

## Top Incomes in Colonial Seychelles

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In 2013, the Seychelles were recorded as having the highest Gini coefficient (66 per cent) for income inequality of any country in the world (World Development Indicators, 2014). The republic had then been independent for thirty seven years. Before independence, however, it had been under colonial rule for some two hundred years.<sup>1</sup> It is therefore interesting to go back to its colonial past to see how unequal was the distribution of income under British governance. Shortly before independence, the Government of the Seychelles reported that “information on the distribution of personal incomes in Seychelles is incomplete, and in particular there is little information about the incomes of the rich” (Government of Seychelles, 1975, page 35). There was however one source that could have been exploited: the income tax returns published by the colonial authorities. It is this source that is used in the present paper.

The aim of the paper is to provide some evidence - partial and incomplete - about the colonial legacy in terms of the distribution of income. The evidence is partial because it relates only to the small fraction of the population who were subject to income tax. The evidence is incomplete because the tax legislation did not necessarily cover all forms of income, and because there was avoidance and evasion. Nonetheless, the income tax is an important feature of society. In his final report as Chief Income Tax Officer in the Seychelles, A C E Georges noted that “It must have been at the same time when Henry Court converted pig iron into malleable iron that the Marquis de Vauban invented income tax - a great invention and perhaps the fairest of all taxes. I am certain that he did not realise at the time that it was going to affect the lives of so many people” (*Annual Report of the Income Tax Department for the year 1970*, page 2).

The income tax tabulations provide one quantitative source in a field where there is little concrete information. They are one source from which we can seek to understand whether the Seychelles before independence in 1976 were unusually unequal.

The first section of the paper describes the basic income tax data; the second section explains the derivation of the control totals for population and income, necessary to place the income tax tabulations in perspective; and the third section presents the results. The main results are summarised in the final section.

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<sup>1</sup> The Seychelles had been a separate colony since 1903; previously under British rule, and prior to 1814 under French rule, it had been a dependency of Mauritius. It is claimed that when the island was first colonised in 1770, it was uninhabited (Colonial Office, *Seychelles, Report for the years 1967 and 1968*, page 3).

## 1. The income tax data

The income tax was introduced in the Seychelles in 1921, but the earliest information that I have been able to locate concerning the distribution of taxpayers relates to the 1950s - see Table 1, which summarises the data used in this paper. As this table shows, there are distributional data for the years 1950 to 1955 and for 1961 to 1971. In total, there are 17 observations. There are no observations post-independence. In this respect it should be noted that 1976, the year of independence, also saw the introduction of a system of pay as you earn, which meant that those with only employment income were not generally assessed (*Statistical Abstract*, 1977, page 58). The income tax returns became therefore a less informative source.

The income 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 data for most years give the frequency distribution of individual taxpayers by range of assessed income. Assessable income is gross income before any deductions (i.e. before deducting losses or capital allowances). The rupee was worth 1s 6d, or 3/40<sup>th</sup> of £1. In 1953, the income tax was extended to cover agricultural produce, which was a major source of income (*Annual Report of the Inland Revenue Department for the years 1954-1955*, page 1). (In what follows, AR refers to the annual report of the Inland Revenue Department.) The total income assessed for IY1952 was 45 per cent higher than that for IY1951. Apart from this change, the income tax remained largely unchanged in form over the period studied. In the 1950s, the exemption for a single person was Rs. 500 and for a couple was Rs. 2,500 (later reduced to Rs. 2,000), with a further allowance for earned income. In addition, incomes below Rs. 2,400 were exempt.<sup>2</sup> For incomes above this, the rates of tax started at 2½ per cent for the first Rs. 3,000, and rose to 50 per cent on taxable income of Rs. 40,000 or more.

The published statistics do not give the amount of income in each range, so that it is necessary to make an estimate. For this purpose, 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 percentiles are expressed as ratios of the mean income. In order to calculate the income shares, the income in the range is calculated as  $[y_i(1-F_i)-y_{i+1}(1-F_{i+1})]/(1-1/\alpha_i)$ . Where the calculated Pareto coefficient is less than 1, then the mean is taken as the mid-point. For the open-ended top interval, the Pareto coefficient is used from the penultimate interval. The income share is then calculated using linear interpolation of the Lorenz curve, which gives a lower bound. It is

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<sup>2</sup> As noted by Hurd (1959, page 11), this created a “notch” in the budget constraint, in that people with incomes above Rs. 2,400 could be worse off than those with incomes just below.

possible to check the accuracy of the interpolation from the known total for assessed income. For IY1971, for example, the interpolation yields a total of Rs. 33.7 million, which is very close to the reported total of Rs. 33.1 million.

For the earliest years, 1950 to 1953, there is the further difficulty that the distributions are published in terms of the amount of tax paid. It is necessary therefore to invert the tax function to work back to the amounts of assessed income. Since there is only an income control total for one of these years (1951), and the resulting estimate is only given as a memorandum item, discussion of the procedure is relegated to an appendix.

A final check is provided by comparing the calculated total assessed income with the totals published by the tax authorities for certain years - see Figure 1.<sup>3</sup> With the exception of 1969, when there is a large divergence (and 1970 when there is a smaller divergence),<sup>4</sup> the approximations described above seem to follow the recorded totals relatively closely. In particular, they follow closely the increase in assessed income in 1952, when agricultural income was brought within the purview of the income tax.

As noted at the outset, the income tax figures are subject to avoidance and evasion. The *Annual Report* for 1972 referred to the “popular conception, which may have some justification, that income tax evasion is rife among certain sections of the community” (AR for the year 1970, page 1). It ends the report by saying that “despite the problems ... the staff have remained cheerful”, but the reader must bear in mind that incomes are likely to be under-stated in the results that follow to a degree that it is difficult to assess.

## 2. Control totals for population and income

The number of tax units recorded in the income tax statistics has to be related to the population of tax units as a whole. The tax unit was the single adult individual or the married couple. The corresponding total is taken therefore to be the total population minus the number of persons aged under 15 minus the number of married women. There are therefore

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<sup>3</sup> The totals in principle relate to the income assessed for the year in question, not the amount assessed in a particular year. Thus the total for IY1950 includes assessments made in years of account up to 1956. For the later years, the totals omit later assessments. Sources: AR for the year 1956, page 5, AR for the four years ended on 31<sup>st</sup> December, 1960, page 4, AR for the year 1962, page 5, AR for the year 1963, page 4, AR for the year 1967, page 7, AR for the year 1969, page 7, AR for the year 1970, page 7, AR for the year 1971, page 7, and AR for the year 1972, page 7.

<sup>4</sup> The difference may in part be explained by the omission of later assessments from the published figures.

three steps: (a) estimation of total population, (b) subtraction of those aged under 15, and (c) subtraction of married women.

The total population figures are taken from the US Census Bureau International Database (the source used by Maddison, 2003), available at <http://www.census.gov/population/international/data/idb/informationgateway.php>).

At the heart of these population figures are the population censuses, and these provide the basis for the adjustment to adult population and for married women discussed below. The earlier censuses in the Seychelles have however been the subject of debate. In the report on the 1960 Census (Webb, 1960, page 14) it was argued that the earlier censuses of 1931 and 1947 should be disregarded on the grounds that there had been over-enumeration (of some 8 per cent). It is for this reason that the population figures used here are lower than those published at the time in the *Colonial Reports* on the Seychelles: the figure for 1950, for example, is about 10 per cent lower than that in the *Report* for 1951 and 1952.

The total of tax units is reached from the total population figure by subtracting those aged under 15 and subtracting married women. The 1960 Census (Webb, Table II) showed that the 38.5 per cent of the population were aged under 15. The same source (Table VI) showed that in 1960 married women constituted 22.1 per cent of those aged 15 and over, or 13.6 per cent of the total population.<sup>5</sup> The earlier 1931 Census (Colony of Seychelles, 1931) classified the population by different age ranges, but showed that the proportion aged under 10 was 25.3 per cent and aged under 20 was 46.1 per cent. These numbers bracket the 38.5 per cent found in 1960, and this figure has been applied to the period considered here (from 1950 to 1971). According to the 1931 Census, married women constituted 13.7 per cent of the total population, which is virtually the same figure as in 1960. The proportion of 13.6 per cent has been applied here throughout the period. Taken together, this means that the tax unit total is equal to 47.9 per cent of the total population. The resulting figures are shown in Table 2.

The starting point for the control total for total household income is national income. Here, however, there is the difficulty that estimates of national income for the Seychelles are of recent origin. According to the Statistics Division,

“The first attempt at preparing national income estimates for the country started in 1971. The method adopted was the income approach and the estimates were prepared for the period 1971 to 1974 ... The income approach was used until 1976 ... It was recognised that this approach was unsatisfactory because of the deficiencies of the basic data ... income from agriculture was under estimated [and there was] under-reporting of operating surpluses/losses in business,

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<sup>5</sup> The 1980-81 Census showed that the proportion of the population aged 15 or over was slightly lower at 34.9 per cent (Republic of Seychelles, *Statistical Bulletin*, March 1985, Table 9). Married women constituted 22.3 per cent of those aged 15 and over (same source, Table 12).

income from self employed and imputed rentals for owner occupied houses due to poor coverage. [In 1978 new estimates for 1976 onwards were prepared] using the production and expenditure approaches. The new GDP estimates were not comparable with the earlier ones and represented a break with the earlier series” (Republic of Seychelles, 1984, pages 290-291).

Since we are seeking control totals for the period 1950 to 1971, there seems to be little that we can do. However, the limited role of these control totals should be borne in mind. We are not seeking to measure the growth of the economy; they are needed only to provide a sense of scale. For this purpose, approximate figures may be adequate. What is more, the income-based approach is closer to that adopted here. Indeed, the earlier Colonial Office estimates for the 1950s - not referred to in the passage quoted above - were indeed constructed by adding to the income tax totals estimates of the amounts of income not covered.

For these reasons, I do not reject the approximate estimates made on an income basis. I start therefore from the figures given in the *Colonial Reports* on the Seychelles (1951 and 1952, page 8, 1953 and 1954, page 9, 1955 and 1956, page 9). At the end of the period, there is the income-based estimate of national income for 1971 (Government of Seychelles, 1975, Table 1). In interpolating the intervening years, I have made use of the total local revenue (i.e. government receipts not including grants in aid and colonial development funds). (The local revenue figures are from the *Annual Report by the Treasurer, Annual Report of the Accountant General and Colony of Seychelles* (1965).) Joining the totals for the 1950s and for 1971, a linear relation for national income in Rs. million would be 2.55 times local revenue plus 3. This yields a national income figure for 1961 of Rs. 17 million. On this basis, the increase from 1961 to 1971 is by a factor of 4.9. As one check on this procedure, it may be noted that the *Annual Reports* of the Income Tax Department in the 1960s have compared the totals of income assessed with the movements in the value of exports and imports in the previous year (for example, the AR for the year 1963, pages 4 and 5). The value of imports increased between 1961 and 1971 by a factor of 7. Alternatively, we may take the increase in GDP at constant price PPP in the estimates made by Maddison (2002), which was by a factor of 1.7. Over the period, the minimum wage for agricultural workers doubled, so that, if this were taken as an index of price movements, the money value of GDP on a Maddison basis would imply a rise by a factor of 3.4. The figure derived using total local revenue lies, therefore, approximately half way between the two check calculations. At the same time, the distance between the figures is an indication of the uncertainty that surrounds the estimated control totals. The estimated top income share could be 30 per cent lower or 44 per cent higher.

The estimates for the 1950s were discussed by Rowe (1959, pages 50-53). He describes the total for 1955 of Rs. 17.5 million as “the first real attempt at an estimate rather than sheer guesswork” (1959, page 50). He notes that this total (given in Colonial Office, *Report on Seychelles for the years 1955 and 1956*, page 9) is constructed from a number of known

components, including the total for assessed income in the Annual Report of the Income Tax Department. He also expresses doubts about the earlier figure for 1951 of Rs. 13.5 million, on the ground that 1951 was a boom year for copra exports at Rs. 7.1 million, compared with Rs. 4.5 in 1955. On this basis, he concludes that the 1951 figure is “surprisingly low”. In view of this, in the main estimates I only make use of the total for 1955, although a memorandum item is also given for 1951.

These figures for the 1950s, and those for 1961 to 1971 described above, are for national income. Household income is less than national income to the extent that income accrues to the government and there are undistributed company profits; operating in the opposite direction, government transfers and payment of debt interest add to household income. Typically, this leads household income to be less than national income. However, given that the income-based national accounts figures are believed to have under-stated agricultural income and income from self-employment (Republic of Seychelles, 1984, page 290), I have in the present case taken household income as 100 per cent of national income.

The control totals for household income obtained using the methods described above are shown in Table 2.

### **3. Top incomes in the Seychelles**

The total number of tax units at the beginning of the period is around 15,000 and at the end around 25,000. In view of the small numbers, attention is focused on groups no smaller than the top 0.25 per cent, which in the middle of the period corresponds to some 50 tax units.

The income shares of the top groups in the Seychelles are summarised in Table 2 and illustrated in Figure 2. If we begin with the estimates for 1971, for which the income total has a relatively solid foundation, then we can see that the top shares were, at that time, high by international standards. The top 1 per cent in the Seychelles received 14 per cent of total gross income, which may be compared with 10 per cent in Mauritius and Malaysia and 11 per cent in Singapore. (The corresponding figure for the UK in 1971 was 7 per cent.) The top 0.5 per cent in the Seychelles received 9.7 per cent of total gross income, which may be compared with 7 per cent in Mauritius, Malaysia and Singapore. The top 0.25 per cent had a share of 7.5 per cent, which meant that they had 30 times their proportionate share, which may be compared with 20 times in Mauritius.

To get into the top 1 per cent in the Seychelles in 1971 required an income that was some 9 times the average (which was Rs. 3,100 per year). This is a higher hurdle than that in Mauritius at the time, where the top percentile was 5.1 times average income. In the same way, it required 15.4 times average income to be in the top 0.25 per cent in the Seychelles

compared with 10.9 times in Mauritius. The percentiles are shown in Figure 3 and given in Table 2.

Income inequality at the top was high in the Seychelles in 1971. What can be said about the changes over time? From Figure 2 it appears that there was little sign of a decline in top shares until the mid-1960s, but that there was then a marked decline. At the start of the 1960s, the estimated top shares were much higher than in 1971. In 1961, the estimated share of the top 1 per cent was 28 per cent - a very high figure by international standards. The highest figure recorded for South Africa in the World Top Incomes Database is 24 per cent. This is indeed the figure estimated for the Seychelles for 1955. Both the high level, and the fall, however, may be a reflection of errors in the estimation of the control totals for income. The 1955 figure has a definite foundation; those for the 1960s are more speculative. If the total for 1961 were too low, then the top income shares would be over-stated. As noted in the previous section, the total could be too low to an extent that would imply that the shares were only 70 per cent of the figures shown in Table 2. The share of the top 1 per cent in 1961 would become 19.7 per cent, and that of the top 0.5 per cent would become 13.6 per cent (as indicated by the vertical line in Figure 2). This would bring the figures down, but still mean that the Seychelles were quite unequal. The shares of the top 1 per cent in 1961 were 8 per cent in Mauritius and 11 per cent in Malaysia and Singapore. There would still be a decline from 1961 to 1971, even if it were less marked.

A similar story applies to the percentiles shown in Figure 3. To enter the top 1 per cent in 1961 one needed some 13 times average income; to enter the top 0.25 per cent, one needed 30 times the average. These thresholds fell; indeed it may be seen that, in contrast to the top income shares, the decline started at the beginning of the 1960s.

In view of the uncertainties surrounding the control totals for income, it is helpful to consider what can be said about the shape of the upper tail independently of the control totals for income. From the control total for tax units, we can define the cumulative distribution,  $F$ , and for each value of  $F$  identify the percentile point,  $y(F)$ , and the average income,  $\mu(F)$ , above this point. The ratio of  $\mu(F)$  to  $y(F)$  is then defined as  $M(F)$ . Where the Pareto distribution has a Pareto upper tail,  $M(F)$  is a constant, equal to  $\alpha/(\alpha-1)$ , where  $\alpha$  is the Pareto coefficient. However, as may be seen from Figure 4,  $M(F)$  is not constant in the case of the Seychelles.  $M(F)$  falls as we approach the top of the distribution. (In considering these results, it should be borne in mind that the underlying estimates of income by ranges were derived making the assumption that the Pareto distribution held within the range; however, the coefficients were not required to be the same across ranges.)

From Figure 4, it is clear that any attempt to summarise the upper tail in terms of a single Pareto coefficient is likely to be misleading. At the ninety-fifth percentile, the value of  $M$  is around 2.5, implying a Pareto coefficient of 1.67, but at the top percentile,  $M$  is around 1.5, implying a



coefficient of 3. The former implies a high level of income concentration; the latter is more moderate. At the same time, some conclusions may be drawn. The M curves moved downward over the period from the 1950s to 1971 taken as a whole. The curve for 1961 is below that for 1955, and the curve for 1971 is below that for 1961. In this sense, the distribution became less concentrated over the period as a whole. At the same time, if we look in more detail, we see that the M curves tended to move upward in the first half of the 1960s. Since the income shares, divided by the population share, are equal to M times the percentile, this explains why the income shares were broadly stable in the early 1960s, despite the decline in the top percentiles shown in Figure 3. It was getting easier to enter the top income groups but the gradient within the group was steeper.

#### 4. Conclusions

Little is known about the distribution of income in colonial times. In this paper, I have explored one source - the published income tax tabulations - with the aim of casting some light on the upper tail of the distribution in the period before independence. To set the data in context has involved constructing control totals, and those for income are - in the absence of full national accounts - speculative in nature. The resulting income shares have therefore to be treated with considerable caution. However, they certainly suggest that top income shares, and the threshold to enter the top income groups, at the beginning of the 1970s in the Seychelles were high by international standards. The top shares were high in comparison with those in Mauritius, Malaysia and Singapore. They were high in relation to those in countries covered by the World Top Incomes Database. The simple answer to the question with which the paper began is that the colonial legacy appears to have been a high level of income inequality at the top. At the same time, there had been a distinct reduction in income concentration over the two decades preceding independence.

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## Appendix: Income tax data for 1950 to 1953

For the 1950 to 1953 there is the further difficulty that the distributions are published in terms of the amount of tax paid. It is necessary therefore to invert the tax function to work back to the amounts of assessed income. (No use is made of the lowest range, which is affected by the Rs. 2,400 exemption.) This can only be approximate, since the tax actually paid depends on family circumstances and on the source of income (there was an allowance for earned income). The income/tax function has been calibrated using data for one of the overlapping years (IY1954). The logarithm of taxable income,  $yT$ , has been calculated from the tax schedule, and regressed against the logarithm of the number,  $N$ , paying more in tax. Equally, the logarithm of assessed income,  $y$ , has been calculated and regressed on the number,  $N$ , with incomes in excess of  $y$ . Eliminating  $N$  between these two equations gives an expression for  $y$  as a function of  $yT$ , which has been used to calculate the intervals in the distribution by amounts of tax paid. The resulting estimates of the income shares have been checked against those obtained for the other overlapping year (IY1955). The share of the top 0.5 per cent differed by 1.3 percentage points, and that of the top 0.25 per cent by 1.8 percentage points. Given the approximate nature of the tax calculation, and the further procedure necessary to arrive at income totals, this does not seem unreasonable.

Table 1 Sources of income tax data

Income year	Source of data (AR denotes Annual Report of the Inland Revenue Department)
1950	AR for the years 1954-1955, para 33, by amounts of tax paid
1951	AR for the years 1954-1955, para 33, by amounts of tax paid
1952	AR for the years 1954-1955, para 33, by amounts of tax paid
1953	AR for the years 1954-1955, para 33, by amounts of tax paid
1954	AR for the years 1954-1955, para 33, by assessed income
1955	AR for the year 1956, para 27
1956	
1957	
1958	
1959	
1960	
1961	AR for the year 1963, para 17
1962	AR for the year 1963, para 17
1963	AR for the year 1964, para 17
1964	AR for the year 1965, para 17
1965	AR for the year 1966, para 17
1966	AR for the year 1967, page 9
1967	AR for the year 1968, page 9
1968	AR for the year 1969, page 8
1969	AR for the year 1970, page 8
1970	AR for the year 1971, page 9
1971	AR for the year 1972, page 9

Table 2 Control totals for tax units and total income Seychelles

	Total tax units 000s	Total income Rs. Million
1950	15.8	
1951	15.8	13.5
1952	16.0	
1953	16.4	
1954	16.6	
1955	17.2	17.5
1956		
1957		
1958		
1959		
1960		
1961	20.6	17.0
1962	21.0	19.1
1963	21.7	20.8
1964	22.4	23.0
1965	22.9	25.8
1966	23.4	29.3
1967	23.9	33.8
1968	24.5	40.4
1969	25.2	53.1
1970	25.9	59.2
1971	26.7	82.7

Table 3 Top income shares and percentiles Seychelles 1950 to 1971

	Share of total gross income			Percentiles relative to mean		
	Top 1 per cent	Top 0.5 per cent	Top 0.25 per cent	Top 1 per cent	Top 0.5 per cent	Top 0.25 per cent
1950						
1951						
1952						
1953						
1954						
1955	23.7	19.8	12.9	9.52	16.49	28.26
1956						
1957						
1958						
1959						
1960						
1961	28.1	19.4	12.4	13.64	20.68	30.75
1962	27.8	19.7	11.9	12.87	20.64	30.44
1963	28.6	20.0	12.0	13.17	20.50	29.09
1964	27.4	19.5	12.2	12.07	18.97	27.83
1965	27.1	19.3	11.8	11.77	18.43	26.34
1966	24.5	17.3	10.4	10.79	16.77	24.01
1967	22.2	18.4	11.2	10.75	16.36	23.06
1968	25.6	15.4	11.4	12.58	18.04	24.54
1969	23.0	17.1	10.2	13.21	18.59	26.18
1970	17.6	11.7	8.8	11.36	15.08	20.03
1971	14.0	9.7	7.5	8.97	11.74	15.37

Memorandum item: 1951 share of top 0.5 per cent = 16.18 per cent; share of top 0.25 per cent = 9.55 per cent.

Figure 1 Total assessed income and calculated totals

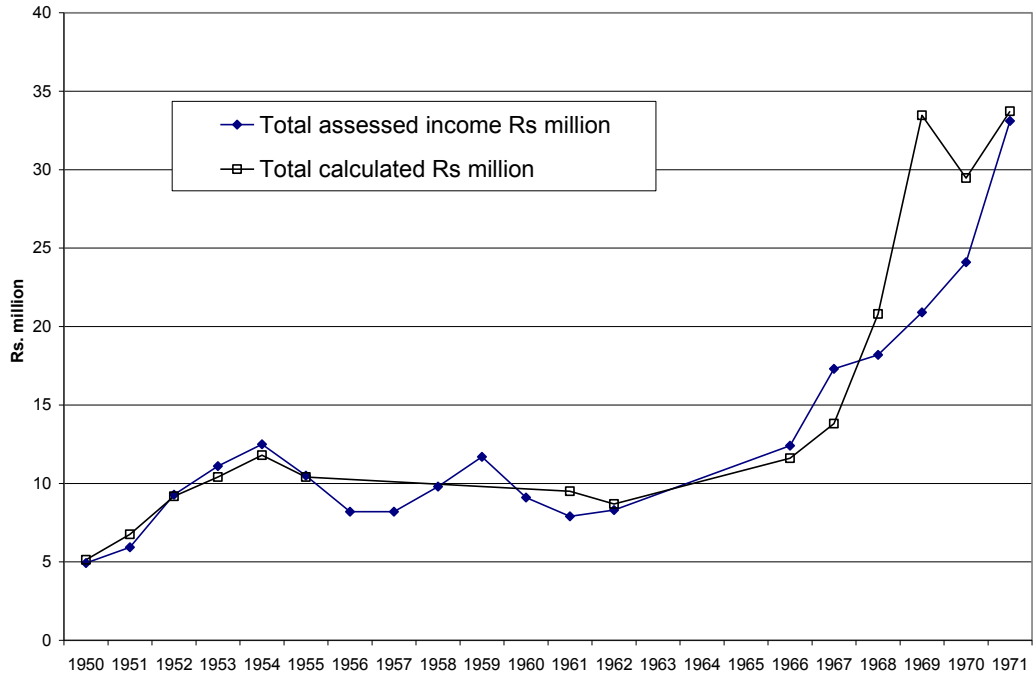


Figure 2 Top income shares Seychelles

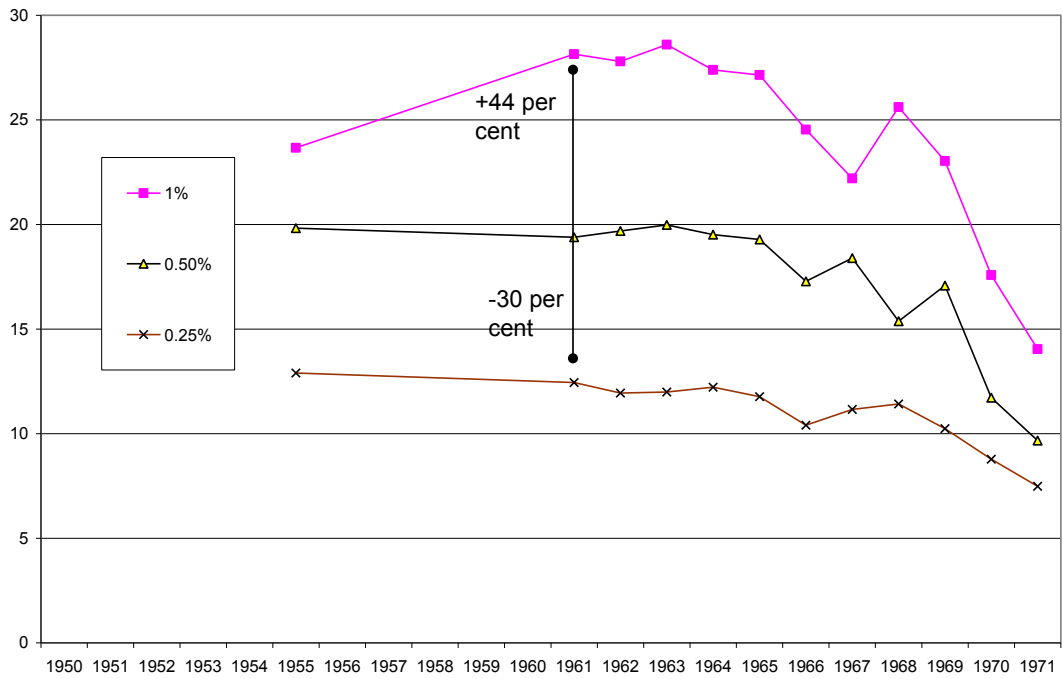


Figure 3 Percentiles Seychelles

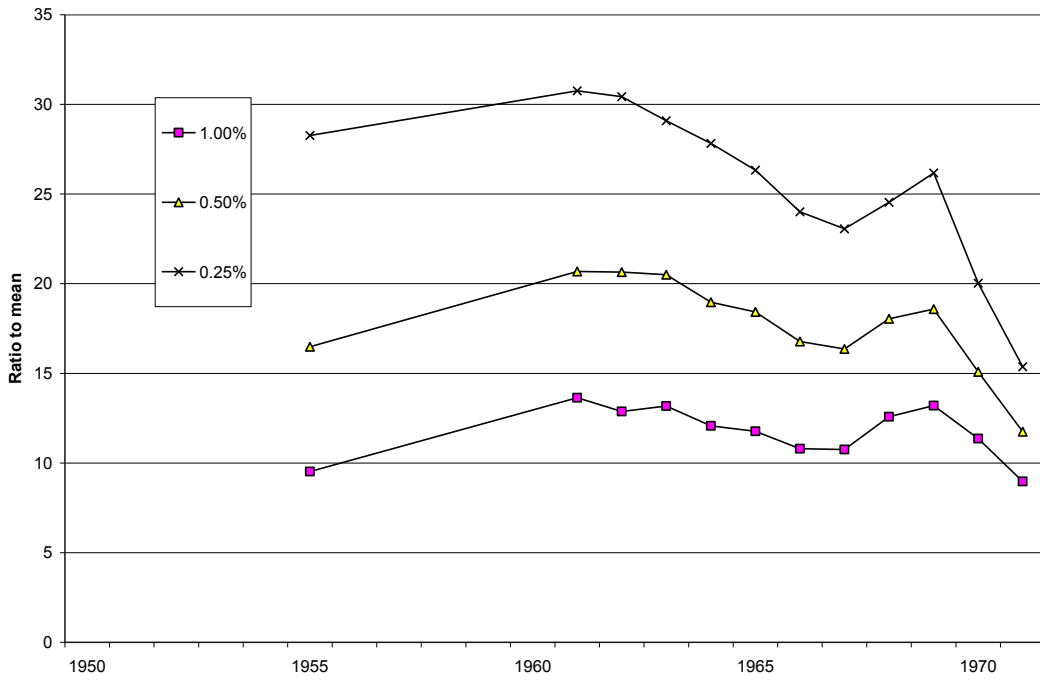


Figure 4 M curves Seychelles

