

日本管理会計学会誌  
管理会計学2002年 第10巻 第2号

論壇

## Tying Valuation to Performance with Financial Analysis

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**Keywords:** accrual accounting valuation models; analysis of performance, accounting for performance

Keynote address to the Annual Conference of the Japanese Association of Management Accounting, Sendai, October 28, 2001.

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Submitted 1 November 2001.

Accepted 13 November 2001.

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## 1. Introduction

The title of my address to you presumes that the valuation of a firm should be tied to the firm's performance. This statement is surely non-controversial. Investors invest in a firm to get a return, to add value to their investment. Firms conduct their operations to deliver that value. So the value of a firm is assessed by the performance of the firms in adding value. Financial analysis is the method of ascertaining value added, of observing performance.

I might well have titled my address as a matter of tying performance to valuation rather than tying valuation to performance. To encourage managers to make decisions that add value, investors need to be sure that those managers are rewarded on the basis of appropriate performance measures. Financial analysis develops the appropriate performance measures that motivate managers to pursue investors' interests.

Financial analysis, then, is both a method for valuation and a method for performance evaluation. The analysis for both is likely to be the same, for valuation is tied to performance and performance to valuation. The question we wish to raise today is how we design a sound analysis for these purposes.

My discussion is from the point of view of the shareholder – the legal owner of the firm -- who wishes to gain value from the firm and so wants management to serve that interest. If you see the firm as serving other interests – employees, banks, or even the nation – this talk will not be of much interest.

One cannot overstate the importance of sound financial analysis and, with it, sound accounting. Without sound financial analysis, investors buying shares do not understand what they are buying. Sound financial analysis challenges speculative beliefs that lead to stock market bubbles, like the one recently experienced in the United States and earlier in Japan. From society's point of view, bubbles – and their inevitable bursting – are very damaging to the economy, as we in the United States are now learning and as you in Japan have also learnt. Performance measurement and sound valuations based on performance are imperatives for well functioning capital markets and well functioning economies.

Before I begin, one point has to be appreciated. A shareholder perspective requires that good performance measurement go hand in hand with good corporate governance. For, without the governance mechanisms to protect and promote shareholder interests, corporations lose accountability, or pursue the interests of management rather than those of shareholders.

My talk is in two parts, one on valuation and one on the analysis of performance.

## 2. Valuation

Academics build models to attack practical problems. Models are a formal way of laying out the thinking in a problem. But models not only convey concepts, they also direct how to carry out the task at hand. Valuation models embody the thinking underlying the task of valuing a firm.

Valuation models also direct how to do financial analysis. So, let us first ask what is an appropriate valuation model to guide the analysis of performance. We will think in terms of valuing the equity of firms, the shares held by common shareholders.

### *Cash Flow Analysis*

The valuation of a share (or any investment) is based on the expected return to the investment. So valuation inevitably involves forecasting. A valuation model has two elements. First, it specifies what is to be forecasted to measure the return to an investment and, second, it explains how the forecast is converted into a valuation. Consider the standard model for valuing a five-year bond:

Value of a Bond = Present Value of Expected Cash Flows

$$V_0^D = \frac{\overline{CF}_1}{\rho_D} + \frac{\overline{CF}_2}{\rho_D^2} + \frac{\overline{CF}_3}{\rho_D^3} + \frac{\overline{CF}_4}{\rho_D^4} + \frac{\overline{CF}_5}{\rho_D^5}$$

Here CF is cash flows and  $\rho$  here is the required rate of return on the bond plus one. The "D" indicates the value is for debt (as a bond is commonly identified). This model embodies the thinking behind debt valuation: the value of the debt is based on its expected cash flows (in form of coupon payments and repayment). It also directs the task of valuing the debt. The model states that, to value the debt, one forecasts cash flows (CF) and then converts those forecasts to a valuation by discounting them at the required payoff rate on the debt,  $\rho_D$ , that is based on the risk of not receiving delivery of the cash flows (the default risk).

Firms issue both debt and equity shares, but it is the valuation of the equity that shareholders are particularly concerned with. We could think about appropriating the model for the valuation of debt for the valuation of equity. That is, forecast cash flows from holding the equity and discount the forecasted cash flows at a discount rate that reflects the risk. Dividends (d) are the cash flows from holding equities, and the cash flow model that substitutes dividends for interest payments is the dividend discount model:

Value of equity = Present Value of Expected Dividends

$$V_0^E = \frac{\overline{d}_1}{\rho_E} + \frac{\overline{d}_2}{\rho_E^2} + \frac{\overline{d}_3}{\rho_E^3} + \frac{\overline{d}_4}{\rho_E^4} + \dots$$

You'll notice that, unlike the five-year bond, the forecasting period for the equity continues indefinitely; firms are going concerns. This feature presents a problem that is the main determinant in developing a valuation model for equities: to be practical, we don't want the forecasting period to be too long and, for performance measurement, we don't want to wait too long to observe something on which to judge performance. Firms may not pay dividends for a very long time. Indeed, many successful firms (like Microsoft) do not pay dividends. Imagine rewarding Microsoft's management on the basis of the dividends they pay? The truth is that dividends, in the short run, have little to do with the generation of value; they are just the distribution of value and firms may choose to distribute little. This observation simply restates the Nobel prize-winning

dividend irrelevance idea of Miller and Modigliani: while the ability to pay dividends in the long run is of paramount importance, the amount of dividends paid in the short run is irrelevant. We have a paradox: dividends are the returns to holding shares, but forecasting dividends is not a practical method for valuing shares.

This paradox is circumvented by looking inside the firm for the value generation. We can carry over the cash flow forecasting idea to forecasting the net cash flows to be generated by the firm. The net cash flow that a firm generates – its free cash flow -- is the difference between cash flow from operations and cash spent on investment. The discounted cash flow model, popular on Wall Street for many years, expresses the idea:

$$\text{Value of Equity} = \text{Present Value of Expected Free Cash Flow} - \text{Value of Firm's Debt}$$

Discounting forecasted free cash flows gives the value of the firm, and the value of the equity is that value minus the value of the debtholders' claim on the firm.

But there is something perverse about this idea. Consider the following numbers for Home Depot Inc., the successful U.S. warehouse retailer of home improvement products, from 1997 – 2001 (in millions of dollars). Free cash flow is always the difference between operating income and the change in net operating assets over a period, so the numbers for operating income and net operating assets are also given.

#### Home Depot Inc.

<i>Year</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>
Operating earnings	941	1,129	1,585	2,323	2,565
Book value, operating assets	6,722	8,333	10,248	12,993	16,419
Free cash flow	(149)	(482)	(330)	(422)	(861)

Suppose you were standing at the end of fiscal year 1996, attempting to make a forecast, and were offered a set of forecasted numbers for the five forward years, 1997- 2001, with the guarantee that these numbers would be the actual reported numbers. And suppose you were trying to apply the discounted cash flow model. The forecasted free cash flows are negative, so getting a valuation from forecasts of free cash flows for five years is problematical indeed. Home Depot invests over and above the cash generated from operations, resulting in negative free cash flow. Those investments are likely to deliver positive free cash flows in the distant future, but forecasting the short run does not work at all.

Discounted free cash flow is a perverse measure of value because investment that is made to add value is treated negatively; free cash flow is reduced by investment. Free cash flow is partially a liquidation concept; firms increase free cash flow by liquidating. And as a performance measure it is perverse. Free cash flow confuses investment from return on investment. An investor

would not want to reward a manager on the basis of free cash flow; such a reward system would encourage him not to invest; indeed it would encourage him to disinvest.

### *Accrual Accounting Analysis*

You'll notice in the Home Depot example, that operating income is positive. It looks like a better attribute to be forecasting. Operating income, of course, involves accrual accounting for value. In principle at least, accrual accounting matches value received (revenues) with value given up in generating revenues (expenses), to yield a value-added measure. Investments are put on the balance sheet, not in the value-added measure, and accruals (non-cash value recognition) are added to cash from operations: operating income = free cash flow + investment + accruals. Of course, accrual accounting operating income, like free cash flow, can also be negative in the short run, but only because of operating losses from the matching of revenues and expenses, not because investments are "expensed".

How is accrual accounting built into valuation analysis? The residual income model utilizes the accrual accounting rule of separating investment from the return on investment. Applied to equity investments, the model is stated as follows:

Value of Equity = Book Value + Present Value of Expected Future Residual Earnings

$$\text{Value of Equity } (V_0^E) = B_0 + \frac{\overline{RE}_1}{\rho_E} + \frac{\overline{RE}_2}{\rho_E^2} + \frac{\overline{RE}_3}{\rho_E^3} + \dots$$

Here B is the book value of the equity investment (the net assets) on the balance sheet and RE is residual earnings. Value is determined by starting with the equity value on the balance sheet and adding extra value not of the balance sheet. So the model gives a particular expression to the term, value added. The extra value is determined by forecasting residual earnings and discounting it at the required return. Residual earnings is earnings in excess of earnings required by the net assets earnings at the required return, for investments only add value if they earn over the required return. Formally, residual earnings is defined as earnings for a period minus a charge (at the required return) on the book value at the beginning of the year. For year 2001, say, residual earnings for a required return of 10% is

$$\text{Residual Earnings} = \text{Earnings (2001)} - (0.10 \times \text{Book Value at the end of 2000})$$

So, if book value at the end of 2000 is \$400 million and earnings for 2001 are \$55 million, residual earnings for 2001 are \$15 million. If the expected earnings rate is 10% on book value, residual income is zero: there is no value added over book value, and so the equity is worth its book value. Correspondingly, the analyst assesses that shares are worth a premium over book value if he or she expects the firm to earn in excess of the required return on book value. This is a model of the price-to-book ratio.

Residual earnings is a value-added measure, so it is a measure that an analyst might forecast to value a share instead of dividends or free cash flow. But it is also a performance measure. Rewarding managers on how well they add value to investments over the required return is consistent with how investors view value added. As a shareholder, I say to management: add value to my investment in the firm by increasing residual earnings.

### 3. Analysis of Performance

This residual earnings model directs how to carry out the financial analysis that gets to the source of the valuation creation. The modern term for the factors that determine value added is "value drivers." Drivers are measures on which the performance of management is judged. The references at the end of this essay will give you the full analysis. Here are the highlights:

- To begin the analysis of residual earnings drivers, recognize that residual earnings can be calculated in another way:

$$\text{Residual earnings} = (\text{ROCE} - \text{Required Return}) \times \text{Book value}$$

ROCE is the rate of return on common equity, so residual earnings is determined by return on common equity and growth in investment in the book values. The higher the ROCE, the higher is residual earnings. But, if managers can add investment to earn at the higher ROCE, they earn additional residual earnings. So there are two drivers to pay attention to in valuation (and two drivers on which management performance should focus): ROCE and growth in investment. Both produce growth in residual earnings, and so add value. Both however, work together. Growth in investment by itself does not add value. Indeed, reducing investment in inventories by Just-in-Time production increases residual earnings because it increases earnings per dollar of investment, that is, ROCE. But investing in new investment opportunities for a given ROCE adds value, provided the ROCE for the new investment is greater than the required return.

- Recognize that return on common equity is affected by leverage from borrowing. The following equation is a financial analysis tool that distinguishes two components of ROCE, one that has to do with the profitability of operations – return on net operating assets (RNOA) -- and one the has to do with leverage:

$$\text{ROCE} = \text{RNOA} + [\text{Leverage} \times (\text{RNOA} - \text{Borrowing Cost on Net Debt})]$$

Leverage is the amount of net debt to common equity. Leverage levers the ROCE over the RNOA, and the amount depends on the difference between the RNOA and the borrowing cost of net debt. As a shareholder, do I want to reward management on the basis of ROCE? No. Because he can increase the ROCE by borrowing and borrowing is a zero net present value activity. Borrowing does not add value; it increases ROCE but it also increase risk with an exactly offsetting effect on value. Rather, I want to reward him on making profits from operations, on the return on net operating assets, for it is in operations – selling goods and services to customers – that value is added.

- Recognize that the appropriate rate of return for operations is return on net operating assets (RNOA), not the more popular return on assets (ROA). RNOA is measured as operating income divided by net operating assets (NOA), where net operating assets are operating assets like inventories and plant) net of operating liabilities (like accounts payable and accrued liabilities). The net investment in inventories, for example, is the amount of inventories held minus the accounts payable from the credit given by suppliers of the inventory. Shareholders' investment in the operating assets is reduced if inventories are reduced (through Just-In-Time practices, for example), but also by suppliers extending credit terms on the payment for the inventory. This feature of the value creation must be captured. The traditional ROA measure is calculated as operating income plus interest on financial assets divided by total assets. Total assets include financial assets (that are not part of operations) but exclude operating liabilities (that are). The average historical return on assets (ROA) in the U.S. is 6.6%. This is too low; it looks more like a bond return than a return to business investments. The reason is that it is measured. The historical return on net operating assets (RNOA) has been 10.5%, more in line with what we'd expect as a return for business operations.
- Accordingly, reward managers on the factors that drive return on net operating assets. Standard Du Pont ratio analysis tells us that profit margins and asset turnovers drive return on net operating assets:

$$\text{RNOA} = \text{Profit Margin} \times \text{Asset Turnover}$$

Profit margin is the percentage of sales revenue that is delivered as operating profit:  $\text{profit margin} = \text{operating income}/\text{sales}$ . Asset turnover is the efficiency in which assets are utilized:  $\text{assets turnover} = \text{sales}/\text{net operating assets}$ . You can see here how the standard ratios of financial statement analysis come into play in tying performance to valuation. Both profit margin and asset turnover can be further broken down into the various expense ratios and individual assets turnovers for which different managers may be responsible.

- Appropriate performance measures distinguish components of earnings that apply to the current period only – sometimes referred to as non-core earnings or non-sustainable earnings -- from earnings that are likely to persist in the future. So unusual, one-time items are rewarded differently from increased income from core business.
- Financial analysis of valuation generation focuses not only on profitability and its drivers, but also on the growth in investment (as demonstrated under the first bullet above). Just as the focus in profitability analysis shifts from the return on equity (ROCE) to the return from operations (RNOA) to remove the effects of leverage (as discussed in the second bullet), so the focus in the analysis of growth is on the growth in net operating assets, not growth in the equity (net operating assets minus net debt). Again, the manager should not be rewarded for borrowing if borrowing does not affect value. Net operating assets (NOA) are driven as follows:

$$\begin{aligned} \text{NOA} &= \text{Sales} \times \text{NOA}/\text{Sales} \\ &= \text{Sales} \times 1/\text{ATO} \end{aligned}$$

Sales growth is the primary driver of growth. With profitability above the required return, a manager grows investment (and value) by growing sales. But the second component here is also important: he must pay attention to 1/asset turnover, that is, to reducing the required investment per dollar of sales. Accordingly, a manager is not rewarded for inefficient growth in net operating assets, but for growing sales while minimizing the investment in net operating assets that is required to support the sales. For a given profit margin from new sales, the manager increases RNOA and residual earnings by reducing investment in net operating assets per dollar of sales.

### *Accounting for Performance*

Earnings must be measured, so accountants join the enterprise of valuation and performance measurement. Indeed, valuation is inherently an accounting matter: how does one account for value added?

Ideally, accountants should calculate a measure each period that would evaluate performance, not only for the current period, but also on how the manager has made decisions to improve performance in the future. This is ambitious. But there are certain principles of accounting which, if adhered to, lead to superior metrics.

- Booking investments to the balance sheet rather than expensing them in earnings is desirable. Expensing expenditures is cash accounting and, as we saw with the Home Depot example, cash accounting yields a perverse performance measure. Under U.S. Generally Accepted Accounting Principles (and the accounting principles of many countries), investment in research and development is expensed, lowering earnings. This hardly gives an incentive to invest in research. This accounting is only justified if the outcome of the research activities are so uncertain that the manager should only be rewarded when the research is vindicated by subsequent sales of products (so discouraging investment in bad research). (This objection calls for a distinction between successful research that should be capitalized on the balance sheet, and research whose outcome is still uncertain.)
- Financial statements should clearly separate the effects of financing activities and operating activities, for it is the operations that add value. This separation is done in two ways:
  - Financial statements should be reformatted to group operating and financing items separately. So net operating assets are distinguished from net debt in the balance sheet, and operating income from financing income and expense in the income

statement. Accordingly, a measure like return on net operating assets (RNOA) is easily identified.

- In transactions that involve both operations and financing, the two elements must be disentangled. When shares are issued to employees in exercise of stock options, for example, the difference between exercise price and the market price must be recognized as compensation expense. U.S. practice inappropriately ignores these implicit wages, treating the transaction merely as a share issue at the exercise price.
- The matching principle – matching revenues to the expenses that generate them – should be rigorously followed. Otherwise value received is not matched with value given up to measure net value added. Mismatching has a number of manifestations:
  - Depreciation sometimes does not reflect economic depreciation
  - Amortizations of goodwill are often arbitrary
  - Stock compensation (in lieu of salary) is not recorded
  - Excessive write-downs depress current earnings and then are added back to create future earnings

Sound accounting for firms' current activities will not capture value added in planned activities. If an entrepreneurial manager develops a business plan that will add value, it is very difficult for the accountant to measure the prospective value added at the time. But that manager should be rewarded for planning. So, inevitably, accounting performance measures must be used along side other measures that indicate the value that will be realized from good strategies. Three devices are available:

- Target the share price. The value of plans and strategies that are communicated to the market are reflected in the stock price, so managers might be rewarded on increasing the stock price. But this must be done with care. Stock prices can increase for reasons that have nothing to do with the manager's effort – an improvement in the overall economy, for example. Or stock prices can be seemingly irrational, as in the recent bubble in the U.S. and other markets. Further, plans are necessary to add value, but there must be follow through in building plants and winning customers. The realization principle of accounting is invoked for this reason. And for this reason compensation ideally involves a weighting of both stock price and realized residual earnings.
- Supplement accounting measures with other more qualitative indicators of likely value enhancement. The balanced scorecard has this feature.
- Bonus banks. Allocate a bonus conditional upon subsequent realizations. This device serves two purposes. First, it protects against behavior that increases short-term accounting measures, but damages the long run. Second, a bonus bank can reward planning but also follow through by the manager. The first point is all the more important if the accounting performance measure does not satisfy the features above. So, if the accounting expenses research investments,

one can award a bonus for research activity, but bank it until the success of the research becomes apparent.

Clearly, designing good performance metrics is not easy. Managers and shareholders may have different tolerances for risk. They may differ in their patience for returns. They may have different information. These are issues being addressed in compensation research and by accounting academics engaged in the design of performance metrics.

### **Some Further Reading**

The financial analysis for valuation and performance is laid out in my recent book, *Financial Statement Analysis and Security Valuation* (New York: McGraw-Hill Companies, 2001). See also D. Nissim and S. Penman, "Ratio Analysis and Equity Valuation: From Research to Practice," *Review of Accounting Studies* Vol. 6, 2001, pp. 109-154.