Appendix 12A Economic Value Added and the Measurement of Financial Performance

Chapter 12 shows how to calculate the appropriate discount rate for capital budgeting and other valuation problems. We now consider the measurement of financial performance. We introduce the concept of economic value added, which uses the same discount rate developed for capital budgeting. We begin with a simple example.

Many years ago, Henry Bodenheimer started Bodie's Blimps, one of the largest high-speed blimp manufacturers. Because growth was so rapid, Henry put most of his effort into capital budgeting. His approach to capital budgeting paralleled that of Chapter 12. He forecast cash flows for various projects and discounted them at the cost of capital appropriate to the beta of the blimp business. However, these projects have grown rapidly, in some cases becoming whole divisions. He now needs to evaluate the performance of these divisions to reward his division managers. How does he perform the appropriate analysis?

Henry is aware that capital budgeting and performance measurement are essentially mirror images of each other. Capital budgeting is forward-looking because we must estimate future cash flows to value a project. By contrast, performance measurement is backward-looking. As Henry stated to a group of his executives, "Capital budgeting is like looking through the windshield while driving a car. You need to know what lies farther down the road to calculate a net present value. Performance measurement is like looking into the rearview mirror. You find out where you have been."

Henry first measured the performance of his various divisions by return on assets (ROA), an approach that we treated in the appendix to Chapter 2. For example, if a division had earnings after tax of $1,000 and had assets of $10,000, the ROA would be:[1]

$$\frac{\$1{,}000}{\$10{,}000} = 10\%$$

He calculated the ROA ratio for each of his divisions, paying a bonus to each of his division managers based on the size of that division's ROA. However, while ROA was generally effective in motivating his managers, there were a number of situations where it appeared that ROA was counterproductive.

For example, Henry always believed that Sharon Smith, head of the supersonic division, was his best manager. The ROA of Smith's division was generally in the high double digits, but the best estimate of the weighted average cost of capital for the division was only 20 percent. Furthermore, the division had been growing rapidly. However, as soon as Henry paid bonuses based on ROA, the division stopped growing. At that time, Smith's division had aftertax earnings of $2,000,000 on an asset base of $2,000,000, for an ROA of 100 percent (= $2 million/$2 million).

Henry found out why the growth stopped when he suggested a project to Smith that would earn $1,000,000 per year on an investment of $2,000,000. This was clearly an attractive project with an ROA of 50 percent (= $1 million/$2 million). He thought that Smith would jump at the chance to place his project into her division because the ROA of the project was much higher than the cost of capital of 20 percent. However, Smith did everything she could to kill the project. And, as Henry later figured out, Smith was rational to do so. Smith must have realized that if the project were accepted, the division's ROA would become:

$$\frac{\$2{,}000{,}000 + \$1{,}000{,}000}{\$2{,}000{,}000 + \$2{,}000{,}000} = 75\%$$

[1]Earnings after tax is EBIT $(1 - t_c)$ where EBIT is earnings before interest and taxes and t_c is the tax rate.

Thus the ROA of Smith's division would fall from 100 percent to 75 percent if the project were accepted, with Smith's bonus falling in tandem.

Henry was later exposed to the economic value added (EVA) approach,[2] which seems to obviate this particular problem. The formula for EVA is:

$$[\text{ROA} - \text{Weighted average cost of capital}] \times \text{Total capital}$$

Without the new project, the EVA of Smith's division would be:

$$[100\% - 20\%] \times \$2{,}000{,}000 = \$1{,}600{,}000$$

This is an annual number. That is, the division would bring in $1.6 million above and beyond the cost of capital to the firm each year.

With the new project included, the EVA would jump to:

$$[75\% - 20\%] \times \$4{,}000{,}000 = \$2{,}200{,}000$$

If Sharon Smith knew that her bonus was based on EVA, she would now have an incentive to accept, not reject, the project. Although ROA appears in the EVA formula, EVA differs substantially from ROA. The big difference is that ROA is a percentage number and EVA is a dollar value. In the preceding example, EVA increased when the new project was added even though the ROA actually decreased. In this situation, EVA correctly incorporates the fact that a high return on a large division may be better than a very high return on a smaller division. The situation here is quite similar to the scale problem in capital budgeting that we discussed in Section 6.6.

Further understanding of EVA can be achieved by rewriting the EVA formula. Because ROA $\times$ total capital is equal to earnings after tax, we can write the EVA formula as

$$\text{Earnings after tax} - \text{Weighted average cost of capital} \times \text{Total capital}$$

Thus, EVA can simply be viewed as earnings after capital costs. Although accountants subtract many costs (including depreciation) to get the earnings number shown in financial reports, they do not subtract out capital costs. We can see the logic of accountants because the cost of capital is very subjective. By contrast, costs such as COGS (cost of goods sold), SGA (sales, general, and administration), and even depreciation can be measured more objectively. However, even if the cost of capital is difficult to estimate, it is hard to justify ignoring it completely. After all, this textbook argues that the cost of capital is a necessary input to capital budgeting. Shouldn't it also be a necessary input to performance measurement?

This example argues that EVA can increase investment for firms that are currently underinvesting. However, there are many firms in the reverse situation: The managers are so focused on increasing earnings that they take on projects for which the profits do not justify the capital outlays. These managers either are unaware of capital costs or, knowing these costs, choose to ignore them. Because the cost of capital is right in the middle of the EVA formula, managers will not easily ignore these costs when evaluated on an EVA system.

One other advantage of EVA is that it is so stark: The number is either positive or it is negative. Plenty of divisions have negative EVAs for a number of years. Because these divisions are destroying more value than they are creating, a strong point can be made for liquidating these divisions. Although managers are generally emotionally opposed to this type of action, EVA analysis makes liquidation harder to ignore.

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[2]Stern Stewart & Company have a copyright on the terms *economic value added* and *EVA*. Details on the Stern Stewart & Company EVA can be found in J. M. Stern, G. B. Stewart, and D. A. Chew, "The EVA Financial Management System," *Journal of Applied Corporate Finance* (Summer 1999).

The preceding discussion puts EVA in a positive light. However, we can certainly find much to criticize with EVA as well. We now focus on two well-known problems with EVA. First, the preceding example uses EVA for performance measurement, where we believe it properly belongs. To us, EVA seems a clear improvement over ROA and other financial ratios. However, EVA has little to offer for capital budgeting because EVA focuses only on current earnings. By contrast, net present value analysis uses projections of all future cash flows, where the cash flows will generally differ from year to year. Thus, as far as capital budgeting is concerned, NPV analysis has a richness that EVA does not have. Although supporters may argue that EVA correctly incorporates the weighted average cost of capital, remember that the discount rate in NPV analysis is the same weighted average cost of capital. That is, both approaches take the cost of equity capital based on beta and combine it with the cost of debt to get an estimate of this weighted average.

A second problem with EVA is that it may increase the shortsightedness of managers. Under EVA, a manager will be well rewarded today if earnings are high today. Future losses may not harm the manager because there is a good chance that she will be promoted or have left the firm by then. Thus, the manager has an incentive to run a division with more regard for short-term than long-term value. By raising prices or cutting quality, the manager may increase current profits (and therefore current EVA). However, to the extent that customer satisfaction is reduced, future profits (and, therefore, future EVA) are likely to fall. But we should not be too harsh with EVA here because the same problem occurs with ROA. A manager who raises prices or cuts quality will increase current ROA at the expense of future ROA. The problem, then, is not EVA per se but with the use of accounting numbers in general. Because stockholders want the discounted present value of all cash flows to be maximized, managers with bonuses based on some function of current profits or current cash flows are likely to behave in a shortsighted way.

EXAMPLE 12A.1

EVA Assume the following figures for the International Trade Corporation:

$$\begin{aligned} \text{EBIT} &= \$2.5 \text{ billion} \\ t_c &= .4 \\ R_{\text{WACC}} &= 11\% \\ \text{Total capital contributed} &= \text{Total debt} + \text{Equity} \\ &= \$10 \text{ billion} + \$10 \text{ billion} \\ &= \$20 \text{ billion} \end{aligned}$$

Now we can calculate International Trade's EVA:

$$\begin{aligned} \text{EVA} &= \text{EBIT}\,(1 - t_c) - R_{\text{WACC}} \times \text{Total capital} \\ &= (\$2.5 \text{ billion} \times .6) - (.11 \times \$20 \text{ billion}) \\ &= \$1.5 \text{ billion} - \$2.2 \text{ billion} \\ &= -\$700 \text{ million} \end{aligned}$$