

# Income distribution and taxation in Mauritius: A seventy-five year history of top incomes<sup>1</sup>

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## Introduction

In her study, *Mauritius in the making*, Monique Dinan (2003) makes use of the long history of population censuses in Mauritius to provide, in her words, a “panoramic” view of the evolution of its people from 1846 to the present day. The data used in this paper - the poll tax and income tax statistics - are more limited in scope and in historical reach. They date back only to 1933, they relate only to income, and they cover only a small proportion of the population; those at the top of the income distribution. Nonetheless, they provide insights about the history of Mauritius not available from other sources, and they have definite advantages as a source of evidence about economic and social development. Unlike the decennial census, the data are annual. They cover (apart from 3 missing years) each year over a seventy-five year period, allowing us to trace the year-to-year variation - like the impact of changing sugar crops and sugar prices. Such economic factors have been important for the overall prosperity of the island but also for its distribution.

The distribution of income is an important aspect of a society, but one that is often neglected because historical information is very limited. The main purpose of this paper is to provide new evidence. A seventy-five year time series is a rich source for any country (the comparable data for the United States cover only twenty years more). For Mauritius the period is of particular interest, since it covers both the British colonial era and the period after independence, which occurred at virtually the mid-point in our series in 1968. Moreover, the fact that the colonial heritage was shared with other countries around the world, and that colonial administrators followed similar practices, means that we can compare the experience of Mauritius under British rule and after independence with that of other former colonies.

The first section of the paper outlines the data sources and the methods employed. While the paper assembles material from already published administrative records, the information has to be converted into a useable

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<sup>1</sup> The research reported in this paper forms part of the “Inequality” project of the Institute for New Economic Thinking at the Oxford Martin School, with the additional support of the Department for International Development grant.

form, and this process involves several significant steps. It is not simply a question of scanning tables into the paper. The second section presents the principal findings regarding the evolution of top incomes in Mauritius, discussing the relation with key developments and the impact of direct taxation. Income taxation in Mauritius over this period is of substantive interest. Since the country has moved to a flat tax for personal (and corporate) taxation, with effect from 2009, the seventy five years covered in this paper can be said to span its whole history to date of graduated income taxation. At the same time, it should be emphasised that the main objective here is to set out the historical record and to make the data available. Full analysis of the time series must await the attention of those with greater knowledge of the economy and society of Mauritius. As a further building block for such an analysis, the third section of the paper compares the findings for Mauritius with those for Malaysia and Singapore. These former colonies differ in size, history, and geographical location, but the application of the same methods demonstrates the potential for comparative analysis using the income tax data.

## 1. Income data from administrative statistics

### *Income taxation in Mauritius*

The central data used in this paper are drawn from the statistics published as part of the administration of income taxation. An income tax was first enacted in Mauritius in 1932 (Ordinance 21 of 1932, the Income Tax Ordinance), to come into force on 1 July 1933. An Income Tax Branch was established, forms were issued and “returns were received in appreciable numbers” (Report of the Poll Tax Commissioner, contained in the *Financial report and statements for the financial year 1934-35*, page 9). However, the income tax was not applied as such, and was replaced by a graduated poll tax (Ordinance 32 of 1934, the Graduated Poll Tax Ordinance), which came into force on 1 July 1934.

The “Poll Tax was in fact an income tax and not a poll tax in the same sense in which the term is used in certain African colonies” (*Annual Report of the Income Tax Department for the year 1951-52*, page 2). There was an exemption (Rs 5,000) and a classification of incomes into intervals, each category paying a fixed amount of tax. Taxpayers with incomes assessed in the range from Rs 5,000 to Rs 7,000 paid Rs 50, which was 1 per cent at the bottom of the interval. There were then 14 intervals, with the maximum payment being Rs 6,150 payable on income in excess of Rs 70,000, which represented a rate of 8.8 per cent. In the first year of operation, there were 1,165 taxpayers, out of an estimated 186,000 tax units in Mauritius at the time (see below). 32 of the taxpayers had assessed taxable incomes above Rs 70,000 (which represented at the time some 150 times mean income per tax unit). The tax in

Assessment Year starting on 1 July of year T was based on income assessed for the previous year: i.e. the income accruing in the 12 months commencing on 1 July of year (T-1) and ending on 30 June of year T. The latter is referred to as the “Income Year T-1”. Unless otherwise stated, the paper refers to Income Years, so that the first income year for which we have data is 1933.

The Graduated Poll Tax was replaced in 1950 by a tax levied on actual income under Ordinance 34 of 1950 (the Income Tax Ordinance 1950), with effect from the year of assessment 1951-52. The first income year covered by the income tax is therefore 1950. Other changes in the form of the income tax took place over the subsequent half century, including the introduction of PAYE (Pay As You Earn) with effect from 1 July 1993.

From the outset, the income tax administration published information about the number of taxpayers in each income range. These appeared initially in the *Annual Report of the Poll Tax Commissioner* (referred to as ARP)<sup>2</sup> and from 1950 in the *Annual Report of the Income Tax Department* (referred to as AR). Later they began also to publish information on the total income of taxpayers by ranges, together with the total tax paid. It is in this form that the papers are published today in the *Digest of public finance statistics*, referred to as DPFS. The 2009 edition, published by the Ministry of Finance and Economic Development in November 2010, contains in its Table 8.1 the number of taxpayers, and the amount of net income, by ranges from Rs 75,000 upwards, with a top range of Rs 5 million or more (containing 557 taxpayers). (The same figures are published in the *Annual digest of statistics*, Table 5.1.) The full set of sources from 1933 to 2008 is given in Table A.1 in Appendix A.

## *Methods*

It is not possible to go straight from the numbers on the pages of official documents to meaningful economic and social conclusions. There are several stages in arriving at the estimated distribution of income;

- Interpretation of the statistics in the light of tax legislation and administration;
- Derivation of external control totals for the numbers of potential taxpayers and for total income;
- Interpolation of the tabulated data to arrive at the desired statistical measures.

Each of these stages has been extensively discussed in studies of top incomes in other countries (see Atkinson and Piketty, 2007 and 2010), but each country requires its own specific treatment. It should also be stressed that each step

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<sup>2</sup> Published as part of the *Financial report and statements for the financial year*.

involves a number of assumptions, some of which - given the paucity of statistical information in the early years - are necessarily heroic. Every attempt is made to indicate the sensitivity of the conclusions to the assumptions made, but the results should be read with this qualification firmly in mind.

### *Interpretation of the administrative data*

The data used in this paper are the product of legislative and administrative processes, and have to be so interpreted. The definitions of the family unit and of income are determined by the tax law, and change with changes in legislation.

To begin with, the distribution considered here relates to tax units, where the incomes of husband, wife and children are combined. When reference is made to the share of the top 1 per cent, this refers to the top 1 per cent of all potential tax units in the population of Mauritius (whether or not they are actually subject to tax). (The method by which this control total is calculated is described below.) For much of the period, the data were presented in this form, even where the wife elected for separate taxation. However, for income years 1987 onwards, a wife electing to be assessed separately is counted as a separate taxpayer, referred to as the “new” basis. We can compare the figures for IY 1987 on a tax unit basis (DPFS 1987-1991) with those on the new basis (DPFS 1990-1994); the estimated share of the top 1 per cent is 8.0 per cent in the former case and 7.2 per cent in the latter case. For the share of the top 5 per cent, the figures are 18.4 and 17.1 per cent, for the top 0.5 per cent they are 5.5 and 5.0 per cent, and for the top 0.1 per cent they are 1.49 and 1.45 per cent.<sup>3</sup> Even if these are not pure measures of the effect of the change in definition, since the later figures also included amendments, it suggests that the removal of the wife’s income from that of top male taxpayers led to a noticeable reduction in measured top shares, except at the very top of the distribution. For this reason, we show a break in the series in 1987.

The definition of income necessarily follows that embodied in the tax law, and this is an inherent limitation on the data used here. In addition, we need to distinguish between three concepts applied under the tax law: *gross* income, *net* income net of allowable deductions, such as depreciation and interest paid, and *chargeable* income, which is income after deduction of personal reliefs and allowances. The aim of the paper is to show the distribution of gross income, but all three concepts are employed in the recorded data at different times. At the outset, the Poll Tax was designed “to

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<sup>3</sup> These calculations maintain the same control total; to the extent that the control total is increased as a result of separate elections the reduction in the measured income shares would be smaller.

be as simple as possible” (*Report of the Poll Tax Commissioner 1934-35*, page 8) and there were neither personal allowances nor any provisions for depreciation or for losses. There was only the fixed exemption. The total incomes reported from 1933 to 1949 are therefore essentially the gross incomes that we wish to measure. In the same way, the income tax statistics from 1970-2004 refer to gross incomes. The problematic periods are therefore 2005-2008 and 1950 to 1969.

For the period 1950 to 1969, the income tax statistics refer to chargeable income, which is the least extensive of the three income concepts. Given that we apply systematically an income total defined in gross terms (see below), this causes the estimated income shares and percentiles to be lower. The potential seriousness of this difference may be gauged by adding to chargeable income the personal allowance for a single person (Rs 3,000 in 1950), which is the minimum difference. This would in 1950 have increased the estimated share of the top 0.5 per cent from 6.1 to 6.7 per cent. It would have raised the cut-off for the 0.5 percentile from 3.8 to 5.1 times the mean income. If we were to allocate all taxpayers the allowance for a married person with 2 children, this would increase the share to 7.2 per cent, a total increase of nearly 20 per cent. This overstates the adjustment required, since not all would have been married with 2 children, but there was also a 20 per cent allowance for earned income.

A second comparison is possible for the income years 1970 and 1971, when data can be matched on both chargeable and gross definitions. In making such a match, there are problems associated with timing (see below), but the AR for the year 1972-73, published in July 1976, contains a distribution for the income year 1970 on a chargeable income basis with the same number of recorded taxpayers as the distribution by gross income published in the *Bi-Annual Digest of Statistics* for June 1975. The same applies to the AR for the year 1973-74, published in December 1977, contains a distribution for the income year 1971 on a chargeable income basis with a number of recorded taxpayers only 1 different from the distribution by gross income published in the *Bi-Annual Digest of Statistics* for June 1977. For the income year 1970 (1971), there are in one case (chargeable income) 248 (274) taxpayers with incomes in excess of Rs 50,000 and in the other there are 382 (438) taxpayers. In excess of Rs 5,000, the numbers are 5,637 (6,052) for chargeable income and 11,400 (12,100) for gross income. These are big differences.

The differences for the estimated top income shares and percentiles are summarised below in terms of the ratio of the gross to chargeable;

	1970 ratio	1971 ratio	average
Share of per cent			
Top 0.01	1.05	1.10	1.08
Top 0.05	1.12	1.12	1.12
Top 0.1	1.22	1.19	1.20
Top 0.5	1.29	1.27	1.28
Top 1	1.36	1.34	1.35
Percentile			
Top 0.01	1.22	1.13	1.18
Top 0.05	1.18	1.20	1.19
Top 0.1	1.24	1.25	1.24
Top 0.5	1.51	1.49	1.50
Top 1	1.84	1.79	1.81

These ratios are close for the two years. They also bear out that the very top is less affected. In what follows, the shares and percentiles for the period 1950 to 1970, when the data related to chargeable incomes, have been multiplied by the average of ratios for 1970 and 1971. The effect of this adjustment is considerable for the share of the top 1 per cent, as is shown in Figure A.2 in Appendix A. The impact on the share of the top 0.1 per cent is less marked.

The difference between gross and net income is not as serious. This affects the estimates from income year 2005. If we compare the figures for IY 2005 on a gross (DGPFS 2008) and net basis (DGPFS 2009), then the estimated share of the top 1 per cent is 6.78 per cent in the former case and 6.76 per cent in the latter case. Even recognising that the latter incorporates some amendments, this suggests that we do not need to mark a break in the series.

The data used here are also affected by the way in which they are compiled. The annual reports stress that the process of assessing tax may extend over several years, and the statistics are often revised to take account of additional and revised assessments. In the ARP 1947-48, there is a warning that the table for the poll tax “covers only those individuals ... who paid tax during the years in question and these figures bear no relation to the to the total number of individuals ... who are *liable* to tax in respect of the years of assessment” (page xv). For the income year 1944, only 71 per cent had been assessed by the end of the assessment year (and appeared in the statistics as then published). These delays can materially affect the conclusions drawn. If allowance is made for the fact that only 71 per cent of returns had been assessed, then the estimated share of the top 0.5 per cent - assuming that those assessed are representative - would be 17.5 per cent, rather than 14.5

per cent as estimated using the published statistics. On this basis, the estimated top income shares based on the poll tax data - from 1933 to 1949 - could be under-stated by around a fifth.

With the introduction of the income tax in 1950, the statistics began to be published allowing for returns assessed after the end of the assessment year. For example, the data used here for 1950 include all assessments up to 30 June 1956, which should be complete. Use of complete data is important not only because of the coverage but also because those assessed later are not a random drawing, as may be illustrated by reference to the income year 1976. The *Bi-annual Digest of Statistics* (BDS) for December 1979 contained (Table 4.10) figures of which it was stated that they were “provisional and relate to individuals who have voluntarily furnished complete returns”. These taxpayers are not a random drawing, as may be seen by comparing this table with the “revised” distribution published in BDS for December 1980 (Table 4.10).<sup>4</sup> The estimated income shares are:

Top	Income shares	
	Provisional	Revised
5 per cent	20.6	21.9
1 per cent	10.2	10.7
0.5 per cent	6.8	7.1
0.1 per cent	2.4	2.6

These figures suggest that there may be a margin of error of some 5 per cent: i.e. that a share of 10 per cent may be under-stated in provisional data (that we have on occasion to use - see Table A.1) by around half a percentage point.

The impact on estimated percentiles is illustrated by the results for income year 1954. The first set of (incomplete) figures (AR 1955-56, page 9) showed the top 0.5 percent as starting at 3.52 times the mean; the final set (AR 1959-60, page 9) showed the higher figure of 4.27. The top 0.1 per cent was shown in the first set of figures as starting at 13.6 times the mean, but at 16.4 times the mean in the final set of figures. We have in all cases used the final figure published.

Finally, use of income tax data is always open to the charge that the data take no account of tax avoidance and tax evasion. These are clearly important considerations. Since the control totals for income are based on national accounts (see below), the estimates made here of the income *shares* understate the true top income shares to the extent that incomes are not declared. In this sense the estimates provide a lower bound.

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<sup>4</sup> This was less a matter of coverage: the provisional figures included 90 per cent of the final number of returns.

### *Control total for total tax units*

The control total for total tax units is reached by the following steps:

- i) an estimate of the total population of the Republic of Mauritius (1.3 million in 2010), including the Island of Rodrigues (population 38,000 in 2010),
- ii) reduction to the adult population, defined as those aged 15 and over, and
- iii) subtraction of the number of married women (who form part of another tax unit).

Each step is described below; the detailed sources are given in Appendix A.

The total population for the years 1970 to the present has been taken from the figures in the United Nations national accounts website. The United Nations (UN) figures have been used here, and for national income, in order to facilitate comparison across countries (as in section 3). This UN series has been linked backwards to population figures in the *Mauritius Annual Digest of Statistics* (ADS) and *Year Book of Statistics* (YBS).

The proportion of the population aged 15 and over is taken from the population censuses of 1931, 1944, 1952, 1962, 1972, 1983, 1990 and 2000. The proportions of adult to total population are interpolated linearly and applied to estimates of the total population for each year.

The number of married women is taken from the population censuses of 1931, 1944, 1952, 1962, 1972, 1983, 1990 and 2000. “Married” is defined to include those not married but living together as man and wife. The numbers are interpolated linearly between census dates, and extrapolated beyond 2000 by assuming the same ratio to total adults.

The resulting series for the total number of tax units is shown in Table A.2.

### *Control total for household income*

The construction of a control total for total household income proceeds by

- i) obtaining a measure of total national income (in current prices);
- ii) identifying that part of national income that accrues to households;
- iii) converting from a calendar year to a fiscal year.

Each step is described below; the detailed pre-1948 sources are given in Appendix A.

The national income figures are reached by working backwards. For recent years, the starting point is the series for Gross National Income (GNI) in the United Nations national accounts. This series provides figures from 1970. This series is linked at 1970 to the earlier series for national income at factor cost in the *UN Yearbook of National Accounts Statistics*, 1971, vol II, page 72 and 1969, page 476. This takes the figures back to 1960, where they are linked to a series on GNP at factor cost from the *Mauritius Abstract of Economic Statistics*, 1964?, Table 1, linked at 1954 to a series in YBS 1958, page 175, that takes us back to 1948.

1948 is the earliest year covered by the national accounts in Mauritius. The Central Statistical Office (CSO), established in that year, explained in its report *The national income and national accounts of Mauritius*, published in 1956, that “the Government of Mauritius had been anxious since 1949 to have an official estimate of the National Income ... and calculations began towards the end of 1952” (1956, page 1). These led to estimates covering the calendar years 1948 to 1954. It should be noted that these figures (Central Statistical Office, 1956, Table I) are some 17 per cent lower than those arrived at by the linking process described above. This difference reflects the fact that the scope and definition of national income has tended to expand with successive revisions.

As spelled out in the CSO report, the introduction of calculations of national income required the development of new sources of statistical information. There is therefore no way in which we can extend the series back to 1933 (the beginning of our income tax data). At the same time, the report offers a clue as to how an approximate calculation may be made; “this economy has the particular feature of having its main source of revenue in one large industry - Sugar Manufacture - the exports of which constitute some 97 per cent of the total domestic exports in value, while the local consumption of this produce amounts only to 4 per cent of the whole production” (1956, page 7). It goes on to calculate the correlation coefficient between GDP and exports over the period 1948 to 1954 as 0.99. Using quantity and price information, the CSO infer that “the National Income of the Colony in 1938 must have been around 90 million rupees”, or some 29 per cent of the figure for 1948. Applying the same approach, we can make use of information on sugar cane output, and the sugar price received by producers, from the publications of the League of Nations (LN) and the Food and Agriculture Organisation (FAO) (see Appendix A for details), to produce a series for the value of the sugar production by Mauritius over the period 1933 to 1959. Fitting a regression line (with zero intercept) for the period 1948 to 1959 for which we have national income, we obtain a correlation of 0.91. For 2 years the error of prediction is in excess of 10 per cent, but in all other years the error is 7 per cent or less. This equation has been applied to the production/price data for 1933 to 1947 to arrive at - very approximate - estimates of national income. For 1938, we may compare with the CSO inference of 90 million rupees. Our estimate is

slightly higher at 33 per cent of the 1948 figure, compared with 29 per cent for the CSO, but the estimate is reassuringly close. The actual and fitted values are shown in Figure A.1.

The resulting series for GNI (gross national income) is shown in Table A.2.

The second step concerns the breakdown of national income. The CSO estimates for 1950 to 1954 show that on average 89 per cent of national income was made up by the compensation of employees, income received by households from farms, professions and other unincorporated enterprises, and income from property. These figures do not include transfer payments to households from the government.<sup>5</sup> The figures given in the *UN Yearbook of national accounts statistics* for household income including transfers show a ratio that averages 90 per cent for the period 1960 to 1973 (1969 edition, volume 1, pages 476 and 479, 1973 edition, page 97, and 1979 edition, pages 900 and 910). Later figures from the Mauritius national accounts for 1982 to 1998 show the same items (plus imputed rent) accounted for between 87 and 91 per cent of national income in all years except for the last two years. In the light of this evidence, it has been assumed that household income was 89 per cent of gross national income for the entire period.

The final series for Total Income by fiscal years is formed by taking the average of national income in calendar years  $t$  and year  $t+1$  to obtain a figure for the fiscal year starting 1 July of year  $t$ . The resulting series for household income is shown in Table A.2.

### *Interpolation*

Since the basic data are in the form of grouped tabulations, 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. Moreover, for a considerable part of the period - prior to 1970 - we have only information on frequencies, not on the total income by range.

Where there is information on both the number of persons and the total income in the range, 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

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<sup>5</sup> Current transfers from the government at that time were small: Rs 2 million in 1950 (UN Statistical Papers series H, number 10, 1957, page 180). They did however increase over time, and by 1968 had reached Rs 44 million (UN Yearbook of national accounts statistics 1969, volume 1, page 479).

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. For example, in 2008, taxpayers above Rs 1.5 million constituted 0.68 per cent of total tax units and received 6.03 per cent of total income, and those above Rs 1 million were 1.28 per cent of taxpayers and received 8.03 per cent of total income. These bracket the top 1 per cent. If we make no assumption about the distribution, then the “gross” bounds for the share of the top 1 per cent are from 7.10 to 7.26 per cent (these are calculated by assuming the extremes: *either* that all incomes are equal to the mean for the range *or* that people are concentrated at the end points). If we assume that the frequency distribution is non-increasing (which rules out both of the bounds just described), then the restricted bounds give a range from 7.19 to 7.22 per cent, which are quite close. The mean-split histogram method gives a value for the share of the top 1 per cent of 7.20 per cent. The scope for error - the distance between the bounds - does of course depend on the width of the ranges and on their location. There is a period in the 1980s and early 1990s when the differences in the refined bounds for the share of the top 1 per cent were in excess of 0.2 percentage points, but for the recent years the range has been 0.02 percentage points or less.

The percentiles of the distribution cannot be bounded in this way, and are calculated from a simple Pareto interpolation. Suppose that we wish to calculate the percentile corresponding to  $F^*$ , where  $F$  is the cumulative distribution, and where the range in which the percentile falls is from  $y_i$  to  $y_{i+1}$ , with cumulative proportions  $F_i$  and  $F_{i+1}$ . If the distribution has the Pareto form, then the mean income above  $y_i$  is  $\beta_i$  times  $y_i$ , where  $\beta_i$  is the inverse Pareto-Lorenz coefficient. This estimate of  $\beta_i$  is then used to calculate the percentile as  $y_i$  times  $(1-F_i)/(1-F^*)$  to the power of  $(1-1/\beta_i)$ . The range in 2008 containing the top 1 per cent yields an estimate for  $\beta$  of 2.279, so that the top percentile is estimated at 1.28 to the power of 0.561 times Rs 1 million, which is Rs 1.149 million, or some 3.16 times the mean.

In general, no extrapolation is made into the open upper interval, except in a few cases where the upper interval is close to one of the key percentages. Where the difference is less than 10 per cent, a simple Pareto extrapolation is used to calculate the share. For example, in 2003 the top interval (above Rs 2 million) contains 0.1029 per cent of adults, and an estimate has been made of the share of the top 0.1 per cent.

Prior to the income year 1970, the published data were in the form of frequencies by ranges. For these years a Pareto interpolation has been applied, range by range. For the range from  $y_i$  to  $y_{i+1}$ , with cumulative proportions  $F_i$  and  $F_{i+1}$ , the Pareto coefficient for that range is calculated as  $\alpha_i = \text{Ln}\{(1-F_i)/(1-F_{i+1})\} / \text{LN}\{y_{i+1}/y_i\}$ . Where the percentile corresponding to  $F^*$  falls in this range, it is calculated as  $y_i$  times  $(1-F_i)/(1-F^*)$  to the power of  $(1/\alpha_i)$ . The income in the

range is calculated as  $[y_i(1-F_i)-y_{i+1}(1-F_{i+1})]/(1-1/\alpha_i)$ . The income share is then calculated using linear interpolation of the Lorenz curve, which gives a lower bound. Where the calculated Pareto coefficient is less than 1, then the mean is taken as the mid-point. This method cannot be applied to the open-ended top interval. For the income years 1933 to 1937, when the top open-ended interval began at Rs. 70,000, the mean for that interval is taken as Rs. 75,000. For some later years (1938-1940), the ranges are very detailed<sup>6</sup> and extend way up the distribution; in these cases we set the mean for the top range at the starting point for that range.<sup>7</sup> For the income years 1941 to 1949, there is less detail at the top, and we apply the Pareto coefficient from the penultimate interval.

The estimates are inevitably less precise where we have only frequency data, but application of this method to years for which range data are available suggests that the results are close: for the income year 1972 the top income percentage shares are in most cases identical up to the first decimal place.

### *Summary*

The methods have been described at some length for two reasons. The first is to facilitate the reproduction of the estimates and their updating. The second reason is to emphasise the extent to which judgment enters into their construction and the potential limitations.

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<sup>6</sup> In 1938, for example, there are 8 ranges at the top containing a single person, and 18 ranges with fewer than 10 taxpayers.

<sup>7</sup> For example, for 1938, when the top taxpayer was recorded as in the interval from Rs 750,000 and upwards, the figure was set at Rs 750,000. For 1963, when two taxpayers were recorded as having incomes in excess of Rs 1 million, their incomes were set at that amount.

Table 1 Top income shares in Mauritius 1933 to 2008

	10%	5%	1%	0.5 %	0.1%	0.05%
1933				18.36	9.25	6.58
1934				15.36	7.44	5.17
1935				14.58	7.22	5.08
1936				13.91	6.93	4.89
1937				13.89	7.07	4.96
1938				17.34	9.90	7.58
1939				14.04	7.33	5.32
1940				16.31	9.74	7.31
1941				11.96	6.05	4.28
1942				12.39	6.35	4.55
1943				13.77	6.51	4.44
1944				14.53	6.36	4.16
1945				10.27	4.44	2.87
1946				8.23	3.62	2.35
1947			11.22	8.77	4.35	3.10
1948			10.82	8.49	4.40	3.23
1949			9.53	7.29	3.35	2.11
1950				7.74	3.67	2.31
1951				7.53	3.36	2.07
1952			10.00	7.53	3.41	2.17
1953			10.03	7.58	3.36	2.09
1954			9.69	7.25	3.13	1.92
1955			9.44	7.06	3.08	1.95
1956			9.95	7.52	3.44	2.16
1957			10.06	7.55	3.50	2.24
1958			9.83	7.32	3.26	2.05
1959			10.81	7.98	3.43	2.10
1960			11.23	8.22	3.53	2.17
1961			11.17	8.23	3.64	2.43
1962			9.49	6.92	2.94	1.87
1963			12.61	9.35	4.57	3.07
1964			11.05	8.13	3.48	2.31
1965			10.44	7.37	2.87	1.95
1966			10.35	7.28	2.80	1.94
1967			10.91	7.49	2.82	1.88
1968			9.77	6.80	2.45	1.60
1969			10.87	7.62	2.93	2.01
1970			11.50	7.93	3.08	2.04
1971			10.44	7.23	2.84	1.90
1972			9.70	6.82	2.76	1.88
1973						
1974						
1975			10.12	7.20	3.33	2.46
1976		18.14	8.29	5.48	1.98	1.35
1977		17.25	7.48	4.79	1.55	1.00
1978		15.98	6.77	4.32	1.41	0.91
1979		16.33	6.84	4.40	1.57	1.00

1980	21.55	16.41	6.72	4.27	1.52	0.94
1981	21.72	15.76	6.25	3.92	1.36	0.82
1982	20.95	15.03	5.80	3.59	1.23	0.74
1983	20.10	14.21	5.39	3.34	1.12	0.67
1984		12.94	4.99	3.10	1.02	0.60
1985		12.57	4.97	3.18	1.10	0.68
1986		11.93	4.95	3.30	1.25	0.82
1987	16.44	11.80	4.92	3.45	1.44	0.98
1988	15.72	10.95	4.23	2.95	1.20	0.81
1989	15.35	11.03	4.76	3.35	1.42	
1990	15.55	11.19	4.93	3.44		
1991	16.31	11.74	5.01	3.45		
1992						
1993	15.03	10.73	4.54	3.13		
1994	15.47	10.90	4.69	3.25		
1995	15.27	10.70	4.62	3.21		
1996		10.62	4.52	3.13		
1997	14.45	10.43	4.50	3.13		
1998		10.77	4.75	3.34		
1999		10.92				
2000	14.21	10.61				
2001		10.55	4.85	3.47	1.54	
2002		8.93	3.90	2.69	1.14	0.76
2003		10.98	5.13	3.70	1.66	
2004	15.17	11.26	5.28	3.82	1.74	1.20
2005	13.96	10.57	4.98	3.59	1.61	1.09
2006		12.48	6.05	4.41	1.95	1.32
2007		13.04	6.68	4.96	2.24	
2008	19.31	14.51	7.20	5.23	2.27	

Table 2 Top income percentiles in Mauritius 1933 to 2008

Ratio to the mean

	1%	0.5 %	0.1%	0.05%
1933		14.74	43.40	72.28
1934		13.13	36.67	58.18
1935		11.68	35.27	58.97
1936		10.69	33.15	56.00
1937		10.10	33.97	58.22
1938		11.10	38.00	59.37
1939		10.23	32.06	54.97
1940		9.56	35.93	65.64
1941		8.71	27.83	45.80
1942		9.05	28.82	47.35
1943		11.06	33.24	52.12
1944		12.74	36.25	52.52
1945		9.22	26.39	37.22
1946		7.18	20.97	31.35
1947	3.60	6.77	20.76	30.22
1948	3.46	6.38	19.35	27.54
1949	3.39	6.10	18.72	27.51
1950		5.71	19.92	30.22
1951		6.08	19.41	28.03
1952	3.48	6.41	18.45	25.97
1953	3.53	6.49	18.74	27.40
1954	3.44	6.43	18.27	26.04
1955	3.39	6.20	17.33	24.92
1956	3.49	6.35	18.50	27.49
1957	3.63	6.50	18.19	26.75
1958	3.85	6.56	18.01	26.07
1959	4.45	7.51	19.91	28.35
1960	4.99	7.99	20.34	28.43
1961	4.95	7.86	18.49	25.92
1962	4.40	6.92	16.36	23.17
1963	5.27	8.14	21.11	29.96
1964	4.84	8.10	18.11	25.50
1965	5.45	8.35	16.62	22.36
1966	5.51	8.37	16.00	20.91
1967	6.07	8.91	17.28	22.95
1968	5.32	8.20	15.73	20.68
1969	5.50	8.73	17.11	22.47
1970	5.63	8.96	18.12	24.10
1971	5.06	8.04	16.73	22.26
1972	4.42	7.11	15.77	21.25
1973				
1974				
1975	4.69	7.03	15.53	22.45
1976	4.72	6.36	12.47	16.09
1977	4.45	5.90	10.87	13.35
1978	4.05	5.37	9.79	12.08
1979	3.95	5.33	10.02	12.67

1980	3.87	5.69	9.73	12.26
1981	3.67	5.32	8.92	11.15
1982	3.48	4.97	8.18	10.14
1983	3.29	4.62	7.61	9.44
1984	3.00	4.23	7.10	8.88
1985	2.87	4.04	7.36	9.22
1986	2.84	3.82	7.61	9.98
1987	2.64	3.65	7.79	10.71
1988	2.33	3.19	6.67	9.08
1989	2.48	3.45	7.52	
1990	2.52	3.51		
1991	2.65	3.61		
1992				
1993	2.43	3.35		
1994	2.46	3.42		
1995	2.41	3.36		
1996	2.40	3.32		
1997	2.36	3.27		
1998	2.43	3.44		
1999				
2000				
2001	2.36	3.35	8.17	
2002	2.03	2.84	6.18	8.81
2003	2.44	3.48	8.89	
2004	2.47	3.55	8.94	12.62
2005	2.33	3.37	8.47	11.99
2006	2.72	4.04	10.30	14.32
2007	2.76	4.19	11.26	
2008	3.16	4.86	11.81	

Figure 1 Top income shares in Mauritius 1933 to 2008

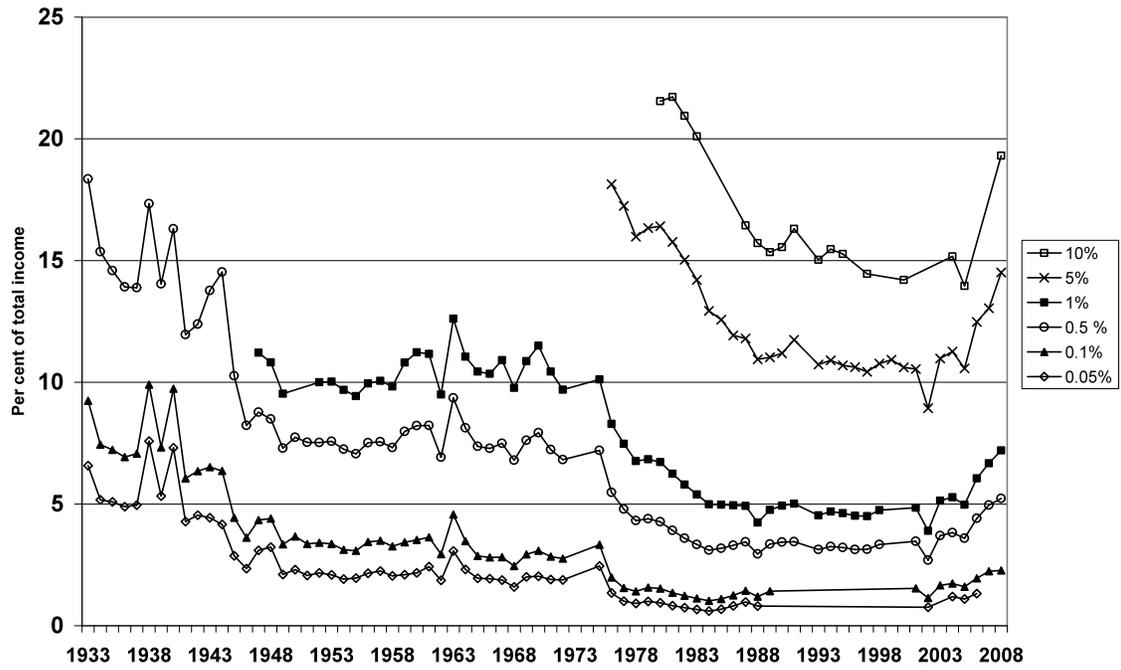
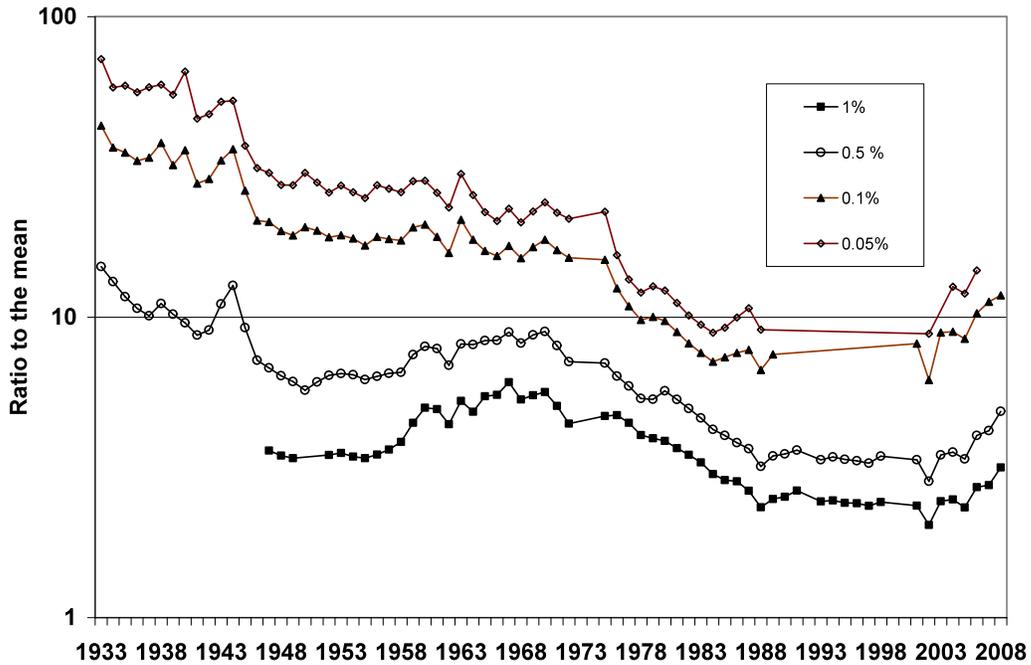


Figure 2 Top income percentiles in Mauritius 1933 to 2008



## 2. The evolution of top income shares in Mauritius

Tables 1 and 2 summarise the evidence regarding the evolution of top incomes in Mauritius. In each case, horizontal lines mark the major breaks in continuity: the move from a graduated poll tax to a fully-fledged income tax in 1950, the change from tabulating chargeable to gross income in 1970, and the change in the treatment of separate election by wives in 1987. As described in the previous section, I have made a - sizeable - correction for the period 1950 to 1969. As a result, with the proviso that the change in 1987 may have led to a reduction in the top income shares and percentiles, it does not seem unreasonable to treat the observations as a continuous series. At the same time, the warning should be re-iterated that the estimates are, as a whole, subject to important qualifications, and we should not lose sight of their origins in the process of tax collection. It should also be emphasised that we are dealing with small numbers. At the outset of the series, there were some 200,000 tax units, so that the top 1 per cent were 2,000 tax units and the top 0.05 per cent only 100 tax units.

Over most of the 75 years, there has been a downward trend in the share of gross income accruing to the top groups. At the outset, in the 1930s, the top 0.5 per cent (around 1,000 tax units) received (Table 1) some 15 per cent of total gross income, or on average 30 times their proportionate share. To be in this group, one had to have an income more than 10 times the average (Table 2). By the mid-1990s, one needed some 3½ times average income, and the share of the top 0.5 per cent was around 3 per cent, or 6 times their proportionate share. The figures for the very top are even more striking. In the early 1930s the top 0.05 per cent had a share in excess of 5 per cent, or 100 times their proportionate share (to be in this group one needed an income of at least 50 times the mean). By the 1990s, their share was less than 1 per cent.

The estimates for the 1930s depend of course on the accuracy of the proxy estimates for national income. To the extent that national income is understated, the 1930s top income shares and percentiles are overstated. Any such adjustment is however only likely to affect the magnitude of the fall, not to reverse the conclusion. And for the one year for which there is an external estimate - 1938 - the figure used here for national income does not appear out of line. The 1940s may be more affected. The method of extrapolation using sugar production applies less well during the Second World War, when the colony had to substitute food crops for sugar cane (see the report *The production of foodcrops in Mauritius during the war, 1939-1945* (Colony of Mauritius, 1947)). For these years total income may be understated and hence top shares overstated.

To put some flesh on these statistics, it may be helpful to relate these numbers to average income. In 1951, average income was some Rs 2,500 a year, or Rs 50 a week. At that time, average weekly earnings for men in the sugar industry, according to the *Annual Report of the Labour Department for 1951* (Table VI) ranged from Rs 15 (labourers) to Rs 31 (artisans). The *Report of an inquiry into the emoluments of officers and others employed by the Government of Mauritius 1952* proposed a scale from Rs 1,584 to Rs 1,752 for drivers and from Rs 1,920 to Rs 2,940 for typists. For the executive class of the civil service, the proposed range was from Rs 4,380 to Rs 10,320. The last of these numbers would have taken the person to some 4 times average income. The Director of Statistics was on Rs 18,600, and the Commissioner of Police on Rs 21,600, or 8 times average income.

The fall in top income shares did not take the form of a steady downward trend. It was episodic. There were distinct falls between 1944 and 1949 and from 1975 to the late 1980s. In between, there was less change: the share of the top 0.5 per cent in 1975 was essentially identical to that in 1949. And the downward tendency came to an end with the century. Over the course of the 21<sup>st</sup> century, the share of the top 0.5 per cent has risen from 3.5 per cent to 5.2 per cent. There is the distinct beginning of a U-shape to the very top shares.

The coverage of the estimates is governed by the coverage of the income-based tax. As incomes rose, more groups entered the statistics. The share of the top 1 per cent (solid squares in Figure 1) can be estimated from 1947, when it was over 10 per cent. It remained around 10 per cent until the mid-1970s, when it started to fall: the share of the top 1 per cent halved between 1975 and the mid-1980s. But in the 2000s it began to rise again, and in 2008 this group had 7 times their proportionate share. The share of the top 5 per cent can be estimated from 1976 (and is therefore unaffected by the adjustment made for chargeable income) and it too exhibits a clear U-shape, falling until the early years of this century and then rising.

### *Shares within shares*

One of the most important qualifications surrounding the estimates is that relating to the control total for income. The uncertainties surrounding the control totals for income can be avoided if we look at the *shape* of the upper part of the distribution, as represented by the shares within shares. In 1933, the share of the top 0.05 per cent within the top 0.5 per cent was 35.8 per cent. There was considerable inequality within the group: the top tenth received over a third of the total income of the group. The share with share was rather lower in the 1950s and 1960s at between 25 and 30 per cent. In 1970 the share of the top 0.05 per cent within the top 0.5 per cent was 25.7 per cent; the share of the top 0.1 per cent within the top 1 per cent was 26.8

per cent. The similarity of these two numbers - both concerned with the top tenth but within groups of different size - reflects the fact that the top of the distribution is broadly Pareto in shape. (A Pareto distribution has the property that at all income levels the mean income of those above you is  $\alpha/(\alpha-1)$  times your income, where  $\alpha$  is the Pareto coefficient.) The shape of the top of the distribution may in fact be summarized in terms of the Pareto-Lorenz coefficient calculated from the shares within shares.

The Pareto-Lorenz coefficients are shown in Figure 3 for four different sub-groups. The fact that they do not coincide reflects the fact that the upper tail of the distribution is not precisely Pareto in form, but they move in a similar way. At the start of the period, the coefficients were between 1.5 and 2.0, indicating that the gradient was such the average income above you was at least double. At the end of the 1960s, the coefficient was around 2.5. A higher value means that the gradient of the upper tail was less. The shape then changed. The coefficient first fell and then rose, to reach values of 3 or higher, indicating that the average income above you was only half as much again. There was then a fall from the mid-1980s to the early 1990s, after which the coefficients have been around 2. This suggests that the recent rise in top shares since 2000 has been a gain for all groups, at least within the top 1 per cent, rather than a change in the shape of the distribution. Put another way, the top 0.1 per cent saw a rise in their income share between 2001 and 2008, but so did the next 0.4 per cent, and the next 0.5 per cent.

### *Seventy five years of history*

In *Mauritius in the making*, Dinan (2003) identifies each decade with distinctive phases in the history of Mauritius. The chapter on the 1930s opens with the sentences: “the 1930s were marked by both an economic depression and the birth of the Mauritian Labour Party. The Government introduced a graduated poll tax on sources of income to finance public revenue” (2003, page 53). The depression led to falling world sugar prices, and the Annual Reports of the Poll Tax Commissioner refer repeatedly to the fact that the Poll Tax yield (and hence the underlying incomes) has “varied with the crop proceeds fairly closely” (1938-39 Annual Report, page 11). 1939 was a “poor crop”, whereas the 1940 crop proceeds were some 50 per cent higher (1941-42 Annual Report, page xiii). It should be borne in mind that our estimates of total income are based on the value of the sugar output, but nonetheless the year by year movements of top shares seem to reflect the fortunes of the sugar producers, with the effect continuing into the post-war period. The Annual Reports of the Income Tax Department contained figures for the gross proceeds of the sugar crop: for example the 1964-65 report (page 3) showed a 69 per cent increase in 1963 (see the distinct spike in top income shares in that year in Figure 1).

The 1950s are described as the period of “demographic explosion”: the natural rate of increase of the population, which had averaged 0.5 per cent per annum in the years immediately before the Second World War rose to about 3 per cent per annum” (Dinan, 2003, page 67). The Report to the Governor of Mauritius of a Commission chaired by James Meade emphasised that real national income per head was falling: by 11 per cent between 1953 and 1958 (1961, Table II).

The 1960s were the decade that brought independence in 1968. There was a progressive move to self-government, with a Chief Minister taking office in 1959 in the new constitution, and a Legislative Assembly being created in 1964 with a Premier campaigning for full independence. During this period, there was little apparent trend in the top shares: the share of the top 1 per cent was 9.8 per cent in both 1958 and 1968. On the other hand, the gradient within the top 1 per cent fell over this period: the Pareto-Lorenz coefficient rose from around 1.9 to 2.5 in the immediate pre-independence decade.

Post-independence Mauritius embarked on a programme of development plans, which were aided in the first half of the 1970s by high sugar prices. The estimates of Angus Maddison show that, purchasing power adjusted, GDP per head rose by a third. During this period there appeared to be little change in the shares of the top 1 per cent and those higher up the scale. There was then a period from 1976 to 1982 when the economy “grew at a mediocre average annual rate of 2.6 per cent” (Lamusse, 2001, page 18). As may be seen from Figures 1 and 2, this was a period when top income shares fell, and the gradient of the upper tail became much less steep: the Pareto-Lorenz coefficient went from around 2 to around 3. The top percentile fell from 4.7 times the mean in 1975 to 3.7 times in 1981.

Real per capita GDP in Mauritius then began to grow steadily: in the 25 years from 1981 to 2006 it rose threefold (according to the purchasing power adjusted estimates of Maddison). From Figure 1, it may be seen that this period of rapid growth was associated first with declining top income shares, and, more recently, with a rise in top shares. The share of the top 5 per cent began at 15 per cent in 1982, fell to around 10 per cent in the 1990s, and then back up towards 15 per cent in 2008. But the period as a whole was associated with a rise in the gradient at the top of the distribution. This shows the importance of separating the absolute level of the income shares from the distribution within the top group.

### *Impact of direct taxation*

The evidence in Tables 1 and 2 refers to income before tax. The distribution of income after tax is less unequal, with the extent of the difference depending on the rates of taxation and the degree of progression. In

the income year 1933, the Graduated Poll Tax was relatively modest, reaching a maximum rate of 8.8 per cent at the bottom of the top range. With the simple form of the Poll Tax, the after tax distribution can be calculated: the absence of differentiated allowances or reliefs means that taxpayers are ranked in the same way before and after tax. In the income year 1933, the percentage share of the top 0.5 per cent was 16.0 in gross terms but 15.4 after tax, the share of the top 0.1 per cent was 8.1 per cent gross and 7.6 per cent after tax. This still leaves the top shares well above the later gross figures. The rates of tax were increased with the advent of the Second World War, and these were maintained afterwards. For the income year 1947, the percentage share of the top 1 per cent was 11.2 in gross terms but 9.5 after tax, the share of the top 0.1 per cent was 4.4 per cent gross and 2.9 per cent after tax.

When the graduated income tax was introduced with respect to the income year 1950, the income tax was charged at a rate of 10 per cent on the first Rs 5,000 of chargeable income, and then at rates rising from 15 per cent, to 25, 40, 50, and 60 per cent, before reaching a maximum of 75 per cent on chargeable incomes in excess of Rs 50,000 (some 20 times the mean). There were 138 taxpayers charged at the top rate. A highly graduated rate structure remained in force for many years.

With the more detailed information published with effect from the income year 1970, showing the amount of tax charged by range, it is possible to make an approximate calculation of the after tax distribution. The calculation is only approximate, since taxpayers are ranked by their gross income. To do a proper calculation, it would be necessary to re-rank taxpayers and this is not possible with the published tabulations. As such, the after-tax figures in Table 3 understate the top shares (since any re-ranking would replace some of the people in the top 1 per cent by others with higher net income). Table 3 shows the distribution before and after tax for the period 1970 to 2008, and Figure 4 shows the implied average tax rate on different groups (1 minus the ratio of after-tax to before-tax income).

The marked decline in the tax burden shown in Figure 4 reflects both the change in the distribution and the reduction in top tax rates. The fall in top shares after 1970 meant that the top x per cent moved, on average, into lower tax bands. In 1970 one needed 9 times average income to be in the top 0.5 per cent; by the mid-1980s it was enough to have 3 times average income. But the reduction in top tax rates has played a role. There has been a convergence towards 15 per cent, which is an interesting reference point, since it is the flat rate adopted in Mauritius from 2009. In 2008, the top 0.1 per cent were paying an average tax rate which was little different from that paid by the top 5 per cent in 1976.

Finally, we should note that the effect of the tax structure is not simply measured by the difference between gross and net incomes, since the tax may

affect gross incomes. It is possible that the reduction in top tax rates has reduced the pre-tax differentials. However, while it is possible that the *levels* of income may be affected, it seems less likely that the changing *relative* tax burdens can be explained in this way.

Figure 3 Inequality within top groups: Pareto-Lorenz coefficients

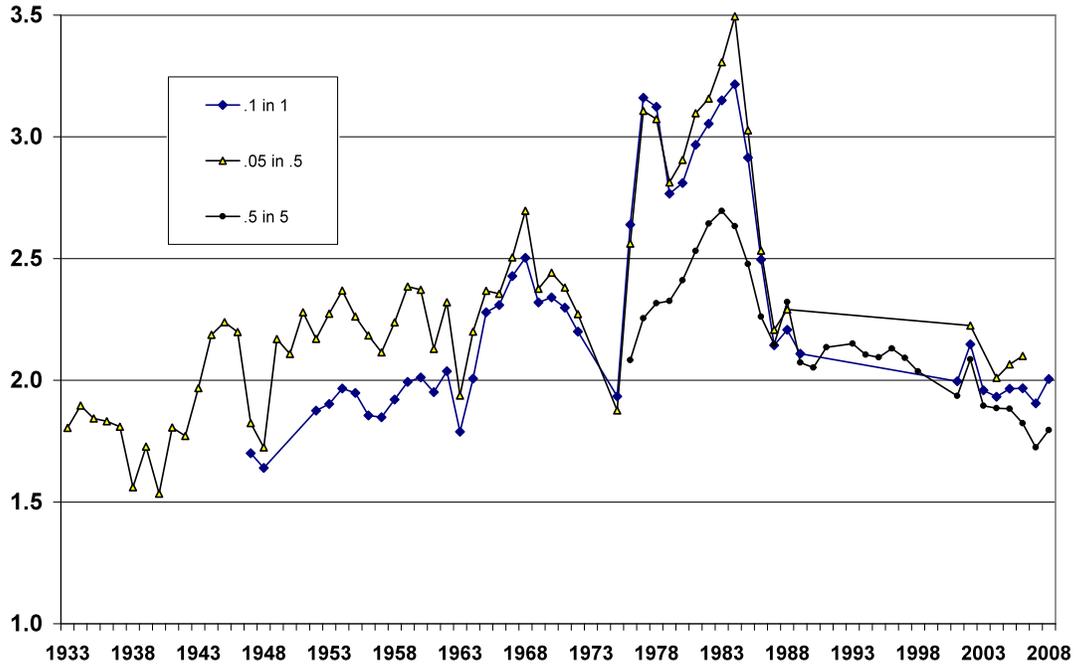


Figure 4 Implicit tax burden on different groups

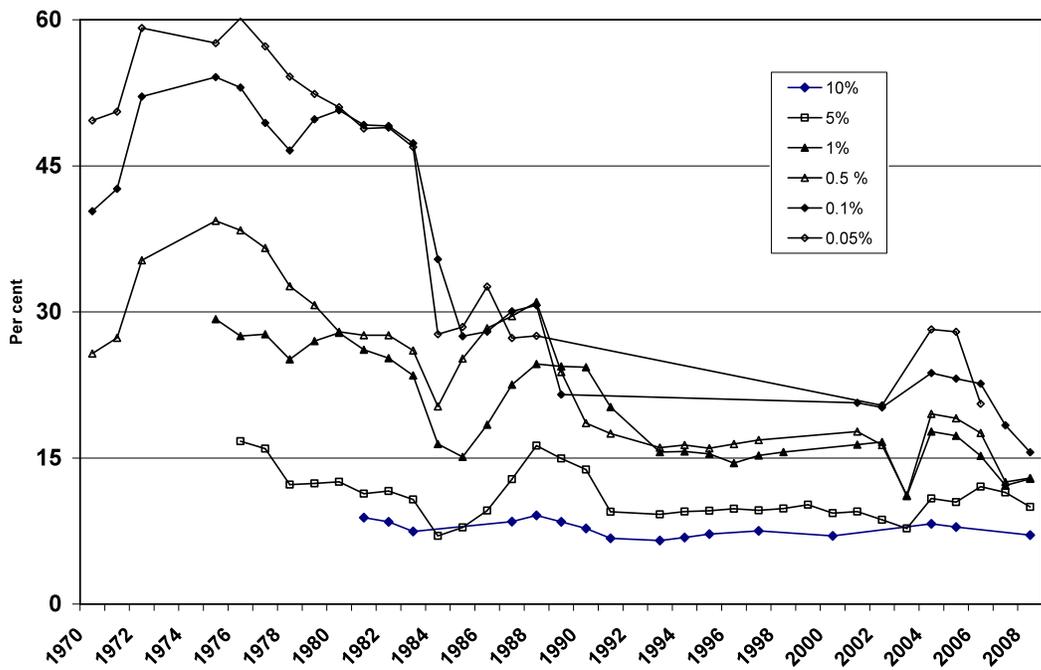


Table 3 After as percent of Gross % reduction

	10%	5%	1%	0.5 %	0.1%	0.05%
1970				25.73	40.35	49.66
1971				27.34	42.63	50.57
1972				35.30	52.12	59.14
1973						
1974						
1975			29.26	39.35	54.11	57.60
1976		16.73	27.51	38.37	53.03	60.14
1977		15.95	27.70	36.56	49.40	57.27
1978		12.27	25.13	32.64	46.58	54.16
1979		12.38	27.01	30.71	49.78	52.37
1980		12.55	27.85	27.96	50.71	51.03
1981	8.88	11.34	26.12	27.60	49.21	48.84
1982	8.45	11.60	25.26	27.61	49.10	48.94
1983	7.46	10.74	23.48	26.04	47.33	46.93
1984		7.00	16.44	20.30	35.41	27.71
1985		7.86	15.10	25.21	27.51	28.45
1986		9.60	18.42	28.32	27.97	32.60
1987	8.46	12.82	22.52	29.56	30.07	27.32
1988	9.11	16.27	24.66	31.01	30.69	27.55
1989	8.43	14.96	24.41	23.83	21.51	
1990	7.77	13.82	24.33	18.58		
1991	6.74	9.47	20.23	17.51		
1992						
1993	6.53	9.20	15.61	16.06		
1994	6.84	9.49	15.67	16.33		
1995	7.19	9.58	15.41	16.01		
1996		9.79	14.48	16.43		
1997	7.51	9.63	15.26	16.84		
1998		9.81	15.61			
1999		10.21				
2000	7.00	9.34				
2001		9.49	16.37	17.72	20.67	
2002		8.64	16.65	16.32	20.18	20.40
2003		7.77	11.09	11.16		
2004	8.24	10.83	17.70	19.52	23.72	28.21
2005	7.91	10.46	17.28	19.08	23.14	27.95
2006		12.06	15.21	17.57	22.64	20.56
2007		11.45	12.18	12.54	18.35	
2008	7.09	9.98	12.87	12.94	15.58	

### 3. Cross-country comparisons

An inadvertent consequence of colonialism is that the similarities in administrative machinery facilitate cross-country comparisons. Many British colonies operated income taxes similar to that in Mauritius. Here I compare the findings for Mauritius with two other countries - Malaysia and Singapore - for which there is evidence concerning the distribution of top incomes both over the colonial period and over the period of independence.

The construction of estimates for these countries is described in Atkinson (2010) and (2011), but follows similar steps. One difference is that the income taxes began after the Second World War, so that there is no requirement to make estimates of national income back to the 1930s. The same qualifications do however apply to the control totals, and this may affect the cross-country comparability. The estimates for Malaysia and Singapore differ in that the control totals for population have been taken as the adult population, rather than an estimate of total tax units. An adjustment to a tax unit basis would reduce the estimated shares for these two countries. The national accounts income total used for Malaysia is close to the United Nations figure (as used for Mauritius) but the percentage attributed to households is higher in the earlier years (97 per cent). The national accounts income total used for Singapore is lower than the United Nations figure (being based on indigenous income) and for most of the period the percentage attributed to households is lower. These differences may well be correct, since the structure of the economies is different, but care must be exercised in making the comparisons.

The shares of the top 0.1 per cent are shown in Figure 5. This highlights the extent to which the top shares in Mauritius were indeed high in the pre-war period. It is possible, as described above, that total income has been understated but it would have to be by a factor of some 2½ times to bring the estimated shares down to post-war levels. From the late 1940s through to the mid-1970s, the top shares are similar in the three countries (apart from the Korean War boom in Singapore). From the mid-1970s there continued to be stability in top shares in Singapore - despite the rapid growth - but top shares fell in Malaysia and, even more, in Mauritius. Then in recent years shares have been rising in all three countries, as is clearer for the share of the top 1 per cent in Figure 6.

Unaffected by the possible differences in the income control totals are the estimated Pareto-Lorenz coefficients (calculated from the share of the top 0.1 per cent in the top 1 per cent) shown for the three countries in Figure 7. There is broadly an inverse U-shape over the post-war period, very much

accentuated in the case of Mauritius in the mid-1970s to mid-1980s period. It is not however clear that the coefficient is continuing to fall. The finding for Mauritius of broad stability in the shape of the top 1 per cent is also found for Singapore.

Figure 5 Comparison of Mauritius with Malaysia and Singapore

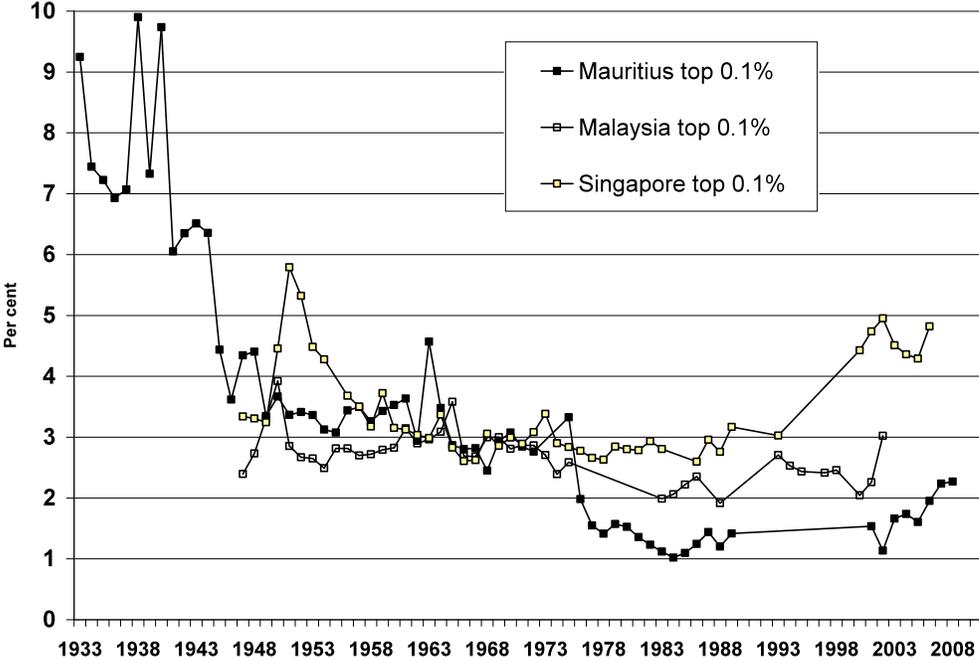


Figure 6 Comparison of Mauritius with Malaysia and Singapore: top 1 per cent

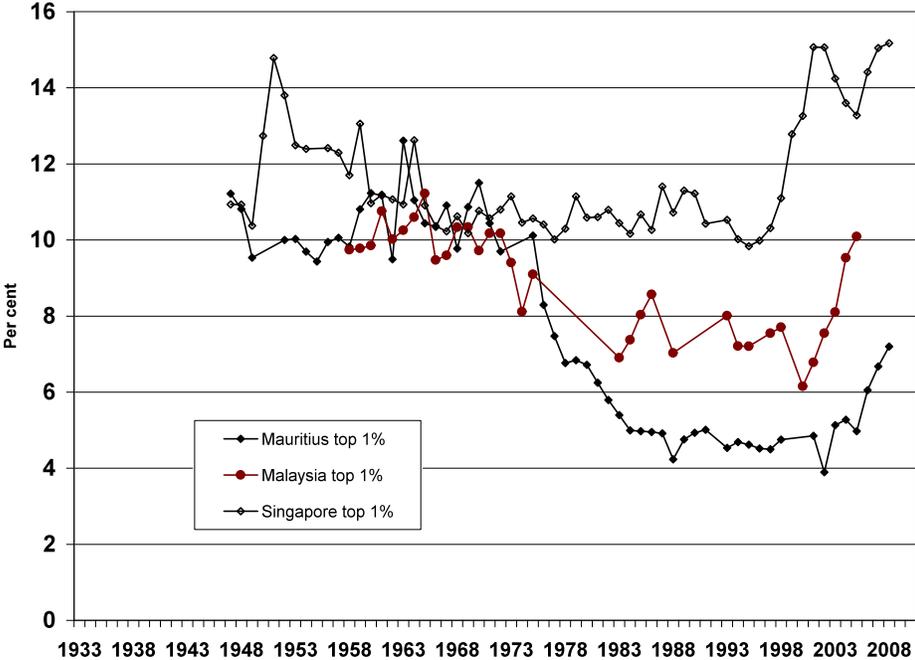
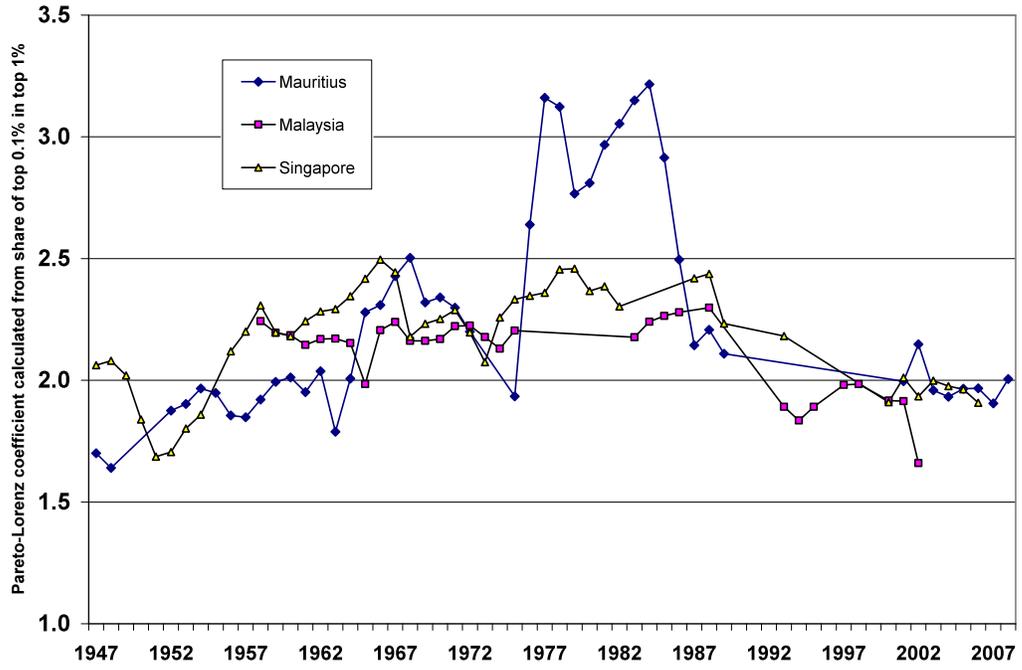


Figure 7 Pareto-Lorenz coefficients for Mauritius, Malaysia and Singapore



## Conclusions

This paper presents new evidence about one part - the very top - of the income distribution in Mauritius. The evidence is surrounded by qualifications, but is of considerable interest for spanning a long period (75 years) that:

- covers both colonial and independent government;
- saw the economy reach a much higher standard of living (and larger population);
- represents the full history of graduated income taxation (there now being a flat tax);
- can be compared with similar evidence for Malaysia and Singapore.

The main conclusions may be summarised as follows:

- the shares of top incomes were strikingly high before the Second World War, falling from 1944 to 1949, and with year-to-year variation influenced by the fortunes of the sugar producing industry;
- in describing the trends over time, a distinction should be drawn between the levels of top shares and the degree of graduation within the top groups (the Pareto coefficient);
- top income shares were relatively stable in the 1950s and 1960s, including the pre-independence decade, at values close to those in Malaysia and Singapore, but fell from the mid-1970s to the mid-1980s, a period of economic difficulties but also the beginning of sustained growth (but there was no similar fall in Singapore);
- over the same period, the gradient of the upper tail was becoming less steep, the Pareto coefficient rising to higher values than found in Malaysia or Singapore;
- the gradient began to become more steep from the mid-1980s, and top income shares have begun rising in recent years;
- the period has seen the rise and fall of progressive income taxation, and this is reflected in the differences between before and after tax shares of total income.

## Appendix A Sources and methods for Mauritius

The sources for the poll tax and income tax data are given in Table A.1. the abbreviations are:

ADS	Annual Digest of Statistics
ARP	Annual Report of the Poll Tax Commissioner
AR	Annual Report of the Income Tax Department
BADS	Bi-Annual Digest of Statistics
DPFS	Digest of Public Finance Statistics
YBS	Year Book of Statistics

Income year starting 1 July	SOURCE USED	Table or page number	Features of statistics and changes affecting their interpretation
1933	ARP 1936-37	page 11	Statistics refer to gross incomes.
1934	ARP 1937-38	page 13	
1935	ARP 1938-39	page 11	
1936	ARP 1939-40	page 10	
1937	ARP 1939-40	page 10	
1938	ARP 1939-40	page 10	
1939	ARP 1941-42	page xiv	
1940	ARP 1941-42	page xiv	
1941	ARP 1942-43	page xii	
1942	ARP 1944-45	page b	
1943	ARP 1944-45	page b	
1944	ARP 1946-47	page xiv	
1945	ARP 1946-47	page xiv	
1946	YBS 1948	page 113	
1947	YBS 1949	page 146	
1948	YBS 1950	page 170	
1949	YBS 1951	page 170	
1950	AR 1955-56	page 9	Introduction of Income Tax and statistics begin to apply to chargeable income
1951	AR 1956-57	page 8	
1952	AR 1957-58	page 9	Statistics "to some extent incomplete" on account of damage to records in fire of December 1955.
1953	AR 1958-59	page 8	Statistics "to some extent incomplete" on account of damage to records in fire of December 1955.
1954	AR 1959-60	page 9	
1955	AR 1960-61	page 8	
1956	AR 1961-62	page 9	
1957	AR 1962-63	page 8	
1958	AR 1963-64	page 8	
1959	AR 1964-65	page 8	
1960	AR 1965-66	page 8	
1961	AR 1966-67	page 9	
1962	AR 1967-68	page 8	
1963	AR 1968-69	page 8	
1964	AR 1969-70	page 8	

1965	AR 1970-71	page 9	
1966	AR 1971-72	page 8	
1967	AR 1972-73	page 7	
1968	AR 1973-74	page 7	
1969	AR 1973-74	page 7	
1970	BADS, June 1975	page 34	Ranges defined in terms of GROSS income rather than chargeable income from this date; information available from this date on total income by range; data described as "provisional"
1971	BADS, June 1977	page 39	Data described as "provisional"
1972	BADS, June 1977	page 39	Data described as "provisional"
1973			
1974			
1975	BADS, June 1978	page 40	Data described as "provisional"
1976	BADS Dec 1980	page 41	
1977	BADS Dec 1981	page 42	
1978	BADS Dec 1981	page 42	
1979	ADS 1985	Table 4.10	
1980	ADS 1985	Table 4.10	
1981	ADS 1985	Table 4.10	
1982	DPFS 1985-1989	Table 12	
1983	DPFS 1985-1989	Table 12	
1984	DPFS 1986-1990	Table 21	
1985	DPFS 1987-1991	Table 21	
1986	DPFS 1987-1991	Table 21	
1987	DPFS 1990-1994	Table 6.1	From this date, wife electing to be taxed separately is counted as separate taxpayer
1988	DPFS 1990-1994	Table 6.1	
1989	DPFS 1995	Table 6.1	
1990	DPFS 1995	Table 6.1	
1991	DPFS 1995	Table 6.1	
1992	DPFS 1997	Table 6.1	Data for this year affected by introduction of PAYE and not used
1993	DPFS 1998	Table 6.1	PAYE introduced with effect from 1 July 1993
1994	DPFS 1998	Table 6.1	
1995	DPFS 2000	Table 6.1	
1996	DPFS 2001	Table 6.1	
1997	DPFS 2003	Table 6.1	
1998	DPFS 2003	Table 6.1	
1999	DPFS 2003	Table 6.1	
2000	DPFS 2003	Table 6.1	
2001	DPFS 2004	Table 6.1	
2002	DPFS 2005	Table 6.1	
2003	DPFS 2007	Table 6.1	
2004	DPFS 2008	Table 6.1	
2005	DPFS 2009	Table 8.1	Definition of income in the statistics switches from gross to net income
2006	DPFS 2009	Table 8.1	
2007	DPFS 2009	Table 8.1	
2008	DPFS 2009	Table 8.1	

*Total population:*

From 1970: United Nations Statistics Division, National accounts main aggregates database, Basic data selection, Population, Latest data upload, December 2010.

Linked backwards at 1970 to the resident population figures for the Island of Mauritius (i.e. not including the Island of Rodrigues) taken from the *Annual Digest of Statistics* (ADS) 1985, Table 1.13, and linked backwards at 1956 to the *Year Book of Statistics* (YBS) 1958, page 3, and 1948, page 4.

*Population by age:*

1931: *Final report on the census enumeration made in the colony of Mauritius and its dependencies on April 26<sup>th</sup>, 1931*, Government Printer, Port Louis, 1933, Table X.

1944, 1952, 1962, 1972, 1983, 1990 and 2000: website of Central Statistics Office, Table 2(a) - Population by age and sex, Republic of Mauritius - Census 1944 onwards.

*Number of married women:*

1931: *Final report on the census enumeration made in the colony of Mauritius and its dependencies on April 26<sup>th</sup>, 1931*, Government Printer, Port Louis, 1933, section V.

1944: *Final report on the census enumeration made in the colony of Mauritius and its dependencies on 11<sup>th</sup> June, 1944*, Government Printer, Port Louis, 1945, section V.

1952: Central Statistical Office, *Census 1952*, Part I, Government Printer, Port, Louis, 1953, section VII.

1962: (interpolated).

1972: Central Statistics Office, *1972 Population census of Mauritius*, volume 1, Port Louis, 1974, Table 8.

1983: Central Statistics Office, *Housing and Population Census of Mauritius*, volume II, Port Louis, 1984, Table 12.

1990: Central Statistics Office, *2000 Housing and Population Census, Analysis Report*, volume IX, page 8.

2000: website of Central Statistical Office, 2000 Housing and Population Census report, Resident population by marital status, Table D3.

*Estimated value of sugar production:*

The information on sugar cane output, and the sugar price received by producers, is obtained from publications of the League of Nations (LN), *Statistical Yearbook 1939/40* and the Food and Agriculture Organisation (FAO), *Yearbook of Food and Agricultural Statistics* and later *Production Yearbook, Part 1: Production*, as follows, working backwards from 1959:

Output of sugar cane crushed in factories, million tonnes, 1959 from FAO 1961, page 69, 1957-8 from FAO 1960, page 69, 1955-6 from FAO 1958, page 67, 1953-4 from FAO 1955, page 39, 1951-2 from FAO 1953, page 45, 1948-50 from FAO 1951, page 42, 1947 from FAO 1950, page 46, 1945-6 from FAO 1948, page 19, 1940-45 from FAO, 1947, page 53 (note that 10 quintals = 1 tonne), 1933 to 1939 from LN, page 105. The last of these series relates to refined sugar; it is linked using the averages for 1934-8 given in FAO 1947, pages 53 and 55.

Price of sugar (average price ex syndicate) 1950-59 from FAO 1963, page 305, 1934-1949 from FAO 1955, page 254; 1933 assumed equal to 1933.

Figure A.1 Actual and fitted national income

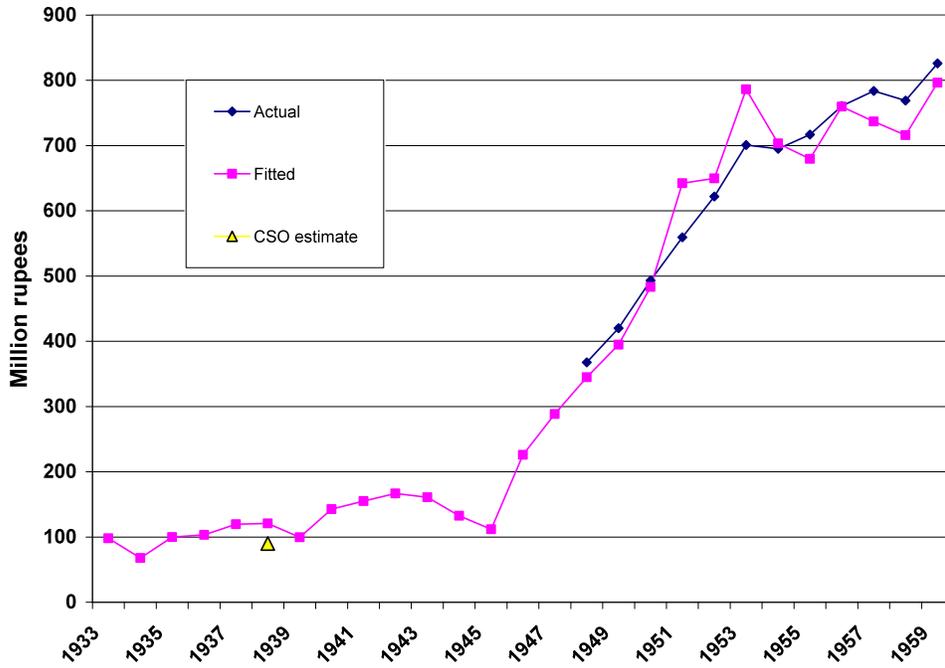
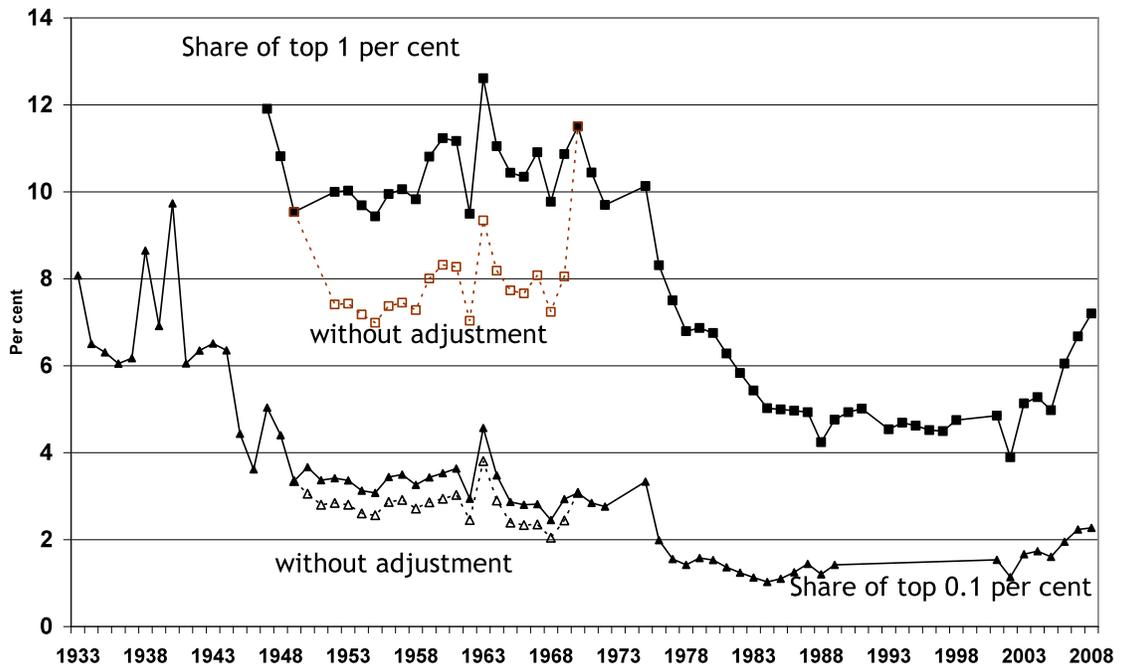


Figure A.2 Effect of adjustment from chargeable to gross income 1950-1969



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*The production of foodcrops in Mauritius during the war, 1939-1945* (Colony of Mauritius, 1947).