keeping such a full record of their transactions as is kept by merchants" (para 19). In 1947, the *Report on a Fiscal Survey of Nyasaland* commented that "although there has recently been a tightening up of control in the income tax as a result of the employment of additional trained staff, we are satisfied that there is still evasion and avoidance of income tax" (page 16). At the establishment of the Federation it was reported in 1954 that in Northern Rhodesia, the "Department was grossly understaffed and the arrears of work were assuming alarming proportions. [Temporary transfer of work saved the office] from a complete breakdown, and probably preserved the sanity of the Inspector of Taxes in charge" (*First Report of the Commissioner of Taxes for the three months ended 30th June, 1954 and for the year ended 3oth June, 1955*, page 3).

Conclusion

The income tax data must be treated with considerable caution. At the same time, they provide an insight into the distribution of income in a period – going back more than 60 years - about which we have virtually no other empirical information.

3. Control totals for population

The people recorded in the income tax statistics have to be related to the population as a whole. The total population figures for all three countries from 1950 are taken from the US Census Bureau International Database (the source used by Maddison, 2003), referred to as USCB, data available at http://www.census.gov/population/international/data/idb/informationgateway.php).

The pre-1950 sources and the adjustment to a tax unit basis are described for each country below.

Malawi

For the pre-1950 period, use is made of the 1945 and 1931 census figures. The 1945 population figures (Kuczynski, 1949, page 534) indicate that there was a de facto population of 2,044,707 Africans and 5,207 non-Africans (0.25 per cent of the total). The total of 2,049,914 may be compared with the figure of 2,816,600 for 1950 from the USCB. The implied increase in the 5 year period (37 per cent) seems unrealistic, being the same magnitude as the increase shown between 1931 and 1945 censuses. The 1950 USCB figure is also 14 per cent higher than the estimate for 1950 in the series given by the Central African Statistical Office (CASO) in the *Statistical Handbook of Nyasaland 1952,* Table III. Part of the difference may be due to that between de facto and de jure counts, but this can only explain some part: in 1945 the difference was some 6 per cent. Much more probable is that the earlier figures were under-stated. Kuczynski concluded that the 36 per cent increase between 1931 and 1945 was "most unlikely" (1949, page 637), and that the earlier figure was under-stated. In view of this, the USCB figures have been used, and, while the CASO series is taken for earlier years from 1931, it has been up-rated at 1950. (For 1929 and 1930, an annual growth rate of 2 per cent has been assumed.)

From the population totals, the control total for total income units is obtained by subtracting the proportion aged 15 and under, and the proportion of married women. The proportion of the population aged 15 and over is obtained from the UN *The Size and Age Distribution of the World Populations* 1994, page 530), which gives figures from 1950 at 5 yearly intervals, which have here been interpolated linearly. The 1945 population figures (Kuczynski, 1949, pages 591 and 595) indicated that, out of a total population of 2,044,707 Africans, 955,289 were aged 18 and over, and that, of 3,566 Europeans and Asiatics, 3,476 were aged 15 and over.

Adding these numbers gives an adult proportion of 46.8 per cent, which is below the UN figure for 1950, as may be expected in the light of the difference between the age cut-offs. Since the UN figures indicate that the ratio was rising between 1950 and 1955, this rate of change has been extrapolated backwards.

The total of tax units is obtained by subtracting the number of married women. A major problem in the case of the African population has in the past been that a sizeable proportion of married women had husbands who were employed outside the country. The 1931 census recorded 409,521 married women and 352,147 married men (Kuczynski, 1949, page 587). The 1945 Census recorded that among the African population there were 494,593 married women but only 367,134 married men (*Statistical Handbook of Nyasaland 1952,* page 17). In this case, it may be better to subtract the number of married men, since those married women with absent husbands do constitute tax units. The 1945 figures for the African population imply that subtraction of married men would reduce the total number of tax units by 18 per cent, and this proportion is applied for the total population (African and non-African) and for all years. For Europeans, the number of tax units can be calculated from the census data. In 1945, there were 1,948 Europeans, of whom 1,614 were aged 15 and over (Kuczynski, 1949, page 599). Subtracting 493 married women gives a total of 1,121 tax units, or 0.12 per cent of the total. The figure for all non-Africans (same source) was 0.28 per cent of total tax units.

Zimbabwe

For the pre-1950 period, use is made of the estimates of total population for census years given in the *Report on the census of population of Southern* Rhodesia (page 3). The figures for the non-African population (5 per cent of the total in 1946) are from the censuses of 1946, 1941, 1936, 1931, 1926, 1921 and 1911; the figures for the African population are estimates of the indigenous population made by the Department of Native Affairs plus estimates or census figures for aliens in employment. The figures for individual years are based on the intercensal annual growth rates as follows:

1921-26	1.68 per cent applied to years 1917 to 1925
1926-31	2.95 per cent applied to years 1926 to 1930
1931-36	3.16 per cent applied to years 1931 to 1935
1936-41	2.30 per cent applied to years 1936 to 1940
1941-46	3.94 per cent applied to years 1941 to 1950

As is noted in the *Report*, the fluctuations reflect migration movements rather than variations in the vital statistics.

The proportion of the population aged 15 and over is obtained from the UN *The Size and Age Distribution of the World Populations* 1994, page 854), which gives figures from 1950 at 5 yearly intervals, which have here been interpolated linearly. The problems in collecting census data on age in

Southern Rhodesia are described in the *Final report of the April/May 1962 census of Africans in Southern Rhodesia*: "the collection of details of individuals ages in underdeveloped countries like Southern Rhodesia with a high level of adult illiteracy is one of the most difficult census problems" (para 47). It has simply been assumed that the proportion in years before 1950 was equal to that in 1950.

The difficulties in securing information on marital status were even more acute. The report of the *Census of population 1969* stated that "marital status data in respect of the African population was not obtained in either the 1962 or 1969 censuses due to the necessity of restricting the number of questions ... and to the difficulty of obtaining meaningful information" (page 13). For the non-African population, the 1969 census showed that married women accounted for 32 per cent of those aged 15 and over. The figures for 1956 and 1961 were 33 and 34 per cent, respectively. In the absence of information covering the whole population, it has been assumed that the number of married women to be subtracted was equal to 35 per cent of the adult population, but considerable uncertainty surrounds this extrapolation from the non-African population.

Zambia

The problems in obtaining accurate population figures for the earlier years are well described in the report of the Commission appointed to enquire into the financial and economic position of Northern Rhodesia:
> "Little reliance can be placed on the figures for the native inhabitants. ... The apparent large increase between 1911 and 1931 is probably due to a somewhat more accurate estimate, while the estimates for later years rest mainly on a basis of speculation" (quoted in Kuczynski, 1949, page 409).

Such criticism undoubtedly applies to the estimates published in the *Economic and Statistical Bulletin* (ESB), January 1949, Table II. These ESB figures are close to those in Mitchell, 1982, page 42 (from which the 1950 figure has been taken), but are considerably below the USCB figure. In view of the probable earlier under-statement, the USCB figures are used from 1950, and are linked backwards to the ESB figures for the period 1929 to 1950 by raising the latter by the ratio in 1959 (an increase of some 41 per cent). It should be noted that the number of non-Africans was initially very small but grew over this period. The breakdown of the total population in the ESB figures shows the percentage non-African as rising from 0.7 per cent in 1929 to 1.4 per cent in 1945.

From the population totals, the control total for total income units is obtained by subtracting the proportion aged 15 and under, and the proportion of married women. The proportion of the population aged 15 and over is obtained from the UN *The Size and Age Distribution of the World Populations* 1994, page 850), which gives figures from 1950 at 5 yearly, which have here been interpolated linearly. The 1931 population figures (Kuczynski, 1949, page 475) indicated that the ratio of children to

adults was 70.6 to 100. The implied ratio (58.6) has been used for 1931 and the figures interpolated between 1931 and the 1950 UN figure. The 1931 ratio was also applied to 1929 and 1930. In the absence of information about marital status, it has been assumed that the subtraction of married women reduces the total population by the same factor as in Malawi (18 per cent), a proportion that is applied for all years.

Marital status was reported for Europeans in the censuses. In 1931, there were 13,846 Europeans, of whom 2,945 were aged 15 and over (Kuczynski, 1949, page 478). Subtracting 2,653 married women gives a total of 8,248 tax units, or 1.1 per cent of the total.

Conclusion

The control totals for tax units are based on demographic data of limited quality and on a number of strong assumptions. They should therefore be interpreted with care. At the same time, it should be remembered that they are only being used here for a limited object: they are designed to provide a sense of scale.

4. Control totals for income

The starting point for the control total for total household income is national income. The difficulties in calculating national income in Africa are widely recognized, and there is much criticism of contemporary macro-economic statistics. Nonetheless, there is a long history of research on national accounts in Africa, and we are considerably helped by the fact that Northern Rhodesia and Nyasaland were two of the three countries studied by Phyllis Deane in her pioneering work (1948 and 1953) on colonial national accounts (the other was Jamaica).

Malawi

The control total used here is constructed by starting with the UN series for Gross National Income (GNI) in million Kwacha[3] (available from 1970) and work backwards, by linking to earlier series for GNI or GDP. The first of these linked series is that from the *Statistical Yearbook (SY) 1976*, page 189, linked at 1970. The estimates for 1964 to 1973 were on the former SNA basis, and the linking involves a large up-rating by some 35 per cent. The second series is from Republic of Malawi, *National Accounts*

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[3] The Kwacha was introduced in Malawi in 1971, at the rate of 2 Kwacha = £1.

Report (1964-67), Table 12, sum of monetary GDP and subsistence production, linked at 1964. This linkage back to 1954 involved raising the earlier estimates by a further 52 per cent. The final link is to Table 94 in Central African Statistical Office, *National accounts and balance of payments of Northern Rhodesia, Nyasaland and Southern Rhodesia, 1954-1963,* which gives estimates for NDP 1950 to 1954 based only on the monetary economy, coupled with a comparable version of the estimates by Deane for 1938, 1945 and 1948. The considerable uncertainty surrounding these early estimates should be all too apparent.

Gross National Income does not correspond to total household income. Adjustments have to be made for retained corporate profits, for the profits of public corporations, and for government interest and transfers received by households. The earlier income-based national accounts included tables for personal incomes. Table 95 in Central African Statistical Office, *National accounts and balance of payments of Northern Rhodesia, Nyasaland and Southern Rhodesia, 1954-1963,* shows for Nyasaland the total of wages, gross income from unincorporated enterprises, and personal income from property. The average over the ten year period was 92 per cent of gross national income (GNP at factor cost). It should be noted that this does not include transfers nor government interest paid. In view of this, a figure of 70 per cent of GNI is employed here as the income control total.

Zambia

Deane (1948 and 1953) identified two important considerations in the Northern Rhodesian context. The first is the difference between domestic and national product arising from the mining activities that developed in the 1920s. Her estimates for 1938 show the total domestic (territorial) income as £13.5 million, but the total national income as £8.5 million. The second is the importance of subsistence agricultural output, estimated to be some £1.9 million for 1938.

In reaching the control total used here, we begin with the UN figure for Gross National Income (GNI) in million Kwacha[4] in 1970 (1,158 m Kwacha) and work backwards, by linking to earlier series for GNI(GNP). The first of these series is that from the Republic of Zambia, *National accounts and input-output tables 1973,* page 13, from which are obtained estimates for 1965 to 1970. These were on the former SNA basis, and the linking involves an up-rating by 12.9 per cent. The second series is from Republic of Zambia, *National accounts 1964-68,* Table 1, linked at 1965 and at 1964. These two linkages back to 1954 involved raising the earlier estimates by 7.2 per cent. (The 1955 figure comes from *National accounts and balance of payments of Northern Rhodesia, Nyasaland and Southern Rhodesia 1954-1963,* Table 50.) The series for 1945 to 1953 is from Central African Statistical Office, *The national income and social accounts of Northern Rhodesia, 1945-1953,* Table 1. In considering how to link these series,

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[4] The Kwacha was introduced in 1968, at the rate of 2 Kwacha = £1.

bridging 1953 to 1954, it was calculated that of the £12.2 million difference between GNP at factor cost (GNI) in 1953 and in 1954, £9.4 million was due to the higher allowance for the African subsistence production. Since the 1945 to 1953 national accounts referred to the figure as purely "nominal", the two series have been linked by adding that amount to the 1953 figure and adjusting the earlier figures proportionately.

Gross National Income does not correspond to total household income. Adjustments have to be made for depreciation, for retained corporate profits, for non-profit institutions, and for government interest and transfers received by households. The early national accounts included tables for personal incomes. Table 7 in Central African Statistical Office, *The national income and social accounts of Northern Rhodesia, 1945-1953*, allows it to be calculated that personal income, including transfer incomes, averaged some 64 per cent of net national income over the period 1945 to 1953. A less complete calculation, not including transfers for the period 1954 to 1964 gives an average of 67 per cent (source: Republic of Zambia, *National accounts and balance of payments of Zambia 1954-1964*, Table 2). The latter figure is too low, since transfers are omitted, and the former figure may understate the value of subsistence production. In view of this, a figure of 70 per cent of GNI is employed here, as in Malawi, as the income control total.

The figure for 1938 for household income is obtained from *National accounts and balance of payments of Northern Rhodesia, Nyasaland and Southern Rhodesia 1954-1963*, Table 46 as £11.4 million, with the subtraction of £5.8 million company incomes from Deane (1948, page 32) and £0.2 million government income from property (Deane, 1948, page 120). To this is added £4.4 million African subsistence income, a figure reached by applying the same per capita figure as in 1945 (£2.16 per person per year), which seems more comparable with the later estimates than the £1.8 million given by Deane (1953, page 64). The total household income for 1938 is then £9.8 million.

This leaves the derivation of totals for the intervening years 1939 to 1944, and for years prior to 1938 (the years 1929 to 1937). Simple interpolation seems unsatisfactory in view of the variation in the output of the copper industry, which grew from negligible size in the 1920s to represent a major part of the economy: from 1920 to 1960 "the copper industry transformed Northern Rhodesia from a comparatively stationary economy into a rapidly growing one" (Baldwin, 1966, page 40). However he goes on to describe it as a "dual economy", with the industry existing in the midst of a subsistence economy. If we take seriously the description by Baldwin, then total income is additive. Total household income, Y, may be represented by adding (1) a per capita allowance, π, for the subsistence income (where the figure of £2.16 per head is taken) plus the taxable income in 1929 (when copper output was negligible) to (2) the contribution, X, of copper output (source: Mitchell, 1982, page 308) valued at the world price (source: US Geological Survey Data Series 140). The equation (where N denotes total population)

$$Y = 0.9 + 2.16 \, N + 0.0183 \, X^{1.515} \qquad R^2 = 0.971$$

provides a reasonable fit to the data for 1945 to 1964 and is used to predict the years 1929 to 1937 and 1929 to 1937. At the same time, use of the symbol π should not provide any false sense of certainty. The difference between the figure used for 1938 (£2.16) and that implied by Deane's estimate of subsistence income (£0.88) is indicative of the margin of error surrounding the income control totals for these earlier years.

Zimbabwe

National accounts for Zimbabwe owe much to a pioneer in the field: Herbert Frankel (and his colleague, Herzfeld). Already in 1945, Frankel published estimates of national income for Southern Rhodesia covering the years 1924 to 1943 (Frankel, 1945), parallel to the analyses that he had carried out for South Africa. The more developed state of national accounts means that for Zimbabwe a different, and more direct, approach can be followed.

The published national accounts provide from 1954 an income side account that can be used to calculate total household income as the sum of wages and salaries, gross income from unincorporated enterprises, and personal income from property. For example, in 1954, this gave a total of £133.3 million, which was 82.1 per cent of Gross National Income. The income from unincorporated enterprises includes the production by rural households for own consumption, where this is produce either directly consumed or produce sold or bartered within the rural household sector. The income from unincorporated enterprises and from wages and salaries is shown separately for Africans and for "Europeans, Asians and Coloureds". In 1954, the latter group received 56 per cent of total income. The totals for 1954 to 1978 are taken from *National accounts and balance of payments of Rhodesia*, for the years 1965, 1966, 1967, 1968 and 1969 (in each case Table 2), 1974 (Table 24), 1976 (Table 34) and 1978 (Table 29). The figures from 1978 to 1984 were extrapolated on the basis of Gross National Income from *National Income and Expenditure Report* 1992, Table 1.1. The Rhodesian/Zimbabwean dollar $Z was introduced in 1968 at the rate of 2$Z = £1.

The totals for years before 1954 are obtained by assuming that total household income moved in line with net domestic product in the monetary economy, making use of the estimates of the Central Statistical Office (from 1939 to 1953) and Frankel (1924 to 1938), from *National accounts and balance of payments of Rhodesia 1973*, Table 1. (The series for GDP at factor cost is used to link 1953 and 1954.) For the year 1942, a comparison may be made with the income total estimated by the Government Statistician (Frankel, 1945, Table 2), which is £27.0 million (excluding the income of companies and the imputed rental value of owner occupied houses). This is close to the total reached here (£29.8 million).

It remains to arrive at income totals for the years 1917 to 1923. As was observed by Frankel, there was in the inter-war period a close relationship between the value of exports and the value of national income: "the correspondence is so close that one would normally be justified in attempting to forecast the size of the Rhodesian National Income on the basis of the future movements of exports" (1945, para 8). A major part of the exports was constituted by gold. If we take gold output (from Mitchell, 1982, pages 316-317), valued at the ruling gold price, to construct an index of the value of gold production, X, then over the period 1924 to 1939 the value of national income, Y, is linearly related to X

$$Y = 7.86 + 0.783\,X \qquad R^2 = 0.65$$
$$(0.152)$$

The fit is not outstanding, but seems sufficient to make estimates for the years 1917 to 1923.

Conclusions

The potential margins of error in the control totals should be evident. The assumptions regarding the proportion of household income are at best an approximation. The successive up-ratings of GDP at different revisions may have been in the correct direction, but the applications of the correction factors to earlier years represent a sizeable departure from the published figures. The estimates themselves are surrounded by wide margins of error. The early estimates of national income were accompanied by an evaluation of their "assessed accuracy" (Irvine, 1955, page 366). The gradings were attached to individual items, and not to the total, and ranged from a) believed to be accurate within 5 per cent, for wages and salaries, to d) accuracy ± 25 per cent, for African income from unincorporated enterprise, and e), denoting a "nominal estimate with unknown error", in the case of African subsistence income.

5. The income taxpayers

The evidence presented here is limited to the very top of the distribution, since the income tax was only paid by a small minority. The statistics on taxpayers as a percentage of total tax units shown in Figure 1 bear out this statement. It should be noted that the figures are not fully comparable across time, as in some years they relate to the total assessed and in other years to the total liable for tax. But they are sufficient to demonstrate that only a small minority of the population are covered by the income tabulations. In Malawi and Zambia, the tax was only levied on non-Africans, which immediately means that the proportion was small, as may be seen from the estimates in section 3 of the total non-African tax units. At the outset, in the pre-war period, taxpayers numbered less than 0.5 per cent of the total tax units. This means that the distributional information relates only to the very top of the distribution: the top 0.25 per cent or

smaller groups, such as the top 0.1 per cent or the top 0.01 per cent. After the Second World War, the numbers rose, reaching 1 per cent in Malawi (MA) and Zambia (ZA). In Zimbabwe (ZI) they approached 5 per cent.

Who were the taxpayers? In taxing salaries, public employees were a natural target group, as were the employees of large companies such as mining corporations, but it would be wrong to see the income tax as simply a payroll tax on employees. In the first year of the tax in Southern Rhodesia, employees accounted for only 19 per cent of the income assessed for individuals (*Report of the Commissioner of Taxes for the Year ended 31st March, 1931,* para 20 and Schedule B). In Nyasaland in the 1930s, there were more or less equal numbers of civil servants, of company employees, and of planters and self-employed (Nyasaland Protectorate, *Financial Report 1932*, Appendix XII). As shown in Table 1, a substantial proportion of the taxable income in the 1920s came from trade and professions, although an increasing proportion came from mining company employees as the industry expanded.

Table 1 Percentage of total income assessed by source Northern Rhodesia 1925 to 1932

	1925	1926	1927	1928	1929	1930	1931	1932
Public employees	17.5	13.6	14.0	12.7	10.0	8.5	13.6	23.7
Other employees	34.8	37.6	43.7	49.2	55.5	58.1	54.6	59.4
Trade and professions	34.9	29.9	30.9	30.5	28.2	28.0	25.0	10.9
Farming	8.2	13.1	6.5	2.6	1.9	0.9	1.0	1.1
Property income	4.7	5.0	5.0	5.0	4.3	4.3	5.8	4.6

Source: Report of the Income Tax Department for the nine months ended 31st December, 1933, Schedule A.

6. The shape of the upper tail

For the three countries, we have income tax data for the years 1938, 1945, 1953 to 1961 and 1964 to 1980 for Nyasaland/Malawi, for 1929 to 1937, 1943 to 1961, 1963, 1968 and 1970 for Northern Rhodesia/Zambia, and 1917 to 1939, 1945 to 1978, 1980 and 1983 to 1984 for Southern Rhodesia/Zimbabwe. There are a total of 119 observations. Given the uncertainty surrounding the control totals for income, I begin with the shape of the distribution, which does not depend on the income totals. In other words, we are concerned first with the distribution of income *within* the top income group, not with their share of total income.

The shape of the upper tail may be summarised in terms of the inverse Pareto coefficient, ß, calculated, for example, from the share of the total income of the top 0.05 per cent that is received by the top 0.01 per cent. (In this calculation, the income totals cancel out.) The inverse Pareto coefficient is equal to $\alpha/(\alpha-1)$, where α is the Pareto coefficient and has the interpretation that, if the distribution has the Pareto form, then at any income level, y, the average income of those with incomes greater or equal to y is equal to ßy. In Figure 2 are shown the Beta coefficients calculated using to combinations of shares: the share of the top 0.005 per cent in the top 0.01 per cent, and the share of the top 0.01 in the top 0.05 per cent.

From Figure 2, it may be seen that, except for the 1920s, the coefficient was less than 2, indicating that people looking up the distribution would have seen that, on average, those above had incomes less than 100 per cent higher than their own. Beta coefficients less than 2 correspond to Pareto coefficients in excess of 2. In 1951, Clark summarised "all available" Pareto coefficients (1951, pages 533-537). He listed 152 estimates from 23 countries, and only 20 of these exceeded 2. The highest value recorded by Clark was 2.46 in New Zealand, which corresponds to ß =

15

1.68. At the end of the 1930s, the Beta coefficient in Zambia and Zimbabwe was of this order - around 1.65 to 1.75 – and was even lower in Malawi. By these standards, concentration was relatively low.

What is more, the Beta coefficients were falling over time in a number of periods. They fell steadily over the pre-war period in Southern Rhodesia and, to a lesser extent, in Northern Rhodesia. In all three countries, they were falling in the 1950s, reaching a point where the values were clustered quite tightly around 1.55, corresponding to a Pareto coefficient of 2.82. Then, in the 1960s, there was a departure. The Beta coefficient in Malawi increased in the years following independence in 1964, rising back towards 2. For Zambia, there is only one post-independence observation (1968). In Zimbabwe, the Beta coefficient rose following UDI in 1965, but then fell in the 1970s. The coefficient calculated from the share of the top 0.05 per cent in the total of the top 0.1 per cent (not shown in Figure 2) in 1984, the last year for which there are data, was as low as 1.41, corresponding to a Pareto coefficient of 3.44. At this time, independent Zimbabwe had a low level of concentration at the top.

Summarising the evidence in terms of the Beta coefficient is justified where the distribution is approximately Pareto in form. How valid is this assumption? One test is provided by the evaluation of the coefficient using different income shares, as for the two shown in Figure 2. This suggests that the two series move closely together, but we are considering here only the very top of the distribution. In Figure 3 is shown a fuller picture for Zimbabwe, extending down to the top 0.1 per cent. There are periods, such as the 1920s and from 1960 onwards, when the Beta coefficients are close, and the Pareto assumption appears justified. But there are also periods, from the mid 1930s to the end of the 1950s, when there is a clear tendency for the coefficients to fall as we move up the distribution. In 1950, the coefficient obtained from the share of the top 0.1 per cent in the total income of the top 0.25 per cent was 2.02, but that from the share of the top 0.005 in the top 0.01 per cent was 1.57.

The shape of the distribution of the distribution may be further explored by considering the function M(F) which relates the average income of people with income above y(F) to y(F), this being the F-percentile. In other words, M(0.99) is the ratio of the share of the top 1 per cent, divided by 1 per cent, to the top percentile expressed as a ratio to the mean. (Again this does not depend on the income control total, since the mean cancels out when the share is divided by the percentile ratio.) In the Pareto case, M is a constant, equal to Beta, so that a simple test of the Pareto assumption is to check how M varies as we consider different points in the distribution.

In the case of Zimbabwe, shown for two years in Figure 4, the M curves are generally falling as F approaches 1. In 1950, M is in excess of 2.5 close to the 1.5 percentile, but falls to under 2 at the 0.1 percentile. By the last point plotted (the top 264 taxpayers or 0.025 per cent), the value of M is below 1.7. In both 1950 and 1960, there is a fall, followed by a levelling

off, followed by a further fall. The M curves provide little support for the assumption that the distribution is Pareto in form. A least squares fit to the data for 1950, for example, yields an equation

$$1.818 + 58.1(1-F), \quad R^2 = 0.803$$
$$(9.1)$$

where the standard error is in the bracket. The coefficient of F is significantly negative. The same applies to Malawi, where the M curves for 1964 and 1979 are shown in Figure 4A. There is a pronounced downward slope.

The fact that the shape cannot be fully summarised in a single Pareto coefficient means that a more nuanced description has to be given of the changes over time. From Figure 4A it may be seen that the value of M in Malawi was in general higher in 1979 than in 1964, but the difference was less at the very top. The climb had become much more daunting in the lower reaches but not to the same extent at the very top.

Conclusions

Concentration within the top income group was falling over the colonial period, in the 1930s in the Rhodesias, and in the 1950s in all three countries. At the time of independence (or UDI), the degree of concentration was relatively low. In Malawi, concentration increased after independence; in Zimbabwe, it first increased and then fell, reaching a low level in the early 1980s. The distribution cannot be adequately described by a single Pareto coefficient, which does not capture fully the changing shape.

7. Top income shares

The ratio of the income share to the population share is equal to M times the threshold (expressed relative to the mean). We have seen the tendency for M to fall in the pre-war period and in the 1950s. What has happened to the threshold? This requires use of the control total for income to calculate the mean income. As has been stressed, the control totals are surrounded by considerable uncertainty, which may affect both the levels and the relative positions of the different countries.

Figure 5 shows the top percentiles for the three countries: the amounts required to enter the top 0.1, top 0.01 and top 0.005 per cent. At the beginning of the 1920s, one needed some 100 times average income to be in the top 0.01 per cent, and this increased over the decade to reach some 175 times in the early 1930s. This latter figure is a very large multiple by international standards, the average for the US over the period 2003 to 2012 being 122 (from website of Emmanuel Saez, Tables A0 and A4). In Zambia, the high early values are off the chart.

Entry to the top income group was therefore highly restricted in the pre-war period. After the Second World War, the top percentiles fell. By the end of the 1950s, the amount required to be in the top 0.01 per cent was some 60 times average income in Malawi, 65 times in Zambia and 80 times in Zimbabwe. These were still high by international standards: the average for the US over the 1950s was 35. An income of 35 times the mean only allowed a person to enter the top 0.1 per cent in Central Africa, not reaching the top 0.01 per cent as in the US. For Malawi and Zimbabwe, there is evidence for the period after independence/UDI. In Malawi, there was an initial rise in the top percentiles, but these fell after 1968 up to the end of the 1970s. In Zimbabwe, there was broad stability until the end of the 1970s when the percentiles began to fall.

The high threshold means that, even allowing for the – relatively – low M, the colonial top income shares are indeed high. As a yardstick, we may note that in the US in the 1920s the share of the top 0.1 per cent averaged 6.6 per cent (website of Emmanuel Saez, Table A1). From Figure 6 it may be seen that the corresponding shares were greater in Zimbabwe (from 1927) and Zambia (from 1943), where they exceeded 8 per cent and reached 10 per cent or more for a number of years. In Malawi in 1938 they were close to 8 per cent. As has been stressed, these estimates depend on the control totals, but it would require the income totals to be under-stated by 50 per cent for the colonial shares to be reduced from 10 to 6.6 per cent.

Over time, the income shares appear to have risen during the Second World War and peaked in the late 1940s. There was then a period when the top shares fell markedly in Zambia and Zimbabwe, although less so in Malawi. The share of the top 0.1 per cent halved in Zambia between 1950 and 1958. The share in Zimbabwe fell from 11.3 per cent in 1950 to 3.8 per cent in 1963. The similar falls for larger groups, including the top 1 per cent, are shown in Figure 7. In considering these findings, account has to be taken of the exclusion of dividend income. Where the supertax data can be used, the effects of this omission can be seen, as in Figure 8. The estimates based on supertax data, indicated by dashed lines, are higher, but until the 1960s the differences are not appreciable and the time paths are very similar.

After UDI, the top income shares in Zimbabwe rose, reaching a peak in the early 1970s. They then fell, particularly after 1980. The share of the top 0.5 per cent was then around 10 per cent, or twice that then found in the US (but less than the US 2003-2012 average of 13.5 per cent). In Malawi the corresponding share was around 7.5 per cent.

8. Concluding comment

The estimates presented here must be qualified in the light of the limitations set out in sections 2-4, but it is hoped that they are sufficient to demonstrate the potential of the income tax data in illustrating the

historical experience of the colonial period and the years immediately following independence. It is hoped also that the historical research will serve to stimulate the analysis of income tax data for more recent years.

Appendix Table A1 Income tax data in Zimbabwe

Income year	Source of data	Notes
	RCT = *Report of the Commissioner of Taxes for the year ended*	
	Data for Southern Rhodesia	
1917	RCT 31st March 1920, Schedule C	Ranges used from £2,001 upwards
1918	RCT 31st March 1921, Schedule B	Ranges used from £1,501 upwards
1919	RCT 31st March 1922, Schedule B	Ditto
1920	RCT 31st March 1923, Schedule B	Ditto
1921	RCT 31st March 1924, Schedule D	Ditto
1922	RCT 31st March 1925, Schedule D	Ditto
1923	RCT 31st March 1926, Schedule C	Ditto
1924	RCT 31st March 1927, Schedule D	Ditto
1925	RCT 31st March 1928, Schedule D	Ditto
1926	RCT 31st March 1929, Schedule D	Ditto
1927	RCT 31st March 1930, Schedule D	Ditto
1928	RCT 31st March 1931, Schedule D	Ditto
1929	RCT 31st March 1932, Schedule D	Ditto
1930	RCT 31st March 1933, Schedule D	Ranges used from £1,001 upwards
1931	RCT 31st March 1934, Schedule D	Ditto
1932	RCT 31st March 1935, Statement XI	Ditto
1933	RCT 31st March 1936, Statement XI	Ditto
1934	RCT 31st March 1936, Statement XII	Ditto; first-year assessment
1935	RCT 31st March 1937, Statement XI	Ditto
1936	RCT 31st March 1938, Statement XI	Ditto; data in Shaul (1941, page 383)
1937	RCT 31st March 1939, Statement XI	Ranges used from £1,001 upwards, and first-year assessment
1938	RCT 31st March 1940, Statement XI	Ditto
1939	RCT 31st March 1941, Statement XI	Ditto
1945	RCT 31st March 1947, Statement IX	Ranges used from £500; first year assessment
1946	RCT 31st March 1948, Statement IX	Ranges used from £800; first year assessment
1947	RCT 31st March 1949, Statement IX	Ditto
1948	RCT 31st March 1951, 1952 and 1953, page 25	Ranges used from £800
1949	RCT 31st March 1954, page 38	Ditto
1950	RCT 31st March 1954, page 40	Ditto
1951	RCT 31st March 1954, page 42	Ditto
1952	RCT 31st March 1954, page 44	Ditto; first year assessment
	Data published by the Federation of Rhodesia and Nyasaland	
1953	*Income Tax Statistics for the Income Years 1953/54*, pages 34 and 36	Supertax data, pages 42 and 43
1954	*Income Tax Statistics for the Income Years 1953/54*, pages 34 and 36	Supertax data, pages 42 and 43
1955	*Income Tax Statistics for the Income Years 1953/54*, pages 34 and 36	Supertax data, pages 42 and 43
1956	*Income Tax Statistics for the Income Years 1953/54*, pages 34 and 36	Supertax data, pages 42 and 43
1957	*Income Tax Statistics for the Income Years 1953/54*, pages 34 and 36	Supertax data, pages 42 and 43
1958	*Income Tax Statistics for the Income Years*	Supertax data, pages 42 and 43

	1953/54, pages 35 and 37	
1959	*Income Tax Statistics for the Income Years 1953/54, pages 35 and 37*	Supertax data, pages 42 and 43
1960	*Income Tax Statistics for the Income Years 1953/54, pages 35 and 37*	Supertax data, pages 42 and 43
1961	*Income Tax Statistics for the Income Years 1953/54 -1962/63, pages 35 and 37*	Supertax data, pages 42 and 43
1962	*Income Tax Statistics for the Income Years 1953/54 -1962/63, pages 35 and 37*	Supertax data, pages 42 and 43; first year assessment
	Data published for Rhodesia	
1963	*First Report of the Commissioner of Taxes for the period 1st January, 1964 to 30th June, 1965*, page 19	Supertax data, page 21; first year assessment
1964	*Second Report of the Commissioner of Taxes for the year ended 30th June*, 1966, page 19	Supertax data, page 21
1965	*Report of the Commissioner of Taxes for the year ended 30th June, 1967*, page 20	Supertax data, page 22
1966	*Report of the Commissioner of Taxes for the year ended 30th June*, 1968, page 18	Supertax data, page 20
1967	*Report of the Commissioner of Taxes for the year ended 30th June*, 1969, page 17	Supertax data, page 19
1968	*Report of the Commissioner of Taxes for the year ended 30th June*, 1970, page 20	Supertax data, page 22
1969	*Report of the Commissioner of Taxes for the year ended 30th June, 1971*, page 17	
1970	*Report of the Commissioner of Taxes for the year ended 30th June, 1972*, page 13	
1971	*Report of the Commissioner of Taxes for the year ended 30th June, 1973*, page 15	
1972	*Income Tax Statistics 1973-1974*, page 15	
1973	*Income Tax Statistics 1974-1975*, page 15	
1974	*Income Tax Statistics 1975-1976*, page 15	
1975	*Income Tax Statistics 1976-1977*, page 15	
1976	*Income Tax Statistics 1977-1978*, page 15	
1977	*Income Tax Statistics 1978-1979*, page 16	
1978	*Report of the Commissioner of Taxes for the year ended 30th June, 1980*, page 14	
1980	*Income Tax Statistics 1981-1982*, page 20	
1983	*Income Tax Statistics 1983-1984*, page 20	
1984	*Income Tax Statistics 1984-1985*, page 20	

Table A2 Income tax data in Malawi

Income year	Source of data	Notes
	Fedn ITS = *Income Tax Statistics for the years 1953/54 to 1958/59*, vol IV AR = Annual Report of the Commissioner of Taxes of Dept of Taxes, Ministry of Finance, Malawi Government	
1938	Deane 1948, pp 69-70	Classified by "Europeans" and "Asians"
1945	Deane, 1952, p 79 and p 308	Ditto
1953	Fedn ITS, pp 26-27	Supertax data, pp 30-31
1954	Fedn ITS, pp 26-27	Supertax data, pp 30-31
1955	Fedn ITS, pp 26-27	Supertax data, pp 30-31
1956	Fedn ITS, pp 26-27	Supertax data, pp 30-31
1957	Fedn ITS, pp 26-27	Supertax data, pp 30-31
1958	Fedn ITS, pp 26-27	Supertax data, pp 30-31
1959	(Fedtn) Seventh Report of the Commissioner of Taxes for the year ended 30 June 1961, App VIII and IX (Supertax data only)	
1960	(Fedtn) Eighth Report of the Commissioner of Taxes for the year ended 30 June 1962, App VIII and IX (Supertax data only)	
1961	(Fedtn) Ninth Report of the Commissioner of Taxes for the year ended 30 June 1963, App VIII and IX (Supertax data only)	
1962		
1963	No data on grounds of introduction of PAYE	
1964	AR for the period 1 January 1964 to 31 March 1968, pp 42 and 46	same data in *Public Sector Financial Statistics 1970*, table C3
1965	AR for the period 1 January 1964 to 31 March 1968, pp 43 and 47	Ditto
1966	AR for the period 1 January 1964 to 31 March 1968, pp 44 and 48	Ditto
1967	AR for the period ended 31 March 1969, pp 19 and 20	Ditto
1968	AR for the period ended 31 March 1970, pp 22 and 23	
1969	AR for the period ended 31 March 1971, App 8 and 9	
1970	AR for the period ended 31 March 1972, Tables 6 and 8	
1971	AR for the period ended 31 March 1973, page 25	
1972	AR for the period ended 31 March 1974, page 29	
1973	AR for the period ended 31 March 1975, Tables 6 and 8	
1974	AR for the period ended 31 March 1976, Tables 6 and 8	
1975	AR for the period ended 31 March 1977, Tables 6 and 8	
1976	AR for the period ended 31 March 1978, Tables 6 and 8	
1977	AR for the period ended 31 March 1979,	

	Tables 6 and 8	
1978	AR for the period ended 31 March 1980, Tables 6 and 8	
1979	AR for the period ended 31 March 1981, Tables 6 and 8	
1980	*Statistical Yearbook 1983*, page 167	

Table A3 Income tax data in Zambia

Income Year	AR = *Annual Report of the Income Tax Department* (Northern Rhodesia). Fedn ITS = *Income Tax Statistics for the years 1953/54 to 1958/59*, vol III (Federation of Rhodesia and Nyasaland).
1 929	AR for the Year ended 31st March 1932, Schedule B
1 930	AR for the Year ended 31st March 1932, Schedule B
1 931	AR for the Year ended 31st March 1933, Schedule B
1 932	AR for the Year ended 31st December 1934, Schedule B
1 933	AR for the Year ended 31st December 1935, Schedule B
1 934	AR for the Year ended 31st December 1936, Schedule B
1 935	AR for the Year ended 31st December 1937, Schedule B
1 936	AR for the Year ended 31st December 1938, Schedule B
1 937	AR for the Year ended 31st December 1938, Schedule B
1 943	AR for the Years 1945, 1946 and 1947, pages 10 and 13
1 944	AR for the Years 1945, 1946 and 1947, pages 11 and 14
1 945	AR for the Years 1945, 1946 and 1947, pages 12 and 15
1 946	AR for the Year 1948, pages 6 and 7
1 947	AR for the Year 1949, pages 8 and 9
1 948	AR for the Year ended 31st March 1951, pages 8 and 9
1 949	AR for the Year ended 31st March 1952, pages 8 and 9
1 950	AR for the Year ended 31st March 1953, pages 10 and 11
1 951	AR for the Year ended 31st March 1954, pages 9 and 10
1 952	AR for the Year ended 31st March 1954, pages 9 and 10
1 953	Fedn ITS, pages 31 and 32
1 954	Fedn ITS, pages 31 and 32
1 955	Fedn ITS, pages 31 and 32
1 956	Fedn ITS, pages 31 and 32
1 957	Fedn ITS, pages 31 and 32
1 958	Fedn ITS, pages 31 and 32
1 959	Seventh Report of the Commissioner of Taxes for the year ended 30 June 1961, pages 26-27
1 960	Eighth Report of the Commissioner of Taxes for the year ended 30 June 1962, pages 30-31
1 961	Ninth Report of the Commissioner of Taxes for the year ended 30 June 1963, Appendices VIII and IX

1 963   AR for the period 1 Jan 1964 to 30th June 1965, pub by Dept of Taxes, Ministry of Finance, Republic of Zambia (first annual report), Appendix II

1 968   Report of the Commissioner of Taxes for the period 1 January 1968 to 31st Dec 1968, pub Office of the Vice-President, Finance Division, Tables 2.1 and 3.1

1 970   Report of the Commissioner of Taxes for the year 1st April 1972 to 31st March 1973, pub Min of Planning and Finance, page 19 (numbers only)

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Figure 1 Taxpayers as per cent of total tax units
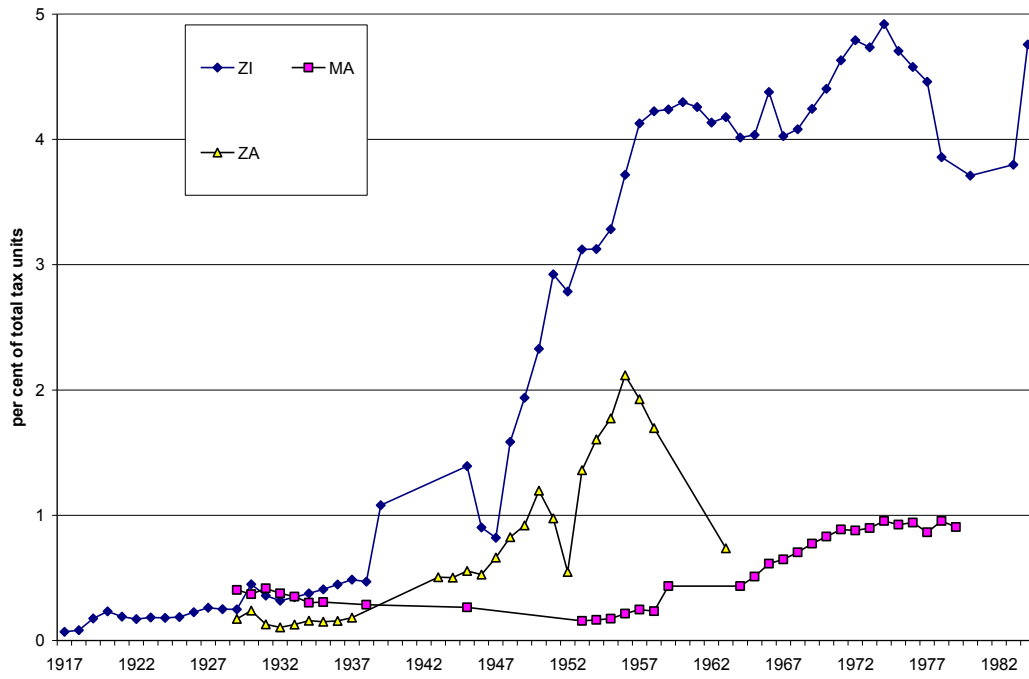
Figure 2 Beta coefficients Central Africa
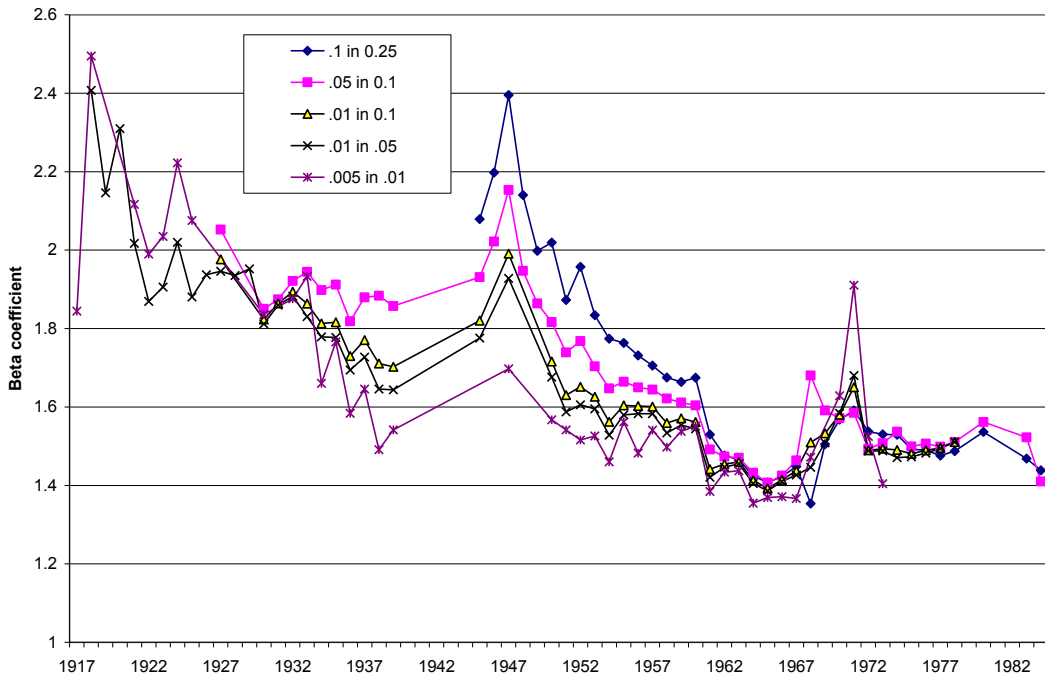

28
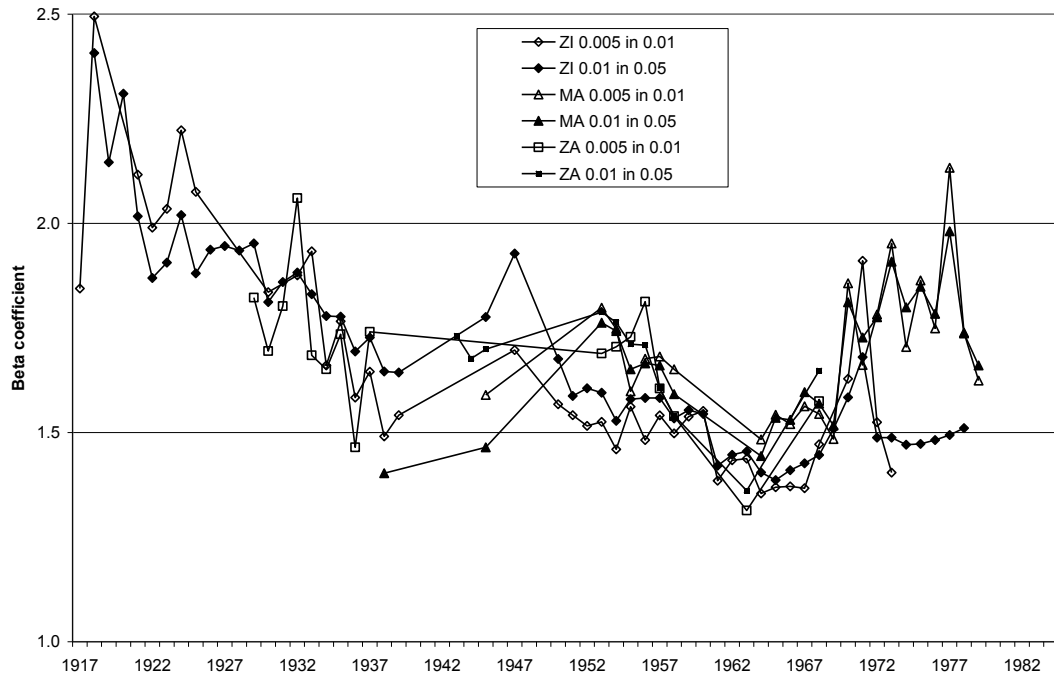
Figure 3 Beta coefficients Zimbabwe

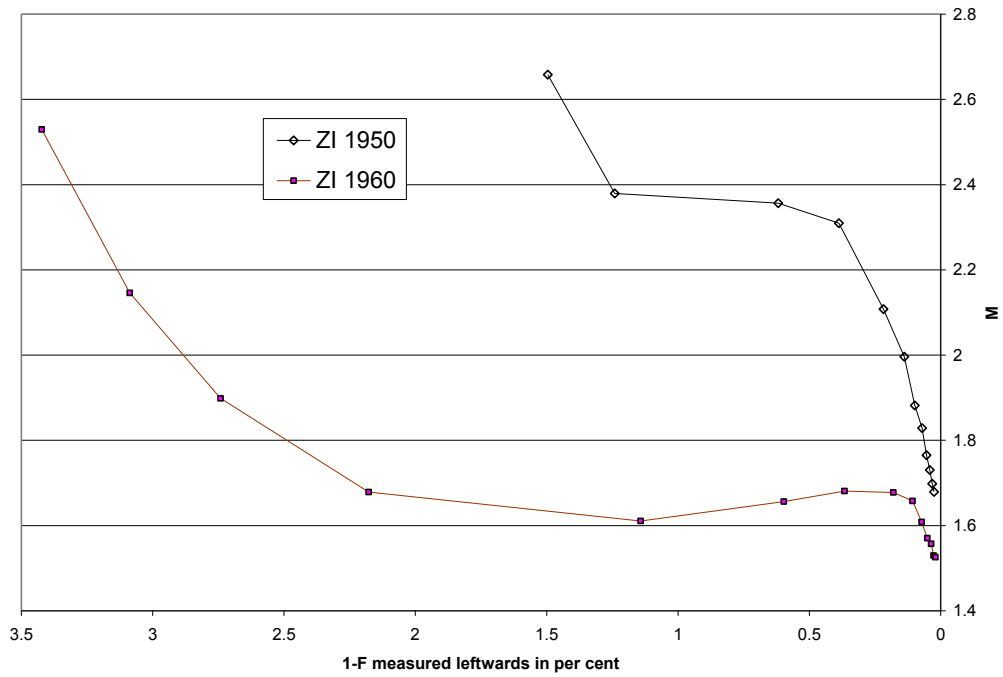**Figure 4 M curves for Zimbabwe**

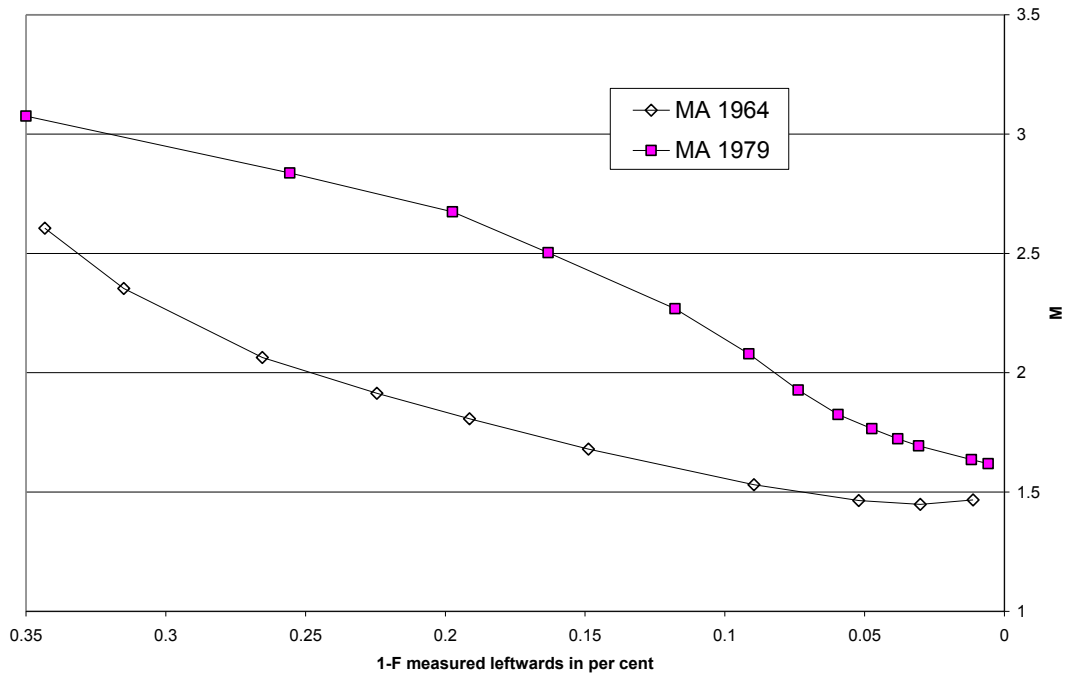**Figure 4A M curves for Malawi**
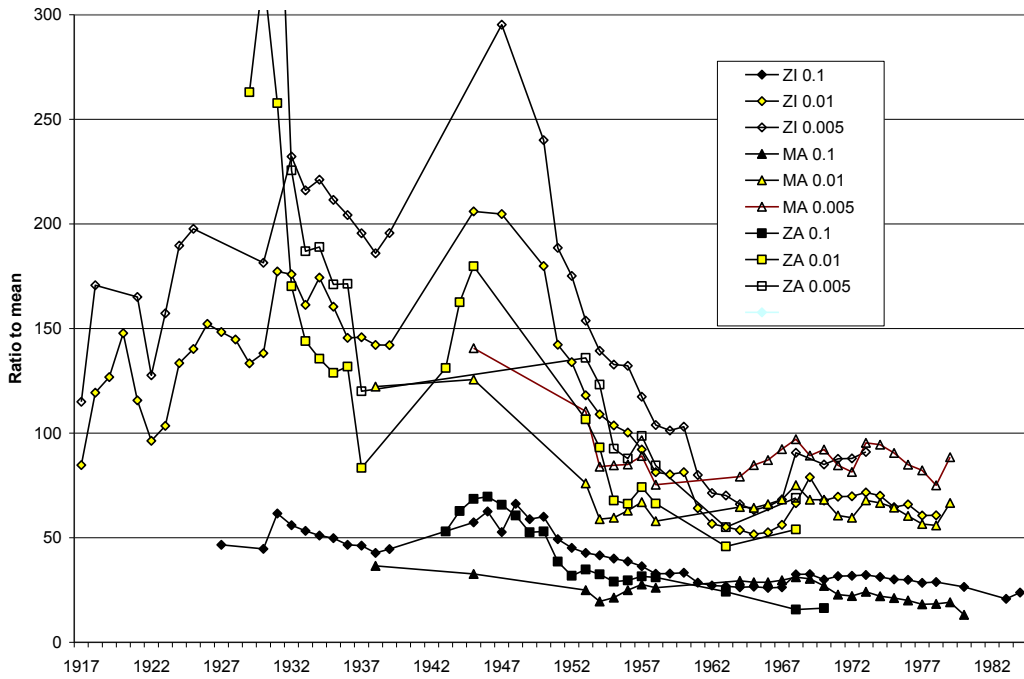
Figure 5 Percentiles

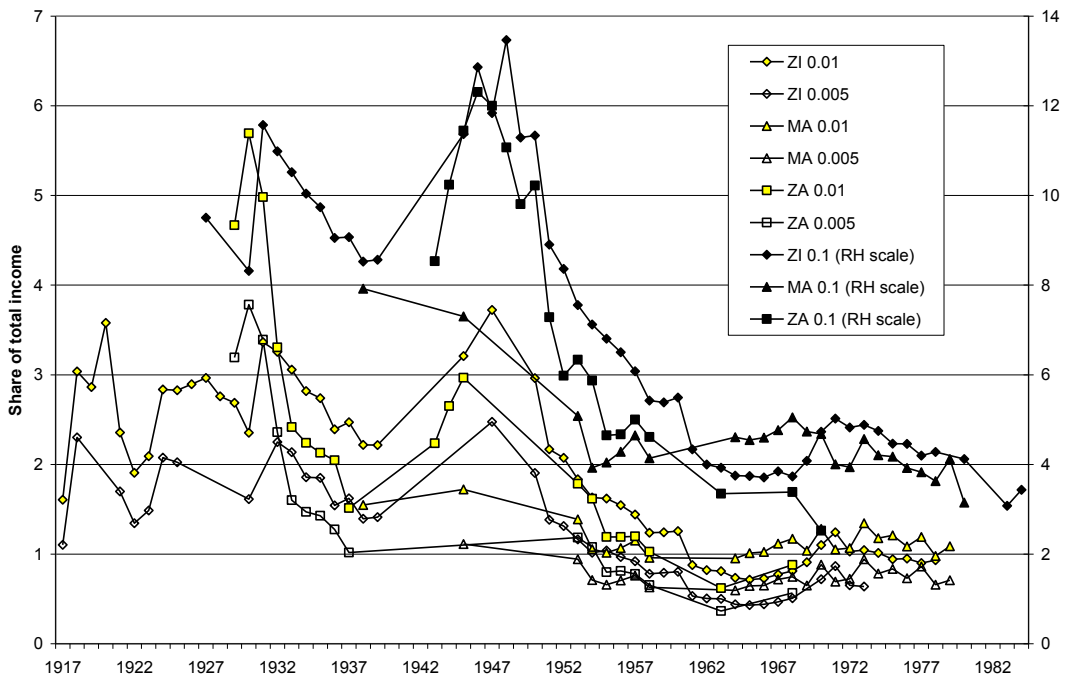**Figure 6 Income shares (top 0.005 to top 0.1 per cent)**
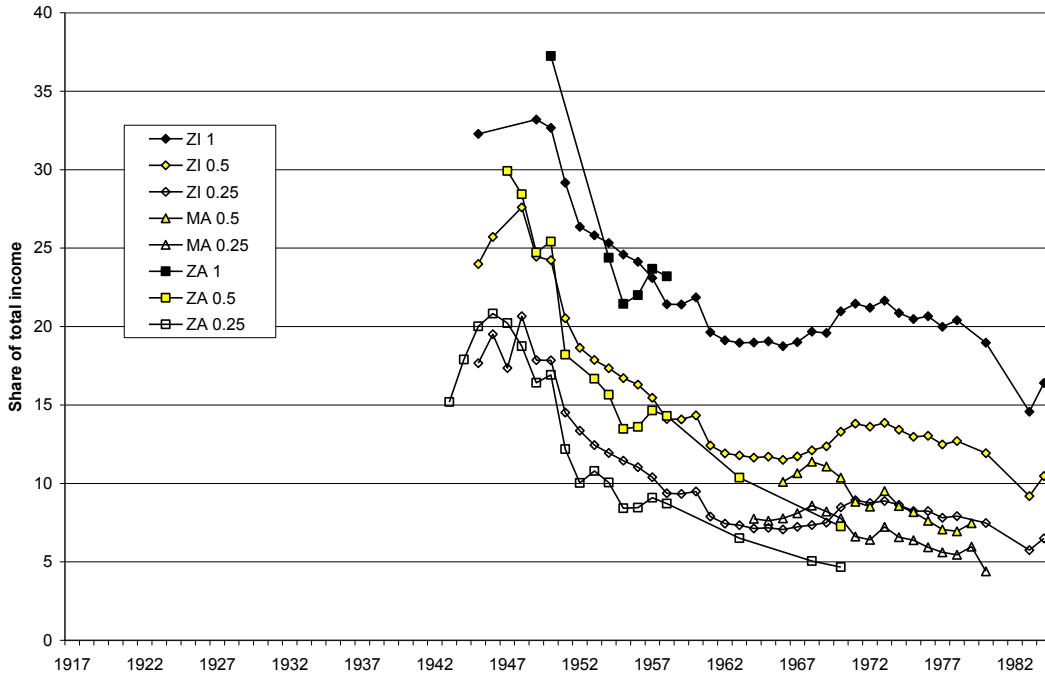
Figure 7 Income shares (top 0.25 to top 1 per cent)

Figure 8 Comparison of supertax and income tax results