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## Discussion Papers

No 45

**Stock-flow consistent income for industrial
and commercial companies:  the UK experience**

by

**K D Patterson**

*December 1989*

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# CONTENTS

Abstract

**ABSTRACT**

Although industrial and commercial companies (ICCs) are primarily concerned
with the production of goods and services which yield a trading profit there
is evidence that they have become increasingly concerned with their portfolios
of tangible and financial assets and liabilities.  As relative prices,
interest rates and exchange rates alter, there are implied changes to the
realisable net worth of ICCs.  That these changes can be substantial is
illustrated by reference to the UK experience between 1980 and 1982 and in
1985.  However, conventional transactions based income measures are purposely
not designed to capture these changes.  Measuring income on a stock-flow
consistent basis provides a complementary view of the performance of ICCs
which is intended to capture these portfolio effects.

# I   INTRODUCTION

Although industrial and commercial companies (ICCs) are primarily concerned
with the production of goods and services which yield a trading profit, there
is evidence that these companies have also become increasingly concerned with
the size and composition of their portfolios of domestic and overseas tangible
and financial assets and liabilities.  To the extent that ICCs hold assets and
liabilities which are subject to changes in their market value, the
appropriation accounts of these companies will be incomplete without a summary
of how these changes affect their realisable net worth.  If for example a
company holds foreign currency in its portfolio, either for speculative
purposes or to service its overseas operations, it is clearly subject to the
risk of exchange rate movements which affect the domestic purchasing power of
this part of its portfolio.  For example, foreign currency overseas deposits
and overseas borrowing are estimated to have increased by factors of around 5
and 1.8, respectively, over the period 1979 to 1987;[1] and a weighted index
(with weights based on the currency basket in the portfolio) of changes in the
sterling exchange rate has shown maximum depreciations and appreciations of
the order of 22% (pa) and 11% (pa), respectively.  The market value of ICCs
holdings of overseas stocks and shares has increased by a factor of 4 over the
same period.[2]  As exchange rates, overseas interest rates and overseas equity
prices have shown substantial movements, over this period, there have
implicitly been non-negligible changes in income which have accrued to ICCs on
account of these portfolio activities.

The importance of measuring corporate sector income to correctly reflect
movements of prices in general, or relative prices in particular, where the
latter include changes in interest or exchange rates, has been recognised by
several authors.  For the United States there have been influential reports by
two accounting standards boards - see FASB(1974) and CASB(1975) - and Shoven

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1 The data on which these estimates are based is from unpublished sources.  For
   the years referred to the relevant (end-period) figures, with percentages
   of gross financial assets or gross liabilities given in parentheses, for
   1979, are deposits overseas: $6.8 billion (2.8%), borrowing overseas:
   $12.3 billion (3.0%);  and for 1987, deposits overseas:  $33.4 billion
   (5.6%), borrowing overseas:  $22.5 billion (2.0%);  these figures are for
   currencies other than £ sterling converted to units of common currency ($).

2 The estimated market value of ICCs holdings of overseas stocks and shares is
   £2.2 billion for end 1979 and £8.6 billion for end 1987.

and Bulow (1975, 1976) have presented estimates for non-financial corporations of gains and losses on (domestic) financial assets and liabilities, and adjustments to obtain depreciation on fixed capital assets at current replacement cost and real stock appreciation. In the United Kingdom, whilst there appears to have been no published study at the aggregate level, there have been several studies concerned either with the general principles which should be applied in this context or with illustrations of particular accounting principles on disaggregated data, with much impetus stemming from the Sandilands report on inflation accounting, Sandilands (1975).

Another different focus has been provided by those interested in how sectoral accounts fit together into a consistent whole. For example, Buiter (1983), Ruggles and Ruggles (1982), Sunga (1987) and Patterson and Stephenson (1988), have suggested general principles with a macroeconomic perspective in mind. Whilst there is some disagreement amongst corporate sector accountants and economists on the general principles of income measurement and adjustment, there is a much greater measure of agreement amongst those concerned with aggregated or national income accounts. In particular, there is general agreement that a system of accounts which integrates flow and balance sheet accounts should be based on the principles of stock-flow consistency and market valuation where possible. These principles are contained in the SNA guidelines issued by the United Nations (1968) and later guidelines which dealt more specifically with the construction of national and sectoral balance sheets - see UN (1977, 1979). Recently Patterson and Stephenson (1988) set out a schematic framework which showed how the principle of stock-flow consistency can be applied to the construction of integrated balance sheet, flow of funds and income accounts. This framework demonstrated, more explicitly than hitherto, just how sectoral gains and losses, arising from differential movements in prices, exchange rates and interest rates, do - or in other cases do not - cancel out across the economy as a whole.

The aim of this study is to present some detailed empirical estimates of a revised set of accounts for ICCs based, as far as possible, on the stock-flow consistency principles outlined in Patterson and Stephenson (1988). In part this is possible through the CSO's publication of sectoral balance sheets, constructed along SNA guidelines, and their co-operation in providing a large number of unpublished series which are essential to this approach. To my knowledge this is the first study to apply these principles to the UK industrial and commercial company sector.

It is important to note - and distinguish - the two related interests we have in presenting our estimates. Emphasising the importance of constructing income and balance sheet accounts on a sectorally consistent basis leads us to the usual national accounting convention of treating equities as a liability of the corporate sector. This principle has been a firm recommendation contained in the United Nation's guidelines - see UN (1968). On the other hand it is usual in interpreting corporate sector accounts not to treat equities as liabilities. Indeed, if Q (ie Tobin's (1969) financial valuation ratio) is always equal to unity treating all equities as a liability will result in a measure of net worth for the corporate sector which is always zero; with the consequence that variations in the values of assets and liabilities must necessarily cancel out in the aggregate, telling us little about the importance of relative price movements. Hence, we present two estimates of stock-flow consistent income under the alternative treatments of equity (see Section V for further consideration of this point).

Also, in interpreting this study, it is necessary to bear in mind that the conceptual and empirical estimates of income which are described here are not intended to supplant more conventional transactions based measures of income. The latter are pertinent to measures of value-added, which is the conceptual basis of income in the Blue Book, whereas the former are concerned with the accrued purchasing power of industrial and commercial companies from the perspective of their ultimate owners. This distinction can, perhaps, be made more apparent by anticipating some of the results reported in sections IV, V and VI of this paper. The recession in conventionally measured corporate income over the period 1980 to 1982 was quite marked with a decline of around 25% in real terms between 1979 and 1980, with the level then relatively flat until 1983. If recognition of the effects of movements in relative prices, including prices of capital goods and inventories, interest rates and exchange rates, is taken into account, then the recession is notably more severe with a decline of the order of 60% or 70% in stock-flow consistent income. Just about every price that could move against the corporate sector did so in 1980 (table 2 in section VI contains the detailed estimates). Indeed, even taking into account the necessarily tentative nature of the estimates presented herein, it is apparent that there were substantial losses on an accrued purchasing power basis in the early 1980s. An analysis of corporate income on the latter basis also makes it apparent that, in practice, movements in the exchange rate have had a very significant impact on the valuation of assets and liabilities denominated in foreign currency units.

This paper is organised as follows. Section II considers a simple example to highlight some of the issues involved in measuring income on a stock-flow consistent basis. Section III follows this up with a brief algebraic analysis of a simple model. Section IV describes the detailed basis of the individual components of the overall measure of accrued purchasing power income. Section V gives brief consideration to the particular role of equities. The detailed estimates of section IV are drawn together and analysed in section VI, and section VII contains some brief concluding remarks. Two appendices deal with a more complex model than that considered in the text and describe the data which forms the basis of this study.

## II    AN ILLUSTRATIVE EXAMPLE

To illustrate some of the principles involved in measuring corporate sector income on a stock-flow consistent basis consider a firm whose assets comprise a single physical asset which we shall call fixed capital, a portfolio of monetary assets (ie assets with values fixed in money terms), part of which is in sterling and the remainder in dollars, and whose liabilities comprise a 10 year bond issued with a fixed coupon, and a stock of equity. Assume also that capital depreciates exponentially at a rate d, with no change in productive potential for that part of the capital stock which remains after depreciation.

The first problem to be considered is how to value the depreciation in the capital stock. In the absence, as is usually the case for specific items of capital, of well developed markets for capital goods we would suggest basing depreciation on current replacement cost rather than historical cost - see also Shoven and Bulow (1975, p563). Taking historical cost, particularly for fixed assets, would lead to an underestimate of capital consumption when the price of an equivalent capital good is increasing. However, in using the replacement cost of capital care must be taken to incorporate any allowances which cause the replacement cost of capital to differ from the price of a new capital good - see also Flemming et al (1976a, 1976b).

This last point is also pertinent to the revaluation of the fixed asset relative to a numeraire price (or price index); since, in principle, if the rate of change of the replacement cost of the fixed asset exceeds the rate of change of the numeraire price, there is an accrued gain relative to the numeraire price. For the purposes of the empirical estimates in section IV, the numeraire price is chosen to reflect the interests of the ultimate owners of ICCs, and is an index of general purchasing power.

Now consider the sterling part of the portfolio held by the firm, and suppose there is an increase in the numeraire price. Here, as with other assets or liabilities which are alike in that they are fixed in nominal value, there will be an erosion of the <u>real</u> value of the firm's holdings of sterling. If the corporate sector owners are domestic residents then revaluations, arising from movements in the sterling-dollar exchange rate, will alter the value of dollar holdings in domestic currency units, which will be subject to further revaluations if there are changes in the numeraire price.

On the liabilities side the firm has issued a 10 year bond with a fixed coupon. Movements in the current market rate of interest for equivalent financial instruments will affect the market value of that liability, with an increase in the interest rate reducing the market value of the bond. If the bond-holder is a domestic resident the gains and losses will sum to zero for the aggregate domestic economy (ie there is simply a transfer from lenders to borrowers). If, on the other hand, the bond-holder is an overseas agent the net gain in market value to the firm is also a net gain to the aggregate domestic economy. Although the market value of the bond has altered not all accounting frameworks would treat that as a gain, as it is in this case, to the firm - and hence to its equity holders through a reduction in the liabilities associated with ownership of the firm. It has been argued, under the 'capital maintenance' approach, that since the value of the liability can be expected to return to par at maturity then no adjustment should be made which results from interim changes in market value. The counter-argument to this position relates to the importance of the timing of gains and losses. A change in the market value of the liability after its issue but before maturity, alters the market value, and hence the economic power, of the firm, and hence its owners, at the time of the change, and this should be reflected in the firm's accounts and in the market value of its equities. Also for intersectoral consistency, in a double entry system, the account corresponding to the bond-holder should reflect the reduction in the market value of the bond. The concept of income implicitly referred to here has been variously attributed to Haig (1921), Hicks (1939), Simons (1938) and Meade and Stone (1941), and is usually referred to as accrued purchasing power.

Returning to the simple example of this section, the firm has also issued equity - the price of which may alter over time. Following the principle of purchasing power accrual an increase in the price of equity represents a gain to equity holders (which is, of course, only a real gain if the proportionate increase in the price of equity exceeds the proportionate increase in an index

of general purchasing power). Assuming, for simplicity, that all equity holders are domestic agents then the increase in equity prices shows as a gain to the personal sector which, for sectoral consistency in an accounting sense, nets out against the increase in liabilities of the corporate sector. The net change for the aggregate domestic economy in this case is zero. Although from a behavioural, in contrast to an accounting, point of view it may be of interest not to treat equity as a corporate sector liability (this point is taken up in greater detail in Section V).

Whilst the above discussion has served to introduce some of concepts involved in defining income it has not provided a formal framework on an accrued purchasing power basis, and this is taken up in the next section.

## III STOCK-FLOW CONSISTENCY

The accounting framework introduced here follows Patterson and Stephenson (1988) and, implicitly, the guidelines issued by the United National Statistical Office in the system of national accounts, the SNA, UN(1968) and the Balance Sheet Guidelines, UN(1977). To make the general principles apparent we have initially to make a decision about the degree of disaggregation of assets and liabilities. Although for empirical purposes we follow the disaggregation structure of the sectoral balance sheets published by the CSO, it is convenient here to continue the simplified balance sheet structure introduced in the previous section, dealing with the more complex case in an appendix.

The central principle introduced in Patterson and Stephenson (1988) is that of stock-flow consistency. This is not, of course, a new concept. In reviewing the 1968 SNA, Ruggles (1987, p41) notes on the statistical feasibility of the suggestions made therein: "...it is not readily apparent why coverage of stock and flow accounts need differ. For reproducible assets, stock figures are most often compiled by perpetual inventory methods, *cumulating* flows over a period of years. If flows are available, stocks can be compiled. For other assets the reverse is generally the case: the primary data are for stocks, and flows are obtained as *differences*" (my emphasis). Thus stock-flow consistency requires either cumulating flows into stocks or differencing stocks to obtain flows; and a pair of variables $x_t$, $y_t$ are said to be stock flow consistent if

$$x_t = \sum_{i=0}^{\infty} y_{t-i}$$

or equivalently $y_t = \Delta x_t$, where $\Delta$ is the first difference operator with respect to time.

The balance sheet shows the stock position of the firm at a point in time. (Here the analysis is in discrete time, since for practical purposes this is the basis on which accounts are constructed, and the point in time is taken to be the end of the period). The balance sheet for our stylised firm is given in table 1, with entries defined with respect to an index of purchasing power, $P_t$. The real net worth of the firm is,

$$W_t/P_t = P_{kt}K_t/P_t + M_{ft}/P_t + M_{ft}^*/e_tP_t - P_{bt}B_t/P_t - P_{Et}E_t/P_t \qquad (1)$$

Where $W_t$ is nominal net worth, $P_{kt}$ is the per unit replacement cost of the fixed asset, $K_t$; $M_{ft}$ and $M_{ft}^*$ are the firm's holdings of domestic and overseas currency respectively; $e_t$ is the spot exchange rate; $P_{bt}B_t$ is the market value of the (10 year) bond split into its price $P_{bt}$ and its book value $B_t$; $P_{Et}$ is the per unit price of equity and $E_t$ is the stock of equity; and $P_t$ is the general price level. All other domestic sectors are consolidated and, for simplicity, we assume that bonds and equity are wholly domestically owned, whereas some domestically-denominated monetary assets are owned overseas. For the aggregate domestic economy there are thus non-zero elements for the fixed asset, domestic currency (reflecting overseas holdings) and overseas currency. Although if the aggregate includes the overseas sector, assets and liabilities other than the fixed asset net to zero.

The treatment of equity as a liability in (1) is essential if we are to also treat equity as an _asset_ of the household sector _and_ maintain sectoral consistency. This is simply an implication of double entry accounting and should not serve to act as a veil over the wealth and income concepts which are of economic interest. The concept of wealth which is likely to be of economic interest excludes equity as a liability of the corporate sector. This is equivalent, as we note in Section V below, to a consolidation of equities over (here just) the corporate and household sectors.

## Table 1: Balance Sheet for the Stylised Firm

| | Corporate Sector | | Other (consolidated) domestic sectors | | Aggregate domestic economy net assets |
|---|---|---|---|---|---|
| | A | L | A | L | A |
| Fixed asset: | $P_{kt}K_t/P_t$ | - | - | - | $P_{kt}K_t/P_t$ |
| Domestic currency: | $m_1 M_t/P_t$ | - | $m_2 M_t/P_t$ | $M_t/P_t$ | $-(1-m_1-m_2)M_t/P_t$ |
| Overseas currency: | $m_1^* M_t^*/e_t P_t$ | - | $m_2^* M_t^*/e_t P_t$ | - | $(m_1^*+m_2^*)M_t^*/e_t P_t$ |
| Bonds: | - | $P_{bt}B_t/P_t$ | $P_{bt}B_t/P_t$ | - | - |
| Equity: | - | $P_{Et}/P_t$ | $P_{Et}E_t/P_t$ | - | - |

Notes:

$M_{ft}=m_1 M_t$ and $M_{ft}^*=m_1^* M_t^*$. $m_1$ is the proportion of domestic currency ("money") held by the stylised firm and $m_2$ is the proportion held by other domestic sectors; hence, overseas assets in domestic currency are $+(1-m_1-m_2)M_t/P_t$; $m_1^*$ is the proportion of overseas currency held by the firm, and $m_2^*$ is the proportion held by other domestic sectors. This table is a simplified version of Patterson and Stephenson (1988, p790-791).

Whilst the expression (1) gives the real net worth of the firm at a point in time it is also convenient to show how real net worth evolves over time, and this is done in the following recursion,

$$W_t/P_t = W_{t-1}/P_{t-1} + a_1 K_{t-1} P_{kt-1}/P_{t-1} + a_2 M_{ft-1}/P_{t-1} + a_3 M_{ft-1}^*/e_{t-1} P_{t-1}$$

$$+ a_{4t} B_{t-1} P_{bt-1}/P_{t-1} + a_5 P_{Et-1} E_{t-1}/P_{t-1} + (Y_t^T-D_t)/P_t \quad (2)$$

where:
$$a_1 = (\Pi_{kt} - \delta(1+\Pi_{kt}) - \Pi_t)/(1+\Pi_t)$$
$$a_2 = -\Pi_t/(1+\Pi_t)$$
$$a_3 = -(\Delta e_t/e_t + \Pi_t)/(1+\Pi_t)$$
$$a_4 = -(\Pi_{bt} - \Pi_t)/(1+\Pi_t)$$
$$a_5 = -(\Pi_{et} - \Pi_t)/(1+\Pi_t)$$
$$\Pi_{kt} = (P_{kt} - P_{kt-1})/P_{kt-1}$$
$$\Pi_t = (P_t - P_{t-1})/P_{t-1}$$
$$\Pi_{bt} = (P_{bt} - P_{bt-1})/P_{bt-1}$$
$$\Pi_{Et} = (P_{Et} - P_{Et-1})/P_{Et-1}$$
$$Y_t^T = \text{Trading profits (before depreciation and net of taxes and coupon payments on bonds)}$$
$$D_t = \text{Actual dividend payments}$$

The recursion in (2) is useful because it shows how net accretions to real net worth arise over time. They arise either from revaluations of the existing

stock of assets and liabilities, measured relative to the general price level and deflated by it; or from savings which are, in this simplified model, real gross trading profits net of taxes, coupon payments and actual dividend payments. It is these revaluations which were described in the example of section II.

The wealth recursion also forms the basis for obtaining a definition of income which can be identified with accrued purchasing power - see Shoven and Bulow (1975, 1976) - and which has been attributed to Haig (1921) and Simons (1938) in the United States, and Hicks (1939) and Meade and Stone (1941) in the United Kingdom.[3] Setting the change in real worth in (2) equal to zero, and treating dividend payments as a variable, which we will denote adjusted income, $Y_t^a$, following Patterson and Stephenson (1988, p793), we obtain

$$Y_t^a/P_t = Y_t^T/P_t + a_1 P_{kt-1} K_{t-1}/P_{t-1} + a_2 M_{ft-1}/P_{t-1} + a_3 M_{ft-1}^*/e_{t-1} P_{t-1} + a_4 P_{bt-1} B_{t-1}/P_{t-1}$$

$$+ a_5 P_{Et-1} E_{t-1}/P_{t-1} \tag{3}$$

Thus 'adjusted' income for the firm is the sum of gross trading profits (net of taxes and coupon payments) <u>plus</u> revaluations arising from the existing stock of assets and liabilities. These revaluation terms are, in general, accrued rather than realised, hence the term 'accrued purchasing power'; and, bearing in mind my earlier comment concerning the treatment of equity as a corporate sector liability, we would also want to consider adjusted income omitting the last term arising from equity revaluations.

There are a number of questions which arise from this, and indeed any, definition of income. As is usual in an accounting framework no distinction is made between expected and unexpected components of income or between extraordinary income and sustainable flows. A gain or loss results in an accrual of purchasing power whether or not it was expected or could be sustained. Of course behavioural motivation might well depend on the

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3 For example from Meade and Stone (1941, P219) "... a man's income may be defined as the value of his expenditure on consumption plus the value of any increase in the real amount of his capital assets. For the sum of these two is the amount he could have *spent on consumption while maintaining the real amount of his capital stock intact*." In the context of the firm we identify consumption with dividend payments.

expectation, or sustainability, of gains, but the question of how expectations are formed, and hence how accrued income can be filtered into expected and unexpected components, is a separate consideration.

Although it is not pursued here it is worth considering briefly an alternative definition of income, within the framework outlined above, which is due to Tobin (1975, p608). To make the point consider a £100 consol which has been issued by a firm at par with a fixed coupon, then a doubling of the current market rate of interest for such instruments halves the market value of the consol. The reduction, of £50, in the market value would be treated as income on the definition given above, which captures the accrued purchasing power of the firm. Tobin (1975) has suggested a permanent income concept which converts the gain, here £50, into a consol and then attributes the return on this consol as the gain to be spread over the infinite life of the consol. If, for example, the original coupon rate was 5%, which then doubled, the gain would be calculated as .10 times £50=£5, which is the value of the annuity to be counted in the firm's income. The present value of the gain whether it is calculated as accrued income or converted into an annuity is the same; what distinguishes these two approaches is how the gain is apportioned over time. In the case of accrued income it is reckoned as it occurs since it is then that the economic power of the firm is altered; whereas Tobin's permanent income concept distributes it over an infinite number of future periods.

## IV        REAL ACCRUED INCOME OF ICCS

This section gives detailed consideration to the calculation of real accrued income for the UK industrial and commercial company sector. In principle a revaluation adjustment can arise on each and every tangible or financial asset and liability held by ICCs; and whilst these could be calculated for each individual company[4] such a procedure is not practicable given the current state of accounting information at a micro-level, (for an assessment of the possibility of constructing macro accounts from the accounts of micro-business units, see Postner (1986)). Of necessity, therefore, some aggregation of assets and liabilities is essential.

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4 Also bearing in mind that we are considering the industrial and commercial company sector for the UK this would need to include those enterprises which have come into UK ownership through outward direct investment, and exclude those whose ownership lies overseas.

For fixed capital assets we adopt a fourfold classification into: vehicles, ships and aircraft; plant and machinery; dwellings; and other building works. In addition to fixed assets, we also consider stocks and work in progress. For financial assets and liabilities we initially distinguish between those denominated in domestic currency units (dcus) and those in foreign currency units (fcus), and then distinguish between short-term, medium term and long-term. The particular sources for these data are given in an appendix.

## IV(i)  Fixed assets

As noted in section III there are two components in the adjustment to transactions income which relate to the stock of fixed assets. One refers to depreciation and the other to changes in the (relative) price of each component of the stock. The depreciation adjustment is in terms of current replacement costs - and not historic costs - and corresponds to the term $\delta P_{kt-1} K_{t-1} / P_{t-1}$ which is a component of (2) of section III. There are three practical points to note about the measurement of that concept in what follows.

First whereas, for simplicity, the implications of stock-flow consistency were outlined for the case of exponential depreciation, the available data from the CSO assumes a straight-line method of depreciating the capital stock, see CSO (1985, p199). In this method an estimate or assumption is made about the average length of life, L, of an asset and gross fixed capital formation, in constant prices, in that asset is cumulated for that length of time; this gives the gross capital stock which when divided by L gives depreciation (or capital consumption), which is then revalued to current prices. The question of whether to use exponential decay or straight-line methods of depreciation has been much discussed in the literature. Straight-line depreciation is "economically accurate for an asset whose product declines linearly (with a slope proportional to the real interest rate) until it drops suddenly to zero at the end of its lifetime", see Shoven and Bulow (1975, p569). The decision to use the straight-line method here is essentially a pragmatic one; (in contrast, in calculating the stock of consumers' durables the CSO adopts an approach which is primarily that of exponential decay, and the Inland Revenue adopts the same approach for corporate sector tax assessment). Although an estimate of total capital consumption for ICCs is published in the Blue Book, the components of the series are not, and these were provided by the CSO.
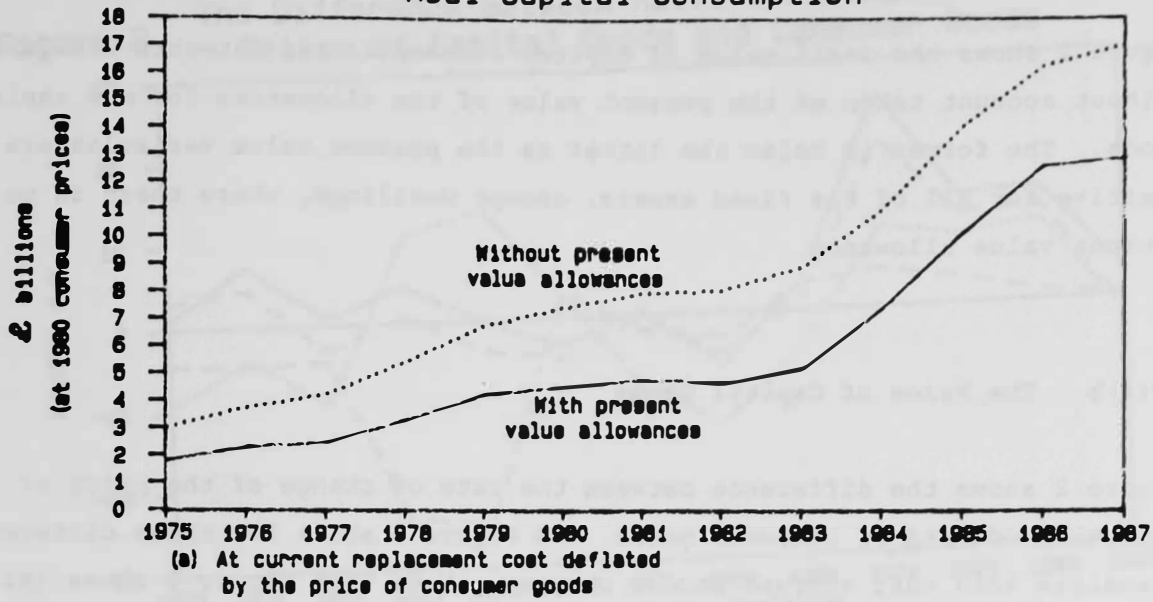
The second point to note is that the current replacement cost estimates of capital consumption do not take into account the present value of various tax allowances which are, or were, available for particular kinds of fixed asset. These, generally, reduce the price of a replacement capital good, and thus effectively reduce the replacement cost of the extant capital stock and capital consumption. The importance of applying such present value of allowance variables to the capital stock has been recognised in earlier work by Flemming et al (1976 a, b), who adjusted the denominator of the financial valuation ratio, Q, that is the replacement cost of reproducible and physical assets, to reflect such allowances.

The third point to note, which relates both to the calculation of the depreciation allowance and to the relative gain or loss on holding fixed assets, is that the lifelengths used by the CSO, in calculating the capital stock estimates, have been criticised as being excessively long.  These lifelengths were based on a period in which the pace of innovation was much slower and some assets - for example, certain buildings - were more durable than their later counterparts.  The CSO have recently reduced the average lifelengths used in constructing their estimate of the capital stock.  In particular, since 1983 they have used rather shorter average lifelengths in their estimates of the buildings, and plant and machinery components of the capital stock.[5]   Before 1983, the average lifelength for buildings was 80 years whereas now, whilst this lifelength is maintained for pre-1890 buildings, it has been reduced to 60 years for post-1930 buildings.  A similar approach has been taken for plant and machinery with more recent vintages having progressively shorter average lives, varying between a low of just under 21 years to a high of just over 30 years, with a modal lifelength of around 25 years.  Estimating the average aggregate lifelength by dividing the gross fixed capital stock by capital consumption gives an average, over the period 1976 to 1987, of just over 26 years, which although still longer than estimates from individual company records shows a substantial reduction compared with estimates before 1983.

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5 The average lifelength for vehicles remains unchanged at 10 years.  I am
   grateful to the CSO for providing detailed information about the
   lifelengths now used in their perpetual inventory model.

## Figure 1

## Real Capital Consumption[a]



**£ billions (at 1980 consumer prices)**

Without present value allowances

With present value allowances

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

(a) At current replacement cost deflated
by the price of consumer goods

## IV(i)a    Capital Consumption

Figure 1 shows the real[6] value of capital consumption adjustments with and
without account taken of the present value of tax allowances for new capital
goods.  The former is below the latter as the present value variables are
positive for all of the fixed assets, except dwellings, where there is no
present value allowance.

## IV(i)b    The Price of Capital Goods

Figure 2 shows the difference between the rate of change of the price of
capital goods and of consumer goods, and Figure 3 shows how these differences
translate into real accrued income changes.  Note that Figure 3 shows (as do
the analogous figures which follow) the effects of _revaluations_, and these are
_not_ compounded by net additions to the stock arising from investment.  The
differences shown in Figure 2 are at times quite substantial and these, in
turn, have resulted in some large adjustments - see Figure 3.    (The large
differences in 1984 and 1985 are primarily due to the reduction in the present
value of allowances on capital goods).    For example there is an adjustment
of -£10.4 billion (at 1980 consumer prices) in 1982 and +£15.3 billion (at
1980 consumer prices) in 1984.  The series is positively autocorrelated as
positive and negative adjustments tend to occur in runs.

## IV(ii)    Stocks and work in progress (inventories)

The approach taken here to changes in the value of stocks and work in progress
follows that of Shoven and Bulow (1975,p590), in adjusting income for the real
appreciation or depreciation of inventoried items.  We take the CSO estimates
of stock appreciation and subtract the general inflation rate (as measured by
the rate of change of the consumers' expenditure deflator) times the stock of
inventories.  The resulting net adjustment due to inventories is shown in
Figure 4.  This adjustment has more often been negative than positive over the
period 1975-1987, reflecting falls in real commodity prices.  Notice that, as
with the accrual adjustment for fixed assets, the period 1980-1982 (inclusive)
was particularly severe for losses on inventories.

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6 All 'real' values are relative to the choice of the consumers' expenditure
  deflator as the index of purchasing power.

Figure 2 — The Difference Between Rates of Change of the Prices of Capital Goods and Consumer Goods
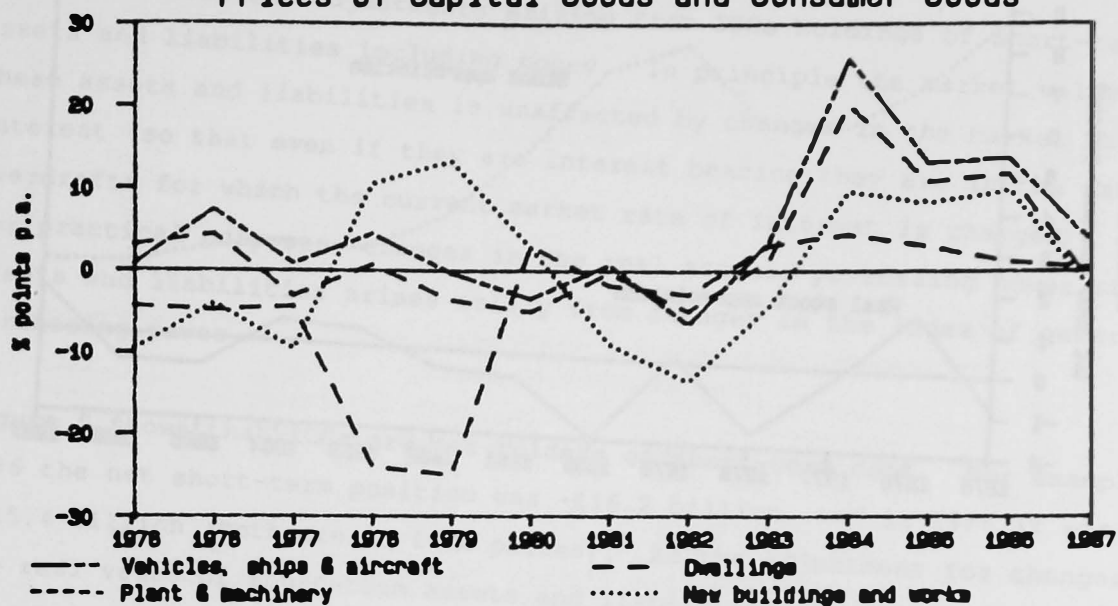


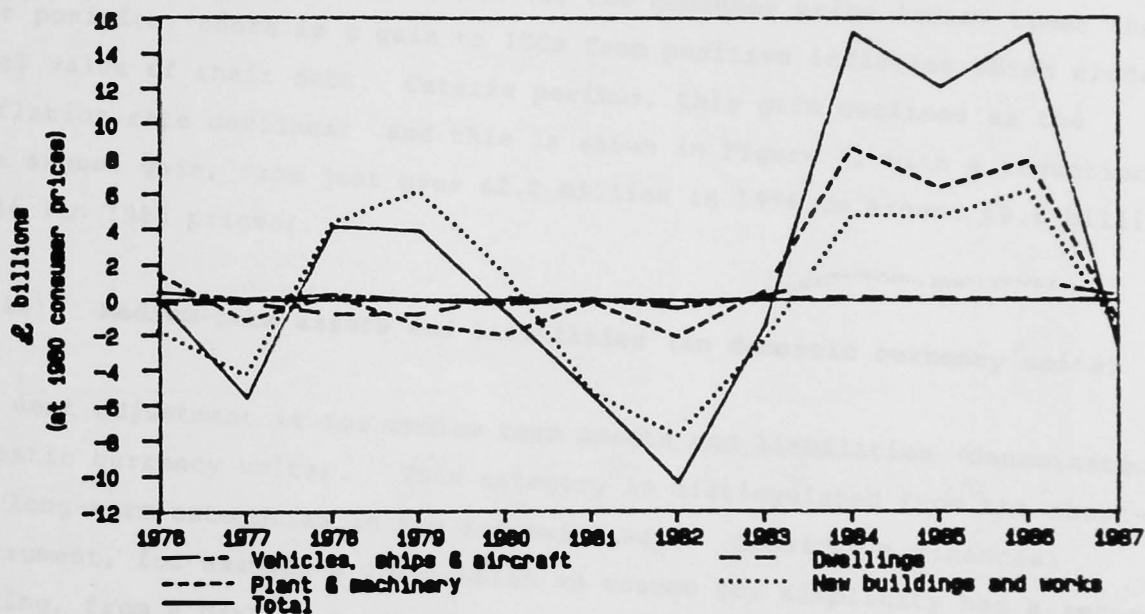Figure 3 — Real Revaluations of the Fixed Capital Stock
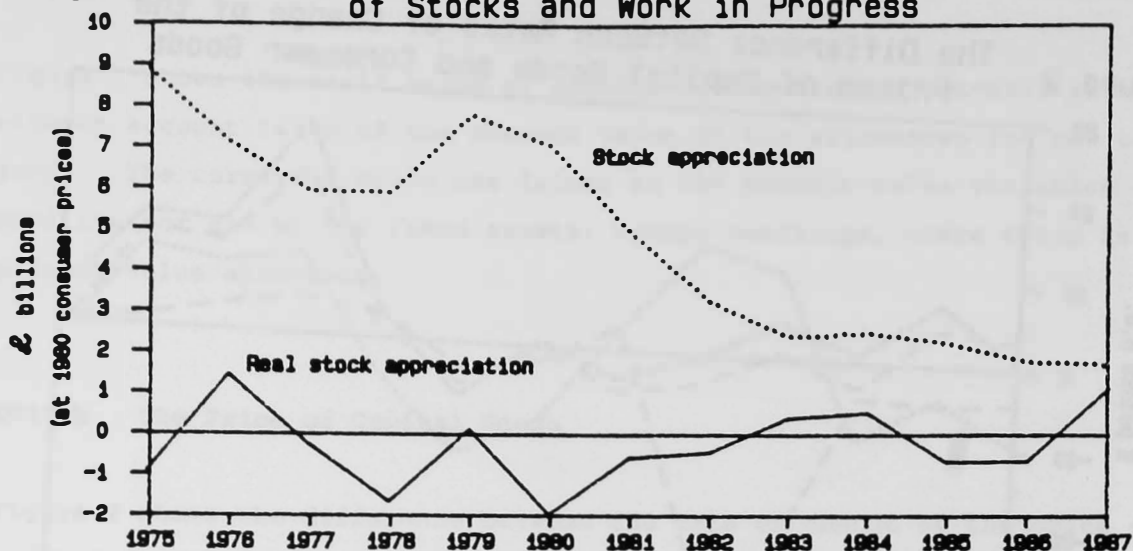
Figure 4

Nominal and Real Revaluations
of Stocks and Work in Progress

£ billions
(at 1980 consumer prices)

Stock appreciation

Real stock appreciation

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

**IV(iii)    Short-term assets and liabilities (in domestic current units)**

We now consider the adjustments arising from ICCs holdings of short-term assets and liabilities including money.  In principle the market value of these assets and liabilities is unaffected by changes in the market rate of interest (so that even if they are interest bearing they are in the nature of overdrafts for which the current market rate of interest is charged).  Thus, for practical purposes, changes in the real accrued purchasing power of these assets and liabilities arises solely from changes in the index of general purchasing power.

Figure 5 shows that ICCs are net holders of short-term debt.  For example in 1976 the net short-term position was -£16.2 billion, and in 1986 it was -£15.4 billion (both are in 1980 prices).  As the adjustment for changes in the real value of short-term assets and liabilities is simply related to the negative of the rate of inflation (of the consumer price index) times the real net position, there is a gain to ICCs from positive inflation which erodes the real value of their debt.  Ceteris paribus, this gain declines as the inflation rate declines;  and this is shown in Figure 6, with a reduction, of the annual gain, from just over £2.2 billion in 1976 to around £0.6 billion in 1986 (in 1980 prices).

**IV(iv)    Medium-term assets and liabilities (in domestic currency units)**

The next adjustment is for medium term assets and liabilities (denominated in domestic currency units).   This category is distinguished from the short-term and long-term categories in the following way.   Consider a financial instrument, for example a loan, which we assume for simplicity has a secure backing, from a bank to a company, issued (at par) with a coupon rate equal to the current market rate of interest for like instruments;  then the instrument is 'short term' if changes in the current market rate of interest do not affect its market value, either because its period to maturity is very short or because it has a variable coupon tied to the market rate of interest.   At the other end of the spectrum, 'long-term' assets and liabilities have an infinite period to maturity;  practically, if changes in the period to maturity have only a minor effect on the market value of an instrument, the coupon of which is not fully indexed to the market rate of interest, it can be regarded as 'long term'.
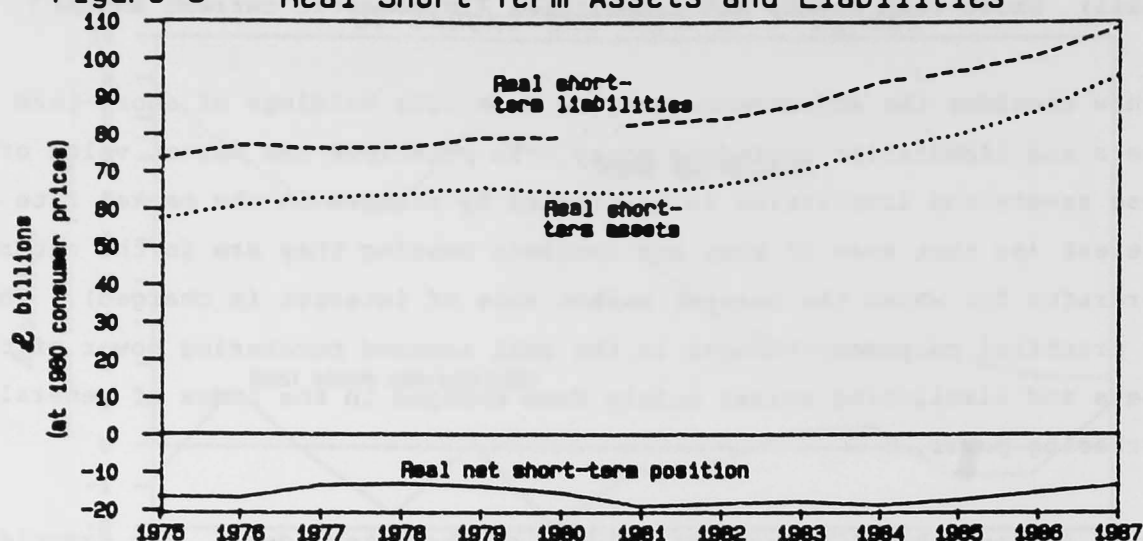
Figure 5   Real Short-Term Assets and Liabilities

£ billions (at 1980 consumer prices)

- Real short-term liabilities
- Real short-term assets
- Real net short-term position

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

Figure 6   Real Revaluations of
Short-Term Assets and Liabilities

£ billions (at 1980 consumer prices)

- Liabilities
- Assets
- Total adjustment

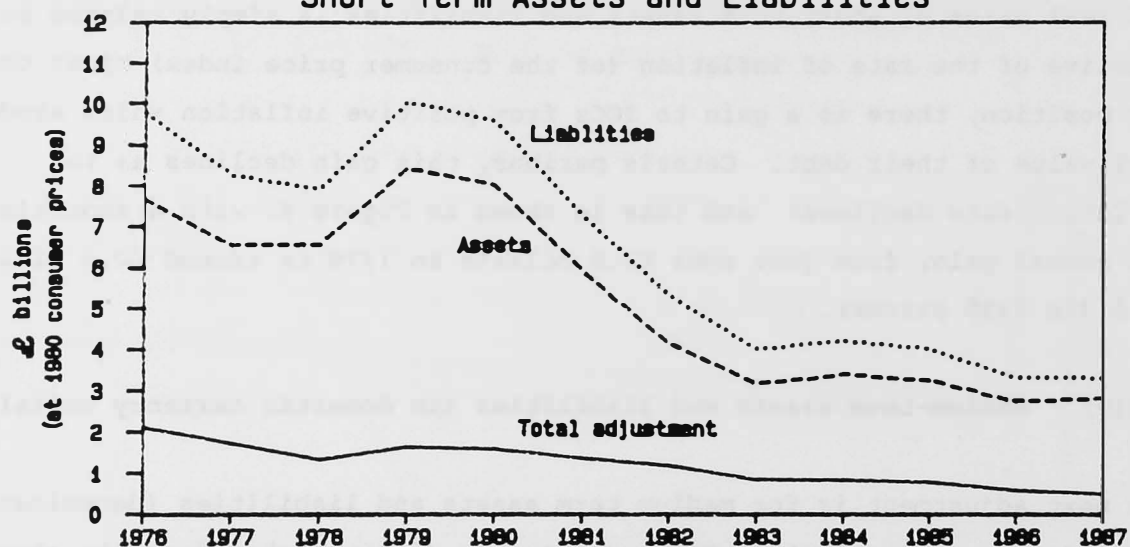1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

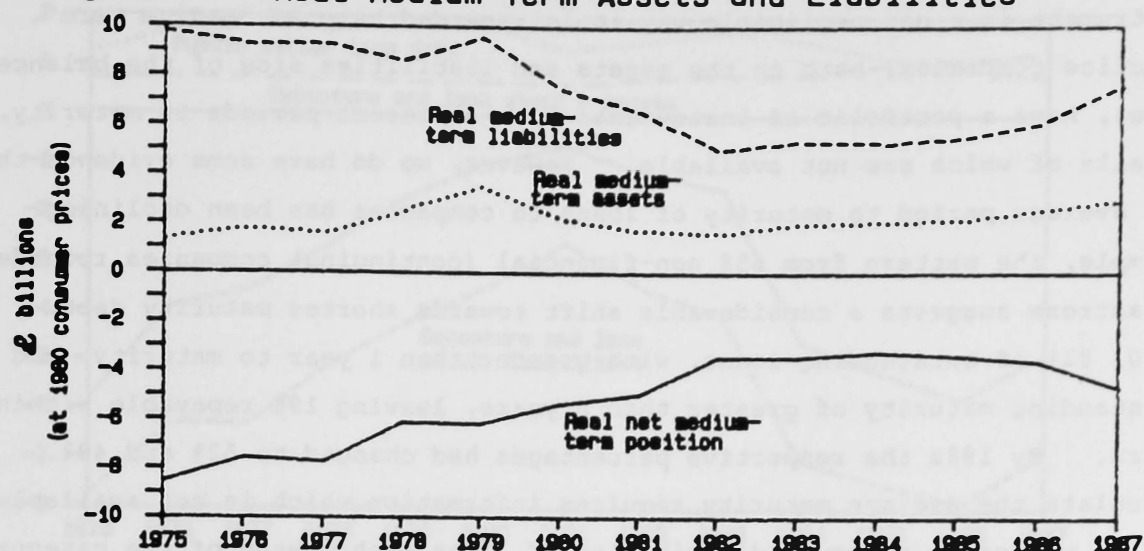## Figure 7  Real Medium Term Assets and Liabilities



## Figure 8  The (Estimated) Difference Between Rates of Change of the Price of Medium-Term Financial Instruments and Consumer Goods
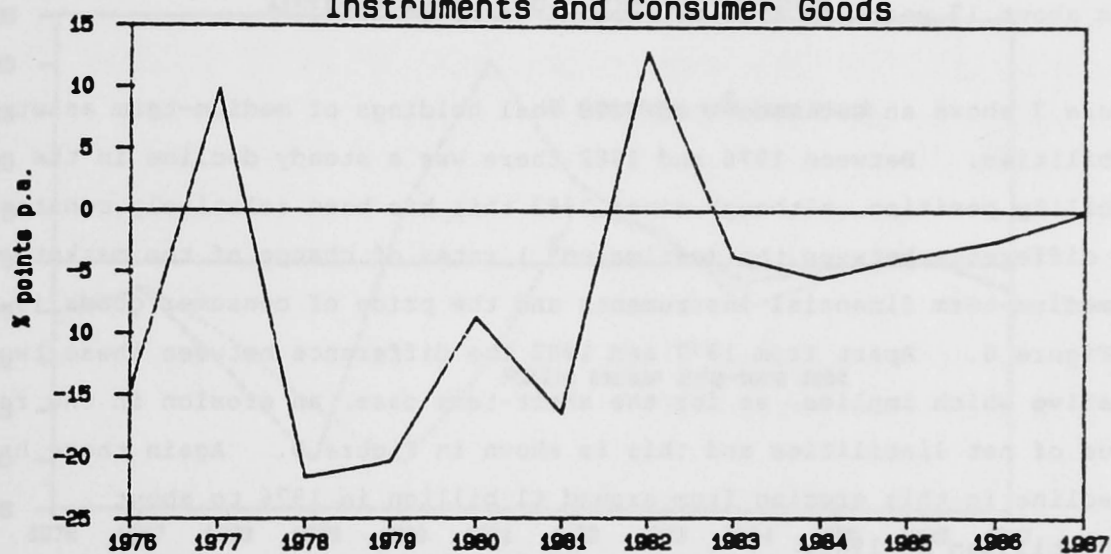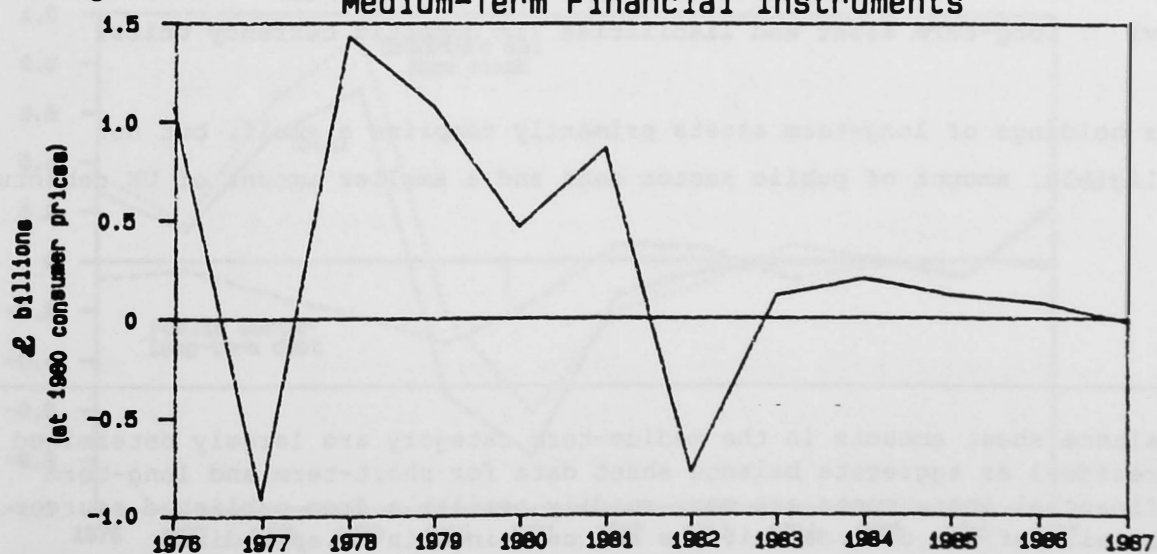


## Figure 9  Real Revaluation of Medium-Term Financial Instruments

If a change in the period to maturity affects the market value of a financial instrument in a non-negligible way it is regarded here as 'medium term'. In practice companies, both on the assets and liabilities side of the balance sheet, have a portfolio of instruments with different periods to maturity, the details of which are not available. However, we do have some evidence that the average period to maturity of loans to companies has been declining. For example, the pattern from 658 non-financial (continuing) companies recorded by Datastream suggests a considerable shift towards shorter maturity debt. In 1970, 81% of outstanding loans, with greater than 1 year to maturity, had an outstanding maturity of greater than 5 years, leaving 19% repayable within 5 years. By 1986 the respective percentages had changed to 52% and 48%. To calculate the average maturity requires information which is not available, but if we assume an equal distribution of loans within each of the categories (and a maximum maturity of 20 years), then the median maturity has declined from about 13 years in 1970 to about 6 years in 1986.

Figure 7 shows an estimate[7] of ICCs real holdings of medium-term assets and liabilities. Between 1976 and 1982 there was a steady decline in the net liability position, although since 1982 this has been relatively constant. The difference between the (estimated[8]) rates of change of the market price of medium-term financial instruments and the price of consumer goods is shown in Figure 8. Apart from 1977 and 1982 the difference between these two is negative which implies, as for the short-term case, an erosion in the real value of net liabilities and this is shown in Figure 9. Again there has been a decline in this erosion from around £1 billion in 1976 to about £0.08 billion in 1986.

## IV(v)  Long-term asset and liabilities (in domestic currency units)

ICCs holdings of long-term assets primarily comprise a small, but not negligible, amount of public sector debt and a smaller amount of UK debenture

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7 Balance sheet amounts in the medium-term category are largely determined by residual as aggregate balance sheet data for short-term and long-term financial instruments are more readily available from published sources. Details of the data definitions are contained in an appendix.

8 Estimated because a consistent run of data for the cost of corporate sector borrowing which reflects the change in the term structure of outstanding debt is not available; see the data appendix for further details.

## Figure 10   Real Long-Term Assets and Liabilities
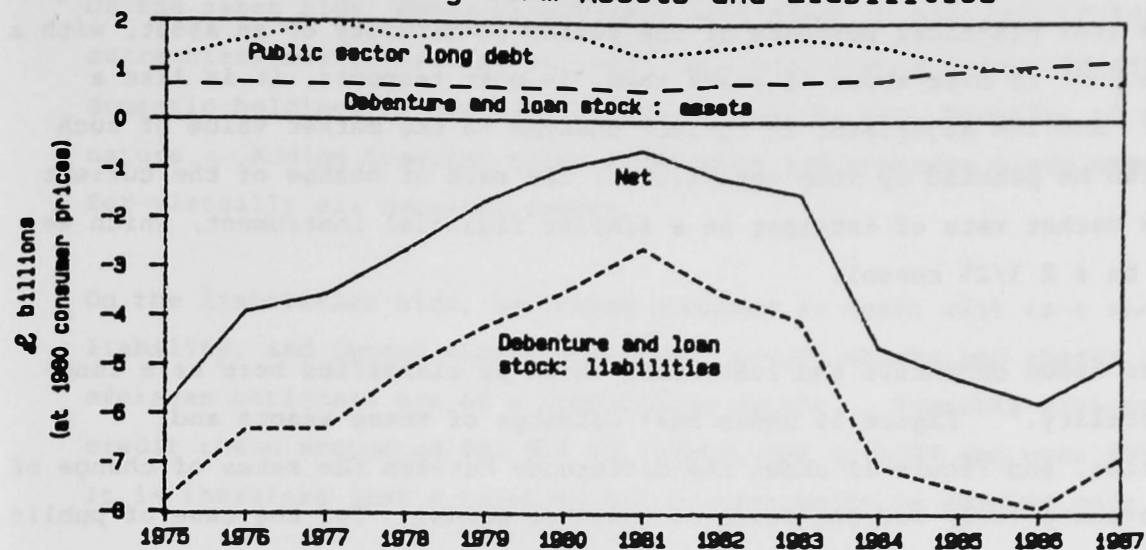


## Figure 11   The Difference Between Rates of Change of the Price of Long-Term Financial Instruments and Consumer Goods
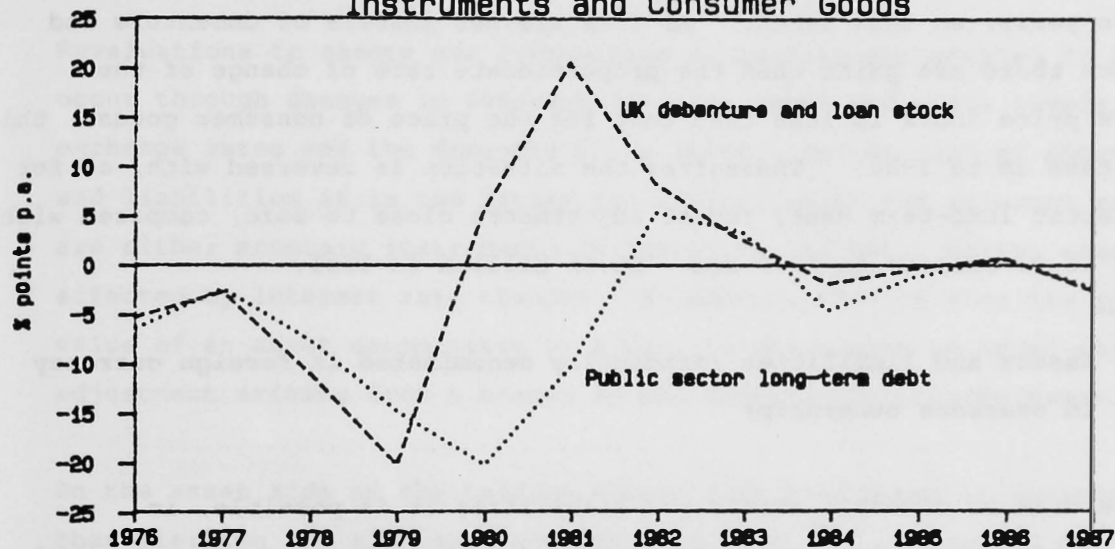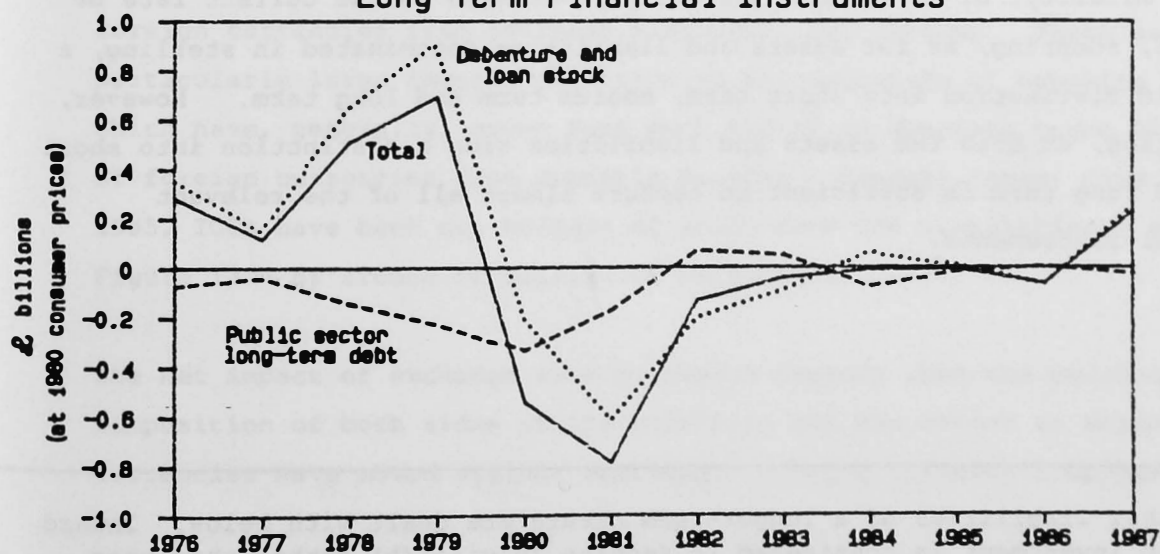


## Figure 12   Real Revaluations of Long-Term Financial Instruments

and loan stock.   For the former the period to maturity is taken to be
infinite (for practical purposes if the period to maturity of an asset, with a
fixed coupon, is over about 15 years then, in most respects, it is like a
consol);   and the adjustment to reflect changes in the market value of such
assets can be proxied by (the negative of) the rate of change of the current
post-tax market rate of interest on a similar financial instrument, which we
take to be a 2 1/2% consol.

ICCs also issue debenture and loan stock which is classified here as a long-
term liability.[9]   Figure 10 shows real holdings of these assets and
liabilities, and Figure 11 shows the difference between the rates of change of
the relevant prices, and the price of consumer goods.   For the case of public
sector long-term debt the difference is negative, apart from 1982, 1983 and
1986, and this is reflected, as is shown in Figure 12, in losses, other than
for these years, on this asset.   As ICCs are net issuers of debenture and
loan stock there are gains when the proportionate rate of change of the
debenture price index is less than that for the price of consumer goods;   this
was the case up to 1980.    Thereafter the situation is reversed with, as for
public sector long-term debt, recent adjustments close to zero, compared with
peaks of £0.92 billion in 1979 and - £0.61 billion in 1981.

**IV(vi)    Assets and liabilities (originally denominated in foreign currency
units or in overseas ownership)**

As in the case of domestic assets and liabilities it is possible, in
principle, to distinguish overseas assets and liabilities according to their
term to maturity, or to their sensitivity to changes in the current rate of
interest, adopting, as for assets and liabilities denominated in sterling, a
threefold distinction into short term, medium term and long term.   However,
in practice, on both the assets and liabilities side a distinction into short
term and long term is sufficient to capture almost all of the relevant
financial instruments.

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9 Two other liabilities of a longer-term nature are dealt with below.   Inward
   direct investment is considered in section IV(viii)(b) rather than here
   because, although such investments generally create a liability in
   sterling, it is more convenient to deal with some common issues, which
   affect inward and outward direct investment, together.  Equity issued by
   ICCs is considered in section V below.

On the asset side, deposits overseas (and domestic holdings of foreign currencies) are classified as short term and outward direct investment and domestic holdings of overseas stocks and shares are, broadly, of a longer-term nature. Adding together these components and overseas trade credit, accounts for virtually all overseas assets.

On the liabilities side, borrowing overseas is dealt with as a short-term liability, and inward direct investment and UK stocks and shares held by overseas nationals are of a longer-term nature. Together with overseas trade credit these accounted for 98% of liabilities in 1986 and over 99% in 1980. It is therefore just a two-fold distinction which is adopted here.

### IV(vii)  Short-Term Assets and Liabilities (fcus)

Revaluations to assets and liabilities originally denominated in fcus can occur through changes in overseas interest rates and price levels, relevant exchange rates and the domestic price level. In the case of short-term assets and liabilities it is the latter two effects which are relevant as these items are either monetary instruments in character, or their market values are not affected by interest rate changes. An appreciation of sterling reduces the value of an asset denominated in a fcu, to which must be added any further adjustment arising from a change in the domestic purchasing power of the dcu.

On the asset side of the balance sheet, ICCs hold money in currencies other than sterling and also hold overseas deposits.[10]  Similarly for liabilities, ICCs borrow in foreign currencies from domestic banks, as well as borrowing in foreign currencies from overseas financial institutions. There have been some particularly large changes over time in the magnitude of deposits overseas, which have, generally, grown very much faster in absolute terms than holdings of foreign currencies from domestic sources. Overall, apart from 1983 to 1985, ICCs have been net holders of short-term fcu liabilities - see Figure 13 - of around £2 billion to £4 billion.

The net impact of exchange rate movements depends upon the currency composition of both sides of the portfolio and the extent to which individual currencies have moved against sterling. A major currency component of both

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10 Some overseas deposits and borrowing are in £ sterling, but these are transferred to other holdings of domestic currency which were dealt with in Section IV(iii). Trade credits are also in the short-term category.

Figure 13

**Real Short-Term Foreign Currency
Assets & Liabilities**

Total Assets

Overseas deposits

Total
Liabilities

Overseas borrowing

Net

£ billions
(at 1980 consumer prices)

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987
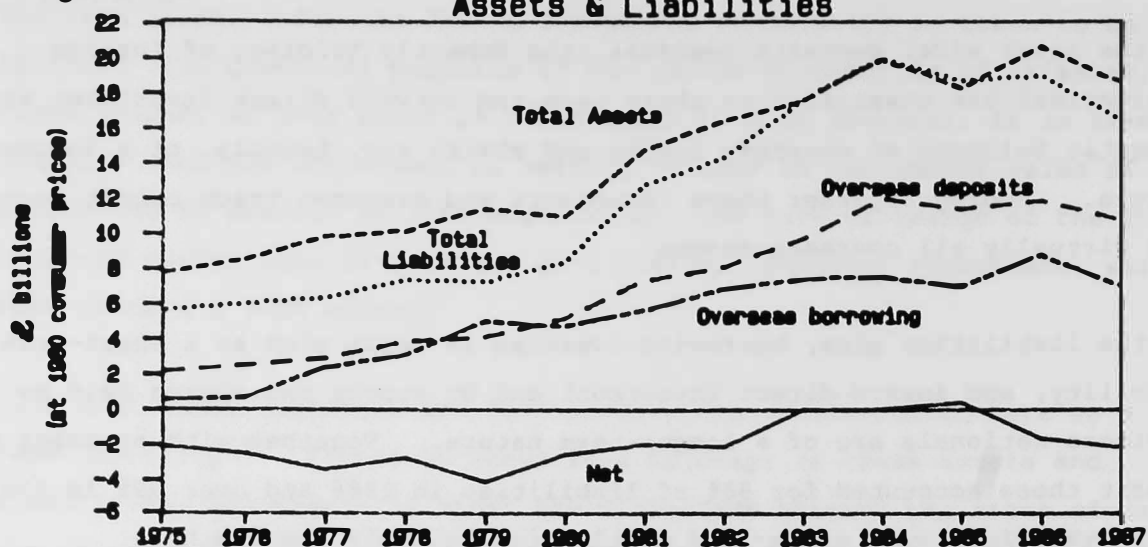


Figure 14

**Proportion of Non-Bank
Borrowing/Deposits in US Dollars**

Borrowing

(a)

Deposits

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

(a) Not available before 1979
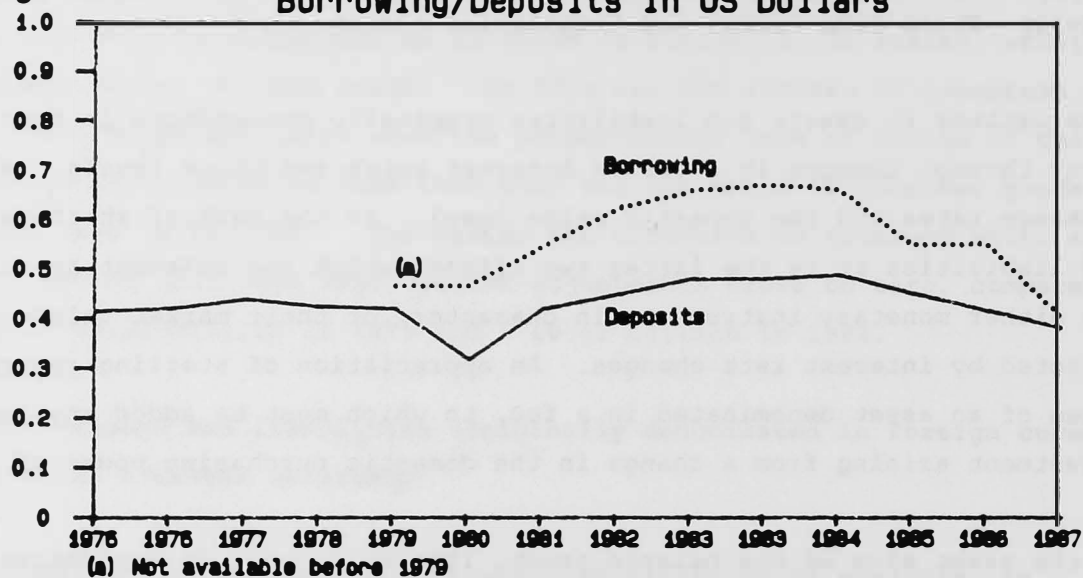


Figure 15

**Weighted Proportionate Change
in the Exchange Rate**

Assets

Liabilities

US Dollar

% points p.a.

1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987
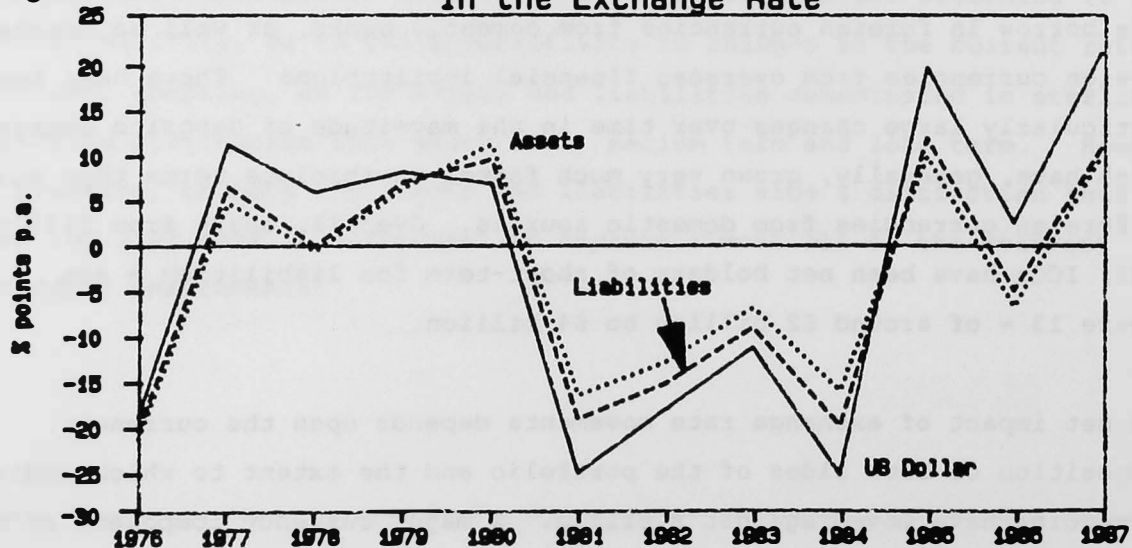
assets and liabilities is the dollar, and Figure 14 shows the proportion of overseas deposits and overseas borrowing[11] denominated in dollars. In the former case the proportion was fairly constant up to 1979 but has thereafter varied from around 0.32 to just under 0.5; and in the latter case the proportion has varied from 0.4 to just under 0.7. To take account of these variations we calculated the rates of change of each of the exchange rates distinguished in our data source,[12] and weighted them by the currency proportions for deposits overseas and borrowing overseas separately. However, as Figure 15 shows rather clearly exchange rate movements are dominated by what is happening to the dollar (a positive number represents an appreciation of sterling and a negative number a depreciation). Even so we may note that when currencies other than dollar are introduced into the construction of the weights, a somewhat smaller variation is induced in the 'portfolio' exchange rate, (introducing other currencies reduces the coefficient of variation by around two-thirds.)

As noted above, the total revaluation to assets and liabilities originally denominated in fcus comprises revaluations originating from changes in the relevant exchange rates and, if real values are being considered, revaluations arising from changes in the purchasing power of these assets and liabilities once their value has been converted into dcus. Figure 16 shows the effect of both of these revaluations. Initially an adjustment is made for exchange rate revaluations, and then the adjustment for inflation in the price of consumer goods is added in to give the total revaluation. The adjustments have something of a cyclical pattern being positive between 1977 and 1980, and of the order of £0.5 billion, and negative until 1985 at around -£0.4 billion.

**IV(viii) Long-Term Assets and Liabilities (in fcus or in overseas ownership)**

**IV(viii)(a)   Assets**

Long-term assets denominated in foreign currency units can be put into three broad categories: direct investment abroad; domestic holdings of overseas equity; and domestic holdings of overseas bonds. Unfortunately the

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11 This is for the non-bank sector but the bulk is taken up by ICCs; data is not available for the proportion of overseas borrowing in dollars before 1979.

12 The currencies are: US dollar, Swiss Franc, German Mark, Yen, French Franc, Guilder, Irish Punt.

**Figure 16**

Real Revaluations of
Short-Term Assets and Liabilities
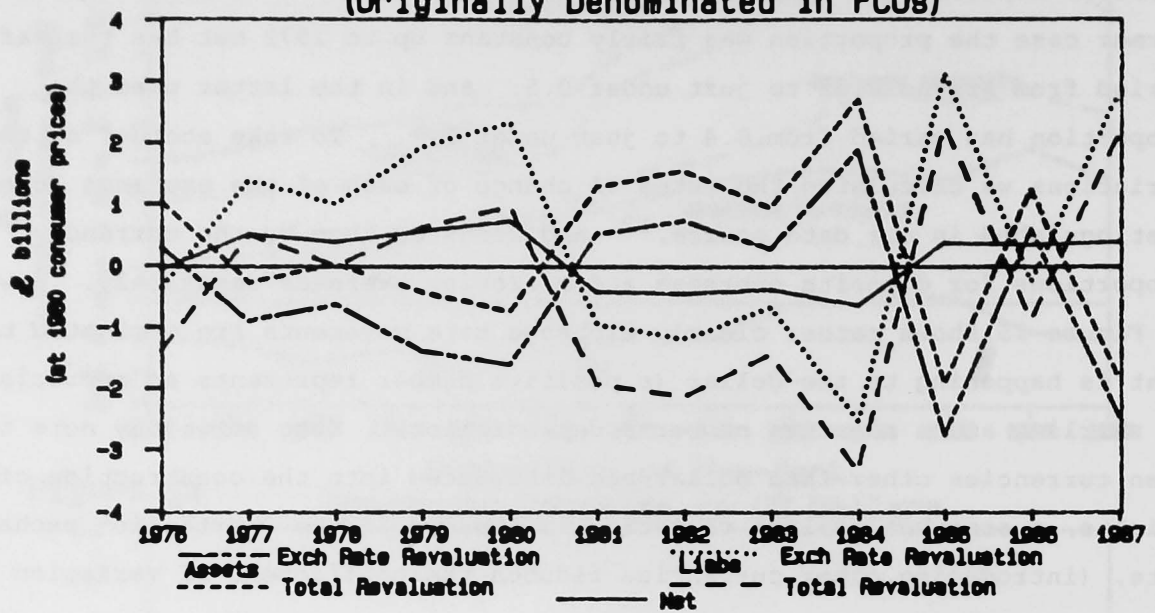(Originally Denominated in FCUs)

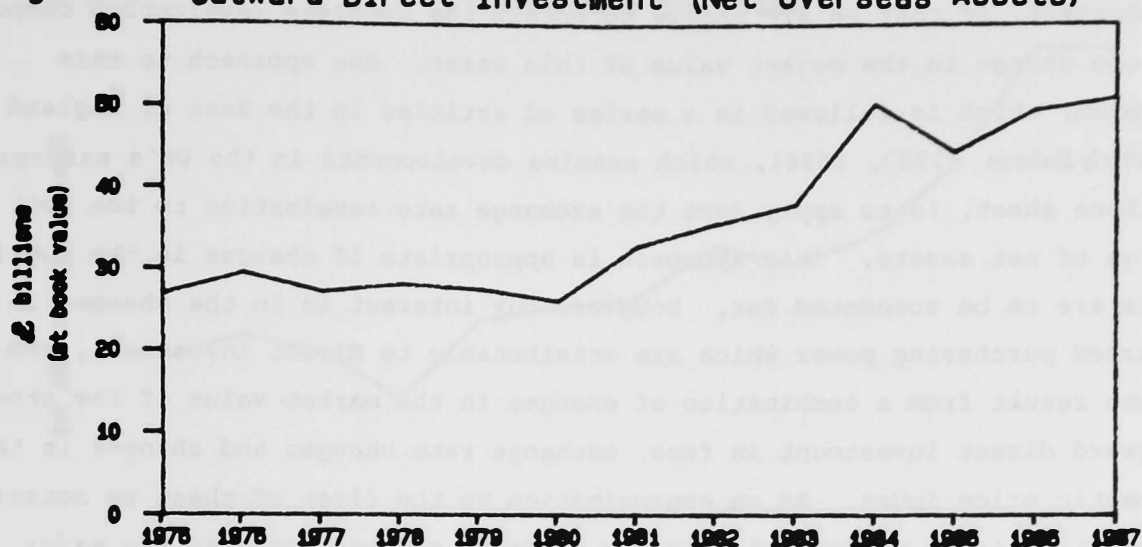**Figure 17** Outward Direct Investment (Net Overseas Assets)



**Figure 18** Exchange Rate Changes and Inflation
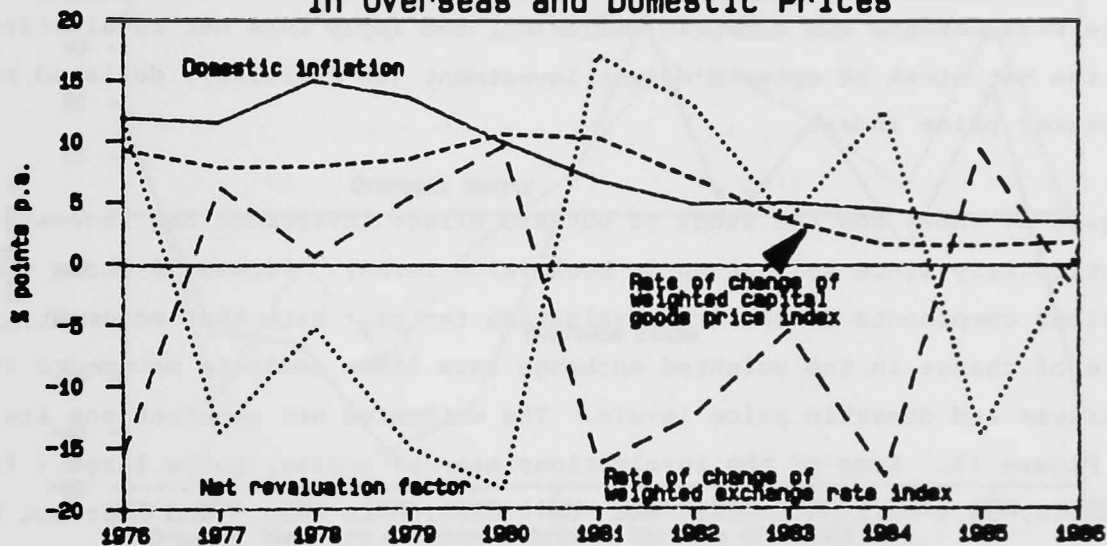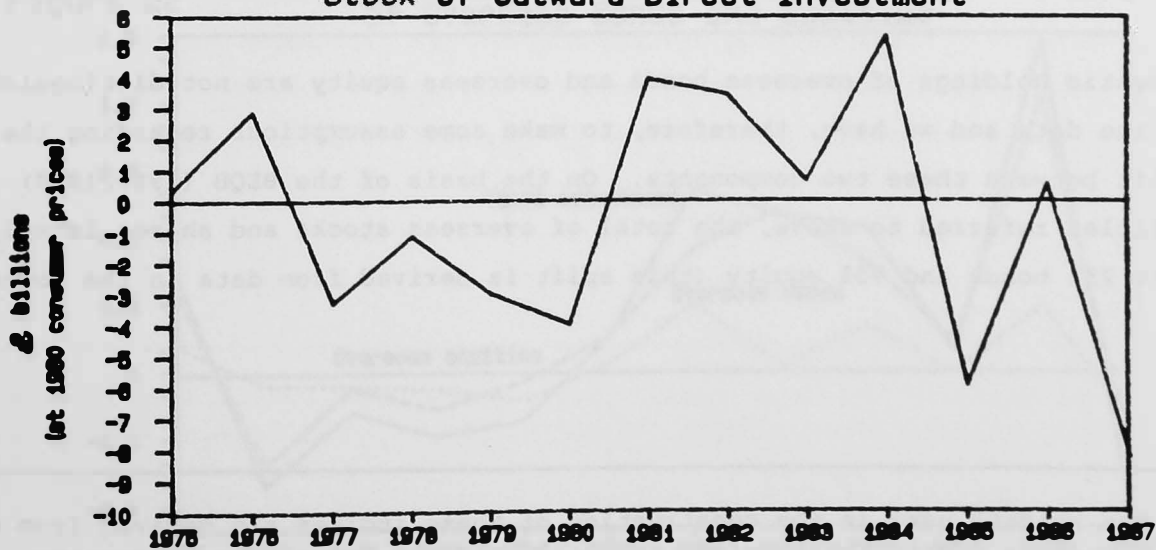in Overseas and Domestic Prices



**Figure 19** Real Revaluations of the Net
Stock of Outward Direct Investment

difficulties with data are particularly acute in this area. In particular, no data are available on the market value of the stock of outward direct investment, so that we are unable to obtain the complete revaluation component of the change in the market value of this asset. One approach to this problem, which is followed in a series of articles in the Bank of England *Quarterly Bulletin* (1987, 1988), which examine developments in the UK's external balance sheet, is to apply just the exchange rate revaluation to the book value of net assets. This approach is appropriate if changes in the published data are to be accounted for. However, our interest is in the changes in accrued purchasing power which are attributable to direct investment, and these result from a combination of changes in the market value of the stock of outward direct investment in fcus, exchange rate changes and changes in the domestic price index. As an approximation to the first of these we construct a weighted index of inflation in the price of capital goods in the major recipient countries of outward direct investment.[13] We then net off exchange rate revaluations and domestic inflation, and apply this net revaluation term to the net stock of outward direct investment (in sterling), deflated by the consumer price index.

Figure 17 shows how the stock of outward direct investment has increased - particularly since 1979 (even in book value terms). Figure 18 shows the various components of the net revaluation factor. Note that movements in the rate of change in the weighted exchange rate index dominate movements in the overseas and domestic price levels. The estimated net revaluations are shown in Figure 19. Some of the revaluations are, of course, quite large - for example, £5.4 billion in 1984 and -£6.0 billion in 1985 - and bear out the emphasis, in the introduction, on the importance of exchange rate movements to the pattern of changes in accrued income.

Domestic holdings of overseas bonds and overseas equity are not distinguished in the data and we have, therefore, to make some assumptions regarding the split between these two components. On the basis of the BEQB (1987,1988) articles referred to above, the total of overseas stocks and shares is split into 25% bonds and 75% equity (this split is derived from data in the World

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13 The weights used in the construction of these indices are derived from data in Business Monitor which gives the book value of net assets by country. In all 8 countries were distinguished, ie USA, Canada, West Germany, Netherlands, France, Switzerland, Italy and Eire.

## Figure 20 — Real Holdings of Overseas Bonds and Equities
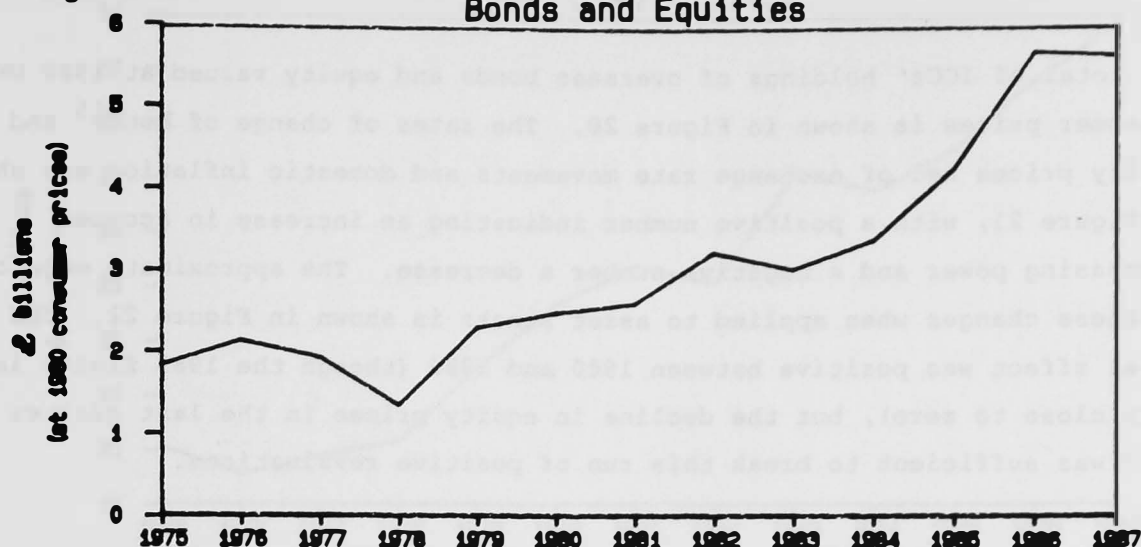


Figure 20
Real Holdings of Overseas Bonds and Equities

£ billions (at 1980 consumer prices)

1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987

## Figure 21 — Relative Changes in the Prices of Overseas Bonds and Overseas Equity[a]



Figure 21
Relative Changes in the Prices of Overseas Bonds and Overseas Equity[a]

% points p.a.

Overseas equity

Overseas bonds

1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987
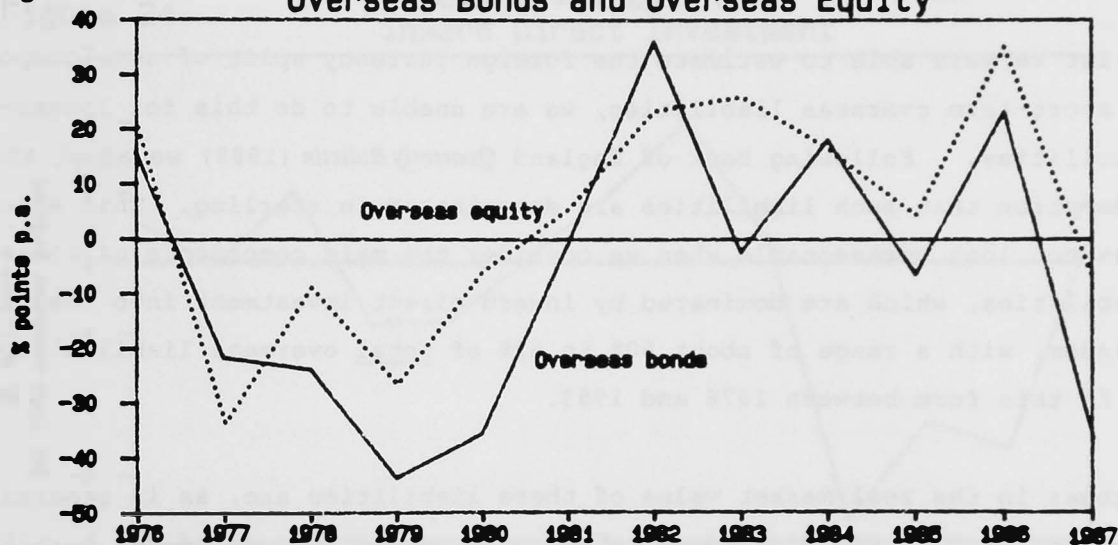
(a) Broadly, these are differences between the rate of change of,
for example, equity prices and the sum of the same changes in
the weighted exchange rate and the domestic price level.

## Figure 22 — Real Revaluations of ICCS Holdings of Overseas Bonds and Equities



Figure 22
Real Revaluations of ICCS Holdings of Overseas Bonds and Equities

£ billions (at 1980 consumer prices)

Total adjustment

Overseas bonds

Overseas equities

1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987
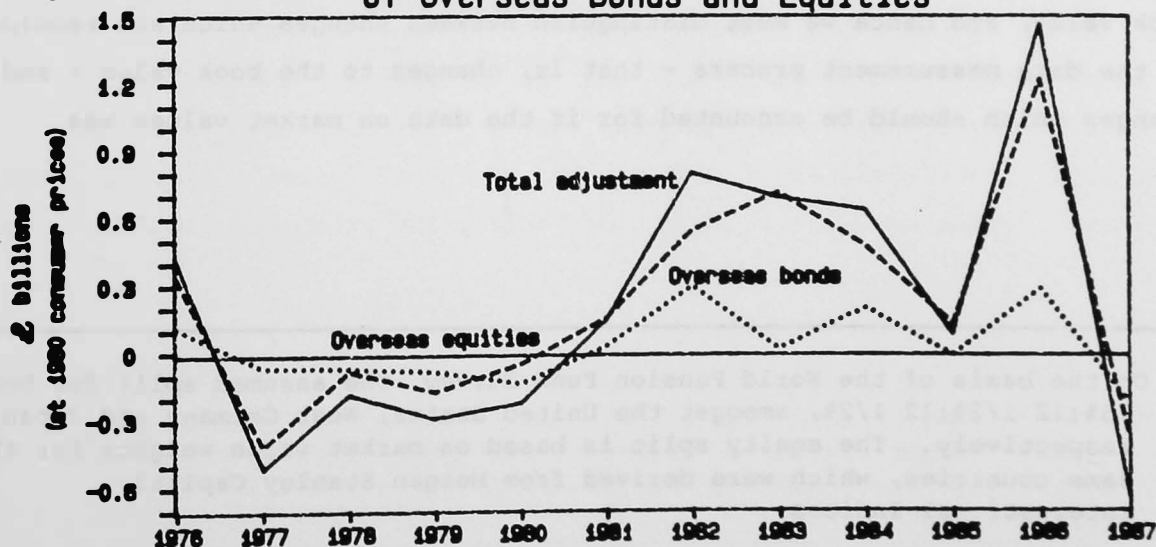
Markets Pension Fund Survey - see W M Company (1988). There is then a further disaggregation by country.[14]

The total of ICCs' holdings of overseas bonds and equity valued at 1980 UK consumer prices is shown in Figure 20. The rates of change of bond[15] and equity prices net of exchange rate movements and domestic inflation are shown in Figure 21, with a positive number indicating an increase in accrued purchasing power and a negative number a decrease. The approximate magnitude of these changes when applied to asset stocks is shown in Figure 22. The total effect was positive between 1980 and 1986 (though the 1985 figure is very close to zero), but the decline in equity prices in the last quarter of 1987 was sufficient to break this run of positive revaluations.

## IV(viii)(b)   Liabilities

Whilst we were able to estimate the foreign currency split of some components of short-term overseas liabilities, we are unable to do this for longer-term liabilities.    Following Bank of England *Quarterly Bulletin* (1988) we adopt the assumption that such liabilities are denominated in sterling.   This assumption does not look unreasonable when we consider the main components of these liabilities, which are dominated by inward direct investment into the United Kingdom, with a range of about 50% to 63% of total overseas liabilities taken up in this form between 1976 and 1983.

Changes in the real market value of these liabilities are, as is generally the case, related to the difference between the rate of change of the market price of the liability and the rate of inflation of a general price level. However, as noted above, outward and inward direct investment are recorded at book value, and hence we must distinguish between changes which are recorded in the data measurement process - that is, changes to the book value - and changes which should be accounted for if the data on market values was

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14 On the basis of the World Pension Fund Survey, the assumed split for bonds is 75%:12 1/2%:12 1/2%, amongst the United States, West Germany and Japan, respectively.  The equity split is based on market value weights for the same countries, which were derived from Morgan Stanley Capital International Indices.

15 A bond price index was calculated based on the equivalent of gilts for each of the countries referred to in the previous paragraph.

## Figure 23

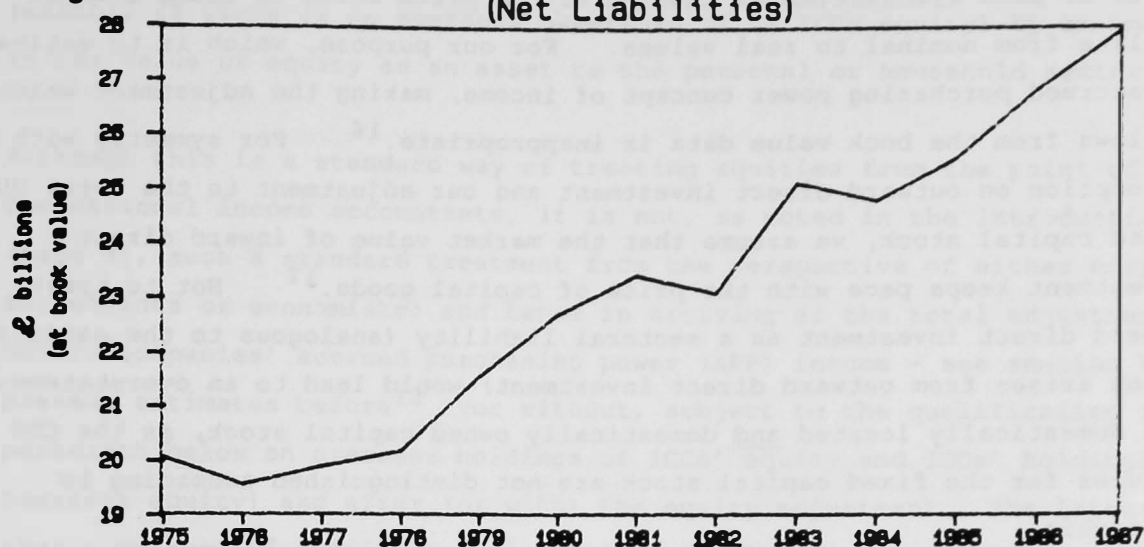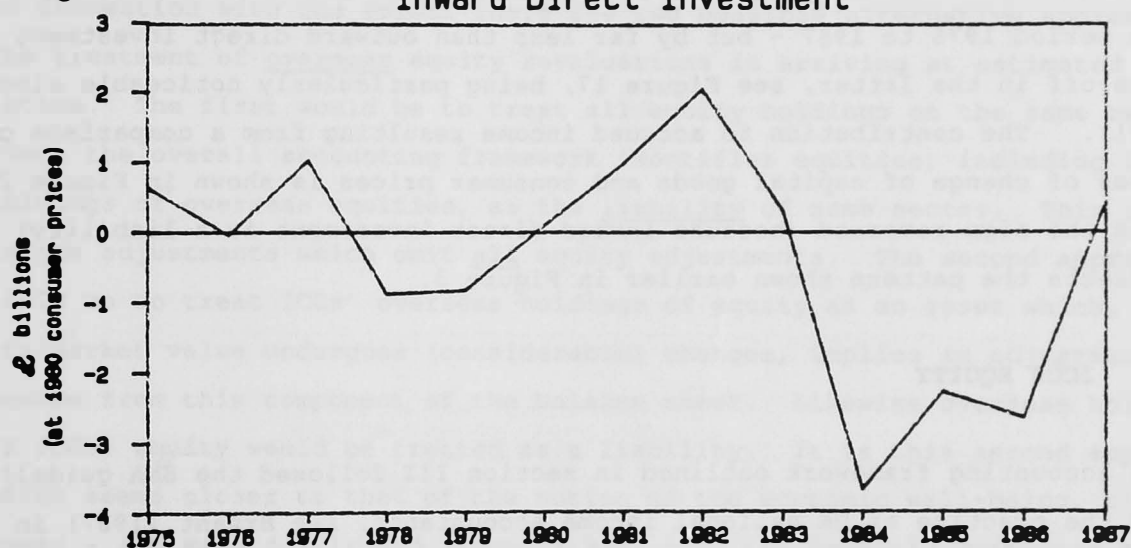### Inward Direct Investment
### (Net Liabilities)



## Figure 24

### Real Revaluations of
### Inward Direct Investment

available.    The difference will depend upon the extent to which the market value of such liabilities is indexed to the price which is being used to deflate from nominal to real values.    For our purpose, which is to estimate an accrued purchasing power concept of income, making the adjustment which follows from the book value data is inappropriate.[16]    For symmetry with the assumption on outward direct investment and our adjustment to the total UK fixed capital stock, we assume that the market value of inward direct investment keeps pace with the price of capital goods.[17]    Not to treat inward direct investment as a sectoral liability (analogous to the asset side which arises from outward direct investment) would lead to an overstatement of the domestically located and domestically owned capital stock, as the CSO figures for the fixed capital stock are not distinguished according to ownership.

Figure 23 shows that inward direct investment into the UK has increased over the period 1976 to 1987 - but by far less than outward direct investment (the take-off in the latter, see Figure 17, being particularly noticeable since 1981).    The contribution to accrued income resulting from a comparison of rates of change of capital goods and consumer prices is shown in Figure 24. With the sign reversed (because inward direct investment is a liability) this reflects the pattern shown earlier in Figure 3.

## V    ICCS EQUITY

The accounting framework outlined in section III followed the SNA guidelines and the practice of UK national income accountants, see Bryant (1987) in treating equities as a financial liability of the industrial and commercial company sector.    This is consistent with:  (i) the treatment of equity holdings in UK companies as an asset to the ultimate holders whether in the personal sector or overseas;  (ii) and the treatment of overseas equity held by UK ICCs as an asset of the company sector.    We also note that there is some intra-sector holding of ICCs equity, though of course the net position in negative.    Thus an increase in the per unit price of equity implies, ceteris

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16 The adjustment to link real book values in successive periods is just the negative of the inflation rate times the opening period book value, converted to end-period prices.

17 In practice the situation is slightly more complex, in that the data on inward direct investment includes loans to subsidiaries but we do not have detailed knowledge of the use to which such loans are put.

paribus, an increase in the value of equity as a liability, which is offset (exactly if there is <u>no</u> overseas ownership of UK ICCs equity) by an increase in the value of equity as an asset to the personal or household sector.

Although this is a standard way of treating equities from the point of view of the national income accountants, it is not, as noted in the Introduction (page 3), such a standard treatment from the perspective of either corporate accountants or economists; and hence in arriving at the total adjustment to obtain companies' accrued purchasing power (APP) income - see section VI - we present estimates before[18] (or without, subject to the qualification in the paragraph below on overseas holdings of ICCs' equity and ICCs' holdings of overseas equity) and after (or with) the equity adjustment. The latter is thus a measure of ICCs' income inclusive of all equity revaluation elements.

In connection with the former there are two possible alternative approaches to the treatment of <u>overseas</u> equity revaluations in arriving at estimated APP income. The first would be to treat all equity holdings on the same basis since the overall accounting framework identifies equities, including ICCs' holdings of overseas equities, as the <u>liability</u> of some sector. This implies income adjustments which omit <u>all</u> equity adjustments. The second approach would be to treat ICCs' overseas holdings of equity as an asset which, since its market value undergoes (considerable) changes, implies an adjustment to income from this component of the balance sheet. Likewise overseas holdings of ICCs' equity would be treated as a liability. It is this second approach which seems closer to that of the notion of the economic well-being, or power - see Haig (1921) and Simons (1938) - of the domestic corporate sector. Hence, in Section VI we present estimates for APP income (a) with just the overseas equity components treated as a liability or an asset as the case may be, and (b) with <u>all</u> equity treated as a liability.

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18 Note from Section III that the version 'without' equity adjustments can be viewed as consolidating the holdings of ICCs' equity across the economy, which, if there is no overseas ownership, implies that the equity adjustment terms net to zero. Note too that there has been a slight change in the status of equities in the SNA guidelines. Ruggles (1987) reports that the most recent Balance Sheet Guidelines suggest a distinction between liabilities to 'third parties' and the sum of liabilities to 'second parties', where the latter are owners of the enterprise's equity.

## Figure 25

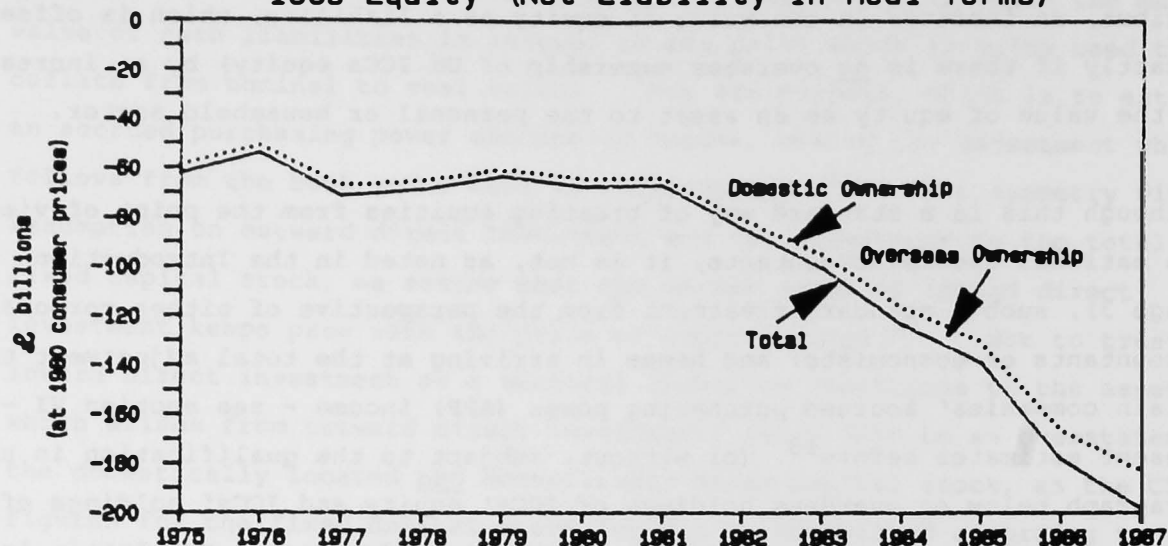ICCs Equity (Net Liability in Real Terms)



## Figure 26

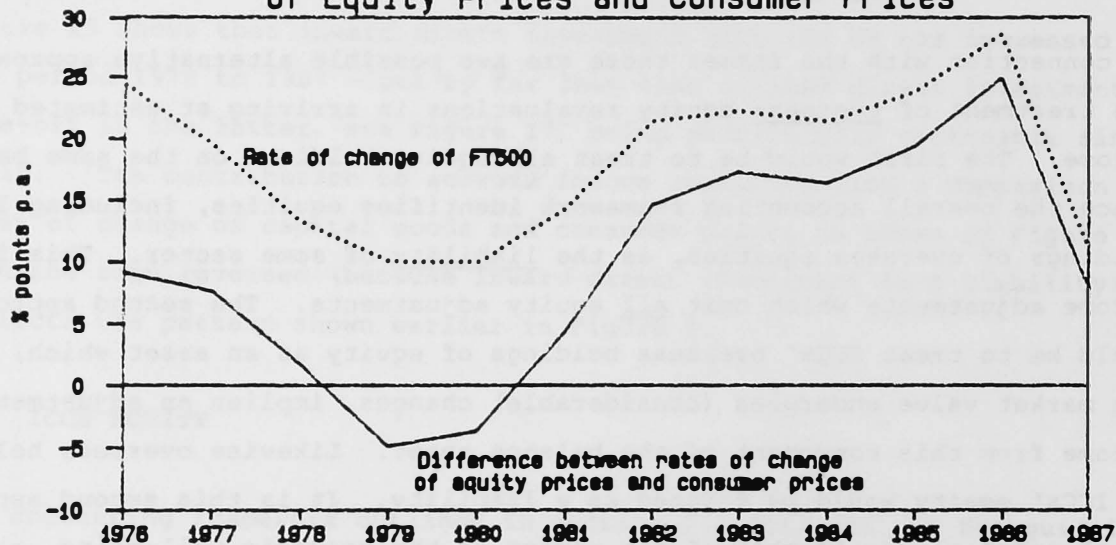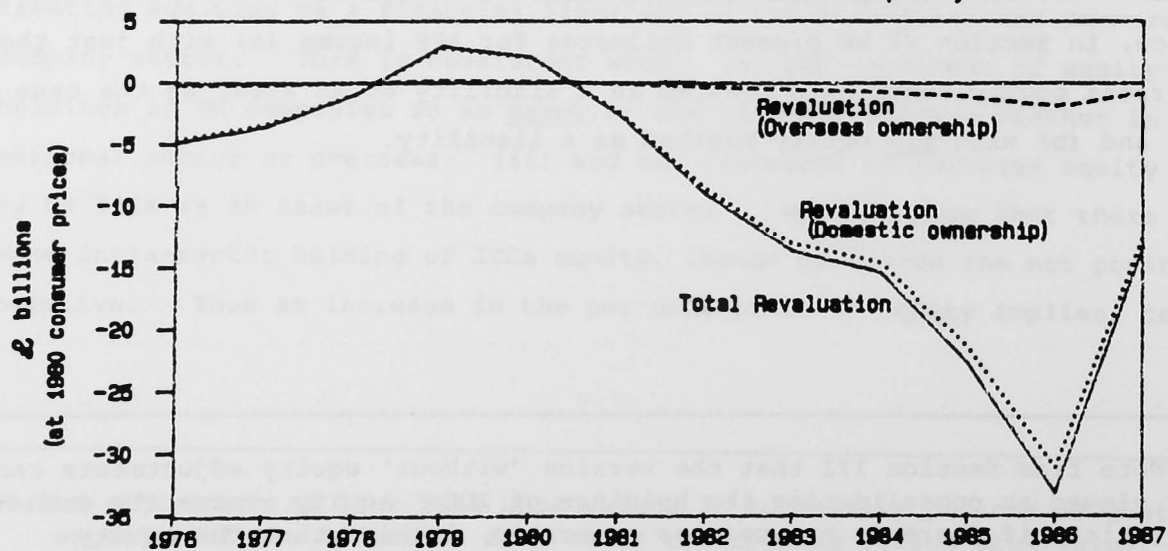The Difference Between the Rates of Change of Equity Prices and Consumer Prices



## Figure 27

Real Revaluations of ICCs Equity

The market value of ICCs equity, in real terms, is shown in Figure 25;[19] and differences between the rates of change of the FT500 (on which revaluations are based) and the consumer price index are shown in Figure 26. Apart from 1979 and 1980 this latter difference has been positive and of late substantially so. This implies some large real increases in liabilities to shareholders, and hence large APP losses to company income - see Figure 27.

## VI  THE OVERALL POSITION: ICCS ASSETS AND LIABILITIES AND ACCRUED PURCHASING POWER

The financial position of ICCs is shown in Figure 28. Notice that (real) financial liabilities have grown (in absolute terms) somewhat faster than financial assets. This is reflected in the net financial worth of ICCs which has become increasingly negative in real terms. Adding in fixed assets and inventories (valued at replacement cost) gives the overall net worth of ICCs as measured by national accounting conventions.

One of the most significant developments over the last 10 years or so has been the extent to which ICCs have moved into foreign currency assets - see Figure 29. This reflects the considerable increase in outward direct investment and foreign currency deposits overseas from about 1981 onwards. Of course such a development implies an exposure to exchange rate movements; and this will be picked up in an accrued income measure of corporate income to the extent that movements in the exchange rate do not reflect differential rates of changes in the price of the foreign currency asset and the index of domestic purchasing power.[20]

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19 Figure 25 also distinguishes between domestic and overseas ownership of UK
   ICCs equity.

20 Consider a simplified example of an asset denominated in a foreign currency
   unit with a market value (in the fcu) of $P_t^* A_t^*$ and a real value in the
   domestic currency unit of $P_t^* A_t^* / e_t P_t$, where $e_t$ is the exchange rate (number
   of fcu's per dcu). Then, and adopting a continuous time approach to
   further simplify the exposition, the revaluation term depends upon $\dot{P}_t^* - \dot{e}_t -
   \dot{P}_t$, where a dot above a variable indicate a time derivative. If (a form
   of) purchasing power parity holds then this term and the associated
   revaluation will be zero (for which it is sufficient that $e_t = P_t^* / P_t$).

**Figure 28    ICCS Real Financial Assets and Liabilities**
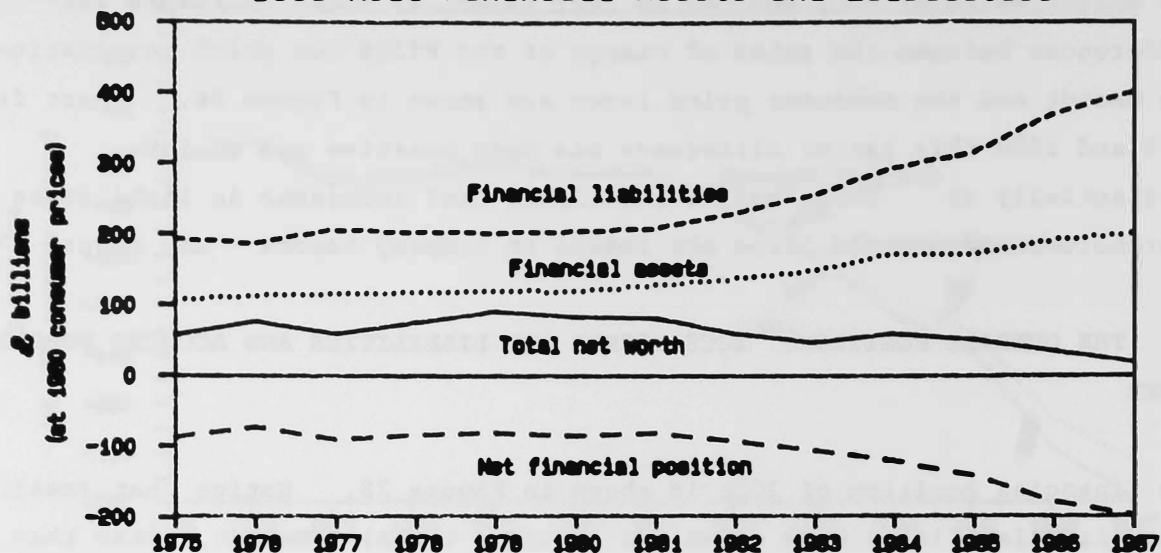


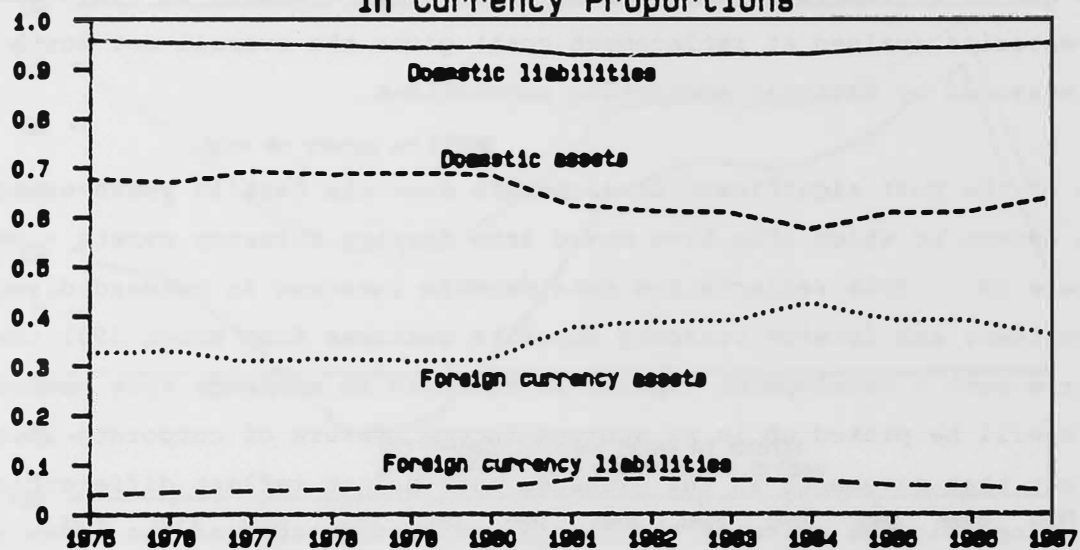**Figure 29    ICCS Financial Assets/Liabilities in Currency Proportions**

Table 2: Corporate Income: Transactions Based and Accrued (a)

| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Real corporate income on a transactions basis (b) | 12443.2 | 18925.2 | 20453.9 | 20459.0 | 15342.2 | 14125.6 | 16133.6 | 20061.7 | 21856.7 | 25827.1 | 26274.6 | 32487.4 |
| **Adjustments due to:** | | | | | | | | | | | | |
| 2 Capital consumption | -3489.7 | -3375.1 | -4046.4 | -4516.8 | -4276.2 | -4132.3 | -3753.5 | -3953.6 | -5387.2 | -7082.4 | -8506.5 | -8407.5 |
| 3 Fixed capital | 50.8 | -5536.2 | 4219.0 | 3957.9 | -659.3 | -5429.3 | -10399.0 | -1449.7 | 15313.1 | 12198.1 | 15219.7 | -2538.4 |
| 4 Inventories | 1468.3 | -254.3 | -1646.8 | 128.7 | -1954.4 | -566.0 | -430.5 | 405.5 | 546.2 | -663.1 | -643.3 | 1122.2 |
| **DCUs** | | | | | | | | | | | | |
| 5 Short-term assets | -7678.2 | -6564.1 | -6596.6 | -8457.9 | -8024.6 | -5933.8 | -4171.6 | -3171.2 | -3398.6 | -3252.1 | -2745.4 | -2824.0 |
| 6 Short-term liabilities | 9786.8 | 8280.7 | 7922.3 | 10084.5 | 9602.1 | 7290.6 | 5343.5 | 4003.5 | 4216.8 | 4019.7 | 3318.5 | 3304.1 |
| 7 Medium-term assets | -166.3 | 212.5 | -295.7 | -448.0 | -263.8 | -356.6 | 270.5 | -57.1 | -121.1 | -78.9 | -51.9 | 9.6 |
| 8 Medium-term liabilities | 1234.2 | -1115.4 | 1725.2 | 1525.1 | 731.1 | 1221.1 | -1041.0 | 177.4 | 325.3 | 199.4 | 132.6 | -23.0 |
| 9 Long-term assets | -98.8 | -50.7 | -206.5 | -344.4 | -295.2 | -37.2 | 123.4 | 74.0 | -85.5 | -15.8 | 16.9 | -49.9 |
| 10 Long-term liabilities | 97.5 | 1005.5 | -212.5 | 361.8 | -51.2 | 124.4 | 1369.0 | -428.9 | -4382.6 | -3529.0 | -4749.7 | -212.7 |
| Sub totals: | | | | | | | | | | | | |
| 11 Financial assets (DCUs) | -7943.2 | -6402.3 | -7098.9 | -9250.4 | -8583.6 | -6327.7 | -3777.6 | -3154.3 | -3605.2 | -3346.7 | -2780.4 | -2864.3 |
| 12 Financial liabilities (DCUs) | 11118.5 | 8170.7 | 9435.0 | 11971.5 | 10282.0 | 8636.2 | 5671.6 | 3752.0 | 159.4 | 690.1 | -1298.6 | 3068.5 |
| 13 Net DCU adjustment | 3175.3 | 1768.4 | 2336.1 | 2721.1 | 1698.5 | 2308.5 | 1894.0 | 597.7 | -3445.7 | -2656.5 | -4079.0 | 204.1 |
| **FCUs** | | | | | | | | | | | | |
| 14 Short-term assets | 296.4 | -896.8 | -625.9 | -1384.2 | -1611.5 | 513.2 | 742.6 | 278.5 | 1882.5 | -2762.4 | 603.9 | -2440.3 |
| 15 Short-term liabilities | -349.7 | 1410.8 | 1017.3 | 1957.8 | 2344.4 | -926.7 | -1188.6 | -659.5 | -2520.0 | 3141.2 | -258.5 | 2835.1 |
| 16 Long-term assets | 3288.5 | -3804.5 | -1333.0 | -3295.7 | -4231.8 | 4089.5 | 4235.2 | 1305.2 | 5944.8 | -5900.3 | 2000.5 | -8919.7 |
| Sub totals: | | | | | | | | | | | | |
| 17 Financial assets (FCUs) | 3584.8 | -4701.3 | -1958.9 | -4679.8 | -5843.3 | 4602.6 | 4977.8 | 1583.8 | 7827.3 | -8662.7 | 2604.4 | -11360.0 |
| 18 Financial liabilities (FCUs) | -349.7 | 1410.8 | 1017.3 | 1957.8 | 2344.4 | -926.7 | -1188.6 | -659.5 | -2520.0 | 3141.2 | -258.5 | 2835.1 |
| 19 Net FCU adjustment | 3235.2 | -3290.6 | -941.6 | -2722.1 | -3498.9 | 3676.0 | 3789.2 | 924.3 | 5307.2 | -5521.5 | 2345.8 | -8525.0 |
| 20 Total adjustment excl domestic ICCs equity adjustment | 4439.9 | -10687.7 | -79.7 | -431.2 | -8690.3 | -4143.0 | -8899.8 | -3475.8 | 12333.7 | -3725.3 | 4336.8 | -18144.5 |
| 21 Equity adjustments (domestic holdings of ICCs equity) | -4675.3 | -3450.9 | -1014.8 | 2796.9 | 1968.8 | -2503.4 | -8728.0 | -13258.3 | -14799.1 | -21525.8 | -31353.0 | -12539.1 |
| 22 Total adjustment incl domestic ICCs equity adjustments | -235.4 | -14138.7 | -1094.5 | 2365.7 | -6721.5 | -6646.4 | -17627.7 | -16734.0 | -2465.4 | -25251.1 | -27016.2 | -30683.7 |
| 23 Accrued income before domestic ICCs equity adjustment | 16883.1 | 8237.5 | 20374.2 | 20027.8 | 6651.9 | 9982.6 | 7233.8 | 16585.9 | 34190.4 | 22101.8 | 30611.4 | 14342.9 |
| 24 Accrued income after domestic ICCs equity adjustment | 12207.8 | 4786.6 | 19359.4 | 22824.8 | 8620.7 | 7479.2 | -1494.1 | 3327.7 | 19391.3 | 575.9 | -741.6 | 1803.8 |

(a) £ billion at 1980 consumer prices.

(b) Equals gross trading profits (before stock appreciation is netted off) + rent and non-trading income + remitted profits from abroad - remitted profits due abroad - interest and other payments (excluding dividend payments) - UK taxes, deflated by the consumers' expenditure deflator.

Table 2 summarises the adjustments, over the period 1976 to 1987, which have
been described in sections IV and V above.   The first row gives a
conventional transactions based measure of corporate real income (of all UK
resident companies including those in foreign ownership), and subsequent rows
give the numerical estimates of adjustments to this measure of income, due to
the main categories of physical assets, and of financial assets and
liabilities distinguishing between those in domestic and foreign currencies.
Note that the treatment of inward direct investment as a liability and outward
direct investment as an asset is necessary to obtain a statement of income
accruing to domestic residents.

An estimate of corporate real income on an accrued purchasing power basis,
before adjusting for revaluations in domestic ICCs' equity, is given in row
23, and after adjusting for these revaluations in row 24.  As noted above (see
Section V) the first of these is a measure of 'economic power' of ICCs,
whereas the latter corresponds to the convention of treating domestically-
owned ICCs' equity as a liability.  It should be emphasised that these are,
because of the need to make a number of assumptions, estimates of a 'broad
brush' nature of the underlying concepts which should allow us to judge trends
rather than the fine detail of the series.

It is tempting to make a direct comparison between the transactions based and
either of the accrued purchasing power measures of corporate income;   it
should however be remembered that they are not different measurements of the
same concept but measurements of different concepts, and as such they provide
complementary rather than competitive sources of information.  Consider, for
example, the period 1980 to 1982 (inclusive) which showed a decline of the
order of 25% in transactions based corporate income.  When account is taken of
the various revaluation adjustments to obtain an accrued purchasing power
measure of income, this recession is shown to be very severe indeed, with a
decline, in accrued income (using row 23), from around £20 billion in 1979 to
about £6.6 billion in 1980.  It was not a single factor which led to the
severe decline in 1980;   rather, just about everything that could move against
the asset side of the balance sheet did so - prices of fixed assets and
inventories failed to keep pace with general inflation, there were accrued
losses on ICCs holdings of domestic and overseas bonds, and exchange rate
movements led to a substantial decline in the value of the stock of outward
direct investment.  On our interpretation of this measure there was a severe
loss of 'economic power' as far as ICCs were concerned over this period.
There was a slight improvement in 1981, which was not, however, sustained in
1982.

**Figure 30**

Corporate Real Net Income
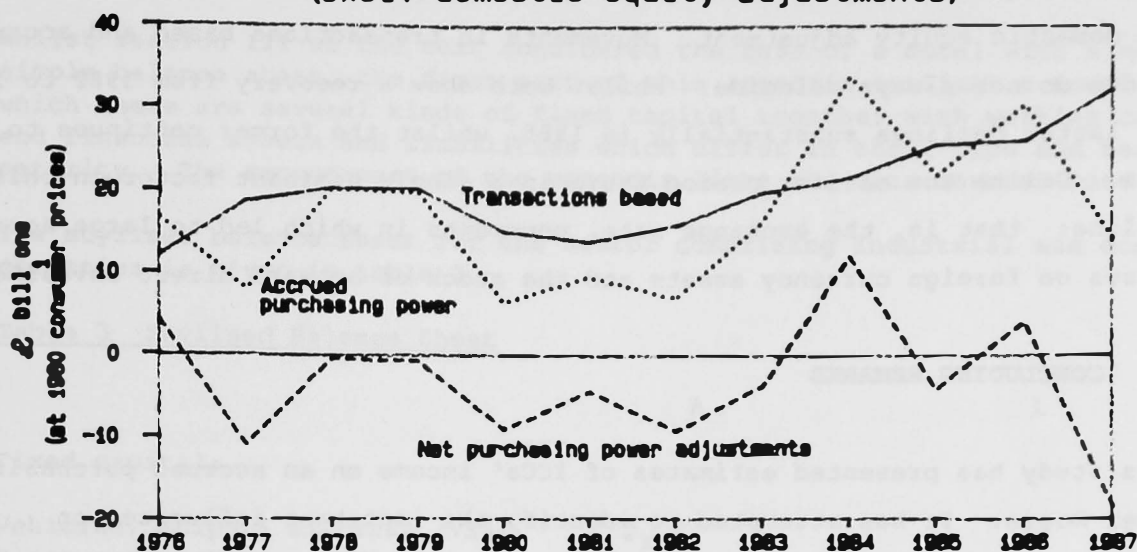(excl. domestic equity adjustments)



**Figure 31**

Corporate Real Net Income
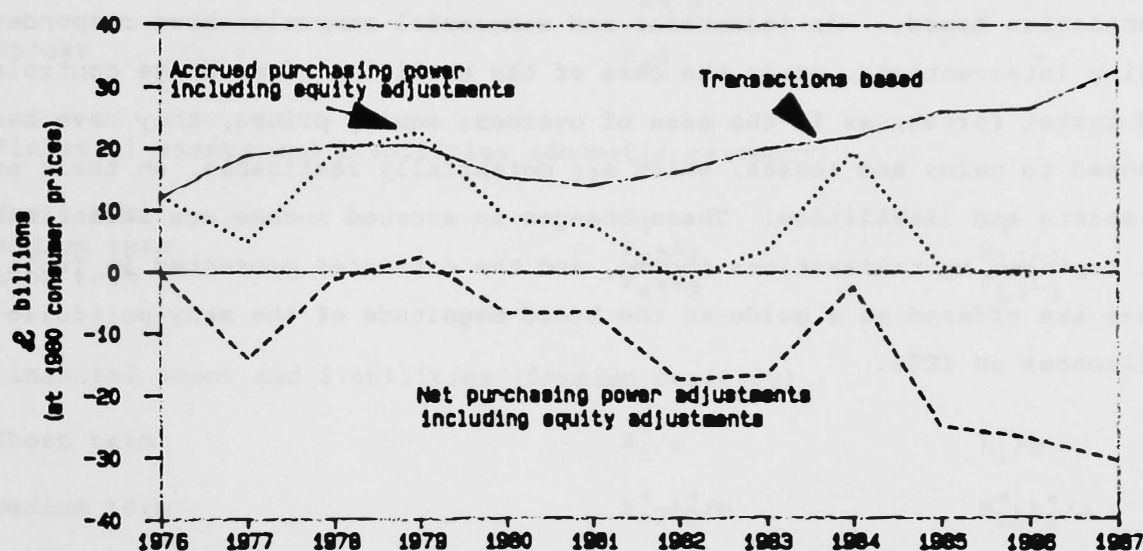(incl. domestic equity adjustments)

Figure 30 illustrates the differences between transactions based and accrued purchasing power income before adjusting for revaluations in domestic holdings of ICCs' equity, and Figure 31 gives the corresponding comparison after making the domestic equity adjustment. Movements in transactions based and accrued income do not always coincide. Whilst both show a recovery from 1982 to 1984, the latter declines substantially in 1985, whilst the former continues to grow. Unlike the earlier period there is a single dominant factor in this decline: that is, the exchange rate, movements in which led to large accrued losses on foreign currency assets and the stock of outward direct investment.

## VII CONCLUDING REMARKS

This study has presented estimates of ICCs' income on an accrued purchasing power basis. It has attempted to identify the important influences on economic power which arise from changes in relative prices, interest rates and exchange rates; and is, therefore, complementary to income measures which are transaction based. As industrial and commercial companies have responded to policy interventions, as in the case of the abolition of exchange controls, and market forces, as in the case of overseas equity prices, they have become exposed to gains and losses, which are potentially realisable, on their stocks of assets and liabilities. These changes in accrued income are intentionally not captured by transactions income, and the estimates presented in Table 2 above are offered as a guide to the broad magnitude of the many portfolio influences on ICCs.

## APPENDIX I

### The stylised model

Whilst section III of the text considered the case of a model with a very simple balance sheet, the first part of this appendix outlines a model in which there are several kinds of fixed capital together with working capital and financial assets and liabilities which differ in their type and term to maturity. The second part of the appendix lists the data sources used.

The stylised balance sheet for the sector comprising industrial and commercial companies is given in table 3.

### Table 3  Stylised Balance Sheet

| | A | L |
|---|---|---|
| **Fixed capital:** | | |
| | | |
| Vehicles, ships & aircraft (VSA) | $P_{k1}K_1$ | - |
| Plant and machinery (PM) | $P_{k2}K_2$ | - |
| Dwellings (D) | $P_{k3}K_3$ | - |
| Other buildings & works (BW) | $P_{k4}K_4$ | - |
| | | |
| Stocks | $P_sS$ | - |
| | | |
| | | |
| **Financial assets and liabilities (domestic currency)** | | |
| | | |
| Short term | $A_1$ | $L_1$ |
| Medium term | $P_{a2}A_2$ | $P_{L2}L_2$ |
| Long term | $P_{a3}A_3$ | $P_{L3}L_3$ |
| | | |
| | | |
| **Financial asset and liabilities (foreign currency)** | | |
| | | |
| Short term | $A_1^*/e$ | $L_1^*/e$ |
| | | |
| Medium term | $P_{a2}^*A_2^*/e$ | $P_{L2}^*L_2^*/e$ |
| | | |
| Long term | $P_{a3}^*A_3^*/e$ | $P_{L3}^*L_3^*/e$ |
| | | |
| Equity | | |
| | | |
| ICCs issue | - | $P_EE$ |
| ICCs holdings of | $P_E^*E^*/e$ | - |
| overseas issues | | |

Items in the balance sheet are valued as follows: the prices for fixed capital and stocks are current replacement costs per unit, and the prices for financial asset and liabilities refer to current market prices. An asterisk indicates an overseas price or quantity. Thus, for example, $P_{a1}^*A_1^*$ is the market value, in foreign currency units, of short-term financial assets held by ICCs; dividing by e, the exchange rate, defined as the number of fcus per dcu, gives the market value in dcus.

The wealth recursion is now,

$$\frac{W_t}{P_t} = \frac{W_{t-1}}{P_{t-1}} + \sum_{i=1}^{4} \{(\Pi_{kit} - \Pi_t - \delta_i(1+\Pi_{kit}))/(1+\Pi_t)\} \, P_{kit-1} K_{it-1}/P_{t-1}$$

$$+ \{(\Pi_{st} - \Pi_t - \delta_s(1+\Pi_{st}))/(1+\Pi_t)\} \, P_{st-1} S_{t-1}/P_{t-1}$$

$$- \{\Pi_t/(1+\Pi_t)\} \, (A_{1t-1} - L_{1t-1})/P_{t-1}$$

$$+ \sum_{i=1}^{2} \{(\Pi_{ait} - \Pi_t)/(1+\Pi_t)\} P_{ait-1} A_{it-1}/P_{t-1} - \sum_{i=1}^{2} \{(\Pi_{Lit} - \Pi_t)/(1+\Pi_t)\} P_{Lit-1} L_{it-1}/P_{t-1}$$

$$- \{((e_t - e_{t-1})/e_t) + \Pi_t)/(1+\Pi_t)\}(A_{1t-1}^* - L_{Lt-1}^*)/e_{t-1} P_{t-1}$$

$$+ \sum_{i=1}^{2} \{(\Pi_{ait}^* - \Pi_t^*)/(1+\Pi_t^*)\} P_{ait-1}^* A_{it-1}^*/e_{t-1} P_{t-1}$$

$$- \sum_{i=1}^{2} \{(\Pi_{Lit}^* - \Pi_t^*)/(1+\Pi_t^*)\} P_{Lit-1}^* L_{it-1}^*/e_{t-1} P_{t-1}$$

$$- \{(\Pi_{Et} - \Pi_t)/(1+\Pi_t)\} P_{Et} E_t/P_{t-1}$$

$$+ \{(\Pi_{Et}^* - \Pi_t^*)/(1+\Pi_t^*)\} P_{Et-1}^* E_{t-1}^*/e_{t-1} P_{t-1}$$

$$+ Y_t^T - D_t \tag{A1}$$

Where:

$$\Pi_{kit} = (P_{kit} - P_{kit-1})/P_{kit-1}$$

$$\Pi_t = (P_t - P_{t-1})/P_{t-1}$$

$$\Pi_{st} = (P_{st} - P_{st-1})/P_{st-1}$$

$$\Pi_{ait} = (P_{ait} - P_{ait-1})/P_{ait-1}$$

$$\Pi_{Lit} = (P_{Lit}^* - P_{Lit-1}/P_{Lit-1}$$

$$\Pi_{ait}^* = (P_{ait}^* - P_{ait-1}^*)/P_{ait-1}^*$$

$$\Pi_{Lit}^* = (P_{Lit} - P_{Lit-1})/P_{Lit-1}^*$$

$$\Pi_t^* = (P_t^* - P_{t-1}^*)/P_{t-1}^*$$

$$P_t^* = e_t P_t$$

$$\Pi_{Et} = (P_{Et} - P_{Et-1})/P_{Et-1}$$

$$\Pi_{Et}^* = (P_{Et}^* - P_{Et-1}^*)/P_{Et-1}^*$$

$Y_t^T$ = Gross trading profits, net of tax and interest payments

$D_t$ = Dividend payments.

With a view to matching up the stylised balance sheet with the data which is currently available on the stock of fixed capital, a fourfold distinction is made within the category of fixed assets. Financial assets are distinguished by their term to maturity with a threefold distinction into short term, medium term and long term. To see the importance of this distinction consider the following expression which gives the present value of a bond, with a book value of $B_t$, which has been issued with a fixed coupon R, whereas the current market rate of interest is $R_{mt}$:

$$P_{bt}B_t = \{(R/R_{mt} + (1 - R/R_{mt})/(1 + R_{mt})^n)\}B_t$$

Where n is the term to maturity of the bond and, for simplicity, taxes on interest income are assumed to be absent. Then as n tends to infinity the present value of the bond tends to $(R/R_{mt})B_t$, and the price of bond is simply the ratio of the coupon to the market rate of interest; in this case $B_t$ is a consol, and "long-term" asset and liabilities are assumed to be of this nature. The polar case to a consol is demand debt (if issued as a liability). Here n=0, in which case $P_{bt}B_t=B_t$; that is, the price of the bond is unity (or $1/P_t$ in real terms), and the present value of the bond is simply its book or par value. This case also characterises money (more specifically notes and coins and non-interest bearing bank deposits).

The Meade-Stone definition of income, see Patterson and Stephenson (1988), is now easily derived and is analogous to equation (2) in the text. It is simply the sum of gross trading profits, net of interest payments and taxes plus the set of revaluation effects due to the changing value of the stock of assets and liabilities.

## APPENDIX II

### Data considerations

The data definitions adopted for the empirical work are as follows, with four letter codes referring to CSO series.

### Net capital stock

$K_1$    Vehicles ships and aircraft (VSA): net capital stock at current replacement cost, EXGI, end-year figures.

$K_2$    Plant and machinery (PM): net capital stock at current replacement cost, EXPG, end-year figures.

$K_3$    Dwellings (D): net capital stock at current replacement cost, EXGW, end-year figures.

$K_4$    Other buildings and works, (BW): net capital stock at current replacement cost, EXHD, end-year figures.

### Price of capital goods

$P_{k1}$   Implicit deflator adjusted for the present value of allowances for VSA, numerator GGAV, denominator unpublished.

$P_{k2}$   Implicit deflator adjusted for the present value of allowances for PM, numerator GGAW, denominator unpublished.

$P_{k3}$   Implicit deflator adjusted for the present value of allowances for D, numerator GGAX, denominator unpublished.

$P_{k4}$   Implicit deflator adjusted for the present value of allowances for BW, numerator GGAY, denominator unpublished.

### Depreciation

$\delta_1 P_{kit} K_{it-1}$ capital consumption at current replacement cost for VSA, unpublished series.

$\delta_2 P_{k2t} K_{2t-1}$ capital consumption at current replacement cost for P&M, unpublished series.

$\delta_3 P_{k3t} K_{3t-1}$ capital consumption at current replacement cost for D, unpublished series.

$\delta_4 P_{k4t} K_{4t-1}$ capital consumption at current replacement cost for BW, unpublished series.

Note that the capital consumption data is consistent with the construction of the net capital stock data. It is converted to end-year prices and adjusted by 1 minus the present value of allowances on that type of capital.

### Stocks and Work in Progress (inventories)

The CSO's estimates of nominal stock appreciation are used, see CSO (1985, ch 13), and adjusted by subtracting the rate of inflation times the book value of stocks, deflated by the consumer price index, to obtain real stock appreciation.

## Financial assets and liabilities (in domestic currency units)

### Short-term assets and liabilities (in domestic currency units)

$A_1 - L_1$: short-term assets (net) =
ALEV+ALEX+ALEY+ALCB+ALCC+ALCD+ALCH+ALCJ+ALCM+(AQBJ-ALCJ)-(ALFB+ALEE+ALCT
+ALCW+(AQBU-ALCT)+STDO£-STBO£

Where:

| | |
|---|---|
| ALEV | sterling M3, |
| ALEX | Building society shares and deposits, |
| ALEY | Building society wholesale borrowing, |
| ALCB | Tax instruments, |
| ALCC | Treasury bills, |
| ALCD | Local authority temporary debt, |
| ALCH | Retailers' credit, |
| ALCJ | Domestic trade and other credit, |
| ALCM | Accruals of taxes, rates and interest, |
| AQBJ-ALCJ | Overseas trade credit, advances etc, (assets) |
| ALFB | Bank lending in sterling, |
| ALEE | Issue department holdings of bills etc, |
| ALCT | Domestic trade and other credit, |
| ALCW | Accruals of taxes, rates and interest, |
| AQBU-ALCT | Overseas trade credit, advances etc (liabilities), |
| STDO£ | Deposits overseas in sterling: unpublished series, |
| STBO£ | Borrowing overseas in sterling, unpublished series. |

### Medium-term assets and liabilities (in domestic currency units)

$P_{a2}A_2 - P_{L2}L_2$: medium-term assets (net) = ALEZ+ALFA-(ALFE+ALCR+ALFF+ALFG)

Where:

| | |
|---|---|
| ALEZ | Other domestic loans, |
| ALFA | Other domestic assets, |
| ALFE | Loans and advances by credit companies, |
| ALCR | Public sector loans, |
| ALFF | Other domestic loans, |
| ALFG | Other domestic liabilities. |

Prices used for income adjustments:  the prices used are based on the
FT-Actuaries indices for fixed interest government securities (see, for
example, the FT and Financial Statistics table 13.4, series AJJV, AJJW and
AJJX).  Ideally, the price series should be based on the cost of corporate
borrowing;  however, no satisfactory series could be found for the maturity
structure of corporate debt, and to the extent that we only need the rate of
change of such prices these series should be an acceptable proxy.  As
mentioned in the text, there is evidence that the average maturity of
outstanding corporate debt has been declining gradually, but consistently,
since the late 1960s.  To take this into account the 3 FT Actuaries series are
interpolated to give prices for securities with maturities that match the
maturity structure of outstanding debt.

### Long-term assets and liabilities (in domestic currency units)

$P_{a3}A_3 - P_{L3}L_3$: long-term assets (net) = ALCE+ALCF-ALCP-ALCPO

Where:

ALCE      ICCs holdings of public sector debt,
ALCF      UK debenture and loan stock held domestically (assets),
ALCP      UK debenture and loan stock held domestically (liabilities),
ALCPO     UK debenture and loan stock held by overseas sector (liabilities),
           unpublished series.

Prices and interest rates used for income adjustments:

AJLZ      Gross flat yield on 2.5% consols, (for ALCE),
AJML      Price index for debenture and loan stocks.

## Inward direct investment

AQBP      Overseas direct investment,

Capital goods prices, $P_{ki}$, $i = 1...4$, as described above.

## Financial assets and liabilities (originating in foreign currency units)

### Short-term assets and liabilities

$A_1^*/e$: short-term assets = ALEW + STDO - STDO£

Where:

ALEW     Money in currencies other than sterling,
STDO     Deposits overseas, all currencies, unpublished series,
STDO£    Deposits overseas in £ sterling, unpublished series.

To obtain the revaluation of this asset a weighted exchange rate was calculated with weights derived from unpublished data on the currency composition of NBPS deposits overseas. The currencies distinguished where: US dollar, Swiss Franc, Deutschemark, Yen, French Franc, Guilder, Irish Punt.

$L_1^*/e$: short-term liabilities = ALFC + STBO - STBO£

Where:

ALFC     Bank lending in other currencies,
STBO     Borrowing overseas in all currencies, unpublished series,
STBO£    Borrowing overseas in £ sterling, unpublished series.

As for the asset side, a composite exchange rate was constructed with weights dependent upon the currency composition of the portfolio. The currencies distinguished were US dollar, Swiss Franc, Deutschemark, Yen, French Franc, Guilder.

### Long-term assets

$P_{a3}^* A_3^*/e + P_E^* E^*/e$: ICCs direct investment abroad, overseas bond and equity holdings = AQBG + AQBFB = AQBFE

AQBG     Direct investment abroad,
AQBFB    Assumed holdings of overseas bonds = 0.25 AQBF,
AQBFE    Assumed holdings of overseas equity = 0.75 AQBF,
AQBF     Overseas government and company securities.

The prices and interest rates for income adjustments are obtained as follows. Direct investment abroad is linked to the prices of capital goods, with the main recipient countries identified from Business Monitor.  The countries distinguished were:  USA, Canada, West Germany, Netherlands, France, Switzerland, Italy and Eire.   Overseas bonds were assumed to be held in the following proportions:  75%/USA, 12 1/2%/West Germany, 12 1/2%/Japan;  and the relevant interest rates were taken to be those on long-term government securities. ICCs holdings of overseas equities were based on market value weights for the USA, West Germany and Japan, with weights derived from Morgan Stanley Capital International indices.

## Equity (other than ICCs holdings of overseas equity)

$P_E E$:  Stock of ICCs equity = ALCG - (ALCQ + ALCQO + ALFD)

Where:

| | |
|---|---|
| ALCG | UK ordinary and preference shares (assets), |
| ALCQ | UK ordinary and preference shares (liabilities) held by domestic residents, |
| ALCQO | UK ordinary and preference shares (liabilities) held by overseas residents, |
| ALFD | Retail co-op societies members' funds. |

The FT500, series code AJMG, was used for income adjustments.

**REFERENCES**

Bank of England. (1987). "The external balance sheet of the United Kingdom: recent developments" <u>Bank of England Quarterly Bulletin</u>, vol 27, pp 536 - 541.

Bank of England. (1988). "The external balance sheet of the United Kingdom: recent developments". <u>Bank of England Quarterly Bulletin</u>, vol 28, pp 520 - 527.

Bryant, C.G.E.(1987). 'National and sector balance sheets 1957-1985', <u>Economic Trends</u>, No.403, May, pp 92-119.

Buiter, W.H.(1983). 'Measurement of the public sector deficit and the implications for policy evaluation and design', <u>IMF Staff Papers</u>, vol 30 pp 306-49.

Business Statistics Office. (various issues). <u>Business Monitor</u>, London: HMSO.

CASB.(1975). 'Proposed rules: historical depreciation costs - adjustment for inflation', <u>Federal Register</u>, vol 40, pp 47517-19.

CSO. (1985). <u>United Kingdom National Accounts: Sources and Methods</u>, London: HMSO.

FASB.(1974). Financial reporting in units of general purchasing power', mimeo.

Flemming, J.S, Price, L.D.D and Ingram, D.H.A (1976a) 'Trends in company profitability', <u>Bank of England Quarterly Bulletin</u>, March, pp36-52.

Flemming, J.S, Price, L.D.D and Byers, S.A (1976b). 'The cost of capital, finance and investment', <u>Bank of England Quarterly Bulletin</u>, June, pp193-205.

Haig, R.M.(1921). 'The concept of income - economic and legal aspects', reprinted in (R Musgrave and C A Sharp), eds, (1959). <u>Readings in the Economics of Taxation</u>, London: George Allen & Urwin.

Hicks, J.R.(1939). <u>Value and Capital</u>, Oxford; Oxford University Press.

Meade, J.E. and Stone, R. (1941). 'The construction of tables of national income, expenditure, savings and investment', <u>Economic Journal</u>, vol 51, pp 216-33.

Morgan Stanley. (Various issues). 'Market coverage of Morgan Stanley Capital International Indices', <u>Morgan Stanley Capital International Perspective</u>, Morgan Stanley: London.

Patterson, K.D.and Stephenson, M.J.(1988). 'Stock flow consistent accounting: a macroeconomic perspective', <u>The Economic Journal</u>, vol 98, pp 787-800.

Postner, H.H.(1986), 'Microbusiness accounting and macroeconomic accounting: the limits to consistency', <u>The Review of Income and Wealth</u>, vol?, pp 217-244.

Ruggles, R.and Ruggles, N.D.(1982). 'The integration of macro and micro data for the household sector', <u>Review of Income and Wealth</u>, vol ??, pp 245-276

Ruggles, N.D.(1987). 'Financial accounts and balance sheets: issues for the revision of SNA', <u>Review of Income and Wealth</u>, vol 33, pp 39-62.

Sandilands, F.E.P.(1975), Inflation Accounting, London: HMSO.

Shoven, J.B. and Bulow, J.I. (1975). 'Inflation accounting and non-financial corporate profits: physical assets', Brookings Papers on Economic Activity, part 3, pp 557-611, including discussion.

Shoven, J.B. and Bulow, J.I. (1976). 'Inflation accounting and non financial corporate profits: financial assets and liabilities', Brookings Papers on Economic Activity, part 1, pp 15-57

Simons, H.C.(1938). Personal Income Taxation, Chicago: University of Chicago Press.

Sunga, P.S.(1987). 'Adjusting net worth for price changes with reference to the Canadian system of national accounts', Review of Income and Wealth, vol 33, pp 83-108.

Tobin, J.(1969), 'A general equilibrium approach to monetary theory', Journal of Money, Credit and Banking, vol 1, pp 15-29.

Tobin, J.(1975). In discussion of Shoven, J.B. and Bulow, J.I.(1975), Brookings Papers on Economic Activity, part 3, pp 608.

United Nations. (1968). A System of National Accounts, Series F, No 2, Rev 3, United Nations.

United Nations. (1977). 'Provisional international guidelines on the national and sectoral balance sheets and reconciliation accounts of the system of national accounts', series M, No 60, United Nations.

United Nations. (1979). Guidelines on statistics of tangible assets, series M, No 68, United Nations.

WM Company. (1988)., WM UK Pension Fund Service Annual Review 1987, WM Company: London.

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