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Chapter Author: A. B. Atkinson

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CHAPTER 10

The Distribution of Wealth in Britain in the 1960s—the Estate Duty Method Reexamined

A. B. Atkinson
University of Essex

There seems little doubt that the distribution of wealth in Britain is highly concentrated; however, while this has been widely accepted, there has been remarkably little research in recent years to determine the degree of inequality with precision. The only statistics published for the 1960s are those prepared by the Inland Revenue, and these do not set out to cover the entire distribution. Moreover, no attempt has been made to reconcile these estimates with the National Balance Sheet data. This lack of interest is the more surprising in view of the fact that the estate method was pioneered in Britain, and that in the past there have been major studies of the size distribution of wealth by (among others) Clay [1], Daniels and Campion [2], Campion [3], Langley [4], [5], and Lydall and Tipping [6].

This paper describes the first results of a new investigation intended to provide more reliable estimates of the distribution of wealth in Britain in the 1960s.[1] The estimates presented here are based on the estate duty returns, but are adjusted in a number of major respects to take account of the deficiencies of this source. The paper builds on the work of earlier investigators, but departs from them in its extensive use of National Balance Sheet data

In preparing the revised version of this paper, I have been greatly helped by the comments of the discussant, as well as by the detailed criticism of the Statistics and Intelligence Division, Inland Revenue.

[1] The research is being undertaken at the University of Essex by Alan Harrison and myself and is supported by the Social Science Research Council. The full results of the study will be reported in a forthcoming monograph, *The Distribution of Wealth in Great Britain*, to which the reader is referred for further details.

which were not previously available and in its analysis of the sensitivity of the results to the different assumptions made.

The plan of the paper is as follows: Section I describes the estate duty method as presently employed by the Inland Revenue and examines the principal problems connected with this approach. Section II sets out the alternative approach to the use of the estate duty data adopted in this paper and presents new estimates on a more comprehensive basis for the year 1968. Section III examines the shape of the wealth distribution indicated by the estimates and the extent to which it may be represented by particular functions such as the Pareto and log-normal distributions. Section IV compares the estimates presented here with those prepared by the Inland Revenue and summarizes the main results.

I. THE ESTATE DUTY METHOD AND THE INLAND REVENUE STATISTICS

The estate duty method has a long history and was used by Baxter to estimate total personal wealth as early as 1869. Since then, the method has been refined, notably by the use of age-related multipliers pioneered by Mallet [8], and has been applied to the estimation of the size distribution of wealth by Clay [1] and subsequent writers. This section examines the use which has been made of this method in recent years by the Inland Revenue.

Since 1961, the Inland Revenue has published estimates of the distribution of wealth based on the estate duty method. As a result we now have an "official" series for the wealth distribution for the years 1960-70.[2] The Gini coefficients published by the Inland Revenue indicate that wealth in Britain is highly concentrated: in 1968, for example, the coefficient was .68, which is over twice that for the distribution of income.[3] As the Inland Revenue recognizes, however, there are a number of major problems with the use of estate duty data and, as a result, their estimates may provide an incomplete picture of the distribution of wealth in Britain. The most serious of these problems are described below.

[2] See, for example, *Inland Revenue Statistics*, 1972, Table 86.

[3] See Stark [9]. It should be noted that the wealth data relates to individuals, whereas the income data relates to tax units. This is unlikely, however, to explain this very large difference.

A. Incomplete Coverage of Estates—"Missing" People

The estate duty data covers only those estates which come to the notice of the estate duty office and, as a result, over half the estates are not included. Those omitted are those cases where no property has been left, or where the estate is not liable for estate duty[4] and the assets are of a type which may be transferred without probate: (1) property to which title can pass by delivery: e.g. cash, personal possessions, and household goods; (2) property where the owner can nominate a person to whom the asset should be transferred: e.g. industrial life assurance policies; and (3) property covered by statutory exemptions (Administration of Estates [Small Payments] Act, 1965)—e.g., sums up to £500 held in National Savings, buildings societies, cooperative societies and friendly societies. It is clear from this list that none of the people excluded from the Inland Revenue estimates are likely to possess large amounts of wealth; the wealth holders who are missing from the official estimates almost certainly belong to the lowest ranges.

In the main part of its work, the Inland Revenue makes no allowance for these "missing" wealth holders: the Gini coefficients quoted earlier, for example, are based only on those covered by the returns. In its most recent report, the Inland Revenue has presented a second set of Gini coefficients, based on the alternative extreme assumption that the remainder of the population has no wealth at all. As one would expect, the Gini coefficients are considerably higher: .87 in 1968, as opposed to .68. However, neither of these extreme assumptions is adequate for our purposes. To ignore the existence of half the adult population is clearly wrong, but at the same time, it is not reasonable to suppose that they possess no wealth at all. It is therefore necessary to investigate more closely the possible wealth of those who do not appear in the Inland Revenue's tables. An attempt to do this was made by Lydall and Tipping [6], who based their estimates for the whole population on the extrapolation (apparently by eye) of the estate duty data below the exemption limit, and on the results of the 1954 Oxford savings survey.[5] Since the savings survey has

[4] The exemption level was £3,000 at the beginning of the 1960s. It was increased to £4,000 in 1962, £5,000 in 1963, and £10,000 in 1969.

[5] Adjustments for the wealth of this group were also made by earlier writers, but since the estate duty exemption limit was very much lower (£100 until 1946) the amounts involved were smaller.

not been repeated, the second of these approaches is not open to us;[6] we do, however, have available the National Balance Sheet data used by Revell [10], which allow us to form an estimate of the likely holdings of the missing population. This balance-sheet approach will provide the main basis for the estimates described below, but in Section III we consider the alternative approach of estimating the holding of lower wealth groups by extrapolating wealth distributions fitted to the upper ranges.

B. Incomplete Coverage of Wealth—"Missing" Wealth

In addition to the wealth of those not covered by the Inland Revenue statistics, there are other important elements of "missing" wealth, which arise from the provisions in the estate duty law allowing wealth to be transferred in certain circumstances without duty being paid. As it is put by the Inland Revenue, "certain elements are omitted because no duty is payable on them either because of special exemptions or because they fall outside the scope of estate duty law." The most important items excluded are: (1) property settled on a surviving spouse (who has no power to dispose of the capital), which is exempt on the death of this spouse; (2) property held under discretionary trusts (exempt before the 1969 Finance Act); (3) items treated as estates by themselves, which do not appear if they do not exceed the exemption limit;[7] (4) growing timber, which is not aggregated with the rest of the estate and on which duty is not paid until the timber is sold; and (5) assets such as annuities and pensions, which disappear on death.

The Inland Revenue makes no attempt to adjust its estimates for this missing wealth, and as a result, the levels of wealth may be seriously understated. In their estimates for 1954, Lydall and Tipping made some very approximate adjustments and added to their total of £40,000 million for personal wealth, a further £2,000 million for pension funds, £3,000 million for property settled on a surviving spouse, and £1,000 million for discretionary

[6] Although it is hoped that at a later stage in the investigation we may be able to make use of data collected by Professors Abel-Smith and Townsend in their survey of living standards in 1968–69.

[7] This applied, for example, to certain life assurance policies and property settled otherwise than by the deceased, when the rest of the property did not exceed £10,000.

trusts. In this paper, we attempt to make more accurate adjustments, based on the National Balance Sheet data and with a series of assumptions about the allocation of the missing wealth by ranges.

C. Choice of Mortality Multipliers

The early discussions of the estate duty method demonstrated clearly that the choice of mortality multipliers is of crucial significance. (The overall multipliers used in the early estimates ranged from 25 to 65, with corresponding variations in the estimate of total personal wealth.) It is, therefore, important to examine the sources from which the multipliers are derived and the consequences of alternative assumptions. The Inland Revenue, following earlier investigators, uses mortality multipliers adjusted for social class (which is assumed to be correlated with wealth): (1) for estates over £3,000, those relating to social classes I and II (broadly the managerial and professional classes); and (2) for estates under £3,000, rates midway between those for social classes I and II and those for the population as a whole.[8] The relationship between these social-class mortality rates and that for the general population is obtained by relating the deaths recorded for the years 1959-63 to the population at risk, as enumerated in the Census of Population of 1961. This procedure suffers from a number of drawbacks; in particular, from the fact that there are serious discrepancies between the occupational statements at death registration and those at the Census. This has led Revell to reject this source and to adopt the alternative approach of using the mortality experience of life assurance offices as a basis for deriving estate multipliers (as used in the United States by Lampman [7]). In Section II, this question is considered at greater length and results are presented on a variety of assumptions.

D. Sampling Problems

The fundamental assumption underlying the estate duty method is that those dying in a given year may be regarded as a representative sample of the living population. This assumption is

[8] The division has been made at £5,000 since 1970.

clearly open to question, and there are a number of reasons why it may lead to biased estimates of the size distribution. In particular, those with poorer health (and shorter life expectancy) are more likely to have taken steps to reduce their estate duty liability than others in the same age-sex group. The effect of such action depends on the form which avoidance takes.[9] In certain cases, such as the deathbed purchase of agricultural property (which bears a lower rate of duty), the full value of wealth is still reported in the estate statistics; in others, the effect of avoidance has already been discussed under the heading of missing wealth (e.g., settled property). One method which may lead to biased estimates, however, is the dispersion of property through gifts *inter vivos* (which are exempt from any tax if the donor lives for a further seven years). If both donors and recipients had the same life expectancy as others in their age-sex group, gifts would not lead to any understatement, since the wealth would appear in the estates of those recipients who died in a given period. However, there are good reasons to doubt whether this is likely to be so. As it was put by Lampman: ". . . it might seem reasonable to assume that persons, particularly at older ages, with shorter than average life expectancy for their age group, would be more likely to be donors than those with longer expectancies" ([7], p. 68n). There is no firm evidence to support this view, but it appears highly plausible. If it is correct, and if gifts are made largely by the wealthy (to avoid duty), then the degree of inequality is understated, although it is very difficult to make any estimate of the likely magnitude of this effect.[10]

In addition to the difficulties arising from the method by which the sample is selected, there are the problems of sampling error. For certain classes, particularly the largest estates and the youngest age groups, the number of cases is extremely small: in 1969–70, for example, only one man leaving an estate of over £200,000 died between the ages of 35 and 45. The Inland Revenue has attempted to reduce the error involved by: (1)

[9] *Evasion* of estate duty is not taken into account here. As is pointed out by Revell: "most people would probably agree that this is at a low level in Britain—if only because the legal methods of avoidance are so many" ([10], p. 112).

[10] A factor working in the opposite direction is that where the donor dies within seven years, the gift is included in his estate and hence may be counted twice.

combining the observations for the largest wealth groups for a number of years to produce a smoother series; and (2) in the case of other wealth groups, combining observations across age groups and applying a combined multiplier. The rationale for these adjustments is far from obvious. The reason for concern is not that errors may be introduced through variation in the total number of deaths in a particular age group, since this would be reflected in an exactly offsetting variation in the mortality multiplier. The problem arises with the distribution of estates among wealth classes. This suggests that any combination of observations before applying the multipliers should *not* be between age groups (which would introduce errors arising from variation in the overall mortality rate for each group) but between estate classes. In view of this, the Inland Revenue approach is not followed here and no adjustment is made for sampling error apart from the grouping of estate classes.

E. Method of Valuation

The valuation of assets in the estate data was discussed by Revell ([10], Chap. 4) in the context of National Balance Sheets, and he concluded that "in general the valuation of items for estate duty is just what we need—a valuation at market prices." He does not, however, bring out the ambiguities involved in such a definition for certain types of asset.[11] His own interpretation is framed in terms of valuation on a "going concern" basis, but in the case of household goods (for example) this could be very different from the price obtainable on the secondhand market. It may therefore be helpful to distinguish between a "going concern" value and a realization value (through sale or borrowing power). It is not clear which of the bases would be more appropriate for our purposes,[12] and although we shall consider only the former ("going concern" value), ideally both should be examined.

One class of assets where the problems of valuation are particularly acute is that of life policies and pension rights. In the estate duty statistics, life assurance policies on the deceased's own life are valued at the sum assured, whereas, in the hands of the

[11] This passage owes a great deal to Kathleen Langley's perceptive comments.

[12] I do not agree with Langley that a realization basis is clearly preferable.

living, they are worth less than this amount (even as a "going concern"). On the other hand, annuities may not appear at all, and the rights to occupational pensions are not included apart from any death benefit (and, in certain schemes, this may be held in trust). On a realization basis, no allowance should be made for pension rights (since one cannot in general borrow on the strength of these rights), and in the case of life policies the appropriate valuation—as has been suggested by Langley [5]—is the surrender value. However, Revell has pointed out that these methods of valuation are "inappropriate for the holder viewed as a 'going concern'. . . . For this there is no alternative but the present value of the future income stream or capital payment." In what follows, this method of valuation is adopted as far as possible. In the case of life policies and funded pension schemes, it is based on the total value of life and pension funds; in the case of unfunded pension schemes, the valuation is necessarily more approximate.[13] The detailed basis for the estimates is discussed further in Section II. The methods followed parallel those of Revell in his work on the National Balance Sheets, but there is the additional problem of allocating the assets by ranges of total wealth.

Summary

The most important problems connected with the Inland Revenue approach have been outlined above,[14] and Table 1 summarizes the main differences between its treatment and the approach adopted here. As will be clear, this paper is particularly concerned with the sensitivity of the results to the assumptions made, and it is hoped that it will provide a guide to those areas where further research is most needed.

[13] No account is taken here of the value of rights to state pensions or other state benefits. This follows earlier studies.

[14] A number of other problems have not been discussed, such as that stemming from the fact that estates only appear in the statistics with a delay (see Langley [5], pp. 2–3). It is assumed here that estates coming to the notice of the estate duty office in a given tax year relate to deaths in the preceding calendar year (the same assumption as that made by the Inland Revenue), but this is not entirely satisfactory.

TABLE 1 Comparison of Methods

	Inland Revenue	*Approach Adopted Here*
A. Incomplete coverage of estates	Estates not coming to notice of Estate Duty Office are omitted	All adult population included Wealth of missing adults estimated from: (1) National Balance Sheet data (Section II) (2) Extrapolation of wealth distribution (Section III)
B. Incomplete coverage of wealth	No adjustments made	Adjustments using National Balance Sheet data and assumptions about allocation by ranges (Section II)
C. Mortality multipliers	Based on Census of Population data	Alternative approaches based on Census of Population and life office data (Section II)
D. Sampling errors	Age groups are combined and observations for largest wealth groups smoothed over time	No adjustments made to basic data
E. Valuation	No adjustments made	Adjustments to a "going concern" basis (Section II)

II. NEW ESTIMATES FOR 1968

A. Choice of Mortality Multipliers

The choice of the multipliers to be applied to the estate data is clearly of central importance, and it is surprising that no attempt has been made to assess the sensitivity of the results to the assumptions made. In this section, we examine the two main sources of data—the Census of Population and the life office mortality investigation—and the differences in the results obtained. As can be seen from Table 2, the mortality rates vary considerably. The first two columns show the rates used by Lydall

TABLE 2 Social-Class Mortality Rates as Percentage of General Mortality Rates

(England and Wales [males])

Age Group	Census Data: Lydall and Tipping, 1951[a]	Census Data: Registrar General, 1959-63; Social Classes I and II Combined	Life Office Data: Revell, 1953-58
15-19	–	92.6	98.7
20-24	96.4	76.1	
25-34	75.5	72.6	72.9
35-44	74.2	72.4	68.3
45-54	80.6	76.9	69.7
55-64	83.7	83.7	66.8
65-74	87.5	92.5	71.8
75-84	91.8	–	77.4
85 and over		–	84.5

SOURCES: Lydall and Tipping [6], Table A; Revell [10], Table 5.4; Registrar General for England and Wales, *Census 1961: Decennial Supplement, Occupational Mortality* (H.M.S.O), Table 3A(i).

[a] This data has been adjusted; see text.

and Tipping, whose approach has been followed by the Inland Revenue, and the rates derived from the census of 1961; the third column shows the life office data used by Revell. The differences are particularly marked in the case of those aged 45 and over, the life office mortality rates being 20 percent lower in some cases.

The Census of Population data suffer from a number of serious shortcomings for the purpose at hand:

1. As noted earlier, the data on deaths and on the population at risk are obtained from different sources, and there are major discrepancies between the occupational statements in the two sources. This has been demonstrated in successive censuses by special matching exercises, which in 1961 showed that only 63 percent of men were assigned to the same occupation unit on both occasions, and that the social class differed in 17 percent of cases surveyed. The Registrar General himself commented that "the lack of agreement between the occupation given at census and that at death reduces considerably the reliability of the analysis. . . . the

net discrepancies . . . are so large that the mortality estimates must be affected by them."

2. A substantial number of people (7 percent) were recorded as "unoccupied" in the Census but very few were so recorded at death (0.5 percent). As a result, the mortality rate for all social classes is overstated, particularly at older ages.

3. The analysis of female mortality does not include widows.[15]

4. The use of the Census data is based on the assumption of a high degree of correlation between social class and wealth, but this association is clearly far from perfect.

In their estimates for 1954, Lydall and Tipping made allowance for point 1 by reducing the estimates of "upper class" mortality by the percentage overrecording indicated by the matching study; and made approximate adjustments for point 2 by allocating the unoccupied proportionately to all social classes. The Inland Revenue has followed them in making this adjustment but otherwise has used the data as it stands.[16]

Revell considered the deficiencies of the Census data so serious as to render it "quite useless" for the derivation of estate multipliers and he accordingly rejected it in favor of the life office data. This latter is derived from the Continuous Mortality Investigation, based on the mortality experience of life offices in the United Kingdom and covering those accepted for ordinary life and endowment policies at standard rates of premium. As Revell points out, this source is attractive in that the population is known throughout, so that there is no problem of incorrect classification. He also argues that those holding life assurance policies are likely to be representative of wealth holders appearing in the estate duty returns, since life policies are subject to estate duty.[17]

There are, however, two major difficulties with the life office data: the problem of "selection" by health and the inadequate coverage of female lives. The first stems from the fact that

[15] Related to this point is the variation in mortality rates with marital status; see Smith [11].

[16] It should also be noted that the Inland Revenue makes no allowance for differential trends in mortality over time, and that it maintained the £3,000 division in applying the social-class multipliers throughout the 1960s, despite the fact that the number of estates above this level approximately doubled.

[17] Industrial branch claims are largely paid without probate, but these are not covered by the Continuous Mortality Investigation.

acceptance for life assurance at standard premiums depends on evidence of health. As a result, the data do not cover those excluded on account of ill health and hence the social-class multipliers are biased upwards. The likely extent of this bias is discussed by Revell and he makes corrections covering those excluded from the life office data. The only light which can be thrown on the second problem is the Continuous Mortality Investigation of male and female annuitants, which indicates that for the older age groups the ratio of female to male mortality is broadly the same as that for the general population. The assumption that this is true for all ages is adopted by Revell, although he describes it as "definitely *faute de mieux.*"

From this brief discussion, it is clear that neither the Census data nor data derived from the Continuous Mortality Investigation are ideal for our purposes. Instead of making any attempt to weigh up the relative advantages and disadvantages of the two sources, the procedure followed is to consider the results obtained with the following range of assumptions:

1. *Assumption A1.* Social-class multipliers based on the Census data adjusted in the same way as Lydall and Tipping (as employed by the Inland Revenue)

2. *Assumption A2.* Social-class multipliers based on the life office data (using the mortality ratios given in [10], Table 5.4) for estates of £3,000 and over, general mortality multipliers below this level

3. *Assumption A3.* General mortality multipliers

The multipliers described above have been applied to the estate data for 1968.[18] (The choice of this year was based on the availability of data required to make the balance sheet adjustments described below.) Table 3 summarizes the results for assumptions A1, A2 and A3 covering the adult population, where adult is defined as 18 and over.[19]

[18] The basic estate data and a number of supplementary analyses were made available by the Inland Revenue Statistics and Intelligence Division, and I am very grateful to them for their assistance with the investigation. They are not responsible in any way for the use to which the data has been put.

[19] Any definition of the adult population is essentially arbitrary, but 18 was chosen on the grounds that it is both the age of majority and likely to correspond to the average age at which children become financially independent of their parents. The use of 18 may be compared to that of 15 by the Inland Revenue, 20 by Lydall and Tipping, and 25 by Daniels and Campion, Campion, and Langley.

TABLE 3 Estimates Using Multipliers A1, A2, and A3: Great Britain, 1968

	A1: Census Multipliers		*A2: Life Office Multipliers*		*A3: General Multipliers*	
	Percent of Population	*Percent of Wealth*	*Percent of Population*	*Percent of Wealth*	*Percent of Population*	*Percent of Wealth*
Not covered by estate duty returns	56.126	–	55.847	–	61.480	–
Cumulative percentage above:						
£ 1,000	30.229	96.6	31.730	97.3	26.096	96.3
5,000	9.492	73.2	11.173	76.0	7.947	72.5
10,000	3.989	56.1	4.735	58.5	3.362	55.7
15,000	2.415	47.8	2.880	49.8	2.040	47.5
20,000	1.641	41.8	1.970	43.6	1.392	41.5
25,000	1.282	38.0	1.535	39.6	1.086	37.7
50,000	0.467	25.8	0.559	26.7	0.396	25.5
100,000	0.154	16.5	0.182	17.0	0.129	16.2
200,000	0.049	10.5	0.057	10.7	0.040	10.2

The first difference between the results concerns the proportion of the population not covered by the estate duty returns. The "missing" population ranges from 61 percent with the general mortality multiplier to 56 percent with the social-class multipliers. The results for assumptions A1 and A2 are in fact very close and suggest that the proportion not covered is unlikely to fall below 50 percent on any assumptions. The second difference concerns the shape of the upper part of the distribution. In general terms, it appears that the use of social-class multipliers (as opposed to general multipliers) leads to a lower estimate of the share of top wealth holders. Comparing assumption A1 with the general mortality case (A3), the share in total personal wealth of those above £200,000 is higher, but the number in this group is also increased. Figure 1 shows that the net effect is that the Lorenz curve for assumptions A1 and A2 lies inside that for assumption A3, and that with social-class multipliers A2, the share of the top 1 percent may be 3½ percent lower than with the general mortality multipliers.

If we turn to a comparison of the two social-class multipliers, the differences are less marked: in terms of the share of the top 1 percent, for example, the difference is some 1 percent of total wealth. This difference is perhaps surprisingly small in view of the substantial differences in the multipliers for certain age groups. It should be noted that the differences between the two estimates are largest in proportionate terms at the top wealth levels (the top one-half percent and above) and that the life office multipliers give considerably higher estimates of the number of top wealth holders:

Numbers above (cumulative)	*A1*	*A2*
£1 million	610	714
£500,000	4,917	5,572
£200,000	18,835	22,178

B. Relationship to Balance Sheet Data

The estimates of personal wealth derived from the estate duty statistics are, as we have seen in Section I, deficient in three major respects: the property of "small" wealth holders is not covered, certain types of wealth (such as settled property) are excluded, and certain assets are not valued in an appropriate way (such as

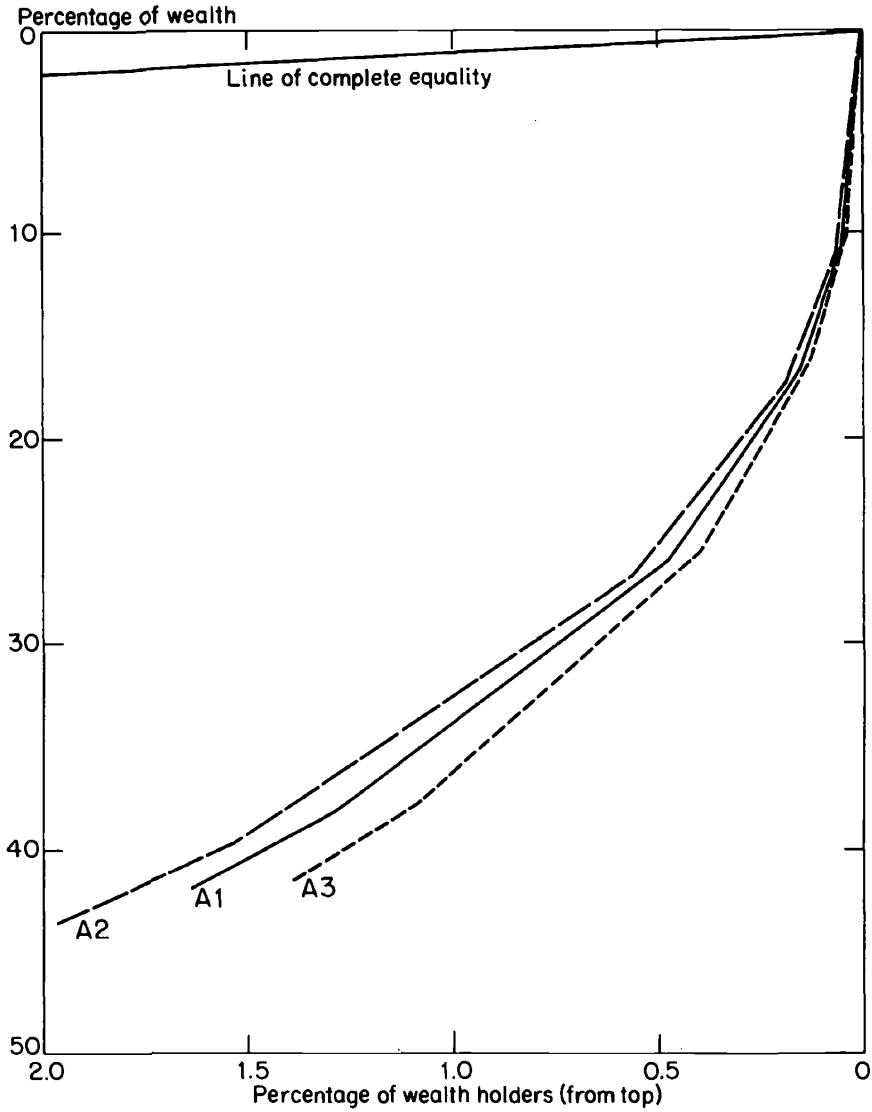

FIGURE 1: Upper Part of Lorenz Curve With Multipliers A1-A3

pension rights). These deficiencies cause the estimates of personal wealth derived by blowing up the estate data to fall considerably short of those reached by National Balance Sheet methods. The existence of the deficiencies may be illustrated by comparing the estimated holdings of government liabilities for which the totals in issue are known. All figures are in millions of pounds.

	Estate duty estimate			*Known total*[20]
	A1	A2	A3	
Unquoted U.K. government securities	3,157	3,500	2,688	4,293
Savings bank deposits	2,878	3,039	2,489	4,040

Even with the life office multipliers, the estimates for these assets fall considerably short of the known totals and adjustments are clearly necessary.

The relationship between estate duty estimates and National Balance Sheet totals was discussed by Revell with particular reference to 1961. In that year, the estimate of total personal wealth made by him on the basis of estate data was £63.9 billion, whereas the corresponding balance sheet total was £77.6 billion. The main sources of this discrepancy are shown in Table 4. Although the assets and liabilities listed there do not exhaust those for which there were discrepancies, they account for the main part of the difference; and in what follows, attention is focused on these categories. It must, of course, be recognized that the discrepancies may arise as much through errors in the balance sheet totals as through inadequacies of the estate duty estimates. In certain cases, the balance sheet totals for the personal sector are obtained as residuals and the divergence from the estate estimates may simply reflect errors in the totals for other sectors. In view of this, the policy adopted here has been to make adjustments only to those assets where there is an a priori reason to expect wealth to be missing from the estate duty estimates. In the case of quoted company shares, for example, there was no clear reason for the discrepancy between the estate duty estimates and Revell's figures obtained from register surveys, and no adjustment is made here. Moreover, it should be noted that the balance sheet totals used in this study are, in nearly all cases, classified by Revell as A (very reliable) or B (fairly reliable). It must, however, be borne in mind that the balance sheet totals quoted in Table 4 correspond to values at December 31, whereas the estate duty estimates are a weighted average for the year as a whole. If the value of assets is rising, then the discrepancy can be partly explained in this way. In view of this, the balance sheet totals have, wherever possible, been

[20] In each case allowance has been made for nonpersonal holdings. The total is an average for the year.

TABLE 4 Discrepancy Between Estate Duty Estimates and National Balance Sheet, 1961

(£ billion)

	Estate Duty	*Balance Sheet*	*Adjustment*
Assets:			
Unquoted U.K. government	3.4	4.2	1
Savings bank deposits	2.9	3.2	2
Building society deposits	3.6	3.1	3
Household goods, etc.	2.1	4.0	4
Trade assets	2.2	4.4	5
Exempt settled property	0	1.4	6
Expectant interests	2.5	0	6
Quoted U.K. shares	12.1	13.9	7
Unquoted U.K. shares	3.1	5.4	7
Life policies and pension rights	7.2	13.5	8
Land and buildings[a]	13.0	19.8	9
Liabilities:			
House mortagages	1.2	4.9	8
Debts	2.9	4.9	10
Net worth	63.9	77.6	

SOURCE: Revell [10], Table 7.1. This excludes holdings by overseas residents.

[a] The liability "other deductions from landed property" is subtracted from this item.

based on a weighted average of the figures for different dates in the year.[21]

Bearing these points in mind, we may use the balance sheet totals to make adjusted estimates for 1968. The first stage involves the construction of balance sheet totals; the basic method follows that of Revell and is described in the appendix. The second stage is one not undertaken by Revell and involves the allocation of missing wealth by ranges. In this allocation, two main factors are taken into account. First, in certain cases the nature of the asset suggests that it is likely to be held in certain wealth ranges: for example, those types of property covered by the Administration

[21] The weights employed correspond to the proportion of deaths in each period.

of Estates Act. Secondly, in a number of cases the discrepancies arise through differences in the method of valuation (e.g. physical assets) and the procedure followed is to increase the holding in each range by an appropriate factor. For this purpose, it is necessary to know the asset composition by wealth range, and use is made of unpublished tabulations provided by the Inland Revenue. Even allowing for these two factors, however, it is necessary to make a number of assumptions, and the practice followed has been to make four types of assumption:

1. *Assumption B1.* No adjustment
2. *Assumption B2.* Lower bound to inequality—where wealth is allocated as far as reasonable to lowest wealth groups
3. *Assumption B3.* A central estimate—inevitably arbitrary but a "best guess"
4. *Assumption B4.* Upper bound to inequality—where wealth is allocated as far as reasonable to upper wealth groups

The precise assumptions are described in greater detail in the appendix.[22]

The results obtained with these four assumptions in the case of the Census of Population multipliers are shown in Table 5. It is immediately clear that the outcome differs considerably according to which assumption is made: for example, the share of the bottom group ranges from 3.4 percent (no adjustment) to 13.2 percent (adjustment B2). Where the wealth is allocated as far as reasonable to the lowest wealth groups (B2), the effect of the adjustment is to shift the Lorenz curve inward at all points; but in the upper-bound case (B4), the Lorenz curve shifts outward at all points above £1,000. In the case of the central estimate (B3) the Lorenz curve is shifted outward for those in the top 0.5 percent and inward below this level. If anything, the Lorenz curve for this case is closer to assumption B2 than to assumption B4. In general, the results suggest the critical importance of the allocation of missing wealth by ranges and the need for further research designed to narrow the bounds placed on the allocation.

Table 6 shows the results obtained with the central assumption B3 and the range of mortality multipliers A1 through A3. We should expect that where the multipliers applied are lower, larger

[22] One further difficulty which should be mentioned here is that the adjustments for missing wealth may change the ranking by size of holding. No allowance has been made for this in the estimates presented below.

TABLE 5 Sensitivity to Assumptions B1-B4: Case of Census Multipliers

Range of Wealth[a]	*Percentage of Population*	*Assumption B1: Percentage of Total Wealth*	*Assumption B2: Percentage of Total Wealth*	*Assumption B3: Percentage of Total Wealth*	*Assumption B4: Percentage of Total Wealth*
Below £1,000	70.17	3.4	13.2	9.2	4.1
Cumulative percentage above:					
£ 1,000	29.83	96.6	86.8	90.8	95.9
5,000	9.30	73.0	64.9	69.3	75.4
10,000	3.91	56.0	50.3	53.9	60.0
15,000	2.37	47.7	43.3	46.3	52.1
20,000	1.61	41.7	38.2	40.7	46.3
25,000	1.26	37.9	35.0	37.4	42.8
50,000	0.46	25.7	24.2	26.2	30.9
100,000	0.15	16.5	15.8	17.4	20.9
200,000	0.05	10.5	10.2	11.3	13.7

NOTE: The population figures and the "unadjusted" estimates (B1) differ from those in Table 3 in that allowance has been made for Northern Ireland and the holdings of overseas residents. See the appendix.

[a] The ranges relate to wealth *before* adjustment.

TABLE 6 Adjusted Estimates: Assumptions B1 and B3 and Different Multipliers

	Assumption A1: Census Multipliers			*Assumption A2: Life Office Multipliers*			*Assumption A3: General Mortality Multipliers*		
		Percentage of Wealth			*Percentage of Wealth*			*Percentage of Wealth*	
	Percentage of Population	*No Adjustment (B1)*	*Adjustment (B3)*	*Percentage of Population*	*No Adjustment (B1)*	*Adjustment (B3)*	*Percentage of Population*	*No Adjustment (B1)*	*Adjustment (B3)*
Below £1,000	70.17	3.4	9.2	68.70	2.8	7.4	74.24	3.7	11.5
Cumulative percentage above:									
£ 1,000	29.83	96.6	90.8	31.30	97.2	92.6	23.76	96.3	88.5
5,000	9.30	73.0	69.3	10.95	75.8	73.0	7.79	72.3	66.6
10,000	3.91	56.0	53.9	4.64	58.3	56.9	3.30	55.6	51.8
15,000	2.37	47.7	46.3	2.82	49.7	48.9	2.00	47.3	44.4
20,000	1.61	41.7	40.7	1.93	43.5	43.2	1.37	41.4	39.1
25,000	1.26	37.9	37.4	1.50	39.5	39.5	1.06	37.6	35.8
50,000	0.46	25.7	26.2	0.55	26.7	27.6	0.39	25.4	25.2
100,000	0.15	16.5	17.4	0.18	16.9	18.1	0.13	16.1	16.6
200,000	0.05	10.5	11.3	0.06	10.7	11.6	0.04	10.1	10.7

NOTE: See Notes to Table 5.

adjustments will be required to bring the estate data into line with the balance sheet totals. This is borne out by the results, which show that the share of those below £1,000 is increased by considerably more in the case of the general mortality multipliers than for assumption A1, and that the same holds true when one compares A1 with A2. The general effect is to shift the Lorenz curves closer together. This may be seen by comparing the share of the top 1.9 percent (A2) and the top 2 percent (A3). Before the adjustment the difference is 3.8 percent, but afterwards it is narrowed to 1.2 percent.

In the results described above, no adjustment has been made for real property, for which the estate duty total falls considerably short of the balance sheet estimates. As is explained in the appendix, this difference reflects in large part the method of valuation, and it may therefore be interesting to see the results of increasing the estate duty estimates for this item proportionately, so that they are in line with the balance sheet figures (see Table 7). The Lorenz curve is clearly shifted inward at the top, and outward at the bottom, reflecting the fact that real property is held disproportionately in the middle ranges.

The adjustments described above have been based on very limited evidence and a large number of assumptions, and it is therefore important to consider the checks which can be made of the reasonableness of the estimates presented here. The figures for

TABLE 7 Effect of Adjustment for Land and Buildings

(percent)

	Assumptions A1 and B3	
Percentage of Population	*As shown in Table 6*	*Adjusted for Land and Buildings*
29.83	90.8	91.6
9.30	69.3	69.1
3.91	53.9	52.7
2.37	46.3	44.6
1.61	40.7	38.7
1.26	37.4	35.2
0.46	26.2	24.3
0.15	17.4	16.1
0.05	11.3	10.4

total personal wealth provide one such test. Although there are at present no balance sheet totals to provide a benchmark for 1968, we may examine the relationship between the estimates given here, the balance sheet totals for earlier years and the Inland Revenue figures (see Table 8). This suggests that the balance sheet totals in the past varied between 130 percent and 150 percent of the Inland Revenue total. Since the Revell/Roe figures were derived using the life office multipliers, we should expect the total to be closest in the case of assumption A2, and this is borne out by the results in Table 8. A second check on the plausibility of the estimates is to consider the implied average wealth of those not covered by the estate duty returns:

	Per capita wealth (£)		
	Assumption B2	*Assumption B3*	*Assumption B4*
Assumption A1	395	275	69
Assumption A2	343	245	66
Assumption A3	437	302	65

TABLE 8 Estimates of Total Personal Wealth

(£ billion)

	Revell/Roe (1)	*Inland Revenue (2)*	*(1) as percent of (2)*
1960	72.0	51.6	140
1961	77.4	54.9	141
1962	85.6	58.3	147
1963	92.4	63.7	145
1964	94.9	71.8	132
1965	102.8	74.3	138
1966	106.5	76.8	139
Estimates Given Here (Assumptions B3) for 1968[a]			
A1 Census of Population	117.7	88.0	134
A2 Life office	123.9	88.0	141
A3 General	111.8	88.0	127

SOURCES: Column (1) from [13], column (2) from Inland Revenue Statistics, 1970 and 1972.

[a] Including adjustment for land and buildings.

Bearing in mind the conditions under which property may be transferred without probate (see page 279), and allowing for an average value for consumer durables and so on, the central assumption does not seem unreasonable.

III. THE SHAPE OF THE WEALTH DISTRIBUTION

The estimates presented in the previous sections provide some evidence about the shape of the wealth distribution in Britain, and in this section we take a preliminary look at how far it may be represented by a specific distribution function.[23] There are two main reasons for being interested in this question: (1) in the absence of complete information about the distribution, we may wish to use a fitted distribution to fill the gaps in our knowledge; and (2) we may wish to test theories of the generation of wealth which lead to predictions about the shape of the distribution.

In the former case, reference has already been made to the extrapolation of the data derived from the estate returns to cover lower wealth ranges. In the past, this extrapolation has often been made by eye, a procedure which is to a large extent arbitrary. As pointed out by Brittain "about the only solid reed Lampman had to lean on below the top 1.6 percent was his eye for a beautiful curve" ([14], p. 6). As an alternative, Brittain suggests the estimation of an explicit wealth distribution function and refers particularly to that proposed by Champernowne. This method, however, is only superior to that of Lampman if two conditions are met: (1) it provides a satisfactory fit to the upper tail; and (2) there are a priori grounds for supposing that the function provides a reasonable characterization of the lower part of the wealth distribution. The former is an obvious requirement, but the second is equally important, and unless it is satisfied we may simply be replacing a beautiful curve by a beautiful formula.[24]

[23] A more detailed study of this question is at present in progress and will be the subject of a later paper.

[24] In addition to the *extrapolation* of the distribution to lower wealth ranges, we may also be concerned about the problem of interpolation. The distributions given earlier are based on grouped data, and it is not, in general, possible to compare points on the Lorenz curve: for example, in order to estimate the share of the top 1 percent, interpolation is required. In the past interpolation has frequently been based on graphical methods, but the Inland Revenue [15] has apparently used a specific distribution function (the Pareto

The requirement that there be a priori grounds for supposing that the distribution is of a particular form leads naturally to the testing of theories of wealth generation. The theories which have been put forward are of two main types. The first group consists of those which regard the distribution as the outcome of a Markov stochastic process. Such theories have been advanced in the case of wealth distributions by (among others) Sargan [16], Wold and Whittle [17], Steindl [18] and Shorrocks [19]. Without considering the plausibility of the assumptions made by these authors, we may simply note here that the models are capable of generating a range of asymptotic distributions (see Table 9). Secondly, there are theories which regard the distribution as essentially deterministic in nature and attach particular

distribution), and if conditions 1 and 2 described above are satisfied, this may well be preferable.

TABLE 9 Theories of Wealth Generation

Model	*Equilibrium Distribution*	*Formula*
Stochastic models:		
Sargan	Log-normal	$F = N(\log W/\mu,\sigma^2)$
Wold-Whittle	Pareto (type I)	$1 - F = \left(\frac{W}{W_0}\right)^{-\alpha}$
Steindl	Pareto	$1 - F = \left(\frac{W}{W_0}\right)^{-\alpha}$
Shorrocks	Yule	$f = A^W W^{-\alpha}$
Deterministic models:		
Stiglitz	Pareto (type II)	$1 - F = (1 - F_0)\left(\frac{W}{W_0} + 1\right)^{-\alpha}$
Atkinson	Range including sech^2	$1 - F = \frac{1}{\left(\frac{W}{W_0}\right)^{\beta} + 1}$

NOTE: F denotes the distribution function, f denotes the density function. W denotes wealth. N denotes the normal distribution. W_0 and F_0 are constants.

importance to economic and social forces. These have received very little attention, and reference is made only to the work of Stiglitz [20], as extended by the author [21], which shows how a range of equilibrium distributions may be generated as a result of the practice of primogeniture.[25] The comparison of the distributions predicted by the two groups of theories with that actually observed in Britain cannot necessarily be expected to allow us to discriminate between them, but it may well provide indications of the directions which further research should take.

There are a number of different methods which could be adopted to estimate the parameters of the distributions under consideration and to judge their goodness of fit, and these have been discussed by Quandt [24] in the context of measuring industrial concentration. For the present, attention will be confined to the very simplest graphical methods, but in view of the obvious deficiencies they should only be regarded as a preliminary "sorting" procedure. The data to be employed is that given in Table 3. There are two reasons for choosing these data rather than the adjusted data of Table 6: (1) the fitting of a distribution function is an alternative method of estimating the wealth of the "missing" population; and (2) the adjustments made in Table 6 mean that the data would have to be regrouped by ranges if conventional procedures were to be employed.[26]

Pareto (Type I) Distribution

Although use of this distribution is hallowed by tradition, there is remarkably little evidence in its support: the only British data, for example, referred to by Wold and Whittle is that relating to estates for 1907–11. A straightforward graphical test of the Pareto distribution is obtained from the fact that $\log 1/(1 - F) = \alpha \log (W/W_0)$. Figure 2 shows the data in this form for the range £1,000-£500,000 and suggests that a Pareto distribution with α approximately equal to 1.6 could provide a reasonable representation of the upper tail (above £25,000). Below this level,

[25] For an interesting analysis, comparing this assumption with the case where wealth is divided equally at death and discussing the role of marriage patterns, see Blinder [23]. This model is not listed in Table 9 since it leads to no definite predictions about the shape of the wealth distribution.

[26] We also confine our attention to the multipliers A1; the results for A2 produce very similar results.

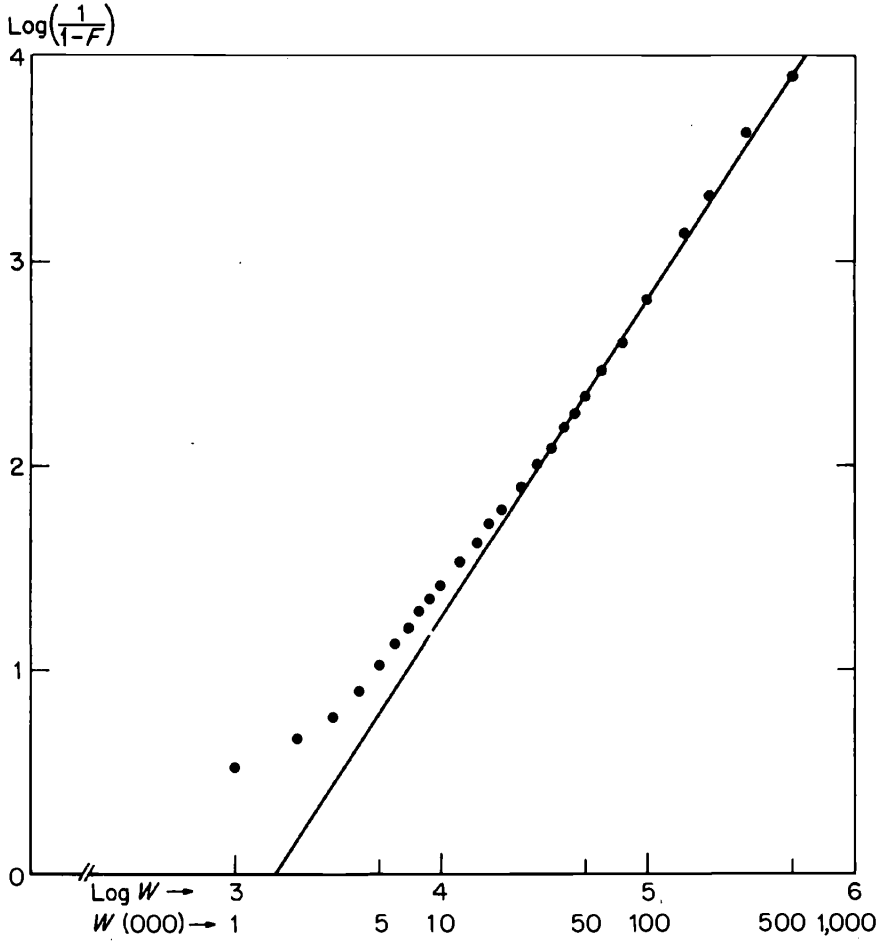

FIGURE 2: Graphical Test of Pareto Distribution

however, it is clearly inadequate, and even its strongest supporters would not want to claim that it could be used to extrapolate the wealth distribution downward. By the same token, the value of α does not provide a good index of the *overall* degree of inequality.

Log-normal Distribution

This distribution was found by Sargan to provide a good approximation to the British data for 1911–13, 1924–30, 1935–38 and 1946–47. The same method of estimation (using log

probability paper) is used in Figure 3 for the 1968 data.[27] This suggests that the log-normal may give a reasonable fit in the middle ranges, but there are systematic deviations from linearity at the top and the bottom. Given the finding that the upper tail is approximately Paretian, we could not expect the log-normal to fit well to large wealth holdings and this is borne out by the excess of

[27] See Aitchison and Brown [25], Section 4.5. The straight-line fit is based on the "quantiles" corresponding to £5,000 and £100,000.

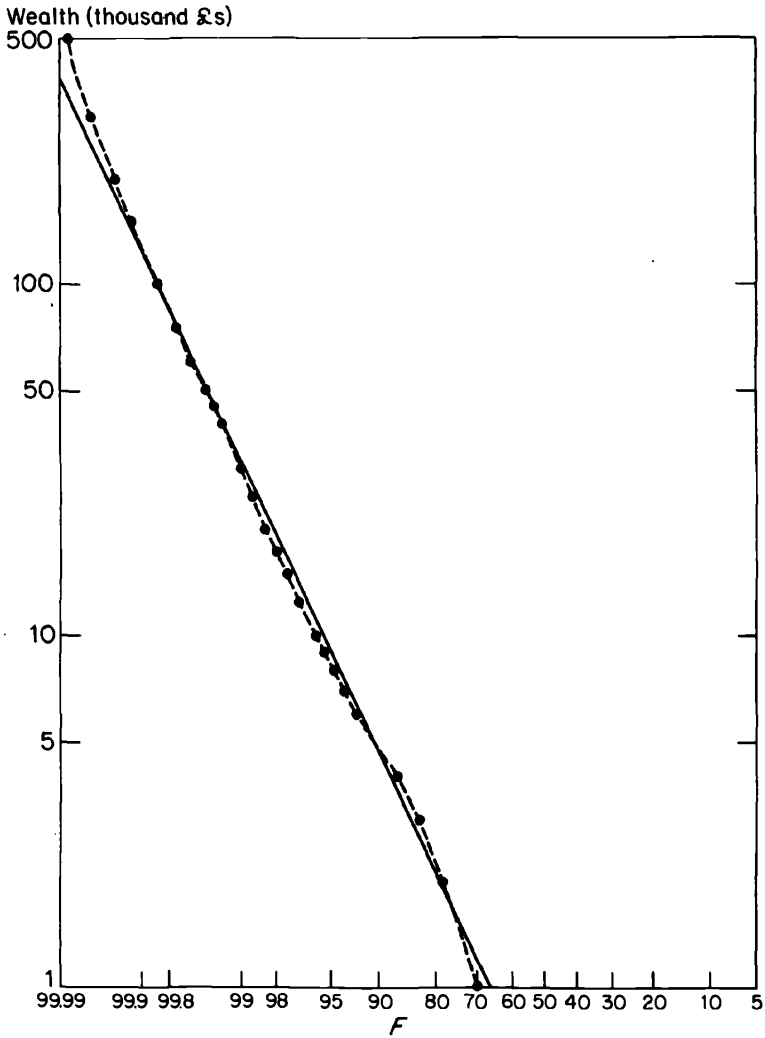

FIGURE 3: Graphical Test of Log-Normal Distribution

frequencies above £100,000. At the lower end (below £5,000) the deviations may well be explained by underrecording or missing estates, and it does not seem unreasonable to suppose that the log-normal might provide an adequate fit to the lower part of the distribution.

If we are seeking a distribution to provide a reasonable fit to the whole range, then we need to find a distribution combining a Pareto tail at the upper end with a shape closer to log-normal in the middle ranges. In addition we need to consider the lower tail. The Pareto distribution assumes a positive lower limit and the log-normal assumes that $W > 0$; whereas, in fact, some fraction of the population have negative net worth. One distribution which may go some way toward meeting these requirements is that given by:[28]

$$1 - F = (1 - F_0)\left[1 + \left(W/W_0\right)^{\beta}\right]^{\alpha}. \tag{1}$$

There is no straightforward graphical method of fitting this distribution, but we may make some assessment of its possibilities by considering the following special case.

The Sech² Distribution

In the special case where $\alpha = 1$ and $F_0 = 0$, we obtain the sech² distribution (which is also a special case of the Champernowne distribution: see [29]). This may be transformed to yield:

$$\log \frac{F}{1 - F} = \beta(\log W - \log W_0),$$

which provides a convenient graphical test. From Figure 4, it can be seen that the distribution provides a quite good fit to the data over the range £5,000–£500,000. Although there are still systematic deviations from linearity, the curvature is less marked than in the Pareto case and there are grounds for being more confident that it can be extrapolated to the lower ranges. As in the case of the log-normal, there are discrepancies in the ranges below

[28] For discussion of this distribution, see Burr [28]. In an unpublished paper, a somewhat similar form was proposed and applied to income data by J. D. Sargan at the 1958 meetings of the Econometric Society.

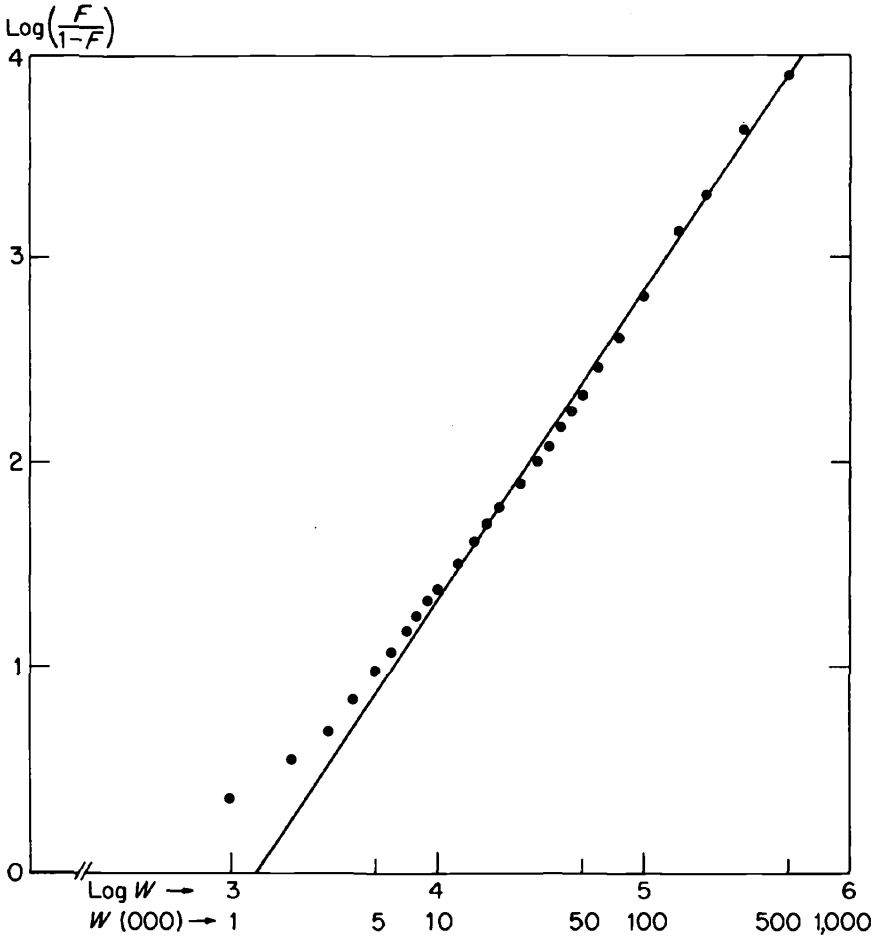

FIGURE 4: Graphical Test of Sech^2 Distribution

the estate duty limit (£5,000), but these may be explained by underrecording.

Table 10 shows the results obtained if the log-normal and sech^2 distributions fitted to the range above £5,000 are extrapolated downward to cover the whole distribution. It is clear that the results using the two distributions are quite different. The log-normal estimates indicate that some £5 billion must be added to allow for those not covered by the estate duty returns, which is £1 billion less than the amount added on assumption B3, using the balance sheet approach. On the other hand, the sech^2 estimates suggest that the amount added should

TABLE 10 Extrapolated Distribution (Multiplier A1)

	Log-normal	*Sech*^{2}
Median (£)	472	1,318
Mode (£)	19	382
Mean (£)	2,380	2,801
Total wealth (£ billion)	95	109
Total wealth according to estate duty estimates (£ billion)[a]	90	90

[a] Corresponding to the distribution given in Table 3.

be £19 billion, which is higher than any of the assumptions B2 through B4. It is probably fair to say that neither distribution gives particularly reasonable results. The log-normal distribution attributes very little wealth to those not covered by the distribution[29] and the mode is somewhat implausible, but the location parameters of the sech^2 appear to err in the opposite direction.

Summary

As emphasized earlier, the primitive techniques employed here do not allow any definite conclusions to be reached about the relative merits of different distribution functions. It is clear, however, that the estimates derived using fitted distributions to extrapolate from the upper tail depend sensitively on the particular functional form adopted. Further research is needed to allow us to discriminate more finely between the alternative distributions (including ones not discussed here, such as the Pareto type II and the Yule distributions). Without this, the usefulness of fitted distributions in filling the gaps in our knowledge will be very limited, and it will not be possible to throw light on such questions as the relative importance of stochastic and deterministic factors in leading to the concentration of wealth.

[29] It is interesting to note that the Gini coefficient (.80) is approaching that calculated on the assumption that the excluded population have no wealth at all.

IV. COMPARISON WITH THE OFFICIAL ESTIMATES

In this section, we compare the results obtained here with the official Inland Revenue estimates. The correct method to be used for such a comparison is open to debate. The Inland Revenue chooses to summarize its results in the form of Gini coefficients, but as argued elsewhere [12], this has little apparent justification, and it seems preferable to adopt the time-honored approach of comparing points on the Lorenz curves. In order to present the results in this form, interpolation is, in general, necessary. The method used in the first part of the section is to take a log-linear interpolation of the Lorenz curves,[30] but the alternative approach using fitted distributions is also discussed. In comparing Lorenz curves, it is conventional to take the top 1 percent, 5 percent, 10 percent, and so on, but since we are particularly concerned with the top of the distribution, it seems more helpful to focus on the top 0.5 percent, 1 percent, 2.5 percent, and 5 percent. The top 10 percent, for example, extends as far as those worth £5,000, which is not exactly the kind of figure one has in mind when considering top wealth holders.

Table 11 shows the Inland Revenue distribution (expressed in terms of the total population aged 18 and over) and the adjusted estimates made here, and allows us to assess the contribution made by different adjustments. First, we may compare the Inland Revenue figures and those obtained using the Census of Population multipliers without any corrections for sampling error. As was pointed out in Section I, the rationale for the particular adjustments made by the Inland Revenue is unclear; and in the present study, we have not followed them in combining age groups and smoothing across years. The effect of the adjustments will vary from year to year, but it is clear that in 1968 they served to reduce the share of top wealth holders (comparing lines 1 and 2). If we continue with the Census of Population multipliers, the next main set of adjustments are those to allow for missing wealth. With the central assumption B3, this involves the addition to total personal wealth of £12 billion (not including the adjustment for land and buildings). Of this, £6 billion is allocated to those not covered by the estate duty returns (an average of £275 per head) and £1.2 billion to those with recorded estates of under £10,000.

[30] This is equivalent to assuming that a Pareto curve is fitted to each pair of points.

TABLE 11 Comparison of Results

(percent)

		Share in Total Personal Wealth: Top Percentages of Adult Population			
		0.5	*1*	*2.5*	*5*
1.	Inland Revenue[a]	24.9	33.1	47.2	59.3
2.	Census of Population multipliers (no other adjustments)	26.5	34.9	48.5	60.5
3.	Life office multipliers (no other adjustments)	25.7	33.8	47.6	59.7
4.	General multipliers (no other adjustments)	28.1	36.8	50.9	63.3
	Census of Population multipliers with:				
5.	Adjustment B2	24.9	32.3	44.0	54.2
6.	Adjustment B3	27.0	34.6	47.0	58.0
7.	Adjustment B4	31.7	39.8	52.9	64.2
8.	Log-normal distribution fitted to Census of Population data (unadjusted)	21.9	30.0	43.6	56.1

[a] The estimates given in *Inland Revenue Statistics*, 1972, expressed as a percentage of total population aged 18 and over.

As a result, the share in total wealth of those with recorded estates above £10,000—broadly the top 4 percent—is reduced, but at the same time the distribution within the top 4 percent becomes more unequal, so that the share of the very rich is actually increased (see line 6). In Section III, we explored the alternative approach of using distributions fitted to the upper wealth ranges to estimate total personal wealth, and the predicted shares, using the log-normal distribution, are shown in line 8. (The use of a fitted distribution also avoids the need for interpolation.) This method makes no allowance for the missing wealth of the rich and, for this reason, we should expect the distribution to appear less concentrated. Moreover, we have seen that the log-normal distribution does not provide a good fit to the upper tail. When these considerations are borne in mind, the results for the

log-normal distribution provide broad support for the earlier estimates.

One of the main aims of the investigation is to examine the sensitivity of the results to different assumptions; and in this paper, we have concentrated on two important aspects: the choice of multipliers and the allowance for missing wealth. The analysis of the paper suggests that the results are likely to be particularly sensitive to the latter factor. The range of variation is illustrated by the fact that the share of the top 0.5 percent increases by nearly 7 percent if we move from assumption B2 to assumption B4 (see lines 5 through 7 of Table 11). In the same way, if a fitted distribution is used to extrapolate the distribution to cover the lower wealth ranges, the results depend sensitively on the functional form adopted. The choice of multipliers, on the other hand, appears to make less difference to the shares of upper wealth groups. The adoption of life office multipliers in place of the Census of Population multipliers used by the Inland Revenue would, for example, reduce the share of the top 0.5 percent by only 0.8 percent (compare lines 2 and 3 in Table 11), and the difference would be even smaller after the adjustment for missing wealth.

APPENDIX: ADJUSTMENTS USING BALANCE SHEET DATA[31]

A. Unquoted U.K. Government Securities

The totals in issue are known from official statistics. In most cases, the assets are owned exclusively by persons: the only major exception is tax reserve certificates, where nonpersonal holdings have been estimated extending the method applied by Roe [13]. The total is a weighted average of the December 1967, June 1968, and December 1968 figures.

The main reasons for the discrepancy between the estate duty estimates and the balance sheet totals are (1) the exclusion of small wealth holders; and (2) the understatement of holdings of those covered by the estate duty returns (particularly those below the exemption level). On the basis of a special analysis of death claims for 1960, Revell concluded that about 40 percent of the

[31] For further details see the forthcoming monograph, *The Distribution of Wealth in Great Britain.*

excess wealth should be allocated to the excluded population.[32] However, since that date, the limit for probate has been increased from £100 to £500. In view of this, the assumptions made are those set out in Table 12 (assumption B1 is that no adjustment be made).

B. Savings Bank Deposits

The totals in issue are known from official statistics and personal holdings are obtained in the same way as for unquoted government securities. The allocations by ranges is made under the same assumptions as unquoted government securities.

C. Building Society Deposits

The total deposits are known from the issuing body, and again nonpersonal holdings are small (about 1 percent). Personal holdings are estimated using the same method as Roe and averaged over the December 1967, June 1968, and December 1968 figures.

According to Revell's estimates for 1960, the value of deposits involved in estates not appearing in the estate data is likely to be small ([10], pp. 168–69). Since that data the Administration of Estates Act 1965 has increased the limit below which probate is not required and the amounts involved may be larger. At the same time, the proportion allocatable to the excluded population is probably smaller than in the case of unquoted U.K. government securities and savings bank deposits, and the assumptions shown in Table 12 reflect this.[33]

D. Household Goods, Etc.

The balance sheet totals given by Revell and Roe are based on a perpetual inventory method, and those used here are obtained in the same way. The total is an average of the December 1967 and December 1968 figures.

The difference between the balance-sheet and estate-duty estimates arises in this case because of the exclusion of small

[32] See [10], pp. 168–69.

[33] The reasons why the holdings appearing in the estate data may be understated include, for example, the fact that accrued interest may not always be credited where the estate is clearly not dutiable.

estates and because of the adoption here of a "going concern" basis for evaluation. The natural assumption under B2 is that the first factor accounts for the whole of the difference, although in certain situations the amount allocated per head would exceed the average for those covered by the estate duty estimates, in which case, the excluded population is allocated an amount equal to the average holdings. For assumption B4, we take the extreme case where the excluded population are allocated no part of the excess wealth. For assumption B3, we take the intermediate case where the average holdings of the excluded population are taken to be equal to the average for the range £0–£3,000 in the estate estimates (approximately half the average for the estate statistics as a whole). In each case, the remaining excess wealth is attributed to the difference in the method of valuation and allocated proportionately to holdings (including those of the excluded population).

E. Trade Assets

The balance sheet total for this item, which relates to the assets of unincorporated businesses, is obtained by Revell using a quite different method from the estate duty estimates, and his approach is followed here (see [10], pp. 141–4). The total is an average of the December figures. The main reason for the differences in this case is the adoption by Revell of a "going concern" valuation, and in view of this, the excess wealth is allocated proportionately to holdings.

F. Exempt Settled Property and Expectant Interests

Any adjustment for missing settled property is necessarily speculative, since no really firm evidence is available about its extent; it is, however, possible to make some approximate allowance. A starting point is provided by the estimates of Revell that in 1961 the amounts involved were:

	(£ *million*)
Property settled on surviving spouse	1,250
Discretionary trusts	200
Property settled on minors	200
Total "missing" settled property	1,650

TABLE 12 Assumptions About Allocation by Ranges

Asset	*B2*	*B3*	*B4*
1. Unquoted U.K. government securities	All excess wealth allocated to EP[a]	70% allocated to EP; remainder equally to those below exemption level	40% allocated to EP, remainder proportional to estate holdings
2. Savings bank deposits		Same as 1	
3. Building society deposits	75% excess wealth allocated to EP; remainder equally to those below exemption level	50% allocated to EP; remainder proportional to holdings below exemption level	25% allocated to EP; remainder allocated proportionately to estate duty holdings
4. Household goods	See text	EP allocated holding equal to that in range £0-£3,000, remainder proportional to holdings	All excess wealth allocated proportionately to holdings

5. Trade assets	*Allocated proportionately to holdings*		
6. Settled property	Allocated in proportion to estate duty wealth above £5,000 (property settled on surviving spouse) or £50,000 (discretionary trusts and property settled on minors)		
7. Shares	No adjustment		
8. Life policies and pension rights	Industrial policies allocated to EP; death benefits allocated as pension rights; nonaggregable policies allocated proportionately to total estate duty wealth		
	Pension rights equally distributed among males	Pension rights distributed as life policies	Pension rights distributed as total wealth
9. Land and buildings	Allocated proportionately to holdings		
10. Debts	25% allocated to EP and those below exemption level; remainder proportionate to estate duty estimates	50% allocated to EP and those below exemption level; remainder proportionate to estate duty estimates	All debts allocated to EP and those below exemption level

[a] EP denotes population excluded from estate duty returns.

These estimates may be on the low side. In the case of discretionary trusts, Revell himself commented that "many people who have practical experiences of settled property would claim that the figure . . . is far too low," and he goes on to say that "undoubtedly an enquiry on similar lines taken today [1967] would yield a much larger figure because corporate trustees all report a great increase in this form of trust ([10], p. 138)." The estimates made by earlier investigators were indeed considerably higher. Campion's figure for the settled property missing from the estate duty estimates in 1936 was between £750 million and £1,300 million ([3], p. 21). In 1954, Lydall and Tipping assumed that discretionary trusts accounted for £1,000 million and "settled property" (presumably that covered by the surviving spouse exemption) for £3,000 million.

It is hoped that in the course of the research being undertaken, it will be possible to provide more definite evidence about settled property,[34] but for the present we consider a range of estimates based on the earlier studies. A lower figure is provided by the estimates of Revell and an upper one by those of Lydall and Tipping, in each case extrapolated to 1968.[35] The central estimate lies in the middle of this range and represents broadly the same percentage of wealth as that estimated by Campion [3].

	(£ *million*)		
	B2	*B3*	*B4*
Property settled on surviving spouse	1,250	3,000	6,000
Discretionary trusts Property settled on minors	1,200	1,700	2,000

It seems reasonable to assume that much of this missing property should be allocated to the higher wealth ranges. The investigations by Revell ([10] and [26]) provide some guide in this respect. It is assumed that all wealth in discretionary trusts and trusts settled on minors belongs to those with wealth of over £50,000, and that this should be allocated in proportion to wealth

[34] Among the questions which need further consideration is the correct method of valuing an interest in settled property.

[35] The extrapolation of the lower figure is based on the indications given by Revell ([10], p. 169) and that of the upper figure on the assumption that settled property has increased approximately in proportion to total wealth.

in excess of this amount as indicated by the estate duty estimates. Property settled on a surviving spouse may be held lower down the scale and is allocated in proportion to wealth in excess of £5,000.

There are two further problems concerning settled property. First, the inclusion of "expectant interests" involves double counting and this item is excluded. Second, the adjustments described in the previous two paragraphs may involve double counting if, at the same time, we are using the national balance sheet estimates to correct for missing wealth. In order to overcome this, it is assumed that the net addition of settled property (allowing for the exclusion of expectant interests) is distributed among different assets in the way shown below (which is based on the estimates in [10], Table 6.2):

	(percent)
Land and buildings	10
Quoted U.K. government securities	15
Quoted U.K. ordinary shares	70
Life policies	5

G. Quoted and Unquoted Company Shares

In the case of unquoted shares, the adjustment made by Revell was designed primarily to give a smoothed series over a number of years. Since the problem of sampling errors has already been considered, no further adjustment is made here. In the case of quoted securities, Revell obtained information from register surveys about personal holdings and used these estimates in place of the estate duty figures. As he comments "the reasons for the apparent errors . . . are by no means clear" (apart from the settled property already taken into account) and in view of this no adjustment is made here.

H. Life Policies and Pension Rights

There are three main problems which arise under this heading. First, the estate duty estimates of sums assured under life policies exclude a number of items, including death claims paid with production of probate (industrial branch claims), death benefits at the discretion of trustees, policies securing loans (e.g. for home purchase) and nonaggregable policies. Second, the method of

valuation—sums assured—is not appropriate. Third, no allowance is made for the value of rights to occupational pensions apart from the death benefits. In order to deal with these problems, Revell replaces the estate duty figure by an estimate of the life funds and of the value of unfunded pensions rights, and the same approach is adopted here, with the total being a weighted average of the December figures.[36]

In allocating the missing items from the estate estimates, industrial branch policies are allocated to the excluded population; death benefits are allocated in the same way as pension rights (see below); policies securing loans are ignored on the grounds that we are not concerned with the asset composition of wealth (and the corresponding adjustment to mortgages is similarly ignored); and nonaggregable policies are allocated proportionately to wealth indicated by the estate duty estimates. The allocation of pension rights can only be based on guesswork in the absence of any firm information about the distribution of the value of rights. It does not seem implausible, however, to suppose that the rights would be distributed across wealth ranges in much the same way as life policies, and this forms the basis for the central assumption.[37] The lower bound is based on the assumption that rights are equally distributed among all male wealth holders; and the upper bound on the assumption that rights are distributed in proportion to total wealth as indicated by the estate duty estimates.

I. Land and Buildings

The balance sheet total for this item is derived primarily by multiplying up the ratable values (as an index of rents), and the figures used here are an extrapolation on the same basis (the total being a weighted average of the December figures). The balance sheet total is quite substantially higher than the estate duty estimate. It is not reasonable to suppose that this excess should be allocated to the excluded population since, according to Revell, it is unlikely that estates containing dwellings would be omitted from the Inland Revenue statistics. Part of the difference can be explained by the understatement of holdings of these assets

[36] An allowance is made for the policies held by personal trusts.

[37] For individuals, there may be a *negative* correlation between life insurance and pension rights (one being a substitute for the other); however, when we consider ranges of wealth, it is likely that they are positively correlated.

by unincorporated businesses and partly by the omission of trusts, but these are unlikely to account for the whole difference, which must reflect in particular the method of valuation. As Inland Revenue has pointed out, the estate data values separate interests in a property and the sum of separate interests may be less than the value for the property as a whole taken in the balance sheet total. On the other hand, the estate valuation is closer to a realization basis than to the "going concern" basis adopted here. In view of this, estimates are presented both with and without the adjustment to the balance sheet total.[38]

J. Debts (Apart from House Mortgages)

The balance sheet total for this item is constructed by Revell largely on the basis of information available from other sectors, and in the present case the same approach is followed.

The discrepancy between the balance sheet value and the estate duty estimate can be attributed to the inadequate coverage of unincorporated businesses, the netting out of debts when a life policy is held, and the estates below the duty exemption level. Revell emphasizes the last of these factors and points out that "when an estate is clearly not liable to duty, nobody has any incentive to do elaborate sums to compute the debts owing by the deceased and they will almost certainly be understated ([10], p. 159)." In view of this, it is assumed that the difference should be attributed in large part to the excluded population and those below the exemption level.

K. Allowance for Northern Ireland and Overseas Residents

The intention is to produce estimates for Great Britain, and we must, therefore, remove the elements of Northern Ireland wealth involved in the adjustments described above. This is assumed to be achieved by reducing the balance sheet totals by 1.7 percent (the percentage of U.K. personal wealth held by Northern Ireland in 1961). The adjustment for overseas residents has to be made to the estate duty figures, since they include property situated in the U.K. owned by overseas residents.[39] According to Revell, these

[38] An allowance is made for land held in settled property; see F above.

[39] Double-taxation relief usually means that duty is not paid, but the full value of the assets will nonetheless appear in the statistics.

constituted between 1.4 percent and 2.1 percent of the gross capital value of all estates of £3,000 and over in 1951–61, and about 1 percent of the estates below £3,000. The assumption made is that 1 percent of estates below £5,000 and 2 percent of estates above this level should be excluded.

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DISCUSSION: WEALTH IN BRITAIN—THE ESTATE DUTY METHOD REEXAMINED

Kathleen M. Langley
Boston University

Atkinson has made a masterly reappraisal of the estate duty method of estimating the distribution of wealth in Britain. It is a real advance to have subjected the two principal sources of error in this method of wealth calculation to a sensitivity analysis. It has long been appreciated by wealth calculators that a considerable opportunity for error arises from inappropriate multipliers and from the problem that decedents' reported estates may differ from the current capital holdings of the living in the same age-sex groups. It is, however, intriguing to learn that after the searching review of the different mortality rates and of "missing" data, conventional wisdom based on rule-of-thumb estimation is more or less confirmed. What is long overdue is the task of selecting a random drawing of living persons—and of their wealth—even if only to reveal the inadequacies of deriving wealth estimates from estate-duty tax returns.

The persistence of significant inequality in the distribution of wealth in Britain despite the existence since 1940 of confiscatory death duties does indeed suggest that either the underlying institutional forces making for inequality are particularly strong or that measurement of the wealth distribution is inadequate. Hicks,[1] in a recent examination of "equality" factors, points out that an estate of £400,000 has today a real value of no more than £100,000 in terms of 1939 pounds, and that since 1939 the rate of tax on such an estate has risen from 20 percent to more than 60 percent. Moreover, during that time span, most estates will have changed hands. As income and wealth are correlated, Hicks looks at the change in the distribution of the personal incomes of married persons (before tax) between 1954-55 and 1967-68 (in terms of "1967 pounds"), and his estimates show a reduction in the number of couples who fall into the top income group of above £10,000 from 43,000 to 33,000 (a 23.3 percent drop). He

[1] J. R. Hicks, *The Social Framework*, 4th edition (Oxford: Oxford University Press, 1971), Chap. XVIII, p. 246.

concludes that "it can hardly be doubted that the *fall* in the number of *large* properties, which is the result of death duties, is one of the causes of the decline."[2] He does, however, speculate that as more than half of income over £10,000 is "earned income," a number of income earners who would otherwise be top income earners have made arrangements to take income in a nontaxable form. "Too great reliance on income taxation to equalize incomes weakens the power of the income taxation itself to do what it is supposed to do."[3] It is possible that this is also the situation with regard to estate duty taxation. Revell[4] says that it has become customary in Britain to call estate duty a "voluntary tax" and to regard as "eccentric" an individual whose estate, through his own neglect to take advantage of legal methods of estate duty avoidance, does attract tax rates in the 60 to 80 percent range. The estate duty statistics must also be somewhat "eccentric," and we may have reached a point when we can no longer pretend that the estate duty statistics in any way represent a random sample of the living population.

I should like to comment, first, on the forces making for wealth preservation and on the problem of "missing" wealth; second, on usage of National Balance Sheet data; and third, on other aspects of the paper.

THE FORCES OF WEALTH PRESERVATION

The process of personal wealth generation and wealth transfer has received inadequate study by economists. Atkinson refers to two types of operational forces, namely, stochastic and deterministic ones. Further discussion of the a priori assumptions concerning the relative weighting of these respective forces within a specific society would have been, I believe, both interesting and pertinent in assessing the validity of his wealth calculations.

The economic and social forces making for both income and wealth distributions of inequality may well exist in a not easily disturbed fashion in Britain. Stiglitz[5] considers the main forces of

[2] Ibid.

[3] Ibid., p. 249.

[4] J. Revell, *The Wealth of the Nation* (Cambridge: Cambridge University Press, 1967), p. 110.

[5] J. E. Stiglitz, "Distribution of Income and Wealth Among Individuals," *Econometrica* 37 (July 1969): 394-97.

wealth inequality to be (a) heterogeneity of the labor force in terms of productivity, that is, I assume, in terms of acquired skills or of given natural abilities; (b) class saving behavior; and (c) primogeniture. A possible additional factor, namely life-cycle saving behavior has been previously investigated for the British case by Atkinson,[6] who concluded that these differences were not an important factor in explaining inequality. While primogeniture may be of importance in Britain and also heterogeneity of the labor force—in the words of George Bernard Shaw "It is impossible for an Englishman to open his mouth without making some other Englishman hate or despise him"[7]—I believe, that we should consider category (b) not in terms of differential savings ratios but in terms of social-class estate duty avoidance or mitigation behavior. System maintenance is alleged[8] to fall within the domain of "grants economics" and one-way transfers or gifts *inter vivos* have long troubled users of estate duty statistics for the purposes of wealth measurement. It is probable that although wealth may indeed be unequally distributed, it is more equally divided within a social group than is apparent from the statistical estimates.

Gifts *inter vivos* pay estate duty today if made within seven years of the death of the deceased. It has been assumed that the question of these "gifts" can be ignored, because as has often been pointed out, the recipients are also subject to the laws (or chances) of mortality and such wealth may be counted *twice* in the statistics. It has for some time been an article of faith to believe in the above thesis and hence to accept the validity of the estate-duty multiplier method of making wealth calculations. There have always been legal gift exemptions: gifts made for public or charitable purposes, or—of greater importance—"reasonable gifts" shown to be part of *normal* expenditure if these should ever be included in the estate. No attention has been given to the question of responsibility for family expenses, that is, to the possibility that gifts *inter vivos* may not be outright gifts—and thus liable to be revealed in the unexpected death of a person in a young rather

[6] A. B. Atkinson, "The Distribution of Wealth and the Individual Life Cycle," *Oxford Economic Papers*, July 1971.

[7] G. B. Shaw, "Preface to Pygmalion 1912," *Prefaces by Bernard Shaw* (London: Constable, 1934), p. 771.

[8] K. E. Boulding, M. Pfaff, and J. Horvath, "Grant Economics: A Simple Introduction," *American Economist* 16 (Spring 1972):21.

than an old age group—but the taking over by more affluent family members of expenses such as those for education or even for vacations or normal living expenses. These "gifts" would, by their very nature, be consumed by the recipient and never come to the attention of the tax inspector, yet in a very real sense they permit the buildup of human capital and of wealth potential to take place and thus help to preserve the social class. Further, is it reasonable to assume that tax inspectors question the payment of possibly (over a period of years) quite substantial sums to wives (or husbands) as normal living expenses—sums which are in effect, capital transfers? In addition to exempt settled property and discretionary and other trusts, significant sums could in this way escape the tax collector.

THE USAGE OF NATIONAL BALANCE SHEET DATA

Atkinson's paper uses extrapolations of the National Balance Sheet data on the basis of the estimates published by Revell in 1967 for the years 1957-61. It should be noted, however, that these estimates of the value of a number of the assets owned by the personal sector were made using the estate multiplier method. Revell considered that he could correct for certain deficiencies in the context of compiling an aggregate balance sheet for the personal sector but he wrote, "We do not go into *further* difficulties involved in trying to estimate the *concentration* of personal wealth."[9] Atkinson has been more ambitious and has allocated the "missing" wealth to specific wealth ranges; his assumptions appear to be based on good judgment—although, of course, an allocation which is simply proportional to estate holdings necessarily compounds any initial misallocation by class size.

The use of National Balance Sheet data means an acceptance of the methods of valuation used in making the estimates. An implicit assumption made by Revell is that of valuation based on a "going concern" basis, that is, that all economic units are continuing in their current line of economic activity. This assumption appears to be entirely appropriate at a national level—but while the state lives on, individuals arrive and depart.

What matters to an individual is his command over resources at

[9] Revell, *Wealth of the Nation*, p. 106.

any specific time. Both the poor and the very rich (at least in Britain) have been called profligate—both groups spend what they get, but the rich can afford to buy the services of tax lawyers, and the lawyers see that their client's status is maintained. A life interest in a trust means that provision is made to obtain (1) current purchasing power and thus command over immediately available goods and services; and (2) the ability to pass along to heirs entitlement to future goods and services. Trusts and the ownership of corporations have shielded the wealthy from many of the consequences of their spending follies. Insurance policies provide additional protection and can be of a form that need never appear in an estate. When a policy on the life of a person is owned by someone else (often for large sums), particularly when business interests are involved, an insurance company will pay out on a death claim, but no estate will pay estate duty. The poor can and do also obtain insurance protection, particularly for anticipated funeral expenses—but it is highly probable that the traditional weekly collection by insurance agents is a means whereby the poor transfer a total "savings" sum to the insurance companies which exceeds the benefits ultimately received. Such small policies do not provide immediate liquidity to the holders; but on the other hand, the wealthy can use their insurance policies to secure bank overdrafts or other loans.

On a personal rather than on a national level, the "going concern" valuation concept is not necessarily the most appropriate one. Personal wealth consists largely of paper "claims"[10] of varying degrees of liquidity. In 1969, on the basis of Inland Revenue's estimate of gross personal wealth (and—as the paper has pointed out—this is an underestimate), quoted shares and debentures and insurance policies alone accounted for 45 percent of the total. On the other hand, household goods and "other personalty" formed 13 percent of the total. Paper claims to wealth and to command over resources are not closely tied to either the flow or stock of real goods and the realization value at any given time can fluctuate for many reasons which are not associated with the productivity

[10] In 1938, in an early and very searching examination of the concept of national capital, Kuznets indicated that the "claims" approach to wealth estimation was "especially suited to be the basis of distribution of wealth among individuals." *Conference on Research in Income and Wealth*, Vol. 2 (New York: National Bureau of Economic Research, 1938), p. 7.

or real economic performance of a country. The interests of the holders of paper wealth do not necessarily lie in the same direction as the interests of the nation as a producer of real things. Carter has recently put forward the view that Britain considered as a "going concern" has suffered too often in the last twenty years from undue attention being given to the interests of those people who hold paper wealth.[11] Can we assert that the "true" capital value of a company on a given date is "correctly" determined by the securities market, when it is known that the specialists in specific stocks frequently encourage speculation? It is generally accepted that the capital market is imperfect and many securities may not be worth their going exchange prices in terms of the present discounted value of future expected earnings—but we must accept, when considering wealth in terms of its command over resources, the view that "a thing is worth what you can get for it"—either through outright sale or through its borrowing power. Inland Revenue does attempt to abide by the above principle. When, for example, the decedent has held an insurance policy on the life of another person, the estate is charged to duty on the surrender value of the policy. If an insurance policy is considered as a current asset, its value must be what can be raised against it or its current surrender value, even if the surrender value is computed so as to impose a penalty on the act of surrender; the poor, with few liquid assets, pay heavily in order to obtain a little additional immediate command over resources. Further, I would not dispute that it is a reasonable procedure in a National Balance Sheet context to take account of rights to funded or unfunded pension schemes and, logically, also of social security retirement benefits. Ultimately, the nation, considered as a "going concern," will have to meet these claims to future consumption in some manner, but if the value of these future "rights" is not at the current time realizable by an individual, can they be considered as part of his wealth? If these "rights" are included in the personal wealth estimates, the actual distribution of *realizable* wealth holdings becomes increasingly concealed. The provision of a pension by an institution is one form whereby an individual can avoid complete payment of current high income taxes; and as the need for personal saving is reduced, so also is control over personal wealth.

[11] Charles Carter, *Wealth, An Essay on the Purposes of Economics* (Baltimore: Penguin Books, 1971), Chap. 5.

SOME OTHER MATTERS

Sampling Error

Atkinson prefers combining observations by estate ranges to ensure a minimum sample size (p. 283) instead of following the Inland Revenue procedure of obtaining a smoother series by combining observations for a number of years. Neither procedure is particularly satisfactory; the decision making is arbitrary, and we can never be sure that the sample size is of minimum adequacy when there is no particular principle that governs the selection of estate class or age groupings.

Choice of Mortality Multipliers

If, as is very likely, the distribution of wealth in Britain owes much to social and economic deterministic factors then it is reasonable (despite an overall national trend of increased prosperity and lower mortality) to attempt to differentiate the mortality rates of wealth owners from those of the general public. The characteristics of the ease of life which wealth makes possible are likely to linger on over several generations and to reduce the hazards of exposure to physically demanding occupations or to occupations entailing a risk to health. Unfortunately, as is pointed out in the paper, the precise relationship between the level of social-class multipliers and the degree of wealth inequality is unclear. It would, however, have been interesting to have heard speculations concerning the not insignificant differences in the estimated number of top wealth holders based on multipliers A1 and A2. The cumulative number of people with over £1 million is 17 percent higher using assumption A2 rather than assumption A1, and the cumulative number of people with over £200,000 is 18 percent higher. Numbers are increased, but evidently per capita wealth decreases and the Lorenz curve shifts inward. The result must be related to the age and sex classification by estate grouping but precisely in what manner?

Wealth Distribution Functions

Atkinson is undoubtedly correct in insisting that much further research work is required before we can rely on a specific fitted

distribution to fill the gaps in our knowledge concerning the overall distribution of wealth. It is, indeed, only too easy to substitute a beautiful formula for a beautiful "guesstimate." It would appear, in particular, that attention should be given to the problem of assessing the proportion of the adult population who have zero or negative net worth. We do not know, either on empirical or theoretical grounds, which of the many assumptions that can be made should be considered reasonable. At present, an assessment of the adequacy or inadequacy of any estimate of the implied average wealth of those not covered by the estate duty statistics is inevitably an arbitrary one.

On the question of the appropriateness of any particular fitted distribution, the basic issue of the functional form should perhaps be reconsidered. It is well known that an appropriate mathematical function to describe the actual frequency distribution of wealth (or income) has been difficult to find. Partly because of this problem, and partly because of Pareto's early discovery that the tail end of the cumulative distribution is linear in the log-log plane, the distribution function has been preferred to the frequency function in most economic research—but most distribution functions do not provide a description of the data over more than a small region of interest. It is possible that further research concerning the form of frequency function in addition to that of the cumulative distribution would be rewarding and help in the assessment of the relative weight of stochastic and/or deterministic wealth-generating factors.

In conclusion, since the results presented by Atkinson indicate that significant inequality of wealth persists in Britain, we might ask whether the publication of wealth estimates does not indeed encourage a continued search by the rich for new devices to ensure the preservation of their status.