CHAPTER 3

Income and asset value measurement: an economist's approach

3.1 Introduction

The main purpose of this chapter is to explain the need for income measurement, to compare the methods of measurement adopted by the accountant with those adopted by the economist, and to consider how both are being applied within the international financial reporting framework.

Objectives

By the end of this chapter, you should be able to:

- explain the role and objective of income measurement;
- explain the accountant's view of income, capital and value;
- critically comment on the accountant's measure;
- explain the economist's view of income, capital and value;
- critically comment on the economist's measure;
- define various capital maintenance systems.

3.2 Role and objective of income measurement

Although accountancy has played a part in business reporting for centuries, it is only since the Companies Act 1929 that financial reporting has become income orientated. Prior to that Act, a statement of comprehensive income was of minor importance. It was the statement of financial position that mattered, providing a list of capital, assets and liabilities that revealed the financial soundness and solvency of the business.

According to some commentators,[1] this scenario may be attributed to the sources of capital funding. Until the late 1920s, as in present-day Germany, external capital finance in the UK was mainly in the hands of bankers, other lenders and trade creditors. As the main users of published financial statements, they focused on the company's ability to pay trade creditors and the interest on loans, and to meet the scheduled dates of loan repayment: they were interested in the short-term liquidity and longer-term solvency of the entity.

Thus the statement of financial position was the prime document of interest. Perhaps in recognition of this, the English statement of financial position, until recent times, tended to show liabilities on the left-hand side, thus making them the first part of the statement of financial position read.

The gradual evolution of a sophisticated investment market, embracing a range of financial institutions, together with the growth in the number of individual investors, caused a reorientation of priorities. Investor protection and investor decision-making needs started to dominate the financial reporting scene, and the revenue statement replaced the statement of financial position as the sovereign reporting document.

Consequently, attention became fixed on the statement of comprehensive income and on concepts of accounting for profit. Moreover, investor protection assumed a new meaning. It changed from simply protecting the **capital** that had **been invested** to protecting the **income information** used by investors when making an investment decision.

However, the sight of major companies experiencing severe liquidity problems over the past decade has revived interest in the statement of financial position; while its light is perhaps not of the same intensity as that of the profit and loss account, it cannot be said to be totally subordinate to its accompanying statement of income.

The main objectives of income measurement are to provide:

- a means of control in a micro- and macroeconomic sense;
- a means of prediction;
- a basis for taxation.

We consider each of these below.

3.2.1 Income as a means of control

Assessment of stewardship performance

Managers are the stewards appointed by shareholders. Income, in the sense of net income or net profit, is the crystallisation of their accountability. Maximisation of income is seen as a major aim of the entrepreneurial entity, but the capacity of the business to pursue this aim may be subject to political and social constraints in the case of large public monopolies, and private semi-monopolies such as British Telecommunications plc.

Maximisation of net income is reflected in the earnings per share (EPS) figure, which is shown on the face of the published profit and loss account. The importance of this figure to the shareholders is evidenced by contracts that tie directors' remuneration to growth in EPS. A rising EPS may result in an increased salary or bonus for directors and upward movement in the market price of the underlying security. The effect on the market price is indicated by another extremely important statistic, which is influenced by the statement of comprehensive income: namely, the price/earnings (PE) ratio. The PE ratio reveals the numerical relationship between the share's current market price and the last reported EPS.

Actual performance versus predicted performance

This comparison enables the management and the investing public to use the lessons of the past to improve future performance. The public, as shareholders, may initiate a change in the company directorate if circumstances necessitate it. This may be one reason why management is generally loath to give a clear, quantified estimate of projected results – such an estimate is a potential measure of efficiency. The comparison of actual with projected results identifies apparent underachievement.

The macroeconomic concept

Good government is, of necessity, involved in managing the macroeconomic scene and as such is a user of the income measure. State policies need to be formulated concerning the allocation of economic resources and the regulation of firms and industries, as illustrated by

the measures taken by Oftel and Ofwat to regulate the size of earnings by British Telecom and the water companies.

3.2.2 Income as a means of prediction

Dividend and retention policy

The payment of a dividend, its scale and that of any residual income after such dividend has been paid are influenced by the profit generated for the financial year. Other influences are also active, including the availability of cash resources within the entity, the opportunities for further internal investment, the dividend policies of capital-competing entities with comparable shares, the contemporary cost of capital and the current tempo of the capital market.

However, some question the soundness of using the profit generated for the year when making a decision to invest in an enterprise. Their view is that such a practice misunderstands the nature of income data, and that the appropriate information is the prospective cash flows. They regard the use of income figures from past periods as defective because, even if the future accrual accounting income could be forecast accurately, 'it is no more than an imperfect surrogate for future cash flows'.[2]

The counter-argument is that there is considerable resistance by both managers and accountants to the publication of future operating flows and dividend payments.[3] This means that, in the absence of relevant information, an investor needs to rely on a surrogate. The question then arises: which is the best surrogate?

In the short term, the best surrogate is the information that is currently available, i.e. income measured according to the accrual concept. In the longer term, management will be pressed by the shareholders to provide the actual forecast data on operating cash flows and dividend distribution, or to improve the surrogate information.

Suggestions for improving the surrogate information have included the provision of cash earnings per share. More fundamentally, Revsine has suggested that ideal information for investors would indicate the economic value of the business (and its assets) based on expected future cash flows. However, the Revsine suggestion itself requires information on future cash flows that it is not possible to obtain at this time.[4] Instead, he considered the use of replacement cost as a surrogate for the economic value of the business, and we return to this later in the chapter.

Future performance

While history is not a faultless indicator of future events and their financial results, it does have a role to play in assessing the level of future income. In this context, historic income is of assistance to existing investors, prospective investors and management.

Identifying maintainable profit by the analysis of matched costs

Subject to the requirement of enforced disclosure via the Companies Act 2006, as supplemented by various accounting standards, the measurement of income discloses items of income and expenditure necessarily of interest in assessing stewardship success and future prospects. In this respect, exceptional items, extraordinary items and other itemised costs and turnover are essential information.

3.2.3 Basis for taxation

The contemporary taxation philosophy, in spite of criticism from some economists, uses income measurement to measure the taxable capacity of a business entity.

However, the determination of income by the Inland Revenue is necessarily influenced by socioeconomic fiscal factors, among others, and thus accounting profit is subject to adjustment in order to achieve taxable profit. As a tax base, it has been continually eroded as the difference between accounting income and taxable income has grown.[5]

The Inland Revenue in the UK has tended to disallow expenses that are particularly susceptible to management judgement. For example, a uniform capital allowance is substituted for the subjective depreciation charge that is made by management, and certain provisions that appear as a charge in the statement of comprehensive income are not accepted as an expense for tax purposes until the loss crystallises, e.g. a charge to increase the doubtful debts provision may not be allowed until the debt is recognised as bad.

3.3 Accountant's view of income, capital and value

Variations between accountants and economists in measuring income, capital and value are caused by their different views of these measures. In this section, we introduce the accountant's view and, in the next, the economist's, in order to reconcile variations in methods of measurement.

3.3.1 The accountant's view

Income is an important part of accounting theory and practice, although until 1970, when a formal system of propagating standard accounting practice throughout the accountancy profession began, it received little attention in accountancy literature. The characteristics of measurement were basic and few, and tended to be of an intuitive, traditional nature, rather than being spelled out precisely and given mandatory status within the profession.

Accounting tradition of historical cost

The statement of comprehensive income is based on the actual costs of business transactions, i.e. the costs incurred in the currency and at the price levels pertaining at the time of the transactions.

Accounting income is said to be historical income, i.e. it is an *ex post* measure because it takes place after the event. The traditional statement of comprehensive income is historical in two senses: because it concerns a past period, and because it utilises historical cost, being the cost of the transactions on which it is based. It follows that the statement of financial position, being based on the residuals of transactions not yet dealt with in the profit and loss account, is also based on historical cost.

In practice, certain amendments may be made to historical cost in both the statement of comprehensive income and statement of financial position, but historical cost still predominates in both statements. It is justified on a number of counts which, in principle, guard against the manipulation of data.

The main characteristics of historical cost accounting are as follows:

- **Objectivity**. It is a predominantly objective system, although it does exhibit aspects of subjectivity. Its nature is generally understood and it is invariably supported by independent documentary evidence, e.g. an invoice, statement, cheque, cheque counterfoil, receipt or voucher.
- **Factual**. As a basis of fact (with exceptions such as when amended in furtherance of revaluation), it is verifiable and to that extent is beyond dispute.

- **Profit or income concept**. Profit as a concept is generally well understood in a capital market economy, even if its precise measurement may be problematic. It constitutes the difference between revenue and expenditure or, in the economic sense, between opening and closing net assets.

Unfortunately, historical cost is not without its weaknesses. It is not always objective, owing to alternative definitions of revenue and costs and the need for estimates.

We saw in the preceding chapter that revenue could be determined according to a choice of criteria. There is also a choice of criteria for defining costs. For example, although inventories are valued at the lower of cost or net realisable value, the **cost** will differ depending upon the definition adopted, e.g. first-in–first-out, last-in–first-out or standard cost.

Estimation is needed in the case of inventory valuation, assessing possible bad debts, accruing expenses, providing for depreciation and determining the profit attributable to long-term contracts. So, although it is transaction based, there are aspects of historical cost reporting that do not result from an independently verifiable business transaction. This means that profit is not always a unique figure.

Assets are often subjected to revaluation. In an economy of changing price levels, the historical cost system has been compromised by a perceived need to restate the carrying value of those assets that comprise a large proportion of a company's capital employed; e.g. land and buildings. This practice is controversial, not least because it is said to imply that a statement of financial position is a list of assets at market valuation, rather than a statement of unamortised costs not yet charged against revenue.

However, despite conventional accountancy income being partly the result of subjectivity, it is largely the product of the historical cost concept. A typical accounting policy specified in the published accounts of companies now reads as follows:

> The financial statements are prepared under the historical cost conventions as modified by the revaluation of certain fixed assets.

Nature of accounting income

Accounting income is defined in terms of the business entity. It is the excess of revenue from sales over direct and allocated indirect costs incurred in the achievement of such sales. Its measure results in a net figure. It is the numerical result of the matching and accruals concepts discussed in the preceding chapter.

We saw in the preceding chapter that accounting income is transaction based and therefore can be said to be factual, in as much as the revenue and costs have been realised and will be reflected in cash inflow and outflow, although not necessarily within the financial year.

We also saw that, under accrual accounting, the sales for a financial period are offset by the expenses incurred in generating such sales. Objectivity is a prime characteristic of accrual accounting, but the information cannot be entirely objective because of the need to break up the ongoing performance of the business entity into calendar periods or financial years for purposes of accountability reporting. The allocation of expenses between periods requires a prudent estimate of some costs, e.g. the provision for depreciation and bad debts attributable to each period.

Accounting income is presented in the form of the conventional profit and loss account or statement of comprehensive income. This statement of comprehensive income, in being based on actual transactions, is concerned with a past-defined period of time. Thus accounting profit is said to be historic income, i.e. an *ex post* measure because it is after the event.

Nature of accounting capital

The business enterprise requires the use of non-monetary assets, e.g. buildings, plant and machinery, office equipment, motor vehicles, stock of raw materials and work-in-progress.

Such assets are not consumed in any one accounting period, but give service over a number of periods; therefore, the unconsumed portions of each asset are carried forward from period to period and appear in the statement of financial position. This document itemises the unused asset balances at the date of the financial year-end. In addition to listing unexpired costs of non-monetary assets, the statement of financial position also displays monetary assets such as debtor and cash balances, together with monetary liabilities, i.e. moneys owing to trade creditors, other creditors and lenders. Funds supplied by shareholders and retained income following the distribution of dividend are also shown. Retained profits are usually added to shareholders' capital, resulting in what is known as shareholders' funds. These represent the company's equity capital.

The net assets of the firm, i.e. that fund of unconsumed assets which exceeds moneys attributable to creditors and lenders, constitutes the company's net capital, which is the same as its equity capital. Thus the profit and loss account of a financial period can be seen as a linking statement between that period's opening and closing statement of financial positions: in other words, income may be linked with opening and closing capital. This linking may be expressed by formula, as follows:

$$Y_{0-1} = NA_1 - NA_0 + D_{0-1}$$

where Y_{0-1} = income for the period of time t_0 to t_1; NA_0 = net assets of the entity at point of time t_0; NA_1 = net assets of the entity at point of time t_1; D_{0-1} = dividends or distribution during period t_{0-1}.

Less formally: Y = income of financial year; NA_0 = net assets as shown in the statement of financial position at beginning of financial year; NA_1 = net assets as shown in the statement of financial position at end of financial year; D_{0-1} = dividends paid and proposed for the financial year. We can illustrate this as follows:

Income Y_{0-1} for the financial year t_{0-1} as compiled by the accountant was £1,200

Dividend D_{0-1} for the financial year t_{0-1} was £450

Net assets NA_0 at the beginning of the financial year were £6,000

Net assets NA_1 at the end of the financial year were £6,750.

The income account can be linked with opening and closing statements of financial position, namely:

$$\begin{aligned} Y_{0-1} &= NA_1 - NA_0 + D_{0-1} \\ &= £6{,}750 - £6{,}000 + £450 \\ &= £1{,}200 = Y_{0-1} \end{aligned}$$

Thus Y has been computed by using the opening and closing capitals for the period where capital equals net assets.

In practice, however, the accountant would compute income Y by compiling a profit and loss account. So, of what use is this formula? For reasons to be discussed later, the economist finds use for the formula when it is amended to take account of what we call **present values**. Computed after the end of a financial year, it is the *ex post* measure of income.

Nature of traditional accounting value

As the values of assets still in service at the end of a financial period have been based on the unconsumed costs of such assets, they are the by-product of compiling the income financial statement. These values have been fixed not by direct measurement, but simply by an assessment of costs consumed in the process of generating period turnover. We can say, then, that the statement of financial position figure of net assets is a residual valuation after measuring income.

However, it is not a value in the sense of worth or market value as a buying price or selling price; it is merely a **value of unconsumed costs of assets**. This is an important point that will be encountered again later.

3.4 Critical comment on the accountant's measure

3.4.1 Virtues of the accountant's measure

As with the economist's, the accountant's measure is not without its virtues. These are invariably aspects of the historical cost concept, such as objectivity, being transaction based and being generally understood.

3.4.2 Faults of the accountant's measure

Principles of historical cost and profit realisation

The historical cost and profit realisation concepts are firmly entrenched in the transaction basis of accountancy. However, in practice, the two concepts are not free of adjustments. Because of such adjustments, some commentators argue that the system produces a heterogeneous mix of values and realised income items.[6]

For example, in the case of asset values, certain assets such as land and buildings may have a carrying figure in the statement of financial position based on a revaluation to market value, while other assets such as motor vehicles may still be based on a balance of unallocated cost. The statement of financial position thus pretends on the one hand to be a list of resultant costs pending allocation over future periods, and on the other hand to be a statement of current values.

Prudence concept

This concept introduces caution into the recognition of assets and income for financial reporting purposes. The cardinal rule is that income should not be recorded or recognised within the system until it is realised, but unrealised losses should be recognised immediately.

However, not all unrealised profits are excluded. For example, practice is that attributable profit on long-term contracts still in progress at the financial year-end may be taken into account. As with fixed assets, rules are not applied uniformly.

Unrealised capital profits

Capital profits are ignored as income until they are realised, when, in the accounting period of sale, they are acknowledged by the reporting system. However, all the profit is recognised in one financial period when, in truth, the surplus was generated over successive periods by gradual growth, albeit unrealised until disposal of the asset. Thus a portion of what are now realised profits applies to prior periods. Not all of this profit should be attributed to the period of sale.

Going concern

The going concern concept is fundamental to accountancy and operates on the assumption that the business entity has an indefinite life. It is used to justify basing the periodic reports of asset values on carrying forward figures that represent unallocated costs, i.e. to justify the non-recognition of the realisable or disposal values of non-monetary assets and, in so doing, the associated unrealised profits/losses. Although the life of an entity is deemed indefinite,

there is uncertainty, and accountants are reluctant to predict the future. When they are matching costs with revenue for the current accounting period, they follow the prudence concept of reasonable certainty.

In the long term, economic income and accountancy income are reconciled. The unrealised profits of the economic measure are eventually realised and, at that point, they will be recognised by the accountant's measure. In the short term, however, they give different results for each period.

What if we cannot assume that a business will continue as a going concern?

There may be circumstances, as in the case of Gretag Imaging Holdings AG which in its 2001 Annual Report referred to falling sales and losses, which require a judgement to be made as to the validity of the going concern assumption. The assumption can be supported by showing that active steps are being taken such as restructuring, cost reduction and raising additional share capital which will ensure the survival of the business. If survival is not possible, the business will prepare its accounts using net realisable values, which are discussed in the next chapter.

The key considerations for shareholders are whether there will be sufficient profits to support dividend distributions and whether they will be able to continue to dispose of their shares in the open market. The key consideration for the directors is whether there will be sufficient cash to allow the business to trade profitably. We can see all these considerations being addressed in the following extract from the 2003 Annual Report of Royal Numico N.V.

> **Going concern**
> The negative shareholders' equity . . . results from the impairment of intangible fixed assets . . . Management remains confident that it will be able to sufficiently strengthen shareholders' equity and return to positive shareholders' equity through retained profits . . . and that the negative shareholders' equity will not have an impact on the group's operations, access to funding nor its stock exchange listing.
>
> Based on the cash flow generating capacity of the company and its current financing structure, management is convinced that the company will continue as a going concern. Therefore the valuation principles for assets and liabilities applied are consistent with the prior year and are based on going concern.

3.5 Economist's view of income, capital and value

Let us now consider the economist's tradition of present value and the nature of economic income.

3.5.1 Economist's tradition of present value

Present value is a technique used in valuing a future money flow, or in measuring the money value of an existing capital stock in terms of a predicted cash flow *ad infinitum*.

Present value (PV) constitutes the nature of economic capital and, indirectly, economic income. Given the choice of receiving £100 now or £100 in one year's time, the rational person will opt to receive £100 now. This behaviour exhibits an intuitive appreciation of the fact that £100 today is worth more than £100 one year hence. Thus the mind has **discounted** the value of the future sum: £100 today is worth £100; but compared with today, i.e. **compared with present value**, a similar sum receivable in twelve months' time is worth

less than £100. How much less is a matter of subjective evaluation, but compensation for the time element may be found by reference to interest: a person forgoing the spending of £1 today and spending it one year later may earn interest of, say, 10% per annum in compensation for the sacrifice undergone by deferring consumption.

So £1 today invested at 10% p.a. will be worth £1.10 one year later, £1.21 two years later, £1.331 three years later, and so on. This is the concept of compound interest. It may be calculated by the formula $(1 + r)^n$, where 1 = the sum invested; r = the rate of interest; n = the number of periods of investment (in our case years). So for £1 invested at 10% p.a. for four years:

$$\begin{aligned}(1 + r)^n &= (1 + 0.10)^4 \\ &= (1.1)^4 \\ &= £1.4641\end{aligned}$$

and for five years:

$$\begin{aligned}&= (1.1)^5 \\ &= £1.6105, \text{ and so on.}\end{aligned}$$

Notice how the **future value** increases because of the compound interest element – it **varies** over time – whereas the investment of £1 remains constant. So, conversely, the sum of £1.10 received at the end of year one has a PV of £1, as does £1.21 received at the end of year two and £1.331 at the end of year three.

It has been found convenient to construct tables to ease the task of calculating present values. These show the cash flow, i.e. the future values, at a constant figure of £1 and allow the investment to vary. So:

$$PV = \frac{CF}{(1 + r)^n}$$

where CF = anticipated cash flow; r = the discount (i.e. interest) rate. So the PV of a cash flow of £1 receivable at the end of one year at 10% p.a. is:

$$\frac{£1}{(1 + r)^1} = £0.9091$$

and £1 at the end of two years:

$$\frac{£1}{(1 + r)^2} = £0.8264$$

and so on over successive years. The appropriate present values for years three, four and five would be £0.7513, £0.6830, £0.6209 respectively.

£0.9091 invested today at 10% p.a. will produce £1 at the end of one year. The PV of £1 receivable at the end of two years is £0.8264 and so on.

Tables presenting data in this way are called 'PV tables', while the earlier method compiles tables usually referred to as 'compound interest tables'. Both types of table are compound interest tables; only the presentation of the data has changed.

To illustrate the ease of computation using PV tables, we can compute the PV of £6,152 receivable at the end of year five, given a discount rate of 10%, as being £6,152 × £0.6209 = £3,820. Thus £3,820 will total £6,152 in five years given an interest rate of 10% p.a. So the PV of that cash flow of £6,152 is £3,820, because £3,820 would generate interest of £2,332 (i.e. 6,152 – 3,820) as compensation for losing use of the principal sum for five years. Future flows must be discounted to take cognisance of the time element separating cash

flows. Only then are we able to compare like with like by reducing all future flows to the comparable loss of present value.

This concept of PV has a variety of applications in accountancy and will be encountered in many different areas requiring financial measurement, comparison and decision. It originated as an economist's device within the context of economic income and economic capital models, but in accountancy it assists in the making of valid comparisons and decisions. For example, two machines may each generate an income of £10,000 over three years. However, timing of the cash flows may vary between the machines. This is illustrated in Figure 3.1.

Figure 3.1 Dissimilar cash flows

Cash flows		
Machine A	*Machine B*	*Receivable end of year*
£	£	
1,000	5,000	1
2,000	4,000	2
7,000	1,000	3
10,000	10,000	

If we simply compare the profit-generating capacity of the machines over the three-year span, each produces a total profit of £10,000. But if we pay regard to the time element of the money flows, the machines are not so equal.

However, the technique has its faults. Future money flows are invariably the subject of **estimation** and thus the actual flow experienced may show variations from forecast. Also, the element of **interest**, which is crucial to the calculation of present values, is **subjective**. It may, for instance, be taken as the average prevailing rate operating within the economy or a rate peculiar to the firm and the element of risk involved in the particular decision. In this chapter we are concerned only with PV as a tool of the economist in evaluating economic income and economic capital.

3.5.2 Nature of economic income

Economics is concerned with the economy in general, raising questions such as: how does it function? how is wealth created? how is income generated? why is income generated? The economy as a whole is activated by income generation. The individual is motivated to generate income because of a need to satisfy personal wants by consuming goods and services. Thus the economist becomes concerned with the individual consumer's psychological state of personal **enjoyment and satisfaction**. This creates a need to treat the economy as a **behavioural entity**.

The behavioural aspect forms a substantial part of micro- and macroeconomic thought, emanating particularly from the microeconomic. We can say that the economist's version of income measurement is microeconomics orientated in contrast to the accountant's business entity orientation.

The origination of the economic measure of income commenced with Irving Fisher in 1930.[7] He saw income in terms of consumption, and consumption in terms of individual perception of personal enjoyment and satisfaction. His difficulty in formulating a standard measure of this personal psychological concept of income was overcome by equating this individual experience with the consumption of goods and services and assuming that the cost of such goods and services formed the measure.

Thus, he reasoned, consumption (C) equals income (Y); so $Y = C$. He excluded savings from income because savings were not consumed. There was no satisfaction derived from savings; enjoyment necessitated consumption, he argued. Money was worthless until spent; so growth of capital was ignored, but reductions in capital became part of income because such reductions had to be spent.

In Fisher's model, capital was a stock of wealth existing at a point in time, and as a stock it generated income. Eventually, he reconciled the value of capital with the value of income by employing the concept of present value. He assessed the PV of a future flow of income by **discounting** future flows using the discounted cash flow (DCF) technique. Fisher's model adopted the prevailing average market rate of interest as the discount factor.

Economists since Fisher have introduced savings as part of income. Sir John Hicks played a major role in this area.[8] He introduced the idea that income was the maximum consumption enjoyed by the individual without reducing the individual's capital stock, i.e. the amount a person could consume during a period of time that still left him or her with the same value of capital stock at the end of the period as at the beginning. Hicks also used the DCF technique in the valuation of capital.

If capital increases, the increase constitutes savings and grants the opportunity of consumption. The formula illustrating this was given in section 3.3, i.e. $Y_{0-1} = NA_1 - NA_0 + D_{0-1}$.

However, in the Hicksian model, $NA_1 - NA_0$, given as £6,750 and £6,000 respectively in the aforementioned example, would have been discounted to achieve present values.

The same formula may be expressed in different forms. The economist is likely to show it as $Y - C + (K_1 - K_0)$ where C = consumption, having been substituted for dividend, and K_1 and K_0 have been substituted for NA_1 and NA_0 respectively.

Hicks's income model is often spoken of as an *ex ante* model because it is usually used for the measurement of **expected** income in advance of the time period concerned. Of course, because it specifically introduces the present value concept, present values replace the statement of financial position values of net assets adopted by the accountant. Measuring income **before the event** enables the individual to estimate the level of consumption that may be achieved without depleting capital stock. Before-the-event computations of income necessitate predictions of future cash flows.

Suppose that an individual proprietor of a business anticipated that his investment in the enterprise would generate earnings over the next four years as specified in Figure 3.2. Furthermore, such earnings would be retained by the business for the financing of new equipment with a view to increasing potential output.

We will assume that the expected rate of interest on capital employed in the business is 8% p.a.

The economic value of the business at K_0 (i.e. at the beginning of year one) will be based on the discounted cash flow of the future four years. Figure 3.3 shows that K_0 is £106,853, calculated as the present value of anticipated earnings of £131,000 spread over a four-year term.

Figure 3.2 Business cash flows for four years

Years	*Cash inflows* £
1	26,000
2	29,000
3	35,000
4	41,000

Figure 3.3 Economic value at K_0

Year	(a) Cash flow	(b) $DCF = \frac{1}{(1+r)^n}$	(c) PV $(a) \times (b)$
	£		£
K_1	26,000	$\frac{1}{(1.08)^1} = 0.9259$	24,073
K_2	29,000	$\frac{1}{(1.08)^2} = 0.8573$	24,862
K_3	35,000	$\frac{1}{(1.08)^3} = 0.7938$	27,783
K_4	41,000	$\frac{1}{(1.08)^4} = 0.7350$	30,135
	131,000		106,853

Figure 3.4 Economic value at K_1

Year	(a) Cash flow	(b) $DCF = \frac{-1}{(1+r)^n}$	(c) PV $(a) \times (b)$
	£		£
K_1	26,000	1.0000	26,000
K_2	29,000	$\frac{1}{(1+r)^1} = 0.9259$	26,851
K_3	35,000	$\frac{1}{(1+r)^2} = 0.8573$	30,006
K_4	41,000	$\frac{1}{(1+r)^3} = 0.7938$	32,546
	131,000		115,403

The economic value of the business at K_1 (i.e. at the end of year one, which is the same as saying the beginning of year two) is calculated in Figure 3.4. This shows that K_1 is £115,403 calculated as the present value of anticipated earnings of £131,000 spread over a four-year term.

From this information we are able to calculate Y for the period Y_1, as in Figure 3.5. Note that C (consumption) is nil because, in this exercise, dividends representing consumption have not been payable for Y_1. In other words, income Y_1 is entirely in the form of projected capital growth, i.e. savings.

By year-end K_1, earnings of £26,000 will have been received; in projecting the capital at K_2 such earnings will have been reinvested and at the beginning of year K_2 will have a PV of £26,000. These earnings will no longer represent a **predicted** sum because they will have been **realised** and therefore will no longer be subjected to discounting.

Figure 3.5 Calculation of *Y* for the period Y_1

$$
\begin{aligned}
Y &= C + (K_1 - K_0) \\
Y &= 0 + (115{,}403 - 106{,}853) \\
&= 0 + 8{,}550 \\
&= £8{,}550
\end{aligned}
$$

The income of £8,550 represents an anticipated return of 8% p.a. on the economic capital at K_0 of £106,853 (8% of £106,853 is £8,548, the difference of £2 between this figure and the figure calculated above being caused by rounding).

As long as the expectations of future cash flows and the chosen interest rate do not change, then Y_1 will equal 8% of £106,853.

What will the anticipated income for the year Y_2 amount to?

Applying the principle explained above, the anticipated income for the year Y_2 will equal 8% of the capital at the end of K_1 amounting to £115,403 = £9,233. This is proved in Figure 3.6, which shows that K_2 is £124,636 calculated as the present value of anticipated earnings of £131,000 spread over a four-year term.

From this information we are able to calculate Y for the period Y_2 as in Figure 3.7. Note that capital value attributable to the end of the year K_2 is being assessed at the beginning of K_2. This means that the £26,000 due at the end of year K_1 will have been received and reinvested, earning interest of 8% p.a. Thus by the end of year K_2 it will be worth £28,080. The sum of £29,000 will be realised at the end of year K_2 so its present value at that time will be £29,000.

If the anticipated future cash flows change, the expected capital value at the successive points in time will also change. Accordingly, the actual value of capital may vary from that forecast by the *ex ante* model.

Figure 3.6 Economic value at K_2

	(a)	(b)	(c)
Year	Cash flow	$DCF = \frac{1}{(1+r)^n}$	$PV = (a) \times (b)$
	£	£	£
K_1	26,000	1.08	28,080
K_2	29,000	1.0000	29,000
K_3	35,000	0.9259	32,407
K_4	41,000	0.8573	35,149
	131,000		124,636

Figure 3.7 Calculation of *Y* for the period Y_2

$$
\begin{aligned}
Y &= C + (K_2 - K_1) \\
Y &= 0 + (124{,}636 - 115{,}403) \\
&= 0 + 9{,}233 \\
&= £9{,}233
\end{aligned}
$$

3.6 Critical comment on the economist's measure

While the income measure enables us to formulate theories regarding the behaviour of the economy, it has inherent shortcomings not only in the economic field, but particularly in the accountancy sphere.

- The calculation of economic capital, hence economic income, is subjective in terms of the present value factor, often referred to as the DCF element. The factor may be based on any one of a number of factors, such as opportunity cost, the current return on the firm's existing capital employed, the contemporary interest payable on a short-term loan such as a bank overdraft, the average going rate of interest payable in the economy at large, or a rate considered justified on the basis of the risk attached to a particular investment.
- Investors are not of one mind or one outlook. For example, they possess different risk and time preferences and will therefore employ different discount factors.
- The model constitutes a compound of unrealised and realised flows, i.e. profits. Because of the unrealised element, it has not been used as a base for computing tax or for declaring a dividend.
- The projected income is dependent upon the success of a planned financial strategy. Investment plans may change, or fail to attain target.
- Windfall gains cannot be foreseen, so they cannot be accommodated in the *ex ante* model. Our prognostic cash flows may therefore vary from the actual flows generated, e.g. an unexpected price movement.
- It is difficult to construct a satisfactory, meaningful statement of financial position detailing the unused stock of net assets by determining the present values of individual assets. Income is invariably the consequence of deploying a group of assets working in unison.

3.7 Income, capital and changing price levels

A primary concern of income measurement to both economist and accountant is the maintenance of the capital stock, i.e. the maintenance of capital values. The assumption is that income can only arise **after** the capital stock has been maintained at the same amount as at the beginning of the accounting period.

However, this raises the question of how we should define the capital that we are attempting to maintain. There are a number of possible definitions:

- **Money capital**. Should we concern ourselves with maintaining the fund of capital resources initially injected by the entrepreneur into the new enterprise? This is indeed one of the aims of traditional, transaction-based accountancy.
- **Potential consumption capital**. Is it this that should be maintained, i.e. the economist's present value philosophy expressed via the discounted cash flow technique?
- **Operating capacity capital**. Should maintenance of productive capacity be the rule, i.e. capital measured in terms of tangible or physical assets? This measure would utilise the current cost accounting system.

Revsine attempted to construct an analytical bridge between replacement cost accounting that maintains the operating capacity, and the economic concepts of **income** and **value**, by demonstrating that the distributable operating flow component of economic income is equal to the current operating component of replacement cost income, and that the unexpected income component of economic income is equal to the unrealisable cost savings of replacement

cost income.[9] This will become clearer when the replacement cost model is dealt with in the next chapter.

- **Financial capital**. Should capital be maintained in terms of a fund of general purchasing power (sometimes called 'real' capital)? In essence, this is the consumer purchasing power (or general purchasing power) approach, but not in a strict sense as it can be measured in a variety of ways. The basic method uses a general price index. This concept is likely to satisfy the criteria of the proprietor/shareholders of the entity. The money capital and the financial capital concepts are variations of the same theme, the former being founded on the historic cost principle and the latter applying an adjustment mechanism to take account of changing price levels.

The money capital concept has remained the foundation stone of traditional accountancy reporting, but the operating and financial capital alternatives have played a controversial secondary role over the past twenty-five years.

Potential consumption capital is peculiar to economics in terms of measurement of the business entity's aggregate capital, although, as discussed on pages 49–52, it has a major role to play as a decision-making model in financial management.

3.7.1 Why are these varying methods of concern?

The problem tackled by these devices is that plague of the economy known as 'changing price levels', particularly the upward spiralling referred to as **inflation**. Throughout this chapter we have assumed that there is a stable monetary unit and that income, capital and value changes over time have been in response to operational activity and the interaction of supply and demand or changes in expectations.

Following the historic cost convention, capital maintenance has involved a comparison of opening and closing capital in each accounting period. It has been assumed that the purchasing power of money has remained constant over time.

If we take into account moving price levels, particularly the fall in the purchasing power of the monetary unit due to inflation, then our measure of **income** is affected if we insist upon **maintaining capital in real terms**.

3.7.2 Is it necessary to maintain capital in real terms?

Undoubtedly it is necessary if we wish to prevent an erosion of the operating capacity of the entity and thus its ability to maintain real levels of income. If we do not maintain the capacity of capital to generate the current level of profit, then the income measure, being the difference between opening and closing capitals, will be overstated or overvalued. This is because the capital measure is being understated or undervalued. In other words, there is a danger of dividends being paid out of real capital rather than out of real income. It follows that, if the need to retain profits is overlooked, the physical assets will be depleted.

In accountancy there is no theoretical difficulty in measuring the impact of changing price levels. There are, however, two practical difficulties:

- There are a number of methods, or mixes of methods, available and it has proved impossible to obtain consensus support for one method or compound of methods.
- There is a high element of subjectivity, which detracts from the objectivity of the information.

In the next chapter we deal with inflation and analyse the methods formulated, together with the difficulties that they in turn introduce into the financial reporting system.

Summary

In measuring income, capital and value, the accountant's approach varies from the sister discipline of the economist, yet both are trying to achieve similar objectives.

The accountant uses a traditional transaction-based model of computing income, capital being the residual of this model.

The economist's viewpoint is anchored in a behavioural philosophy that measures capital and deduces income to be the difference between the capital at commencement of a period and that at its end.

The objectives of income measurement are important because of the existence of a highly sophisticated capital market. These objectives involve the assessment of stewardship performance, dividend and retention policies, comparison of actual results with those predicted, assessment of future prospects, payment of taxation and disclosure of matched costs against revenue from sales.

The natures of income, capital and value must be appreciated if we are to understand and achieve measurement. The apparent conflict between the two measures can be seen as a consequence of the accountant's need for periodic reporting to shareholders. In the longer term, both methods tend to agree.

Present value as a concept is the foundation stone of the economist, while historical cost, adjusted for prudence, is that of the accountant. Present value demands a subjective discount rate and estimates that time may prove incorrect; historical cost ignores unrealised profits and in application is not always transaction based.

The economist's measure, of undoubted value in the world of micro- and macroeconomics, presents difficulty in the accountancy world of annual reports. The accountant's method, with its long track record of acceptance, ignores any generated profits, which caution and the concept of the going concern deem not to exist.

The economic trauma of changing price levels is a problem that both measures can embrace, but consensus support for a particular model of measurement has proved elusive.

REVIEW QUESTIONS

1 What is the purpose of measuring income?

2 Explain the nature of economic income.

3 The historical cost concept has withstood the test of time. Specify the reasons for this success, together with any aspects of historical cost that you consider are detrimental in the sphere of financial reporting.

4 What is meant by present value? Does it take account of inflation?

5 A company contemplates purchasing a machine that will generate an income of £25,000 per year over each of the next five years. A scrap value of £2,000 is anticipated on disposal. How much would you advise the company to pay for the asset?

6 Discuss the arguments for and against revaluing fixed assets and recognising the gain or loss.

7 To an accountant, net income is essentially a historical record of the past. To an economist, net income is essentially a speculation about the future. Examine the relative merits of these two approaches for financial reporting purposes.

8 Examine and contrast the concepts of profit that you consider to be relevant to:

(a) an economist;
(b) a speculator;
(c) a business executive;
(d) the managing director of a company;
(e) a shareholder in a private company;
(f) a shareholder in a large public company.

EXERCISES

An extract from the solution is provided on the Companion Website (www.pearsoned.co.uk/elliott-elliott) for exercises marked with an asterisk (*).

* Question 1

(a) 'Measurement in financial statements', Chapter 6 of the ASB's *Statement of Principles,* was published in 1999. Amongst the theoretical valuation systems considered is value in use – more commonly known as economic value.

Required:
Describe the Hicksian economic model of income and value, and assess its usefulness for financial reporting.

(b) Jim Bowater purchased a parcel of 30,000 ordinary shares in New Technologies plc for £36,000 on 1 January 20X5. Jim, an Australian on a four-year contract in the UK, has it in mind to sell the shares at the end of 20X7, just before he leaves for Australia. Based on the company's forecast growth and dividend policy, his broker has advised him that his shares are likely to fetch only £35,000 then.

In its annual report for the year ended 31 December 20X4 the company had forecast annual dividend pay-outs as follows:

Year ended: 31 December 20X5, 25p per share
31 December 20X6, 20p per share
31 December 20X7, 20p per share

Required:
Using the economic model of income:
(i) Compute Jim's economic income for each of the three years ending on the dates indicated above.
(ii) Show that Jim's economic capital will be preserved at 1 January 20X5 level. Jim's cost of capital is 20%.

Question 2

(a) Describe briefly the theory underlying Hicks's economic model of income and capital. What are its practical limitations?

(b) Spock purchased a space invader entertainment machine at the beginning of year one for £1,000. He expects to receive at annual intervals the following receipts: at the end of year one £400; end of year two £500; end of year three £600. At the end of year three he expects to sell the machine for £400.

Spock could receive a return of 10% in the next best investment.

The present value of £1 receivable at the end of a period discounted at 10% is as follows:

End of year one	£0.909
End of year two	£0.826
End of year three	£0.751

Required:
Calculate the ideal economic income, ignoring taxation and working to the nearest £.
Your answer should show that Spock's capital is maintained throughout the period and that his income is constant.

Question 3

Jason commenced with £135,000 cash. He acquired an established shop on 1 January 20X1. He agreed to pay £130,000 for the fixed and current assets and the goodwill. The replacement cost of the shop premises was £100,000, stock £10,000 and debtors £4,000; the balance of the purchase price was for the goodwill. He paid legal costs of £5,000. No liabilities were taken over. Jason could have resold the business immediately for £135,000. Legal costs are to be expensed in 20X1.

Jason expected to draw £25,000 per year from the business for three years and to sell the shop at the end of 20X3 for £150,000.

At 31 December 20X1 the books showed the following tangible assets and liabilities:

Cost to the business before any drawings by Jason:		**He estimated that the net realisable values were:**	
	£		£
Shop premises	100,000		85,000
Stock	15,500		20,000
Debtors	5,200		5,200
Cash	40,000		40,000
Creditors	5,000		5,000

Based on his experience of the first year's trading, he revised his estimates and expected to draw £35,000 per year for three years and sell the shop for £175,000 on 31 December 20X3.

Jason's opportunity cost of capital was 20%.

Required:
(a) Calculate the following income figures for 20X1:
(i) accounting income;
(ii) income based on net realisable values;
(iii) economic income *ex ante*;
(iv) economic income *ex post*.
State any assumptions made.
(b) Evaluate each of the four income figures as indicators of performance in 20X1 and as a guide to decisions about the future.

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2 D. Solomons, *Making Accounting Policy*, Oxford University Press, 1986, p. 132.

3 R.W. Scapens, *Accounting in an Inflationary Environment* (2nd edition), Macmillan, 1981, p. 125.
4 *Ibid*., p. 127.
5 D. Solomons, *op. cit.*, p. 132.
6 T.A. Lee, *op. cit*., pp. 52–54.
7 I. Fisher, *The Theory of Interest*, Macmillan, 1930, pp. 171–181.
8 J.R. Hicks, *Value and Capital* (2nd edition), Clarendon Press, 1946.
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