

STOCK FLOW CONSISTENT INCOME FOR INDUSTRIAL AND COMMERCIAL COMPANIES

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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 particularly illustrated by reference to the U.K. 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.

1. INTRODUCTION

The importance of measuring corporate sector income to correctly reflect the movement of prices in general has been recognised by several authors and institutions responsible for setting accounting standards. From the United States there have been influential reports by the FASB (1974) and the CASB (1975); in the U.K. much interest in inflation accounting stemmed from the Sandilands (1975) report; and a comparative study by Hibbert (1983) focused on the effects of inflation in six industrialised countries. The impetus for these studies, however, was the unprecedented increase in inflation rates in many industrialised countries in the 1970s rather than substantial movements in relative prices, where the latter includes changes in interest rates and exchange rates. Although inflation rates have generally declined, changes in relative prices have continued to be of importance. The need for consideration of a general accounting framework which can reflect both movements in prices in general *and* in relative prices, has been given an added stimulus from the changing nature of the operations of many industrial and commercial companies (ICCs). Thus, whilst 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

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accounts of these companies will be incomplete without a summary of how these changes affect their realisable net worth. There is a need, therefore, for accounting conventions, both at the micro and macro level, to respond to the increased emphasis of ICCs to the management of their portfolios.

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 purchasing power (in terms of a numeraire price) of this part of its portfolio. Foreign currency overseas deposits and overseas borrowing for U.K. ICCs are estimated to have increased by factors of around 5 and 1.8, respectively, over the period 1979 to 1987.¹ 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 percent (pa) and 11 percent (pa), respectively. The market value of U.K. 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 during this period, there have implicitly been non-negligible changes in the income which has accrued to ICCs on account of these portfolio activities.

Inflation accounting is by itself an incomplete response to these kinds of changes. Rather as shown in this article, following a line of argument which can be traced to Haig (1921) and Simons (1938) in the United States and Hicks (1939) and Meade and Stone (1941) in the United Kingdom, a more comprehensive definition of income is needed. The one we adopt which has been called an accrued purchasing power, or app, concept of income—see also Shoven and Bulow (1975, 1976)—is derived formally below but can be motivated by the following quotation from Meade and Stone (1941, p. 219) “. . . 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.*” (Italics in original.) Some translation to companies is required, and in that context we identify consumption with dividend payments.

An additional, but related, focus on an appropriate definition of income, in the presence of changes in the general price level *and* relative prices, has been provided by those interested in how sectoral accounts fit together into a consistent whole. For example, Buiters (1983), Ruggles and Ruggles (1986) and Sunga (1987) have suggested general principles with a macroeconomic view in mind. From this perspective 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

¹The 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 percent), borrowing overseas; \$12.3 billion (3.0 percent) and for 1987, deposits overseas; \$33.4 billion (5.6 percent), borrowing overseas; \$22.5 billion (2.0 percent). These figures are for currencies other than £ sterling converted to units of common currency (\$).

²The 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.

contained in the SNA guidelines issued by the United Nations (1968) and later guidelines which handled more specifically 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. In this framework they 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.

There are, however, some distinctions between conventions that should be adopted when dealing with national accounts, on the one hand, and corporate sector accounts on the other. 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 [i.e. 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. This point is considered in greater detail in section 4.

Overall, the view we take here is in line with Ruggles and Ruggles (1982) as summarised by Postner (1986, p. 221) that "The macroenterprise sector would be a consolidation of composite microdata sets reflecting the individual units of the sector." This implies the need for economic accounting and corporate accounting to be on the same footing. This is not generally the case, either for the U.K. or the other G7 countries (i.e. U.S.A., Canada, Japan, F.R.G., France and Italy). For example, whereas we would recommend current replacement cost for the valuation of fixed capital, the "norm" in corporate accounting procedures for the G7 countries is historical cost. This is subject to some exceptions, with occasional revaluations of real property in the U.K. and some revaluations permitted, rather than required, in France, Italy and Canada. The valuation of financial assets in corporate accounts also varies across the G7 countries. Marketable securities, other than Government stock, are usually valued at the lower of historical cost and current market value, though U.K. practice tends to use historical cost. The closest that usual corporate accounting principles come to those recommended here is in the valuation of foreign currency assets, where outstanding foreign exchange assets and liabilities are usually revalued using the parent company currency. In summary, there is some recognition in corporate accounting practice in the G7 countries of the need to record revaluations of some assets and liabilities, but no general agreement as to the principle of market valuation rather than, for example, historical cost.

The conceptual and empirical estimates of income which are considered here are applicable to micro-business units and the macroenterprise sector; and are designed to aid an analysis of the complete performance of ICCs, insofar as

that relates to their success both in generating trading profits and managing their portfolios of assets and liabilities. Our measures of income are intended to complement rather than supplant more conventional transactions or value-added based measures of income, which are the conceptual basis of most existing national income accounts.

This article is organised as follows. In section 2 we outline the principle of stock-flow consistency and its application to the corporate sector. This is followed up in section 3 by an example which illustrates the central concepts in the context of a company with a stylised balance sheet. In section 4, which is relatively brief, we consider the particular role to be accorded to equities in the measurement of app income. Some of the detailed measurement problems in the context of the industrial and commercial company sector of the United Kingdom are examined in section 5. Section 6 is a continuation of section 5, but we concentrate on an overall view and a comparison between conventionally defined corporate income and app income. Concluding remarks appear in section 7.

2. 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 United Kingdom CSO, it is convenient here, for expositional purposes, to use a simplified balance sheet structure.

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, p. 41) comments 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.

The balance sheet shows the stock position of the company 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 company, which has a much simplified assets and liabilities structure, is given in Table 1, with entries defined with respect to an index of purchasing power, which is a general price level denoted P_t . The real net worth of the firm is,

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

Where W_t is nominal net worth, P_{kr} is the per unit replacement cost of the fixed

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_1M_t/P_t	—	m_2M_t/P_t	M_t/P_t	$-(1-m_1-m_2)M_t/P_t$
Overseas currency	$m_1^*M_t^*/e_tP_t$	—	$m_2^*M_t^*/e_tP_t$	—	$(m_1^*+m_2^*)M_t^*/e_tP_t$
Bonds	—	$P_{bt}B_t/P_t$	$P_{bt}B_t/P_t$	—	—
Equity	—	P_{Et}/P_t	$P_{Et}E_t/P_t$	—	—

Note: $M_{ft} = m_1M_t$ 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, pp. 790-791).

asset, K_t ; M_{ft} and M_{ft}^* are the company's holdings of domestic and overseas currency respectively; e_t is the spot exchange rate; $P_{bt}B_t$ is the market value of a bond, issued by the company, 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 (some part of) equity as a liability of the corporate sector—see section 4 below.

Following Patterson and Stephenson (1988) our measure of income, adjusted for revaluations of the stock of assets and liabilities, which we denote Y_t^a/P_t , is:

$$Y_t^a/P_t = Y_t^T/P_t + a_1P_{kt-1}K_{t-1}/P_{t-1} + a_2M_{ft-1}/P_{t-1} + a_3M_{ft-1}^*/e_{t-1}P_{t-1} + a_4P_{bt-1}B_{t-1}/P_{t-1} + a_5P_{Et-1}E_{t-1}/P_{t-1} \quad (2)$$

where

$$\begin{aligned} a_1 &= (\Pi_{kt} - \delta(1 + \Pi_{kt}) - \Pi_t)/(1 + \Pi_t) & \Pi_{kt} &= (P_{kt} - P_{kt-1})/P_{kt-1} \\ a_2 &= -\Pi_t/(1 + \Pi_t) & \Pi_t &= (P_t - P_{t-1})/P_{t-1} \\ a_3 &= -(\Delta e_t/e_t + \Pi_t)/(1 + \Pi_t) & \Pi_{bt} &= (P_{bt} - P_{bt-1})/P_{bt-1} \\ a_4 &= -(\Pi_{bt} - \Pi_t)/(1 + \Pi_t) & \Pi_{Et} &= (P_{Et} - P_{Et-1})/P_{Et-1} \\ a_5 &= -(\Pi_{Et} - \Pi_t)/(1 + \Pi_t) \end{aligned}$$

and

Y_t^T = Trading profits (before depreciation and net of taxes
and coupon payments on bonds)

δ = Rate of depreciation, assumed constant, of the capital stock.

This measure of income, which is one of accrued purchasing power, is the sum of gross trading profits (net of taxes and coupon payments) *plus* revaluations arising from the existing stock of assets and liabilities.³ These revaluation terms are, in general, accrued rather than realised, hence the term “accrued purchasing power.” The associated income concept is referred to as accrued purchasing power, or app, income.

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 a change in accrued purchasing power whether or not it was expected or could be sustained. Of course behavioural motivation might well depend on the 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.

Tobin (1975, p. 608) has suggested a permanent income concept which is relevant to corporate income. If there is a revaluation to an asset or liability, for example the revaluation of a consol arising from a change in the market rate of interest, Tobin suggests converting the gain or loss into an annuity value which is then 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 app income it is reckoned as it occurs since it is *then* that the economic power, as measured by its current realisable net worth, of the company is altered; whereas Tobin’s permanent income concept distributes it over an infinite number of future periods.

3. A SIMPLIFIED EXAMPLE

To illustrate some of the principles involved in measuring corporate sector income on a stock-flow consistent basis, consider a company whose general balance sheet structure is as in Table 1. Its assets comprise a single physical asset which we shall call fixed capital, with depreciation rate δ ; a portfolio of monetary assets (i.e. 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.

The first problem to be considered is how to value depreciation of the capital stock. Historical cost is not appropriate here as this does not measure the current

³In principle, it is possible to calculate the revaluation component for a particular asset given the change in its real value and the real value of the net flow into that asset during period t . Data availability and consistency will influence the choice of method. The direct method illustrated in the text has the advantage of identifying the key elements leading to revaluations.

opportunity, or user, cost of capital and 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 this cost to differ from the price of a new capital good—see also Flemming *et al.* (1976a, b). 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, the numeraire price should be chosen to reflect the interests of the ultimate owners of ICCs, and will usually be an index of general purchasing power.

Now consider the sterling part of the portfolio held by the company, 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 *real* value of the company'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 company 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 (i.e. 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 company—and hence to its equity holders through a reduction in the liabilities associated with ownership of the company. 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 company, and its owners at the time of the change, and this should be reflected in the company'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 company 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, as mentioned above, from a behavioural, in contrast to an accounting, point of view it may be of interest not to treat equity (in total) as a corporate sector liability. In section 4, which follows, we consider this point in greater detail.

This simplified example shows that what is happening to a company is only in part captured through reporting its trading profit, even if that is net of depreciation measured at current replacement cost. Whether or not the company, or more generally the corporate sector, is operating successfully, in a broader sense, depends upon its decisions relating to the valuation of its physical and financial assets and liabilities. A heavy exposure to relative price movements would arise if, for example, foreign currency holdings were not hedged against exchange rate movements.

Following further consideration, in section 4, of how to treat equity holdings, in section 5 we consider a much more detailed illustration of the concepts used here as applied to the industrial and commercial company sector of the United Kingdom.

4. EQUITY

The accounting framework outlined in sections 2 and 3 followed SNA guidelines and the practice of U.K. national income accountants—see Bryant (1987)—in treating equities, whether held domestically or by overseas residents, as a financial liability of the industrial and commercial company sector. This is consistent with the treatment of equity holdings in U.K. companies as an *asset* to the ultimate holders, whether in the United Kingdom or overseas; and to the treatment of overseas equity held by U.K. ICCs as an asset of the company sector. However, although considering domestically held ICCs equity as a liability is standard from the point of view of national income accountants, it is not a standard treatment from the perspective of either corporate accountants or economists.

Taking this point into account, a method of obtaining app income which accords closely with the notions of economic well-being or power (in an aggregate domestic sense) based on Haig (1921) and Simons (1938), distinguishes between assets and liabilities arising from overseas equities on the one hand, and domestic equities on the other. Specifically, our “above the line” app income measure treats U.K. ICCs holdings of overseas equity as an asset on par with other financial assets; and, symmetrically, overseas holdings of U.K. ICCs equity are treated as a liability on par with financial liabilities other than domestic equity. This measure has, therefore, a limited amount of adjustment due to equity revaluations. Adding in revaluations arising from domestic holdings of U.K. ICCs equity gives our “below the line” app income measure.

5. AN APPLICATION OF APP PRINCIPLES TO U.K. ICCS

This section has both an illustrative and a substantive purpose. In sections 2 and 3 we considered simplified models of the corporate sector balance sheet

and we were able to abstract from some of the detailed measurement problems inherent in applying app principles in practice. Here we report on some of the practical considerations arising from calculating app income for the industrial and commercial company sector of the United Kingdom.⁴ Although the estimates we obtain are necessarily of a broad brush nature they do indicate the importance of incorporating asset and liability revaluations into a measure of corporate income.

In principle a revaluation adjustment could arise on each and every tangible or financial asset and liability held by ICCs; and whilst these could be calculated for each individual company and then aggregated, such a procedure is not practicable given the current state of accounting information at a micro-level.⁵ (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. For fixed capital assets we adopt a fourfold classification: 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.

This section is organised as follows. In Table 2, which follows, we present estimates of app income for U.K. ICCs for the period 1976 to 1987, and show the contributions which arise from each component asset and liability. In discussing these estimates we first give brief consideration to the row items corresponding to these individual components, noting problems which arise from translating theoretical concepts to practical ones, and then conclude with an assessment of our overall measure of income.

5.i. *Fixed Assets*

There are two components in app income which relate to the stock of fixed assets. One refers to depreciation—see row 2 of Table 2—and the other to changes in the relative price of each component of the stock—see row 3 of Table 2 for the total of these latter effects. The depreciation adjustment is based on current replacement costs, not historic costs, and hence will be sensitive not just to estimated physical depreciation but changes in the allowances on capital goods.

As shown in the estimates in row 3, there have been substantial differences between the rates of change of the prices of capital goods and consumer goods (the price of consumer goods in the U.K. is our numeraire price relevant to the ultimate domestic owners of U.K. ICCs). For example, there are adjustments of -£10.4 billion, and +£15.3 billion in 1982 and 1984, respectively, at 1980 consumer prices.

⁴Further details of the data sources used are contained in Patterson (1989).

⁵Also bearing in mind that we are considering the industrial and commercial company sector for the U.K. this would need to include those enterprises which have come into U.K. ownership through outward direct investment, and exclude those whose ownership lies overseas.

TABLE 2
CORPORATE INCOME: TRANSACTIONS BASED AND ACCRUED

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
1 Real corporate income on a transactions basis ^a	12,443.2	18,925.2	20,453.9	20,459.0	15,342.2	14,125.6	16,133.6	20,061.7	21,856.7	25,827.1	26,274.6	32,487.4
Adjustments due to:												
2 Capital consumption	-3,489.7	-3,375.1	-4,046.4	-4,516.8	-4,276.2	-4,132.3	-3,753.5	-3,953.6	-5,387.2	-7,082.4	-8,506.5	-8,407.5
3 Fixed capital	50.8	-5,536.2	4,219.0	3,957.9	-659.3	-5,429.3	-10,399.0	-1,449.7	15,313.1	12,198.1	15,219.7	-2,538.4
4 Inventories DCUs	1,468.3	-254.3	-1,646.8	128.7	-1,954.4	-566.0	-430.5	405.5	546.2	-663.1	-643.3	1,122.2
5 Short-term assets	-7,678.2	-6,564.1	-6,596.6	-8,457.9	-8,024.6	-5,933.8	-4,171.6	-3,171.2	-3,398.6	-3,252.1	-2,745.4	-2,824.0
6 Short-term liabilities	9,786.8	8,280.7	7,922.3	10,084.5	9,602.1	7,290.6	5,343.5	4,003.5	4,216.8	4,019.7	3,318.5	3,304.1
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	1,234.2	-1,115.4	1,725.2	1,525.1	731.1	1,221.1	-1,041.0	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	1,005.5	-212.5	361.8	-51.2	124.4	1,369.0	-428.9	-4,382.6	-3,529.0	-4,749.7	-212.7
Sub totals:												
11 Financial assets (DCUs)	-7,943.2	-6,402.3	-7,098.9	-9,250.4	-8,583.6	-6,327.7	-3,777.6	-3,154.3	-3,605.2	-3,346.7	-2,780.4	-2,864.3
12 Financial liabilities (DCUs)	11,118.5	8,170.7	9,435.0	11,971.5	10,282.0	8,636.2	5,671.6	3,752.0	159.4	690.1	-1,298.6	3,068.5
13 Net DCU adjustment FCUs	3,175.3	1,768.4	2,336.1	2,721.1	1,698.5	2,308.5	1,894.0	597.7	-3,445.7	-2,656.5	-4,079.0	204.1

14	Short-term assets	296.4	-896.8	-625.9	-1,384.2	-1,611.5	513.2	742.6	278.5	1,882.5	-2,762.4	603.9	-2,440.3
15	Short-term liabilities	-349.7	1,410.8	1,017.3	1,957.8	2,344.4	-926.7	-1,188.6	-659.5	-2,520.0	3,141.2	-258.5	2,835.1
16	Long-term assets	3,288.5	-3,804.5	-1,333.0	-3,295.7	-4,231.8	4,089.5	4,235.2	1,305.2	5,944.8	-5,900.3	2,000.5	-8,919.7
	Sub totals:												
17	Financial assets (FCUs)	3,584.8	-4,701.3	-1,958.9	-4,679.8	-5,843.3	4,602.6	4,977.8	1,583.8	7,827.3	-8,662.7	2,604.4	-11,360.0
18	Financial liabilities (FCUs)	-349.7	1,410.8	1,017.3	1,957.8	2,344.4	-926.7	-1,188.6	-659.5	-2,520.0	3,141.2	-258.5	2,835.1
19	Net FCU adjustment	3,235.2	-3,290.6	-941.6	-2,722.1	-3,498.9	3,676.0	3,789.2	924.3	5,307.2	-5,521.5	2,345.8	-8,525.0
20	Total adjustment excl. domestic ICCs equity adjustment	4,439.9	-10,687.7	-79.7	-431.2	-8,690.3	-4,143.0	-8,899.8	-3,475.8	12,333.7	-3,725.3	4,336.8	-18,144.5
21	Equity adjustments (domestic holdings of ICCs equity)	-4,675.3	-3,450.9	-1,014.8	2,796.9	1,968.8	-2,503.4	-8,728.0	-13,258.3	-14,799.1	-21,525.8	-31,353.0	-12,539.1
22	Total adjustment incl. domestic ICCs equity adjustments	-235.4	-14,138.7	-1,094.5	2,365.7	-6,721.5	-6,646.4	-17,627.7	-16,734.0	-2,465.4	-25,251.1	-27,016.2	-30,683.7
23	Accrued income before domestic ICCs equity adjustment	16,883.1	8,237.5	20,374.2	20,027.8	6,651.9	9,982.6	7,233.8	16,585.9	34,190.4	22,101.8	30,611.4	14,342.9
24	Accrued income after domestic ICCs equity adjustment	12,207.8	4,786.6	19,359.4	22,824.8	8,620.7	7,479.2	-1,494.1	3,327.7	19,391.3	575.9	-741.6	1,803.8

Note: Corporate income is presented in £ billion at 1980 consumer prices.

^aEquals 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)-U.K. taxes, deflated by the consumers' expenditure deflator.

5.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, p. 590), in adjusting income for the real appreciation or depreciation of inventoried items. We take the United Kingdom Central Statistical Office's estimates of stock appreciation and subtract the general inflation rate (as measured by the rate of change of the numeraire price) times the stock of inventories. The resulting net adjustment due to inventories is shown in row 4 of Table 2. This adjustment has more often been negative than positive over the period 1976–87, reflecting falls in real commodity prices. Notice that, as with the accrual adjustment for fixed assets (row 3), the period 1980 to 1982 (inclusive) was particularly severe for accrued losses on inventories.

5.iii. *Short-Term Assets and Liabilities Denominated in Domestic Currency Units*

We now consider the adjustments arising from ICCs holdings of short-term assets and liabilities, including money, which are denominated in domestic currency units. 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.

We note that U.K. 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. This is illustrated in Table 2, see rows 5 and 6 for the contributions to app income arising from short-term assets and liabilities, respectively. There is a reduction, of the annual gain, from just over £2.1 billion in 1976 to around £0.5 billion in 1987.

5.iv. *Medium-Term Assets and Liabilities Denominated in Domestic Currency Units*

The next adjustment, see rows 7 and 8 of Table 2, 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."

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 percent of outstanding loans, with greater than one year to maturity, had an outstanding maturity of greater than 5 years, leaving 19 percent repayable within 5 years. By 1986 the respective percentages had changed to 52 percent and 48 percent. 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.

Between 1976 and 1982 there was a steady decline in the net medium-term liability position of ICCs; although since 1982 this has been relatively constant. This position, together with the difference between the estimated rates of change of the market price of medium-term financial instruments and the price of consumer goods, provides the contributions to app income shown in rows 7 and 8.⁶ Apart from 1977 and 1982, the difference between the relevant price changes is negative which implies, as for the short-term case, an *erosion* in the real value of net liabilities. The decline is from around £1 billion in 1976 to virtually zero in 1987.

5.v. Long-Term Assets and Liabilities Denominated 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 U.K. debenture 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 2½ percent consol. ICCs also issue debenture and loan stock which is classified as a long-term liability. There are further liabilities arising from inward direct investment into the U.K. from overseas and from our treatment of overseas holdings of ICCs equities as a liability.

In Row 9 of Table 2 the component of app income due to revaluations of long-term assets is shown. Apart from 1982, 1983 and 1986 the difference between the rates of change of long-term asset prices and the price of consumer goods is negative, and this is reflected in losses other than for those years. In Row 10 of

⁶These are estimated rates 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.

Table 2 we report the analogous position for long-term liabilities. For these calculations we assume that the market value of inward direct investment keeps pace with the price of capital goods (this assumption is symmetric with our treatment of outward direct investment and our adjustment to the total U.K. fixed capital stock). Another element of long-term liabilities is debenture and loan stock and, as ICCs are net issuers of such debt, there are accrued gains when the rate of change of the debenture price index is less than that for the price of consumer goods; and there is a further contribution from the change in the value of overseas holdings of ICCs equity.

In Rows 11 and 12 of Table 2 we summarise the contributions to app income arising from assets and liabilities denominated in domestic current units. The net position can be split into two phases. From 1976 to 1982, the net contribution from the domestic side was positive; but was negative or close to zero from 1983 to 1987.

5.vi. Assets and Liabilities 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.

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. The total of these components and overseas trade credit accounts for virtually all overseas assets. On the liabilities side, borrowing overseas is treated as a short-term liability, and inward direct investment and U.K. stocks and shares held by overseas nationals are considered to be of a longer-term nature. Together with overseas trade credit these accounted for 98 percent of liabilities in 1986 and over 99 percent in 1980. Therefore only a two-fold distinction is adopted here. Following BEQB (1988) we assume that inward direct investment creates a liability in sterling, which was addressed in 5.v.

5.vii. Short-Term Assets and Liabilities Denominated in Foreign Currency Units

Real revaluations to assets and liabilities originally denominated in foreign currency units 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 foreign currency unit, to which must be added any further adjustment arising from a change in the domestic purchasing power of the domestic currency unit.

On the asset side of the balance sheet, ICCs hold money in currencies other than sterling and also hold overseas deposits.⁷ 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 foreign currency liabilities 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 assets and liabilities is the dollar. The proportion of overseas deposits in dollars was fairly constant up to 1979 but has, thereafter, varied from 0.32 to just under 0.5. On the liabilities side the proportion of overseas borrowing in dollars 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, and weighted them by the currency proportions for deposits overseas and borrowing overseas separately.⁸ However, exchange rate movements are dominated by what is happening to the dollar. 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.)

In Rows 14 and 15 of Table 2 we show the contributions to app income from revaluations to short-term assets and liabilities, denominated in foreign currency units, respectively. The net contribution has something of an autocorrelated pattern being positive between 1977 and 1980, negative from 1981 to 1984, and positive in 1985 and 1987.

5.viii. *Long-Term Assets and Liabilities Denominated in Foreign Currency Units*

Long-term assets denominated in foreign currency units can be divided into three broad categories: direct investment abroad; domestic holdings of overseas equity; and domestic holdings of overseas bonds. Unfortunately the difficulties with data are particularly acute in this area, and this is also likely to be the case for countries other than the U.K. 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. Our interest is in the contribution to app income which is attributable to direct investment, and this results from a combination of changes in the market value (in foreign currency units) of the stock of outward direct investment, 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

⁷Some overseas deposits and borrowing are in £ sterling, but these are transferred to other holdings of domestic currency which were discussed above.

⁸The currencies are: U.S. Dollar, Swiss Franc, German Mark, Japanese Yen, French Franc, Dutch Guilder, Irish Pound.

of capital goods in the major recipient countries of outward direct investment.⁹ 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.

We find that the stock of U.K. outward direct investment has increased markedly since 1979, and that movements in the rate of change of the weighted exchange rate index dominate movements in overseas and domestic price levels. Some of the revaluations are quite substantial, for example, +£5.4 billion in 1984 and -£6.0 billion in 1985, and bear out the importance of exchange rate movements to the pattern of changes to app 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 proportional share of each of these two components. The total of overseas stocks and shares is divided into 25 percent bonds and 75 percent equity. This division is derived from data in the World Markets Pension Fund Survey—see W. M. Company (1988). There is then a further disaggregation by country.¹⁰ Rates of change of bond and equity prices, respectively, were calculated using a weighting scheme reflecting this disaggregation.¹¹

The overall contribution from long-term (foreign currency) assets is shown in row 16 of Table 2; adding rows 14 and 16 gives total financial (foreign currency) assets shown in row 17. Note the substantial nature of some of these contributions: +£5.0 billion in 1982 and -£11.4 billion in 1987.

Row 18 in effect repeats row 15 as we do not have a foreign currency breakdown for long-term liabilities. Practically, this is not of much importance because what evidence we have, see BEQB (1988), is that such liabilities are denominated in sterling, and hence will have been treated as a sectoral liability arising from inward direct investment. There are some large year to year changes in the net adjustment on assets and liabilities denominated in fcus which indicate the exposure of U.K. ICCs to exchange rate movements. For example, there is a turn-round from just over £5.3 billion in 1984 to -£5.5 billion in 1985; and here is a substantial accrued loss in 1987.

6. THE OVERALL POSITION

We are now in a position to take an overall view of U.K. ICCs, with particular regard to their assets and liabilities and the revaluations arising from them. The financial position of U.K. ICCs is shown in Figure 1. Note that real financial liabilities have increased (in absolute terms) somewhat faster than financial assets. This implies a net financial worth which has become increasingly negative in real

⁹The 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, i.e. U.S.A., Canada, F.R.G., Netherlands, France, Switzerland, Italy and Eire.

¹⁰On the basis of the World Pension Fund Survey, the assumed ownership for bonds is 75 percent: 12½ percent: 12½ percent, amongst the United States, Federal Republic of Germany and Japan, respectively. The equity ownership is based on market value weights for the same countries, which were derived from Morgan Stanley Capital International Indices.

¹¹A bond price index was calculated based on the equivalent of gilts for each of the countries referred to in the previous footnote.

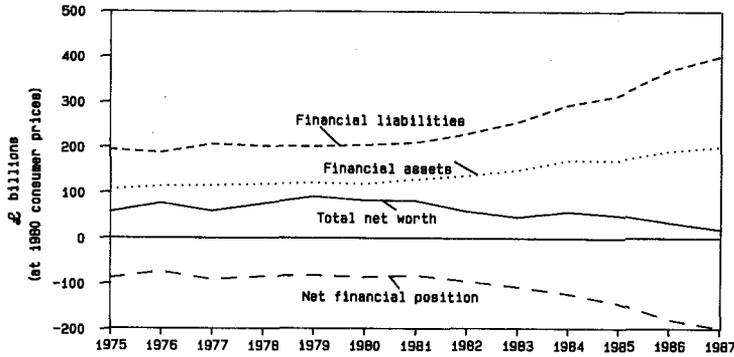


Figure 1. U.K. ICCs Real Financial Assets and Liabilities

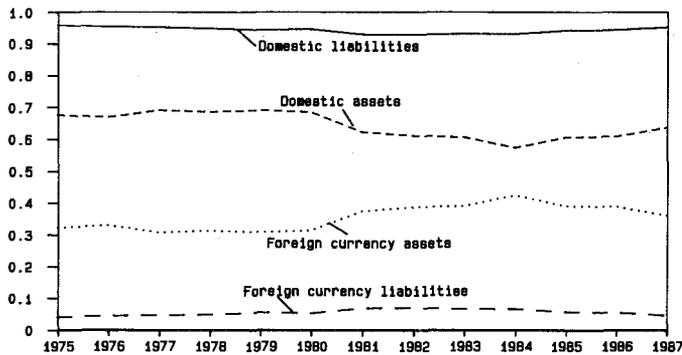


Figure 2. U.K. ICCs Financial Assets/Liabilities in Currency Proportions

terms. Adding in fixed assets and inventories valued at replacement cost gives total net worth.

One of the most significant developments over the last 10 years or so has been the extent to which ICCs have increased their foreign currency assets—see Figure 2. 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. These 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; and we saw that this was, indeed, the case (row 19 of Table 2).¹²

¹²Consider a simplified example of an asset denominated in a foreign currency unit (fcu) 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 indicates 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 $e_t = P_t^* / P_t$).

Corporate income as conventionally defined in the national income accounts is given in row 1 of Table 2, and an estimate of corporate real income on an accrued purchasing power basis, but before adjusting for revaluations in *domestic* ICCs' equity, (i.e. "above the line" app income), is given in row 23. App. income after making such an equity adjustment, (i.e. "below the line" app income), which corresponds to the convention of treating domestically-owned ICCs' equity as a liability, is given in row 24 of Table 2. It should be emphasised that these are, because of the need to make a number of assumptions, broad-brush estimates 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 1979 to 1982 (inclusive) which showed a decline of the order of 25 percent in transactions based corporate income. When account is taken of the various revaluation adjustments to obtain an app measure of income, this recession is shown to be very severe indeed, with a decline, in app 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 U.K. ICCs were concerned over this period. There was a slight improvement in 1981, which was not, however, sustained in 1982.

In Figure 3 we illustrate the differences between transactions based and accrued purchasing power income before adjusting for revaluations in domestic holdings of ICCs' equity, and in Figure 4 we give the corresponding comparison after making the domestic equity adjustment. Movements in transactions based

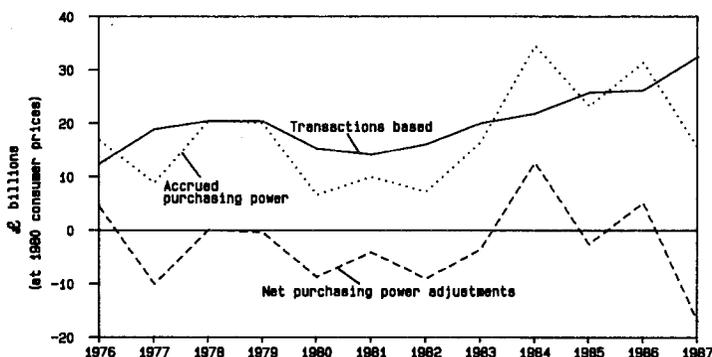


Figure 3. U.K. ICCs Real Net Income (excl. domestic equity adjustments)

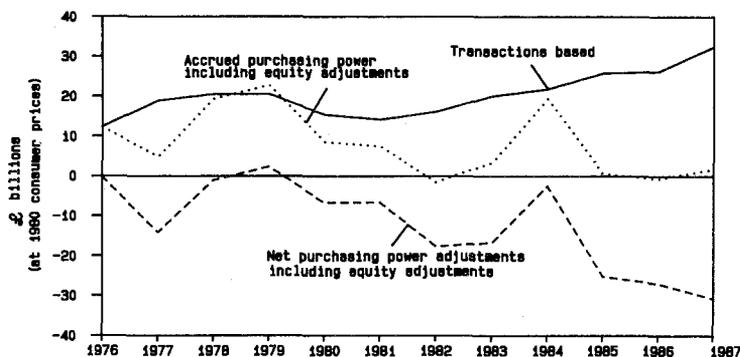


Figure 4. U.K. ICCs Real Net Income (incl. all equity adjustments)

and app income do not always coincide—see Figure 3. 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 weighted sterling exchange rate, movements in which led to large accrued losses on foreign currency assets and the stock of outward direct investment.

7. CONCLUDING REMARKS

In this study we have shown that the principles of stock-flow consistency and market valuation of assets and liabilities are viable ones for the construction of sectoral accounts, just as they are for individual companies. This approach is more general than inflation accounting to which it reduces if prices rise or fall proportionately. It is necessary to adopt a more general framework when relative prices, which include interest rates and exchange rates, are subject to alteration for these changes imply that income measured on an accrued purchasing power basis is not constant.

The importance of taking relative price changes into account has been intensified in recent years by the expansion and diversification of the portfolios of companies which might previously have been regarded as purely interested in trading profits. Since the abolition of exchange controls (for example, in the United Kingdom in the early 1980s) domestically based companies have increased their portfolios of overseas equities and bonds, foreign currency and direct investment. They are, thus, exposed to valuation changes arising from changes in overseas equity prices, interest rates and exchange rates. As portfolio management becomes an important aspect of the activities of trading companies, there is a need for national income and corporate accounting procedures to respond in order to reflect overall performance. Accrued purchasing power income is complementary to traditional valued added measures of income, as the latter are intentionally not designed to capture what is happening to the balance sheet of companies—except for a partial recognition of the importance of depreciation on fixed capital and changes in the value of inventories.

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