

# A framework for reporting

## INTRODUCTION

In accounting literature there is much information on the objectives of financial reporting. One important objective is that of providing information to help assess the risk/return characteristics of securities. There is, however, less than specific guidance offered on how this objective is to be achieved. It has been stated that "accounting is a source of market imperfection".<sup>(1)</sup> Certainly if financial reporting is to achieve its objectives it must serve a more positive function to the financial markets than it has thus far rendered. This paper, therefore, directs attention as to how financial reporting might at least get closer to achieving its objectives by focusing on specific items of information within the general framework of a valuation model.

In presenting a framework for development of a financial reporting strategy, it is necessary to make the assumption that the ethos of the firm is unimpeachable, and that management consists of men of integrity who are well-intentioned in their efforts to serve the interests of shareholders and other interested parties, including that of society in general. If this assumption is made, then there should be no objection on the part of management to a financial reporting strategy of full disclosure except where this is seen to not be in the best interests of the shareholders (i.e. in withholding information that could aid competitors). It is suggested that the shareholders are basically concerned with ascertaining the value of the company's shares and a reporting framework which centres around attempting to provide correct intrinsic values would suit their requirements. Therefore, the framework selected is one of a valuation model which has as inputs information which could be provided through the financial reporting medium of the firm.

The valuation model which has been adapted for use in this situation is that model propounded by Stern.<sup>(2)</sup> Stern's model does not specifically incorporate the tools of portfolio theory nor does it attempt to overcome the severe limitations of the historic cost model. It must, therefore, be adapted.

## A FRAMEWORK FOR REPORTING

Stern's valuation model is based on the belief that the value of the company's shares can be described in terms of the following:

$$V = \frac{\text{NOPAT}}{c} + tD + I \frac{r-c^*}{c^*(1+c^*)}$$

- Where NOPAT = expected net operating profit after taxes but before financing costs  
 c = market's required rate of return for business risk  
 t = marginal company income tax rate  
 D = interest-bearing debt  
 I = new investment capital  
 T = time horizon for which growth potential is expected to continue  
 r = the expected rate of return after taxes on new investment  
 c\* = weighted average cost of debt and equity capital (after tax)

The equation is divided into its three main terms, and each of these is discussed below.

### 1 Expected net operating profit after taxes but before financing costs/market's required rate of return for business risk

This is an expression of a fundamental principle of valuation: the market value of the firm's equity is equal to the anticipated net operating profit discounted at a rate that is a measure of the risk involved (i.e. capitalised anticipated profits).

#### 1.1 Expected net operating profit after taxes but before financing costs (NOPAT)

If NOPAT equals anticipated profits then it follows that profits computed on the historic cost model will not be satisfactory. The reasons for the model's failure are well documented,<sup>(3)</sup> the main criticism being its failure to deal with price changes resulting in the profit figure not being close enough to what investors really need: a reasonable surrogate for economic income.

It is suggested here that two important policy decisions be taken by management so that NOPAT can be computed on a more realistic basis. The first decision is to change from the historic cost model to the replacement cost model. The second is to provide a clear guideline for choosing between accounting alternatives.

#### (a) Change to replacement cost model

The rationale for changing to the replacement cost model is that it provides a method of computing a figure for economic income which, if not perfect, is at least closer to reality than the historic cost model –

"Theoretically, replacement cost income is virtually identical to economic income in a perfectly competitive economy." (4.98).

Economic income is the measure of change over a period of time in the value of the firm's assets. The value of the firm's assets is in turn computed by discounting, at the market rate of return, the expected cash flows to be derived from those assets. The argument in favour of replacement cost measurement is based on the theoretical relationship between the discounted present value of an asset and its replacement cost –

"At any point in time the replacement cost of an asset is the most objective possible approximation of its discounted present value – the theoretically best measure of asset worth." (4.82).

The replacement cost income concept seeks to separate two components of earned income: that component which has resulted from operating activities (properly called 'operating profit'), and that component which has resulted from holding activities. If the profit figure is to be recurring (in the sense that it is

expected to be repeated, and therefore supposedly useful for predictive purposes), then it is important that this distinction is made. Holding gains are attributable to external price changes, and therefore result from a set of decisions quite different to those relating to operating activities. They are therefore subject to different expectations. Commingling the two activities obscures the picture and makes an assessment of what can be expected in the future almost impossible. Because replacement cost income is computed using current figures, it must be at least more useful than historic cost for determining the long-run profitability of the entity.

In this regard, Edwards and Bell state: "Current operating profit... indicates whether or not the current proceeds from the sale of product are sufficient to cover the current cost of the factors of production used in producing that product. The factors of production are valued in this case not at prices which could be obtained by selling them outside the firm, but at the prices which would currently have to be paid in order to bring the factors of production into the firm. The existence of a profit for a particular period indicates that the firm is making a positive long-run contribution to the economy; the production process in use by the firm is an effective means for converting resources having one value into an output having a larger value.

If this profit exceeds interest on the current cost of the firm's asset at the beginning of the period, the production process of the firm is worth continuing. Current operating profit, therefore, is essentially the long-run profit associated with the existing process of production carried on under existing conditions.

... Current operating profit is a measure of the amount of current output, in the sense of value added, which is profit." (5.98).

It will probably be helpful to illustrate the relationship between historical cost income and replacement cost income. This can be accomplished by preparing a reconciliation of the two profit figures, as follows:

<b>XYZ Company</b>	
<b>Reconciliation between historical cost and replacement cost income</b>	
<b>19 x 1</b>	
	R
Replacement cost current operating profit	300
<i>Plus:</i> Cost savings that were realised through sale or use during the year (realised holding gains)	100
Historical cost operating profit	400
<i>Plus:</i> Cost savings that were not realised through sale or use during the year (unrealised holding gains)	200
Total replacement cost income	<u>R600</u>

This reconciliation indicates that traditional historical cost operating profit (R400 in this

example) is actually composed of two components:

- 1 the current operating profit component of replacement cost income (R300), and
- 2 that portion of cost savings (or holding gains) that relates to assets that have been consumed in whole or in part or sold during the current period (R100).

It is suggested that this separation facilitates the evaluation of holding activities and, by isolating the effect of price changes, maintains the integrity of operating results.

An important caveat should be introduced at this point. It is possible that in an individual firm, the relationship between changes in asset prices and changes in operating flow potential do not move in the same direction. For example, as an asset's price changes, future operating flows could remain constant or change in the opposite direction. If this can be expected to occur, then replacement cost income will not be a useful surrogate for economic income.

The first term of the equation therefore should be split into two parts: that part representing operating profits which expect to be repeated (NOPAT) and that part representing realisable holding gains which need not necessarily be repeated in perpetuity depending on changes in price levels. (HG).

Stern's model assumes that I (new investment each period) is financed out of the previous period's NOPAT. Thus NOPAT in this expression would more properly be shown as NOPAT-I and the ratio of reinvestment (i.e. retention ratio) to current profit would therefore be

$$\frac{I}{\text{NOPAT}}$$

In separating out the holding gains it is necessary to assume that this same ratio pertains.

Thus, if holding gains can be forecast for the forthcoming (say) three time periods, the value assigned to them would be expressed as follows:

$$1 - \frac{I}{\text{NOPAT}} \cdot \text{HG}_1 (1 + c)^{-1}$$

$$+ 1 - \frac{I}{\text{NOPAT}} \cdot \text{HG}_2 (1 + c)^{-2}$$

$$+ 1 - \frac{I}{\text{NOPAT}} \cdot \text{HG}_3 (1 + c)^{-3}$$

To this then is added the capitalised value of operating profits not treated as I, expressed more specifically as follows:

$$\frac{\text{NOPAT}-I}{c}$$

From the shareholders' point of view one other beneficial effect flowing from the introduction of the replacement cost model is that the

possibility of "secret reserves" being built up in the balance sheet, and, thus, providing sources of future profits to prospective take-over bidders is eliminated. It is not possible to "raid" a company where the values of tangible assets are fully disclosed.

(b) Guidelines for choosing between accounting alternatives

Whether the firm adopts the replacement cost model or the historic cost model there is still a variety of accounting alternatives possible. Stern suggests that in reality there is no choice: the firm must select that alternative which maximises cash flow to the firm. However, this suggests that the tax authorities have different rules for different companies which is not in fact the case. There are tax laws which govern the allowance or disallowance of certain expenses, and they are not dependent (except in one instance) on the accounting reporting options selected by the company. The exception to this is the valuation of inventory and here the guideline offered by Stern would apply. The company must select LIFO since this maximises cash flow (by reducing tax expense). However, LIFO would probably be the method of valuation under the replacement cost model so there is no conflict.

Therefore, the Stern guideline must be rejected and the following applied: the firm must select that alternative which is likely to be most recurring.

"Current operating profit indicates the amount that the firm can expect to make in each period over the long run." (5.99).

The corollary to this is that in each instance where a choice exists the choice made must be to disclose in the annual financial statements sufficient quantitative data for these to be meaningful. Since the profit figure disclosed in the annual financial statements will not be the profit figure for tax purposes, there will be additional compulsory disclosure reconciling the two.

Because it is so important that the profit figure be recurring, it is essential that any figure which management feel to be non-recurring should be separately shown in the annual financial statements. There is a Statement of Generally Accepted Accounting Practice (No. 1.003) which governs the disclosure of abnormal and extraordinary items. The statement is very narrow in its definitions and it is unlikely that these definitions will in all cases coincide with management opinion on what is non-recurring. The point is that there is no legal constraint on additional discretionary disclosure, and whether or not definitions agree is academic. As long as shareholders and other financial statement users are given the information they can draw their own conclusions and make whatever adjustments they deem necessary.

1.2 Market's required rate of return for business risk (c)  
It is difficult to arrive at a c objectively but there is market information that can be used in the form of the capital asset pricing model which describes the

overall risk-return relationship of an individual security. The capital asset pricing model will establish a weighted average cost of capital (or required rate of return)  $c^*$  and from this,  $c$  can be derived.

$$\text{i.e. } c^* = c \left( 1 - \frac{tD}{D + E} \right)$$

- $c^*$  = weighted average cost of capital
- $t$  = marginal company income tax rate
- $D$  = interest bearing debt
- $E$  = aggregate market value of ordinary shares

It is noteworthy that the market establishes its required rate of return for a given level of risk based on the information that it has. No market can react to information it does not receive. Thus, the more comprehensive the information given to the market the more accurate and reliable  $c^*$  will be. Basically the market requires information to determine its risk levels. There are no conclusive studies defining those particular characteristics which go to make up the risk attached to a particular security, but on the studies so far conducted it would appear that the nature of this information would include (i) accurate disclosure of debt levels, on the assumption that the higher the debt level the higher the risk (beta); (ii) disclosure of operating leverage on the assumption that the higher the operating leverage of a firm, the higher the volatility of returns; and (iii) disclosure of different activities undertaken by the firm and their relative contribution, on the assumption that the more diversified the activities of a firm, the lower the level of risk that can be attached to that firm. This means that segment reporting is recommended. Segment reporting can be defined as information about an enterprise's operations in different industries, its foreign operations and export sales, and its major customers.

Stern maintains that the risk is also influenced by the nature of the firm's assets. "Therefore, planned changes by management of asset composition should be reported to the market. This includes industry and geographical distribution." (2.13).

2. Marginal tax rate times interest bearing debt

$$\left( tD \text{ or } \frac{tbD}{b} \right) \quad \text{where } b = \frac{\text{interest rate on borrowed funds}}{\text{interest rate on borrowed funds}}$$

This expression is again an application of fundamental principles. In computing the value of the firm the market will capitalise not only profits as measured by the expression NOPAT, but will also take into account the tax savings which benefit the company through the use of debt. This implies that the company has a stable capital structure, that debt would be refinanced as it became due, and that the tax saving is, therefore, available in perpetuity. Thus, the capitalised tax savings would be part of the value of the company. This will hold true only if the debt levels are kept within "prudent limits". The fixing of those limits is beyond the ambit of this paper.

The debt figure (D) should include all debt including

lease commitments, or so-called "off-balance sheet financing". One of the most significant defects in traditional financial reporting is the failure to reflect off-balance sheet financing. Currently, what is reported to shareholders is:

"the amount paid by way of leasing charges for the use of any asset other than immovable property, which, if owned by the company, would have been subject to a charge for depreciation." (6)

It is suggested that future lease charges be capitalised to an asset account with a corresponding liability for future lease commitments. Leasing charges should be apportioned between that which is, in fact, interest on debt, and that which is a reduction in the liability.

The rate at which the tax savings is capitalised will be the effective interest rate on the debt itself. Since debt is the component here which management is in a position to alter, management should convey its target debt ratio to the market if the target ratio is different from the current capital structure or has fluctuated widely in the past.

### 3 Expected growth rate on new investment capital for specified time horizon

$$\left( I T \frac{r - c^*}{c^*(1 + c^*)} \right)$$

It will be noticed that in the first two expressions no allowance has been made for growth. Growth can be described as the difference between what investors expect to earn as quantified by  $c^*$ , and what the firm will earn over and above  $c^*$  assuming management will not invest in new projects ( $I$  = new investment capital) with expected rates of return ( $r$ ) less than the weighted average cost of capital ( $c^*$ ).

Thus,  $\frac{I(r-c^*)}{c^*}$  measures the discounted value of new investment in the firm. However, since  $r$  cannot exceed  $c^*$  forever (the discounted value of the growth potential would be infinite), a finite time horizon is introduced:  $T$ . The introduction of a finite time horizon results in a mathematical expression which simplifies to:

$$\frac{IT(r - c^*)}{c^*(1 + c^*)}$$

(Mathematical proof of this simplification is shown in Appendix 1.)

It is probable that if a certain proportion of NOPAT is retained for growth, then a similar proportion of HG will also be retained and reinvested at a similar return. The value of this retention should then also be added to the value of the firm. This value would be expressed as follows:

$$\begin{aligned} & \frac{I}{NOPAT} r HG_1 \quad a \frac{1}{T c^*} (1 + c^*)^{-1} \\ & + \frac{I}{NOPAT} r HG_2 \quad a \frac{1}{T c^*} (1 + c^*)^{-2} \\ & + \frac{I}{NOPAT} r HG_3 \quad a \frac{1}{T c^*} (1 + c^*)^{-3} \end{aligned}$$

(Where  $T$  corresponds to the finite time horizon previously referred to.)

The information needed by the market to calculate growth in this way is as follows:

–  $I$  – which is new investment capital. Stern defines  $I$  as – "net fixed capital additions: capital expenditures minus depreciation and other non-cash charges plus additions to working capital (net current assets) and other long-term assets, or, what amounts to the same thing, additions to total assets minus additions to current liabilities". (2.7). Stern believes – "that rates of return on fixed capital do not change much on average and over time, and since the rate of return multiplied by the amount of fixed capital is equal to the level of net operating profit, a forecast of anticipated incremental investment tells investors half of what they need to know in order to calculate future profits". (2.14).

–  $T$  – which is the time horizon for which growth potential is expected to continue. This factor is exogenous to the firm and its management, and is determined almost exclusively by the market. It is a measure of the market's confidence ( $T$  years) in management's ability to out-perform the weighted average cost of capital.

" $T$  is a function of product cyclicity, the state of monetary policy, and the degree of government regulation and product technology. Again given the firm's expected asset composition, the market determines  $T$ ." (2.13).

–  $r$  – which is the expected rate of return, after taxes, on new investment. Stern suggests that "all companies (should) include a statement about, and even the calculation of, the rate of internal growth in net operating profits in their annual reports and in presentations to investment analysts". (2.14).

It is suggested that it is unlikely that  $r$  would remain constant over time period  $T$  (an assumption made in the Stern model). It is more likely that  $r$  will tend back toward  $c^*$  (the cost of capital) over time. If this is true the equation should be expanded to form one expression for each time period with a different  $r$  for each time period.

### ADVANTAGES AND DISADVANTAGES OF FRAMEWORK

Stern's framework has been adopted in the previous section to read as follows:

$$\begin{aligned} V = & \frac{NOPAT - I}{c} + 1 - \left( \frac{I}{NOPAT} \right) H_1 (1 + c)^{-1} \\ & + 1 - \left( \frac{I}{NOPAT} \right) H_2 (1 + c)^{-2} \\ & + 1 - \left( \frac{I}{NOPAT} \right) H_3 (1 + c)^{-3} \\ & + tD \\ & + IT \frac{r - c^*}{c^*(1 + c^*)} \\ & + \frac{I}{NOPAT} r H_1 \frac{a}{T c^*} (1 + c^*)^{-1} \\ & + \frac{I}{NOPAT} r H_2 \frac{a}{T c^*} (1 + c^*)^{-2} \\ & + \frac{I}{NOPAT} r H_3 \frac{a}{T c^*} (1 + c^*)^{-3} \end{aligned}$$

It is a framework which indicates to management some of the specific requirements of investors which could be met through the financial reporting medium of the corporate entity. It is suggested that these requirements would satisfy the stipulation made in the Sandilands Report:

"Investors would undoubtedly like to see accounts drawn up in a form which provides the most satisfactory basis for assessing the future prospects of a company – a quality which has been described to us as 'predictive ability'." (7.47).

It is further suggested that this information would more closely approximate the Companies Act requirement of 'fair presentation' and overcome at least some of the limitations of the current conventional reporting framework. It is further suggested that a reporting framework which provides information of a consistent nature would reduce the area of so-called 'organisational slack' which again is likely to be for the benefit of all except a less well intentioned management who have no wish to be judged in this way.

The framework is tailored to accommodate the theory of efficient markets and if adopted would contribute to increased efficiency for the benefit of all. The more efficient the market the more accurate the ascertainment of cost of capital, thus improving the efficiency of the finance function in the firm. Furthermore, the adoption of such a framework minimises the possibility of takeovers for the purpose of so-called 'asset stripping' since there can be no profit advantage where the share price reflects the 'intrinsic' value of the firm.

The adoption of the framework will necessitate management formulating their strategic targets in accordance with the parameters of the framework. Stern cites the particular advantages of his framework in this context as follows:

- (a) management can test the sensitivity of assumptions by varying estimates of the parameters, and
- (b) management can simulate the impact of its assumptions on the pro-forma price of its firm's ordinary shares.

These advantages should not suggest an attempt by management to manipulate the parameters but rather a

method of choosing between alternative business decisions where the impact of the decisions can be evaluated before the implementation thereof. It is suggested that the framework is particularly advantageous in that it sharply reduces areas of political conflict within the organisation as well as the amount of 'organisational slack' in the form of alternative reporting options.

**CONCLUSION**

This paper has been devoted to identifying specific parameters which satisfy some of the needs of users of company financial reports. Investors have been credited with the objective of seeking to ascertain the value of their shareholding in the company and financial reporting with the objective of providing relevant information to this end. It is suggested that use of the valuation model originated by Stern, expanded and modified, would help in the achievement of the shareholders' objective. The information inputs to this model highlight the main theme of this paper, that what is reported has a direct impact on the value (price) of the company's shares on the stock market, and should, therefore, be an integral component of the entity's corporate strategy.

To give some plausibility to this model it would need to be empirically tested. To conduct a test it would be necessary to persuade a sufficiently large number of companies to provide information as suggested in this paper, and then test whether it was easier to predict future share prices for this group than some other group of companies where information is not provided. To persuade a sufficient number of companies to provide this information seems an insurmountable obstacle to empirical testing. The only alternative lies in persuading the accounting profession as the preparers of external reports of the value of the additional information.

"No other professional group has the interest or inclination to explore and effect improvements in external reports, the responsibility for initiating such changes must either rest with accountants or remain undone; since the societal costs of inaction are high (i.e. inefficient allocation of capital resources) we would opt for the first alternative." (4.56).

**Appendix 1**

**MATHEMATICAL PROOF OF SIMPLIFICATION OF FORMULA SHOWN**

(X is short for NOPAT)

TIME:	NOTES*	0	1	2	3	4	T	X
profits:			X	X	X	X	X	XXX
return on				lr	lr	lr	lr	
reinvestment	1			lr	lr	lr	lr	
	2			(lr) <sup>2</sup>	(lr) <sup>2</sup>	(lr) <sup>2</sup>		
	3			X	X	X	*!?	*!?

TOTALS on return on reinvestment and normal profits

$$X \quad X + lr \quad X + 2lr + \frac{(lr)^2}{X} X \left(1 + \frac{lr}{X}\right),^3 \dots X \left(1 + \frac{lr}{X}\right)^{T-1}$$

$$4 \quad = X \left( 1 + \frac{lr}{X} \right) = X \left( 1 + \frac{2lr}{X} + \frac{(lr)^2}{X^2} \right) \text{ etc}$$

$$= X \left( 1 + \frac{lr^2}{X} \right)^2$$

PV of this stream of TOTALS at time 0 is  $V = X (1 + c)^{-1} + X \left( 1 + \frac{lr}{X} \right) (1 + c)^{-2} + X \left( 1 + \frac{lr}{X} \right)^2 (1 + c)^{-3}$

$$+ X \left( 1 + \frac{lr}{X} \right)^3 (1 + c)^{-4} + \dots + X \left( 1 + \frac{lr}{X} \right)^{T-1} (1 + c)^{-T}$$

$$5 \quad V = X (1 + c)^{-1} + (1 + c)^{-1} + X (1 + c)^{-1} \dots T \text{ terms} \dots X (1 + c)^{-1}$$

$$V = \frac{TX}{1 + c}$$

Now if  $\frac{1 + \frac{lr}{X}}{1 + c} = 1$  (assumed) then  $\frac{lr}{X} = c$  and  $\frac{lr}{c} = X$

Combining, we get  $V = \frac{T}{1 + c} \cdot \frac{lr}{c} = \frac{rIT}{c(1 + c)}$

6 Finally, allowing for operational cost of funds reinvested, which is  $c\%$

we express  $V = \frac{(r - c) IT}{c(1 + c)}$

\*Notes attached.

### Notes

- 1 In each period,  $l$  is invested out of previous period's  $X$  (ratio of reinvestment to current profit is  $\frac{l}{X}$ ). Thus  $l$  earns  $lr$  in each period up to  $T$ .
- 2 Assuming same reinvestment ratio applies, a proportion  $\frac{l}{X}$  of  $lr$  will be reinvested, earning  $\frac{l}{X} \cdot lr$  from period 3 onwards. (i.e.  $\frac{(lr)^2}{X}$ )
- 3 Similarly, from period 4 onwards, you get not only returns from reinvested returns on reinvestment, but also returns from reinvested returns on reinvested returns – re investment – and so on ad nauseam.
- 4 Note that periods 1-3 follow normal compound interest pattern.  $\therefore$  extend pattern to point  $T$  to avoid insurmountable complications, mentioned in (3).
- 5 It is assumed that  $\frac{1 + \frac{lr}{X}}{1 + c} = 1$
- 6 Every  $R$  reinvested comes out of  $X$ , where it could have been earning a return of  $c$ . A more correct but more complicated method would have been to use  $r - c$  instead of  $r$ , throughout in the above table.

### References

- 1 Birkett, W. P. and Walker, R. G. Accounting: a source of market imperfection. *Journal of Business Finance and Accounting*, Vol. 2, No. 2, 1974, p. 192.
- 2 Stern, J. *Analytical Methods in Financial Planning*. The Chase Manhattan Bank, N.A. 1974.
- 3 Davidson, S. (ed.) *Handbook of Modern Accounting*. McGraw-Hill Book Company, USA 1970.
- 4 Revsine, L. *Replacement Cost Accounting*. Prentice-Hall Inc., Englewood Cliffs, New Jersey, 1973.
- 5 Edwards, E. O. and Bell, P. W. *The Theory and Measurement of Business Income*. University of California Press, 1961.
- 6 The Companies Act, No. 63 of 1973 (as amended), para. 36 (M).
- 7 Sandiland, F. E. P. (Chairman). *Inflation Accounting: Report of the Inflation Accounting Committee*. Her Majesty's Stationery Office, London, September 1975.