

# CYCLICAL FLUCTUATIONS IN FACTOR SHARES AND THE SIZE DISTRIBUTION OF INCOME

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The way in which cyclical fluctuations in activity in the U.K. economy affect factor income shares and the channels through which these effects work through to the size distribution of income are traced. Using National Accounts data, the impact of an upturn in activity in increasing the shares of profits and self-employment income in factor incomes, and of self-employment and rent, interest and dividends in personal incomes, is quantified. Using Family Expenditure Survey micro-data, the resulting shift in decile shares in personal income, which is towards the top of the size distribution, is estimated.

## 1. INTRODUCTION

Long-term changes in factor income shares have been recognized as a major force in altering the size distribution of income among persons over time, though data have not been available to allow such effects to be precisely identified. In the (relatively limited) research on the impact of short-term fluctuations in macroeconomic conditions on the size distribution, cyclical variations in factor shares have also been seen as an important factor. Such analysis has, however, largely been at a highly aggregated level, almost all based on U.S. data. Studies such as Schultz (1969), Metcalf (1972), Thurow (1970) and Beach (1977), for example, have taken a time-series approach, relating observed changes in, *inter alia*, factor shares directly to those in the size distribution for the U.S. For the U.K. very little research has been done on the effects of changes in macroeconomic conditions on the size distribution (though the contribution of long-term trends in factor shares to the reduction in measured inequality over time has been noted as long ago as Lydall (1959)).

This paper uses U.K. data to trace the complex process whereby changes in factor income shares over the cycle lead to changes in the composition of total personal-household income and in the size distribution. First, the fluctuations which actually take place in factor income shares over the cycle are examined, in section 2. These are then traced through to the effects on the shares of income from different sources in total personal/household income, which are quite distinct from the shares going to the different factors of production. With the growth of limited companies, of pension funds, and of the state, the way in which factor income flows feed through to personal incomes has become quite complex—the simple Ricardian identification of labour, capital and rent factor flows as going to workers, capitalists and landlords, with a corresponding income ranking, is no longer a tenable simplification. This relationship has received relatively

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little attention, and is explored in section 3 of the present paper using National Accounts time-series data, not only to estimate the cyclical variations in the composition of total household income, but also to illustrate the process which produces these shifts. The impact which such fluctuations may have on the size distribution of income is then explored (in Section 4) using cross-section data from the Family Expenditure Survey.<sup>1</sup>

## 2. CYCLICAL FLUCTUATIONS IN FACTOR SHARES

While the long-term behaviour of factor income shares has been the subject of continuing debate, centred round the alleged constancy/relative stability of these shares over time, rare unanimity prevails with respect to the cyclical movements in these shares.<sup>2</sup> These movements are dominated by strong pro-cyclical movements in profits, with other income types being much more stable, leading to a rising share of profits in years of upswing and a falling share in the downswing.

The components of factor income distinguished in the U.K. National Accounts can be readily aggregated into employment income, self-employment income, profits (of companies, public corporations and government enterprises) and rent. In order to derive the functional distribution between labour income, profits and rent, self-employment income would have to be divided into profit and labour income components. While various imputation methods have been used for this purpose (see Feinstein (1968) and Kravis (1962) for example), these can produce quite different results and are also sensitive to cyclical changes in the economy. It will, in any case, be useful to distinguish self-employment income separately when looking at the impact of shifts in shares on the size distribution, so self-employment income is retained as a separate category in the analysis.

U.K. annual National Accounts data from 1948 to 1980 are used, and movements in the shares of income from employment, self-employment, profits and rent in GDP over the period are graphed in Figure 1. Some increase in the shares of employment income and rent, and a fall in those of profits and self-employment income, together with considerable year-to-year variation in shares, can be seen. These observed changes are produced by a combination of long-term structural changes and short-term fluctuations in economic activity. Here we wish to isolate the effects of the latter: this is done by regression of the components/shares on a capacity utilization index and a time trend.

The capacity utilization index used as an indicator of cyclical fluctuations in activity—which is also graphed in Figure 1—is based on one constructed by the IMF (Artus, 1977). It was constructed by fitting a production function, calculating “full capacity” levels of labour and capital input for each period, and deriving full capacity output: the ratio of actual to capacity output is then the index of utilization.<sup>3</sup> The estimated relationships are intended to provide

<sup>1</sup>The other major channel through which macroeconomic fluctuations affect the size distribution, unemployment, is analyzed using U.K. data in Nolan (1986).

<sup>2</sup>See, for example, Kravis (1962), Kaldor (1955), Marchal and Ducros (1968).

<sup>3</sup>Artus (1977) presents figures for 1955–78; values for 1948–54 and 1979–80 were estimated using the trends in capacity output together with the actual output data.

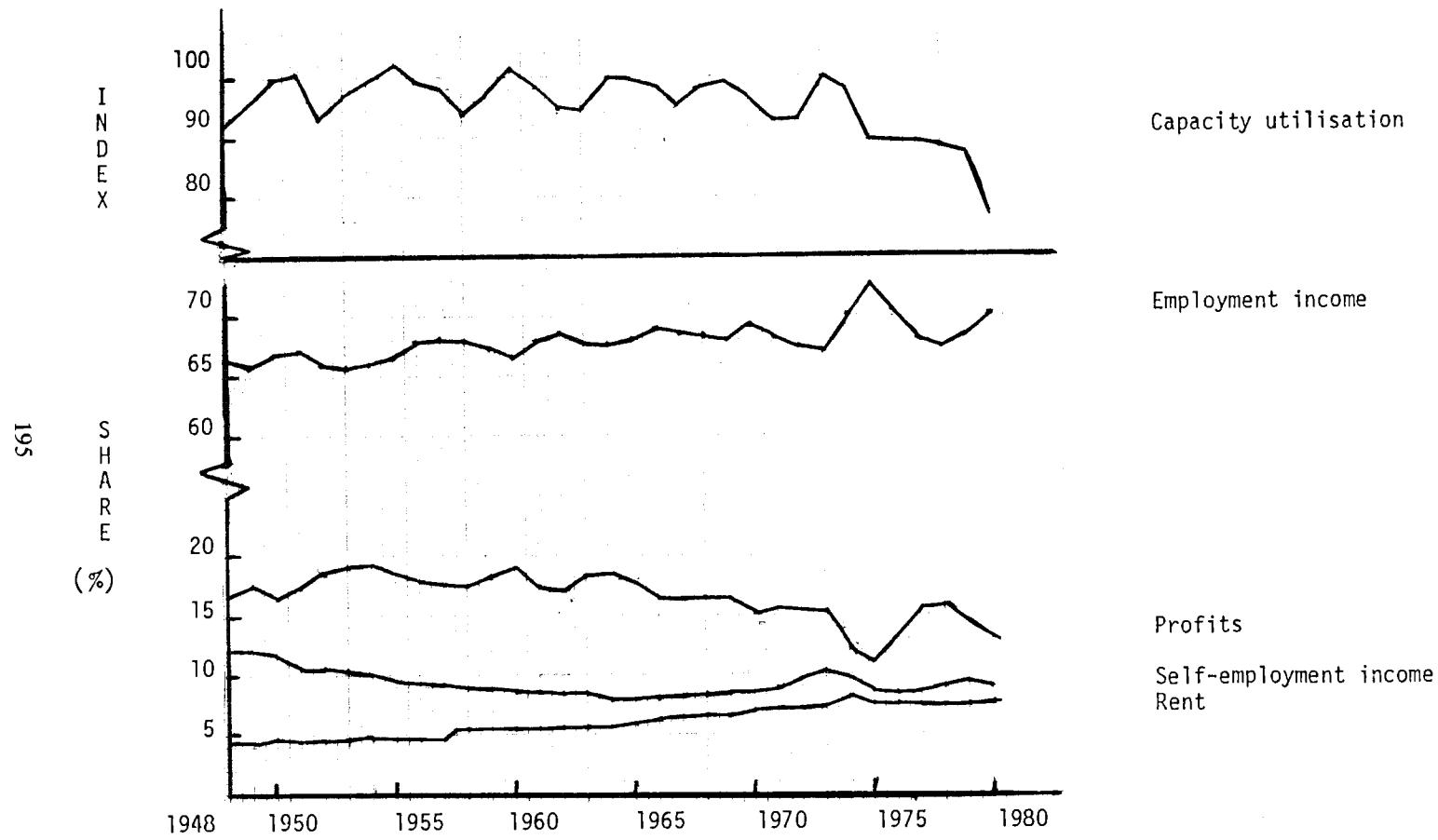


Figure 1. Shares of Factor Income Types in GDP, with Capacity Utilization Index, 1948-80

summary descriptions of the changes in income levels/shares which have accompanied fluctuations in activity, abstracting from longer-term structural effects, rather than seeking to explain how such changes come about or forming a structural economic relationship.

Rather than merely analyze the factor income shares directly, it is more revealing also to examine the impact which fluctuations in activity have on the actual levels of the different income types, deriving the implications for their shares. In order to abstract from the very substantial increase in all income types in nominal terms over the period due to inflation, they are deflated using the GDP deflator.<sup>4</sup> Regressing each income type (in real terms) on the capacity utilization index (CAP) and a time trend, significant CAP effects on all the major factor income types are found, as shown in Table 1.

The most direct way to compare the relative impact of CAP on the different income types is through the implied elasticities with respect to CAP, and these are also shown in the table. They vary considerably, with company profits and self-employment income much more responsive than employment income. It should be noted that, here, self-employment income and profits are after adjustment for stock appreciation: when stock appreciation is separately distinguished it is found to have an extremely high elasticity with respect to CAP, so that the shares of these income types before adjustment for stock appreciation are considerably more variable.

These differences in the effect of fluctuations in activity on the levels of the different income types mean that their shares will also vary as CAP changes. Taking the mean levels/shares over the period as base, the estimated CAP effects on each income type imply that an increase of 1 in CAP would be associated with the following shares shift (with the mean shares shown in brackets):

	% of GDP
Employment income	-0.14 (68.1)
Self-employment income	+0.04 (9.1)
Gross trading profits (of companies, public corporations and government enterprises)	+0.09 (16.4)
Rent	+0.01 (6.4)

When the CAP effects on the factor income shares are estimated directly, using the shares themselves rather than the levels as dependent variables in the regressions, CAP coefficients similar in size to those implied by the estimated levels effects are found.<sup>5</sup> The magnitude of these estimated effects may be illustrated by the example of a change of 10 units in the CAP index, which (as shown in Figure 1) would be a very large but not unprecedented movement. This

<sup>4</sup>Other possible deflators could be used to convert factor incomes to real terms—the price index for private consumption, for example—but the use of the GDP deflator is customary.

<sup>5</sup>Before adjustment for stock appreciation the CAP coefficients on the income type shares are highly significant, while after adjustment the coefficients on the major income types have *t* statistics just short of the conventional significance levels.

TABLE 1  
RESULTS OF REGRESSION OF FAÇTOR INCOME COMPONENTS ON CAPACITY UTILIZATION INDEX AND TIME TREND, 1948-80

Dependent Variable	Coefficient On			$R^2$	D-W	rho	Mean	Elasticity w.r.t. CAP
	Intercept	CAP	$T$					
Employment income	9,630.49 (1.99)	144.48 (3.39)	1,535.49 (21.67)	0.996	1.302	0.754	50,808.10	0.27
Self-employment income	-3,761.12 (1.50)	61.07 (3.05)	240.03 (5.01)	0.939	1.650	0.833	6,745.78	0.86
Gross trading profits of companies	-3,471.85 (0.76)	111.71 (2.57)	146.84 (3.42)	0.683	1.349	0.569	9,762.24	1.1
Gross trading profits of public corporations	-1,334.23 (1.05)	17.75 (1.50)	96.85 (7.13)	0.944	1.519	0.635	2,069.48	—
Gross trading surplus of government enterprises	311.76 (0.61)	1.46 (0.30)	-10.91 (2.11)	0.632	1.801	0.610	259.79	—
Rent	-2,635.23 (3.04)	27.44 (3.91)	225.78 (14.08)	0.994	2.252	0.823	4,173.7	0.63
Stock appreciation	-21,593.10 (3.72)	182.76 (3.70)	307.73 (3.23)	0.775	1.942	0.789	1,860.3	9.38
GDP	-1,521.07 (0.24)	369.07 (6.84)	2,259.75 (22.02)	0.997	2.496	0.788	74,422.7	0.47

shift would, according to the estimates, change the share of profits by about 1 percent of GDP, which would represent a change of about 6 percent in the mean share of profits. While this is quite a substantial effect, it may not be as much as might have been expected on the basis of observation of the fluctuations in profits over time. Such expectations may be based on fluctuations in profits before adjustment for stock appreciation, however.

We now turn to the way in which factor incomes feed through to households, and the implications of cyclical shifts in factor income shares for the shares of income from different sources in total household income.

### 3. FACTOR AND HOUSEHOLD INCOME SHARES

#### 3.1. *The Links Between Factor, Personal Sector and Household Incomes*

Some types of factor incomes are paid directly to persons, others find their way to persons through indirect channels, most importantly the company sector or the government. In exploring the connections between factor and personal incomes, the first complication which must be noted is that the Personal Sector in the National Accounts does not include only persons—it also includes unincorporated businesses, private non-profit-making bodies serving persons (NPBSP), and the funds of life assurance and superannuation schemes (LASS). Separate data for a Household Sector more closely corresponding to those which would be reflected in the size distribution of income among households have recently been made available but do not cover the entire period being examined. It is possible with the available data, however, to construct series which closely approximate those for the Household Sector and cover the entire period.

Personal Sector income in National Accounts terms is made up of income from employment, income from self-employment, rent, dividends and net interest, transfers from companies to charities, and National Insurance benefits and other current grants from government. The first two of these components are identical to the factor income components examined above, the total going directly to the Personal Sector in each case. The last two are transfers rather than factor incomes, not components of GNP. The key relationship in going from factor income shares to Personal Sector shares is therefore that between the factor incomes profits and rent and the Personal Sector component “rent, dividends and interest.”

The Household Sector in the U.K. national accounts differs from the Personal Sector in that it excludes all receipts of NPBSP and LASS, and includes payments from these bodies to households. Private pensions and other benefits from LASS are thus included (as a separate category) in Household Sector income, while rent, interest and dividends and transfers received by NPBSP and LASS are excluded. Neither NPBSP nor LASS receive any employment or self-employment income, but the definition of these income types does differ between Personal and Household sectors.<sup>6</sup> As a result of all these factors, significant differences

<sup>6</sup>In the Household compared with the Personal Sector, employment income excludes employers' contributions, self-employment income is net of stock appreciation, capital consumption and interest payments, rent excludes imputed rent, and interest received is gross rather than net. For a full discussion of the definition and coverage of the Household Sector data, see Jones (1981).

between the two sectors in income type shares are to be seen for the period for which both are available.

Data on the separate Household Sector are available only back to 1970, not sufficient for the analysis of the effects of fluctuation in economic activity on components and shares which we have been examining for the period 1948 to 1980. However, it is possible with the information available for earlier years to construct an income table for the whole period for a “Household plus NPBS” sector, which is much closer to the Household Sector than the Personal Sector components. The way in which this is done and the information used are fully described in Nolan (1984, Appendix 1). The small size of the NPBS component in the constructed sector ensures that the changes in the income components and their shares mirror closely those of the Household Sector proper, as can be seen from the period where the latter are available. We now go on to analyze the impact of cyclical fluctuations on the income components in this constructed sector.<sup>7</sup>

### 3.2. *Cyclical Fluctuations and Income Type Shares in the “Household Plus NPBS” Sector*

In examining the effects of cyclical fluctuations on the different income types in the “Household plus NPBS” sector, we will first deal only with direct income, that is transfers will continue to be excluded, in order to be able to relate the results to those for factor income shares. The components of direct income are employment income, self-employment income, rent, dividends and interest, and pensions and other benefits from LASS. The impact of CAP on these components was estimated by regression as before, using data for the period 1950–1980, and the results are shown in Table 2. Self-employment income again has a much higher elasticity with respect to CAP than employment income, as was the case for the factor income components (which differ slightly in definition<sup>8</sup>). Pensions etc. from LASS are quite unresponsive to CAP, with an elasticity almost as low as that for employment income. The category of rent, gross interest and dividends is much more responsive than these two, though less than self-employed income and less than the factor income component profits on which dividends ultimately depend. It is of interest to analyze briefly the way in which the impact of fluctuations in activity on this factor income—the most cyclically-variable type—are “damped” as it feeds through to household incomes.

To explore this feature, the cyclical responsiveness of various company-sector variables over the period is examined in Table 3. A principal explanation is seen to be the relationship between profits, dividends paid and undistributed income of the company sector. Whereas gross trading profits are relatively responsive to

<sup>7</sup>The impact of cyclical fluctuations on shares in Personal Sector income, and the links between Personal and Household Sector incomes, are analyzed in Nolan (1984).

<sup>8</sup>Employment income is now net of employers’ contributions to National Insurance and super-annuation schemes, while self-employment income is before adjustment for stock appreciation. For the latter, this may be closer to households’ perception of their income as reflected in the Family Expenditure Survey, and therefore more suitable in the present context. This is not in accord with the Household Sector definition, it should be noted, which excludes not only stock appreciation but also depreciation and interest payments: data on that definition are in any case available only for more recent years.

TABLE 2  
RESULTS OF REGRESSION OF COMPONENTS OF "HOUSEHOLDS+NPBSP" DIRECT AND GROSS INCOME ON CAP AND TIME TREND(S) 1950-80

Variable	Coefficient On				R <sup>2</sup>	D-W	rho	Mean <sup>a</sup>	Elasticity w.r.t. CAP
	Intercept	CAP	T	T <sup>2</sup>					
Employment income (excluding employers' contributions)	11,689.40 (2.59)	140.28 (3.29)	1,203.81 (26.05)	—	0.97	1.58	0.644	47,251.60	0.28
Self-employment income	-3,764.18 (1.50)	79.43 (3.72)	199.21 (3.95)	—	0.46	1.33	0.908	7,064.76	1.07
Rent, gross interest and dividends	-1,825.73 (0.68)	49.01 (1.98)	153.01 (4.22)	—	0.40	1.18	0.773	5,532.81	0.85
Pensions and other benefits from LASS	-420.32 (0.57)	12.13 (1.93)	146.26 (9.88)	—	0.79	1.30	0.907	3,323.73	0.35
N.I. pensions etc.	-539.10 (0.81)	13.75 (1.97)	76.51 (4.19)	2.59 (5.01)	0.99	1.97	0.330	3,272.64	0.40
Other current grants	1,572.83 (1.57)	3.86 (0.39)	-43.32 (0.97)	6.90 (5.66)	0.95	1.70	0.692	4,030.47	<sup>b</sup>

<sup>a</sup>1951-80.

<sup>b</sup>CAP coefficient insignificant.



TABLE 3  
RESULTS OF REGRESSION OF COMPANY SECTOR VARIABLES ON CAP AND T, 1950-80

Variable	Coefficient On			R <sup>2</sup>	D-W	rho	Mean <sup>b</sup>	Elasticity w.r.t. CAP
	Intercept	CAP	T					
Gross trading profits	-21,295.70 (5.43)	261.80 (8.24)	433.51 (5.25)	0.929	1.938	0.834	11,403.20	2.19
U.K. tax paid	5,744.18 (2.58)	-29.75 (1.39)	-14.30 (0.70)	0.369	1.800	0.517	2,673.90	<sup>c</sup>
Additions to tax reserves	-4,028.73 (1.52)	42.03 (1.61)	19.41 (1.29)	0.099	1.863	0.182	303.02	<sup>c</sup>
Total U.K. tax	-5,039.44 (1.65)	73.09 (2.65)	60.58 (1.32)	0.369	1.962	0.739	2,976.93	2.34
Net trading profits <sup>a</sup>	-1,202.91 (3.15)	161.08 (4.41)	304.28 (8.23)	0.911	2.035	0.547	8,426.28	1.83
201 Stock appreciation	-14,799.90 (3.46)	124.67 (3.19)	244.38 (3.95)	0.803	2.053	0.721	1,465.88	8.12
Gross trading profits after adjustment for stock appreciation	-2,790.50 (0.60)	111.69 (2.52)	129.68 (2.82)	0.608	1.346	0.558	9,937.32	1.07
Net trading profits after adjustment for stock appreciation	465.80 (0.10)	53.74 (1.25)	89.44 (1.67)	0.675	1.572	0.640	6,960.35	0.74
Ordinary dividends paid	-410.66 (0.18)	37.81 (2.75)	-14.52 (0.24)	0.863	1.647	0.901	2,483.74	1.45
Interest paid by banks, building societies etc.	-3,025.56 (1.17)	11.37 (0.51)	227.83 (4.67)	0.919	1.146	0.805	1,975.62	<sup>c</sup>
Total dividends and interest paid	-3,903.95 (1.36)	57.40 (2.18)	224.56 (5.57)	0.918	1.330	0.713	5,258.46	1.04
Undistributed income <sup>d</sup>	18,213.10 (3.31)	195.17 (4.21)	434.27 (4.08)	0.910	2.038	0.812	8,194.01	2.27

<sup>a</sup>Gross trading profits minus U.K. tax.

<sup>b</sup>1951-80.

<sup>c</sup>CAP coefficient insignificant.

<sup>d</sup>Gross trading profits plus rent and other non-trading income plus income from abroad less dividends and interest paid, UK taxes including additions to tax reserves, transfers to charities, and profits due abroad.

cyclical fluctuations (with a CAP elasticity of 2.2), ordinary dividends paid by the company sector are considerably less responsive with a CAP elasticity of 1.4. This is reflected in the behaviour of the undistributed income of the company sector, which shows a greater reaction to cyclical fluctuations than trading profits, and a much greater reaction than dividends paid, with an estimated elasticity with respect to CAP of 2.5.

The varying responsiveness of gross trading profits, undistributed income, and dividends to fluctuations in CAP may be explained in terms of the standard partial adjustment model used to explain dividend behaviour. Lintner (1956) suggested that companies tend to have to a target payout ratio relating desired dividends to profits. However, since transitory earnings increases might lead to levels of dividend payments which could not be sustained, and shareholders are thought to react strongly to dividend reductions, actual dividends are only partially adjusted to the desired ratio over time as profits vary. So current dividends are a distributed lag function of current profits. This basic model has been developed in, for example, Brittain (1964), Feldstein (1970), King (1977) and Anderson (1983). The partial adjustment model explains why the CAP impact on current trading profits is reflected largely in undistributed profits rather than dividends paid, and using this model the estimated CAP effects on company profits can be shown to be consistent with those on undistributed income, dividends paid, and receipts of the Household Sector, as analyzed in detail in Nolan (1984).

In addition to dividends, the cyclical sensitivity of interest and rent received by the Household Sector contribute to that of the “rent, interest and dividends received” aggregate. Separate data on rent are available, and show that this element is slightly less responsive to CAP than the overall aggregate.<sup>9</sup> As far as interest and dividends received are concerned, separate data on each are not available, but total payments by other sectors can be analyzed. Dividends paid by the company sector have already been discussed, and fluctuations in this should be reflected in receipts by households. No significant CAP effect on interest paid by financial institutions (which account for most of the interest paid by the company sector) is to be found (as shown in Table 3), and the same is true of interest paid by the Government. Interest received by households is therefore likely to be similarly insensitive, with the bulk of the impact of CAP on interest and dividends received coming through dividends.

The estimated CAP effects on the components of direct “Household plus NPBSP” income imply the following shifts in income type shares with a +1 change in CAP (if taken from the mean shares, shown in brackets):

	Effect of +1 CAP on Share	
	%	
Employment income	-0.11	(75.0)
Self-employment	+0.07	(11.1)
Rent, interest and dividends	+0.04	(8.7)
Pensions etc. from LASS	0	(5.2)

<sup>9</sup>Most of the cyclical responsiveness of rent can be seen to be attributable to the imputed rent component, which accounts for about three-quarters of the total.

So far we have only been concerned with direct income, since it is through market-related income that changes in factor shares feed directly into household income. However, in looking at the impact of changing income type shares on the size distribution, we will also be concerned with gross income, that is including transfers. These transfers are classified in the National Accounts as “national insurance pensions” and “other current grants from government etc.” The CAP effects on these two transfer income types were also estimated and are shown in Table 2. The estimated elasticity with respect to CAP for N.I. pensions etc. was 0.40, greater than employment income and about the same as pensions etc. from LASS. For “other current grants” the coefficient on CAP was, somewhat surprisingly, insignificant.

The estimated effects on the shares of the different income types in total gross income of a +1 change in CAP, taken from the mean shares, would be:

	Change in Share after +1 CAP	
Employment income	-0.085	(67.0)
Self-employment	+0.070	(10.0)
Rent, gross interest and dividends	+0.036	(7.8)
Pensions, etc. from LASS	-0.003	(4.7)
N.I. pension etc.	0.00	(4.6)
Other current grants	-0.019	(5.7)

The results of analyzing the time-series for the shares themselves again give very similar results.

These estimated share effects will now be used to examine the impact which fluctuations in activity may have on the size distribution of income through changes in the shares of different income types in total income.

#### 4. SHARES OF INCOME FROM DIFFERENT SOURCES AND THE SIZE DISTRIBUTION OF INCOME

##### 4.1. *Data and Methodology*

In assessing the likely size and pattern of shifts in income type shares on the size distribution, cross-section micro-data from the 1977 Family Expenditure Survey is used as the data base and the impact of such shifts on the distribution in that sample simulated. The 1977 FES contained over 7,000 households, and has considerable detail on the income from different sources going to each respondent. The categories of income receipt used are broadly comparable to those used in the National Accounts, and can thus serve as the base for our exercise, though with certain important qualifications, which centre on the substantial understatement of income from some sources in the FES compared with the National Accounts.

The shares of income from different sources in total direct and gross income in the 1977 FES sample are shown in Table 4. The income categories used correspond broadly to those in the National Accounts (where investment

TABLE 4  
INCOME TYPE SHARES IN THE 1977 FAMILY EXPENDITURE SURVEY, WITH DEGREE OF  
UNDERSTATEMENT RELATIVE TO NATIONAL ACCOUNTS

Income Type	Share in Total Gross Household Income %	Grossed-up FES Total as % of National Accounts aggregate
Employment income <sup>a</sup>	71.4	93.7
Self-employment	6.0	50.9
Investment	3.1	46.4
Occupational pensions	2.5	40.9
N.I. retirement etc. pensions	6.9	97.6
Other current government benefits	4.8	85.0
Imputed rent	4.3	83.2
Other	1.1	—

<sup>a</sup>Excluding employers' contributions.

income = rent, interest and dividends), except for "other," which comprises such income as scholarships and children's earnings. Total income is dominated by employment income to an even greater extent than was the case in the National Accounts, because self-employment and investment income and occupational pensions are understated relative to the National Accounts. The extent of this understatement may be assessed by comparing the FES sample totals for each income type, grossed up to the total household population, with the National Accounts aggregates. This exercise has been done for a number of years by Atkinson and Micklewright (1983), and the results for 1977 are also shown in Table 4.<sup>10</sup> For employment income, N.I. retirement etc. pensions and other current grants, there is not a very substantial difference, but for self-employment income the FES grossed-up total is only 51% of the National Accounts aggregate, while for investment income and occupational etc. pensions the figures are even lower.

Atkinson and Micklewright analyze the explanations for this understatement, and highlight the contribution of differences in coverage and timing, in addition to actual under-reporting or sampling biases. Whatever the reasons, though, the substantial understatement of some income types means that the cyclical shifts in income type shares estimated on the basis of National Accounts data cannot be directly applied to the FES sample. In order to see what the likely effects on the FES sample would be—which will facilitate comparison with observed changes in the size distribution in the FES over time—the National Accounts results may be adjusted to take the understatement into account. This is done by assuming that for each income type the CAP effects estimated from the National Accounts data are proportionately the same for the income not picked up in the FES—for whatever reason—as for the income which is shown.

The effect of this adjustment will clearly be that, not only are the shares of certain income types smaller in the FES than in the National Accounts, but the

<sup>10</sup>These figures are taken from Atkinson and Micklewright (1983) Tables 2-5 and 7, with the exception of that for imputed rent which they did not examine but which was calculated using their grossing-up factor.

CAP effect and therefore the shift in their shares will also be considerably less. The size of the overall shift in shares to be imposed on the FES also depends on how large a movement in CAP we wish to consider. The effects of an increase of 4 units in CAP is the cyclical shift in the level of activity chosen: this represents a movement which would be relatively substantial but not unusual over the cycle during the period covered. Adjusted for FES understatement, such a cyclical shift might be associated with an increase of about 0.2 percent and 0.1 percent, respectively, in the shares of self-employment and investment income in total direct income, balanced by a fall in the share of employment income. For gross income, there might be slightly smaller increases in the shares of self-employment and investment income, and a fall of about 0.1 percent in the share of "other current grants" as well as 0.25 percent in that of employment income.

In imposing such shifts in income type shares on the FES sample, assumptions must be made about the way in which the shift in income type shares takes place. The simplifying assumptions used here are that the shifts take place in such a way that (i) total income is unchanged but the shares of income from different sources are different, and (ii) the change in total income from each source affects each recipient of income from that source proportionately. This has the effect of producing a shift in income type shares while leaving the correlation between income types unchanged, and assumes that there are no changes in the distribution of income from particular sources taken alone.<sup>11</sup> This is necessary in the absence of a firm foundation for alternative assumptions: it may be deemed adequate when considering short-term fluctuations in income type shares, but would not suffice if long-term structural changes in shares were being considered.

#### 4.2. *Results of the Exercises*

When the receipts of each household in the 1977 sample from each source are altered to produce the required change in shares, and total income of each household is recalculated, the distribution of income among households by decile is altered as shown in Table 5. For direct income, the share of the bottom decile is unaffected, the shares of each of the next three deciles rise, the shares of deciles 5 to 9 fall, and the share of the top decile rises by 0.06 percent. For gross income, however, the share of each decile except the top one falls, while that of the top decile rises by 0.08 percent. These changes leave the Gini Coefficient for direct income unaltered, while that for gross income increases by about 0.001.

We can see what is producing these patterns of decile share change by looking at the actual distribution in the sample of income from each source by decile of direct and gross income, shown in Table 6. In the case of direct income, the adjustment to income type shares takes the form of a fall in the share of employment income and a rise in investment and self-employment income, with a small fall in the share of occupational pensions. Self-employment and investment income are more concentrated in the top direct income decile than employment

<sup>11</sup>The way this is actually implemented in the simulation exercises is to calculate an adjustment factor for each income type such that, if the mean receipt of each type is multiplied by its adjustment factor, there is no change in total income but the required change in income type shares is produced. The amount of income from each source received by each household is then multiplied by the relevant factor, and the distribution of total income recalculated.

TABLE 5  
EFFECT OF CHANGE IN INCOME-TYPE SHARES ON THE DISTRIBUTION OF INCOME AMONG  
HOUSEHOLDS, 1977 FES

Decile	% Share in Direct Income		% Share in Gross Income	
	Actual	After change	Actual	After change
1	0.017	0.017	2.190	2.181
2	0.704	0.711	3.312	3.299
3	2.905	2.920	4.798	4.791
4	6.228	6.233	6.655	6.648
5	8.493	8.488	8.283	8.278
6	10.435	10.425	9.829	9.824
7	12.341	12.327	11.447	11.442
8	14.530	14.511	13.331	13.320
9	17.702	17.672	16.121	16.109
10	26.645	26.696	24.035	24.108
GINI	0.4339	0.4339	0.3408	0.3416

income, but there is also a higher proportion of income from these sources going to deciles 2-4 than is the case for employment income, so these deciles as well as the top decile increase their share of direct income. Employment income, though not as concentrated in the top decile as self-employment or investment income, has in fact a higher proportion of receipts going to the top half than either of these.

Looking at gross income, the shift in income type shares involves a fall in the share of not only employment income but also of "other current government grants." The latter are more concentrated in the bottom 3-4 deciles than other income sources apart from N.I. pensions, so the fall in its share more than offsets, as far as the bottom 4 deciles are concerned, the rise in self-employment and investment income, and the shares of these deciles fall. The shares of deciles 5-9 fall for the same reason as for direct income—their share of employment income is greater than of self-employment and investment income.

#### 4.3. *Impact on the FES Distribution Corrected for Understatement*

These results refer to the changes which might actually appear in the FES, given the understatement of certain income types compared with the National Accounts. It is also of interest, though, to try to correct the FES distribution where necessary for the effect of this understatement, and examine the impact of income type share shifts on the corrected distribution. Briefly, the approach taken in adjusting the sample data for understatement involved:

- (i) increasing the receipts of all recipients of self-employment and investment income by a factor, to correct for differences in timing between these and other income sources;<sup>12</sup>

<sup>12</sup>Investment income refers to the average over the previous twelve months rather than the amount received last week. Self-employment income refers to the average of the most recent twelve months for which figures are available, the further lag being estimated by the CSO at nine months on average (RCDIW Report 8 (1979), Appendix D).

TABLE 6  
DISTRIBUTION OF INCOME FROM DIFFERENT SOURCES BY DECILE OF TOTAL DIRECT AND GROSS INCOME

(a) By Decile of Total Direct Income

Decile	% of total receipts of					
	Employment income	Self-employment income	Investment income	Occupational pensions	Other income	Imputed rent
bottom	0.0	0.0	0.28	0.05	0.40	0.0
2	0.06	0.22	3.00	7.86	2.77	5.76
3	1.22	2.87	11.66	23.57	15.81	9.48
4	5.51	8.32	7.49	15.82	14.70	6.68
5	8.57	7.14	8.16	9.96	10.06	8.11
6	11.01	8.08	7.04	5.98	8.87	9.54
7	13.00	8.51	8.40	8.42	14.91	11.25
8	15.72	8.87	8.53	5.97	10.66	13.00
9	19.28	10.42	10.15	8.97	11.42	13.90
top	25.66	45.60	35.29	13.42	10.40	22.32
total	100	100	100	100	100	100

(b) By Decile of Total Gross Income

Decile	Employment income	Self-employment income	Investment income	Occupational pensions	Other income	Imputed rent	N.I. pensions	Other government grants
bottom	0.05	0.60	1.86	2.67	4.43	2.25	19.10	11.28
2	0.24	1.16	3.46	7.47	7.99	4.79	24.62	16.61
3	1.87	5.41	6.72	13.69	9.70	6.85	19.58	17.73
4	5.82	5.42	7.52	12.61	12.40	7.22	9.58	11.01
5	8.40	7.60	7.42	11.28	8.02	8.02	6.92	8.72
6	10.73	7.29	7.35	9.44	11.26	10.43	5.03	7.24
7	12.84	8.89	8.43	7.60	15.29	11.42	3.86	7.57
8	15.63	8.01	8.64	8.38	9.13	12.75	3.55	7.24
9	19.16	10.09	10.40	9.95	12.68	14.29	3.58	5.90
top	25.26	45.54	38.19	16.91	9.10	21.99	4.19	6.71
total	100	100	100	100	100	100	100	100

- (ii) understatement of these income types was further reduced by increasing all receipts by a factor to take account of understatement, and by allocating some "missing" income to the top decile to reflect the apparent failure of the FES to adequately capture incomes at the top of the distribution.<sup>13</sup>

These adjustments, and their effects on the distribution of direct and gross income, are fully described in Nolan (1984). The principal effect is to significantly increase the share of the top decile, by 1.5 percent in the case of direct income and 1.6 percent for gross income, at the expense of most other groups.

The impact on this corrected distribution of the shift in income type shares associated with an increase of 4 in CAP was examined—with that shift recalculated

<sup>13</sup>See Kemsley (1975).

to take into account the fact that self-employment and investment income are no longer significantly understated relative to the other income types.<sup>14</sup> The results show a pattern similar to those for the unadjusted distribution but the effects are now greater in size, with the share of the top decile in direct income increasing by 0.12 percent and that in gross income by 0.14 percent.

#### 4.4. *Assessment of the Results*

In assessing whether these estimated effects of cyclical fluctuations in income type shares on the distribution are to be considered “large” or “small,” a relevant comparison is with the observed changes from year to year in the size distribution. Since the estimated effects are concentrated at the top of the distribution, we may first compare the impact on the share of the top decile with movements over time in that share. In the income distribution series based on the FES for each year, the share of the top decile has been relatively variable, with, for example, a mean absolute year-to-year change over the period 1967–77 of 0.48 for gross income. Compared with this, the estimated effect of the income type share shift on the actual FES distribution—of 0.08 percent for gross income—is relatively small, and even that on the corrected FES distribution—at 0.14 percent—would not appear very substantial. Summarizing the changes in the distribution using the Gini Coefficient, the mean absolute change in this inequality measure for FES gross income 1967–77 was 0.006, so the impact of the income type shift exercise—which was to increase the Gini by 0.001—appears, relatively, even smaller on this basis.

However, sampling variation may be responsible for a large part of the observed changes in the FES distribution, as reflected in the significant differences from year to year in the degree of understatement of income from particular sources compared with the National Accounts. It is therefore difficult to assess the changes which may be taking place in the underlying distribution. The U.K. income distribution data based on income tax returns do indicate that the FES series overstates the degree of variability.<sup>15</sup> It may be the case, then, that the estimated effects of the shift in income type shares on the distribution are significant relative to the changes over time: they are unlikely, however, to be large enough to dominate these changes, and are certainly not large enough to bring about a substantial change in the shape of the size distribution itself.

## 5. CONCLUSIONS

The analysis of factor incomes showed profits to be the most responsive to cyclical fluctuations in activity, followed by self-employment income, then rent, with employment income being least responsive. The results showed that an

<sup>14</sup>The major elements of the shift in income type shares is now, for direct income, an increase of about 0.26 percent and 0.13 percent for self-employment and investment income, respectively, and for gross income also a fall of 0.1 percent for other grants, with a balancing fall in employment income in each case.

<sup>15</sup>The mean absolute change in the share of the top decile in gross income in the “Blue Book” income distribution series for the U.K. over the 1967–77 period was 0.33 percent. This series refers to the family rather than the household unit: since the wider unit would be expected to show less variability, the implied change from year to year for the distribution among households may be less.



increase in the level of activity would increase the shares of profits and self-employment income, these effects being quantified.

The links between factor and Household Sector incomes in the National Accounts were outlined. An increase in the level of activity was associated with an increase in the shares of self-employment income and rent, interest and dividends and a fall in the share of employment income and (non-pension) Government transfers in gross Household Sector income. However, the impact of fluctuations in activity on dividends was considerably less than that on the factor income profits, and interest appeared unresponsive to such fluctuations, so cyclical changes in factor shares only affected the Household Sector in a somewhat muted form.

These results were used, together with micro-data from the 1977 Family Expenditure Survey, to quantify the likely effects of cyclical fluctuations in income type shares on the size distribution. The results indicated that for both pre- and post-transfer income, the top decile gained from the shift in income type shares as activity increased—that is, principally an increase in the share of self-employment and investment income. When the FES was adjusted to reduce the apparent under-representation of self-employment and investment income, a similar pattern in the distribution but somewhat larger effects were seen when income type shares were changed. The estimated effects may be significant relative to changes in the underlying distribution over time, though not large enough to dominate these changes.

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