
VALUE ENHANCEMENT

In all the valuations so far in this book, you have taken the perspective of an investor valuing a firm from the outside. Given how Cisco, Motorola, Amazon, Ariba and Rediff are run by their existing management, what value would you assign them? In this chapter, you look at valuation from the perspective of the managers of the firms. Unlike investors, who have to take the firm's actions and policies as given, managers can change the way a firm is run. You examine how the actions and decisions of a firm can enhance value.

For an action to create value, it has to affect one of four inputs into the valuation model – the cash flows generated from existing investments, the expected growth rate in earnings which determines the cash flows looking forward, the period for which the firm can sustain above-normal growth (and excess returns) and the cost of capital that gets applied to discount these cash flows. In the first half of this chapter, you look at the different approaches to value enhancement, and the link to management actions, with an emphasis on technology firms. In the second half of the chapter, you look at economic value added (EVA) and cash flow return on investment (CFROI), which are the two most widely used value enhancement tools, and examine their strengths and weaknesses in the context of technology firms.

Value Creation: A Discounted Cash Flow (DCF) Perspective

In this section, you explore the requirements for an action to be value creating, and then you go on to examine the different ways in which a firm can create value. In the process, you also examine the role that marketing decisions, production decisions, and

strategic decisions have in value creation. In each section, you also look at the potential for each of these actions to create value at Cisco, Motorola, Amazon, Ariba and Rediff.

Value Creating and Value Neutral Actions

The value of a firm is the present value of the expected cash flows from both assets in place and future growth, discounted at the cost of capital. For an action to create value, it has to do one or more of the following:

- increase the cash flows generated by existing investments
- increase the expected growth rate in these cash flows in the future,
- increase the length of the high growth period
- reduce the cost of capital that is applied to discount the cash flows

Conversely, an action that does not affect cash flows, the expected growth rate, the length of the high growth period or the cost of capital cannot affect value.

While this might seem obvious, a number of value-neutral actions taken by firms receive disproportionate attention from both managers and analysts. Consider four examples:

- Technology firms often announce stock splits to keep their stock trading in a desirable price range. In 1999, both Cisco and Amazon announced stock splits, Cisco splitting each share into two, and Amazon converting each share into three. Stock dividends and stock splits change the number of units of equity in a firm but do not affect cash flows, growth, or value.
- Accounting changes in inventory valuation and depreciation methods that are restricted to the reporting statements and do not affect tax calculations have no effect on cash flows, growth or value. In recent years, technology firms, in particular, have spent an increasing amount of time on the management and smoothing of earnings and seem to believe that there is a value payoff to doing this.

- When making acquisitions, firms often try to structure the deal in such a way that they can pool their assets and not show the market premium paid in the acquisition. When they fail and they are forced to show the difference between market value and book value as goodwill, their earnings are reduced by the amortization of the goodwill over subsequent periods. This amortization is not tax deductible, however, and thus does not affect the cash flows of the firm. So, whether a firm adopts purchase or pooling accounting, and the length of time it takes to write off the goodwill, should not really make any difference to value. The same can be said about the practice of writing off in-process R&D, adopted by many technology firms, to eliminate or reduce the goodwill charges in future periods.
- There has been a surge in the number of firms that have issued tracking stock on their high-growth divisions. For instance, the New York Times announced that it would issue tracking stock on its online unit. Since these divisions remain under the complete control of the parent company, the issue of tracking stock, by itself, should not create value.

Some would take issue with this proposition. When a stock splits or a firm issues tracking stock, they would argue, the stock price often goes up¹ significantly. While this is true, it is price, not value, that is affected by these actions. It is possible that these actions change market perceptions about growth or cash flows and thus act as signals. Alternatively, they might provide more information about undervalued assets owned by the firm, and the price may react, as a consequence. In some cases, these actions may lead to changes in operations; tying the compensation of managers to the price of stock tracking the division in which they work may improve efficiency and thus increase cash flows, growth and value.

¹ This is backed up empirically. Stock prices do tend to increase, on average, when stocks are split.

Ways of Increasing Value

There are clearly some actions that firms take that affect their cash flow, growth and discount rates, and consequently the value. In this section, you consider how actions taken by a firm on a variety of fronts can have a value effect.

1. Increase Cash Flows from Existing Investments

The first place to look for value is in the firm's existing assets. These assets represent investments the firm has already made and they generate the current operating income for the firm. To the extent that these investments earn less than their cost of capital or are earning less than they could if optimally managed, there is potential for value creation.

1.1: Poor Investments: Keep, Divest or Liquidate

Every firm has some investments that earn less than necessary to break even (the cost of capital) and sometimes even lose money. At first sight, it would seem to be a simple argument to make that investments that do not earn their cost of capital should either be liquidated or divested. If, in fact, the firm could get back the original capital invested on liquidation, this statement would be true. But that assumption is not generally true, and there are three different measures of value for an existing investment that you need to consider.

The first is the *continuing value*, and it reflects the present value of the expected cash flows from continuing the investment through the end of its life. The second is the *liquidation or salvage value*, which is the net cash flow that the firm will receive if it terminated the project today. Finally, there is the *divestiture value*, which is the price that will be paid by the highest bidder for this investment.

Whether a firm should continue with an existing project, liquidate the project, or sell it to someone else depends upon which of the three is highest. If the continuing value is the highest, the firm should continue with the project to the end of the project life, even though it might be earning less than the cost of capital. If the liquidation or divestiture

value is higher than the continuing value, there is potential for an increase in value from liquidation or divestiture. The value increment can then be summarized below:

If liquidation is optimal: Expected Value Increase = Liquidation Value - Continuing Value

If divestiture is optimal: Expected Value Increase = Divestiture Value - Continuing Value

1.2: Improve Operating Efficiency

A firm's operating efficiency determines its operating margin and, thus, its operating income; more efficient firms have higher operating margins, other things remaining equal, than less efficient firms in the same business. If a firm can increase its operating margin on existing assets, it will generate additional value. There are a number of indicators of the potential to increase margins, but the most important is a measure of how much a firm's operating margin deviates from its industry. Firms whose current operating margins are well below their industry average must locate the source of the difference and try to fix it.

In most firms, the first step in value enhancement takes the form of cost cutting and layoffs. These actions are value enhancing only if the resources that are pruned do not contribute sufficiently either to current operating income or to future growth. Companies can easily show increases in current operating income by cutting back on expenditures (such as research and development), but they may sacrifice future growth in doing so.

1.3: Reduce the Tax Burden

The value of a firm is the present value of its *after-tax* cash flows. Thus, any action that can reduce the tax burden on a firm for a given level of operating income will increase value. Although there are some aspects of the tax code that offer no flexibility to the firm, the tax rate can be reduced over time by doing any or all of the following:

- Multinational firms that generate earnings in different markets may be able to move income from high-tax locations to low-tax or no-tax locations. For instance, the prices

that divisions of these firms charge each other for intra-company sales (transfer prices) can allow profits to be shifted from one part of the firm to another².

- A firm may be able to acquire *net operating losses* that can be used to shield future income. In fact, this might be why a profitable firm acquires an unprofitable one.
- A firm can use risk management to reduce the average tax rate paid on income over time because the marginal tax rate on income tends to rise, in most tax systems, as income increases. By using risk management to smooth income over time, firms can make their incomes more stable and reduce their exposure to the highest marginal tax rates³. This is especially the case when a firm faces a windfall or supernormal profit taxes.

1.4: Reduce net capital expenditures on existing investments

The net capital expenditures is the difference between capital expenditures and depreciation, and, as a cash outflow, it reduces the free cash flow to the firm. Part of the net capital expenditure is designed to generate future growth, but a part, called maintenance capital expenditure, is to maintain existing assets. If a firm can reduce its maintenance capital expenditures, it will increase value.

There is generally a trade off between capital maintenance expenditures and the life of existing assets. A firm that does not make any maintenance capital expenditures will generate much higher after-tax cash flows from these assets, but the assets will have a far shorter life. At the other extreme, a firm that reinvests all the cash flows it gets from depreciation into capital maintenance may be able to extend the life of its assets in place significantly. Firms often ignore this trade-off when they embark on cost cutting and

² Taxes are only one aspect of transfer pricing. Brickley, Smith and Zimmerman (1995) look at the broader issue of how to best set transfer prices.

reduce or eliminate capital maintenance expenditures. Although these actions increase current cash flows from existing assets, the firm might actually lose value as it depletes these assets at a faster rate.

1.5: Reduce non-cash Working capital

As noted in the earlier chapters, the non-cash working capital in a firm is the difference between non-cash current assets, generally inventory and accounts receivable, and the non-debt portion of current liabilities, generally accounts payable. Money invested in non-cash working capital is tied up and cannot be used elsewhere; thus, increases in non-cash working capital are cash outflows, whereas decreases are cash inflows.

The path to value creation seems simple. Reducing non-cash working capital as a percent of revenues should increase cash flows and therefore, value. This assumes, however, that there are no negative consequences for growth and operating income. Firms generally maintain inventory and provide credit because it allows them to sell more. If cutting back on one or both causes lost sales, the net effect on value may be negative.

Illustration 12.1: Potential for Value Creation from Existing Investments

You begin this analysis by estimating how much of the value of the firms comes from existing investments. One way of doing this is to assume that the current operating earnings of the firm are generated by existing assets, and that these earnings would continue in perpetuity with no growth, as long as the firm reinvests the depreciation on those assets (capital maintenance = depreciation).

$$\text{Value of existing assets} = \frac{\text{EBIT} (1 - \text{tax rate})}{\text{Cost of Capital}}$$

³ Stulz (1996) makes this argument for risk management. He also presents other ways in which risk management can be value enhancing.

This value will become negative if the operating earnings are negative, as they are for Amazon, Ariba and Rediff.com, and will be set to zero. The difference between the total value of the firm, estimated in chapter 7 using the discounted cash flow model and the value of existing assets can then be attributed to the growth potential of the firm. Table 12.1 summarizes the estimates of value for the five firms under consideration.

Table 12.1: Investments in Existing Assets

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff</i>
EBIT with Adjustments	\$ (276)	\$ (164)	\$3,455	\$3,216.00	\$ (6.92)
Tax Rate	0.00%	0.00%	35.00%	35.00%	0.00%
EBIT (1-t)	-\$276	-\$164	\$2,246	2090.4	-\$6.92
Cost of Capital	12.56%	13.11%	11.71%	10.39%	25.82%
Value of Assets in Place	\$0	\$0	\$19,184	\$20,115	\$0
Value of Operating Assets	\$13,971	\$17,816	\$310,124	\$66,139	\$463
Existing Investments/Value	0.00%	0.00%	6.19%	30.41%	0.00%
Growth Potential/ Value	100.00%	100.00%	93.81%	69.59%	100.00%
Firm's Return on Capital	-7.18%	-218.10%	34.07%	12.18%	-73.69%
Industry Average Return on Capital	16.94%	23.86%	16.52%	15.03%	NMF

The table also summarizes the return on capital and cost of capital of the firms, as well as the industry average return on capital. To the extent that you trust the return on capital as a measure of the earning power of existing assets, it provides a snapshot on whether the existing investments of the firm are earning a sufficient return.

Of the five firms that you are analyzing, Rediff.com has almost no existing investments, and hence there is little potential for value creation from this source for the firm. Amazon and Ariba have existing investments that are also a negligible proportion of their total value, and managing them better can provide only a minor boost in value. Does the negative return on capital on existing investments at these firms suggest that the existing investments of the firm are poor investments? That conclusion is not justified because these firms are young, and the returns on existing investments are being

measured early in the investment life cycle. To the extent that returns improve as projects mature, the negative returns could reverse over time. In addition, the operating income at young firms, especially technology-based ones, is misstated because many capital expenses are treated as operating expenses. While you have adjusted for some of these expenses (R&D at Ariba, S,G&A and Rediff.com), the current operating income at these firms may not be good measure of the profitability of existing investments at these firms.

Cisco does have significant existing investments, but the potential for value creation is likely to be small for two reasons. First, while these investments might be substantial in terms of absolute value, they represent a small proportion of the total value of the firm – only 6.19%. Second, Cisco earns a return on these investments that is not only well in excess of its cost of capital, but is much higher than those of its competitors. This would suggest that it is managing these investments optimally already.

Motorola offers the most promise for value creation from existing investments, getting almost a third of its value from these investments. Its return on capital has been on a downward trend recently, and it has investments in diverse businesses. Table 12.2 breaks down the operating income, operating margin and return on capital and cost of capital in their telecomm and semi-conductor businesses:

Table 12.2: Motorola – Segment Analysis

<i>Segment</i>	<i>Revenues</i>	<i>% of Total</i>	<i>EBIT</i>	<i>EBIT(1-t)</i>	<i>Capital Invested</i>	<i>ROC</i>	<i>Industry Average</i>
Telecomm	\$25,042	77.26%	\$947	\$616	\$5,016	12.27%	13.82%
Semiconductor	\$7,370	22.74%	\$619	\$402	\$3,344	12.03%	18.09%

While Motorola is earning more than its cost of capital in both segments, it is earning less than its competitors in both. To the extent that it can move its margins and returns towards the industry averages, there is potential for value added.

Reductions in maintenance capital expenditures or non-cash working capital offer little promise in terms of cash flows for the firms being analyzed. Much of the maintenance capital expenditure is in intangible assets (R&D or brand name) and the non-cash working capital investments of the firms are similar or lower than those of the industry, as shown in Table 12.3:

Table 12.3: Non-cash Working Capital Investments

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
Firm	-25.53%	-41.57%	6.75%	8.23%	26.02%
Industry Average	8.26%	3.05%	22.68%	20.06%	22.35%

In summary, there is some potential for value creation from existing assets at Motorola, but very little at the other firms in the analysis.

2. Increase Expected Growth

A firm with low or negative current cash flows can still have high value if it is able to grow quickly and earn high cash flows in the future. In chapter 4, you considered two categories of firms. For the first, which includes firms like Cisco and Motorola that have profitable investments, higher growth arises either from increases in reinvestment or a higher return on capital. For the second category, which includes money losing firms such as Amazon, Ariba and Rediff, the expected cashflows in the future are determined by the expected growth rate in revenues, the expected operating margin and the sales to capital ratio (determining the reinvestment needs of the firm).

2.1: Profitable Firms: The Reinvestment Rate/ Return on Capital Analysis

For a firms that has positive operating earnings, the expected growth rate in operating earnings is the product of the reinvestment rate and the after-tax return on capital on new investments (marginal return on investment):

$$\text{Expected Growth}_{\text{Operating Income}} = \text{Reinvestment Rate} * \text{Marginal Return on Capital}$$

The expected growth rate can be increased by increasing either the reinvestment rate or the marginal return on capital or both.

The trade off from increasing the reinvestment rate is listed in Table 12.4. The positive effect of reinvesting more, higher growth, has to be compared to the negative effect of reinvesting more, the drop in free cash flows:

Table 12.4: Trade off on Reinvestment Rate

<i>Negative Effects</i>	<i>Positive Effects</i>
Reduces free cash flow to firm: FCFF $= \text{EBIT} (1 - \text{tax rate}) (1 - \text{Reinvestment Rate})$	Increases Expected Growth: Expected Growth $= \text{Reinvestment Rate} * \text{Return on Capital}$

You could work through the entire valuation and determine whether the present value of the additional cash flows created by higher growth is greater than the present value of the actual reinvestments made, in cash flow terms. There is, however, a far simpler test to determine the effect on value. Note that the net present value of a project measures the value added by the project to overall firm value, and that the net present value is positive only if the internal rate of return on the project exceeds the cost of capital. If you make the assumption that the accounting return on capital on a project is a reasonable estimate for the internal rate of return, then increasing the reinvestment rate will increase value if and only if the return on capital is greater than the cost of capital. If the return on capital is less than the cost of capital, the positive effects of growth will be less than the negative effects of making the reinvestment.

Note that the return on capital that you are talking about is the marginal return on capital, i.e., the return on capital earned on the actual reinvestment, rather than the average return on capital. Given that firms tend to accept their most attractive investment first and their less attractive investments later, the average returns on capital tend to be greater than the marginal returns on capital. Thus, a firm with a return on capital of 18%

and a cost of capital of 12% may really be earning only 11% on its marginal projects. In addition, the marginal return on capital will be much lower if the increase in the reinvestment rate is substantial. Thus, you have to be cautious about assuming large increases in the reinvestment rate while keeping the current return on capital constant.

A firm that is able to increase its return on capital, while keeping the cost of capital fixed, will increase its value. If, however, the increase in return on capital comes from the firm entering new businesses that are far riskier than its existing business, there might be an increase in the cost of capital that offsets the increase in growth. The general rule for value creation remains simple, however. As long as the projects, no matter how risky they are, have a marginal return on capital that exceeds their cost of capital, they will create value.

Illustration 12.2: Reinvestment Rates, Return on Capital and Value

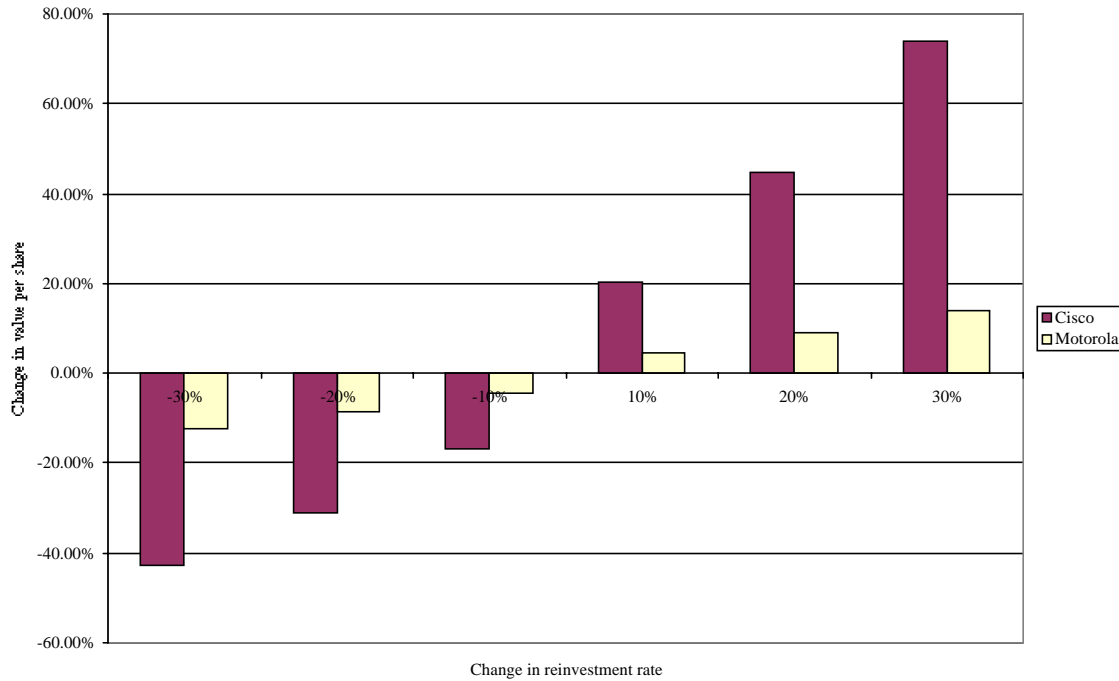
In Table 12.5, the base case assumptions about reinvestment rates, returns on capital, and cost of capital, and the estimates of value are listed for Cisco and Motorola

Table 12.5: Reinvestment Rate, Return on Capital and Value – Cisco and Motorola

	<i>Cisco</i>	<i>Motorola</i>
Reinvestment Rate	106.81%	52.99%
Marginal Return on Capital	34.07%	17.22%
Expected Growth	36.39%	9.12%
Cost of Capital	11.71%	10.39%
Value of Operating Assets	\$310,124	\$66,138.81
Value per Share	\$44.92	\$32.39

If Cisco and Motorola could increase their reinvestment rates, without affecting their returns on capital, the value per share will increase, because they are both earning excess returns. In Figure 12.1, the impact on the value of equity of changing the reinvestment rate at both firms is summarized, keeping the cost of capital fixed:

Figure 12.1: Reinvestment Rate and Value per Share

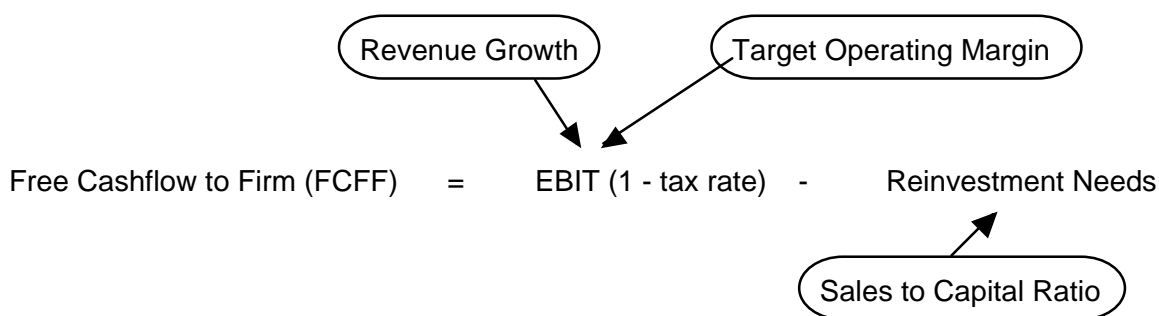


To illustrate, the reinvestment rate at Cisco was reduced from 106.81% to 76.81% and the percentage effect on value of equity was examined; the value per share dropped 42.81%. The effect of a similar change at Motorola was a drop in value per share of 12.38%. The effect of changes in the reinvestment rate were more dramatic at Cisco for every change in the reinvestment rate, because it earns higher excess returns. In fact, as the excess return converges on zero, the reinvestment rate effect will disappear.

2.2: Negative Earnings Firms

For the negative earnings firms in the analysis – Amazon, Ariba and Rediff.com – expected future cash flows are derived from assumptions made about three variables – the expected growth rate in revenues, the target operating margin and the sales to capital ratio. The first two variables determine the operating earnings in future years and the last variable determines reinvestment needs. Figure 12.2 summarizes the impact of each of these variables on the cash flows:

Figure 12.2: Determinants of Growth



Other things remaining equal, the expected cash flows in future years will be higher if any of the three variables – revenue growth, target margins and sales to capital ratios – increase. Increasing revenue growth and target margins will increase operating earnings, while increasing the sales to capital ratio will reduce reinvestment needs.

In reality, though, firms have to make a trade off between higher revenue growth and higher margins. When firms increase prices for their products, they improve operating margins but reduce revenue growth. Michael Porter, one of the leading thinkers in corporate strategy, suggests that when it comes to pricing strategy, there are two basic routes a firm can take⁴. It can choose to be a *volume leader*, reducing price and hoping to increase revenues sufficiently to compensate for the lower margins. For this strategy to work, the firm needs a cost advantage over its competitors to prevent pricing wars that may make all firms in the industry worse off. Alternatively, it can attempt to be a *price leader*, increasing prices and hoping that the effect on volume will be smaller than the increased margins. The extent to which revenue growth will drop depends upon how elastic the demand for the product is and how competitive the overall product market is. The net effect will determine value.

While a higher sales to capital ratio reduces reinvestment needs and increases cash flow, there are both internal and external constraints on the process. As the sales to capital ratio increases, the return on capital on the firm in future years will also increase.

⁴ “Competitive Strategy”, Michael Porter

If the return on capital substantially exceeds the cost of capital, new competitors will enter the market, making it more difficult to sustain the expected operating margins and revenue growth.

Illustration 12.3: Revenue Growth, Operating Margins and Sales to Capital Ratios

In Table 12.6, the expected compounded revenue growth rate (over the next 10 years), the target margins and sales to capital ratios are summarized for Ariba, Amazon and Rediff.com.

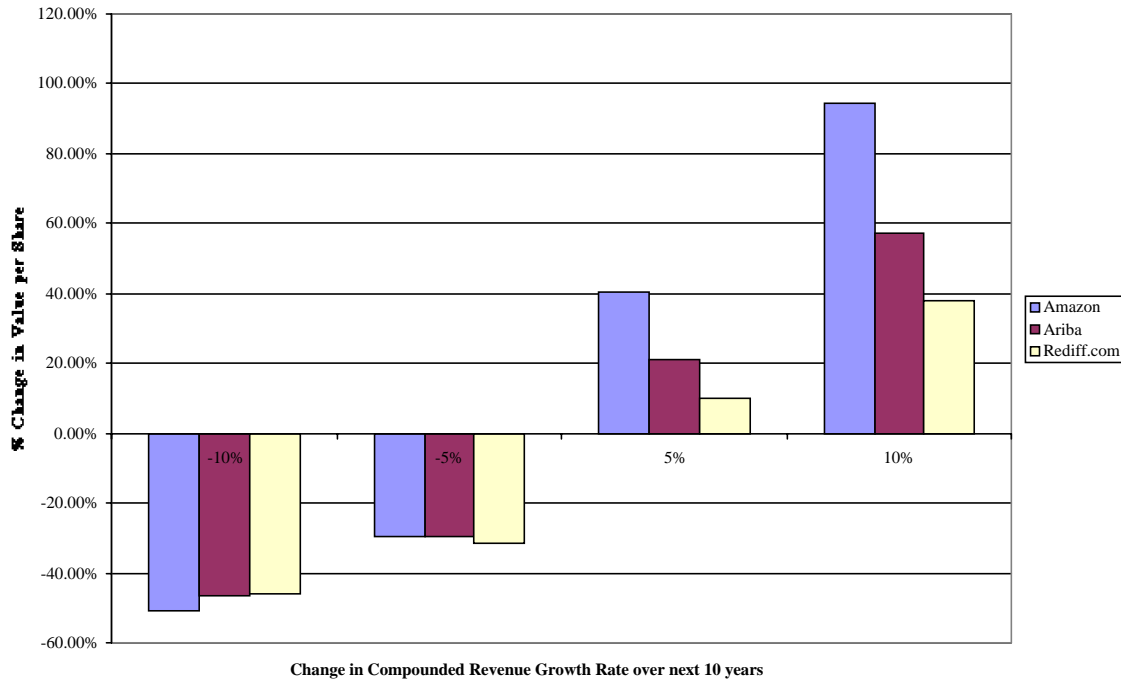
Table 12.6: Growth Assumptions: Amazon, Ariba and Rediff.com

	<i>Amazon</i>	<i>Ariba</i>	<i>Rediff.com</i>
Growth rate in revenues	40.00%	82.39%	104.57%
Target Operating Margin	9.32%	16.36%	40.00%
Sales to Capital Ratio	3.02	2.50	1.00
Return on Capital (in terminal year)	16.94%	20.00%	25.00%
Value of Operating Assets	\$13,971	\$17,816	\$463

In addition, the return on capital ten years from now is also reported for each of the firms.

For all three firms, higher revenue growth translates into higher values per share. Figure 12.3 graphs the change in value per share for each of the firms as a function of the change in expected growth rate in revenues:

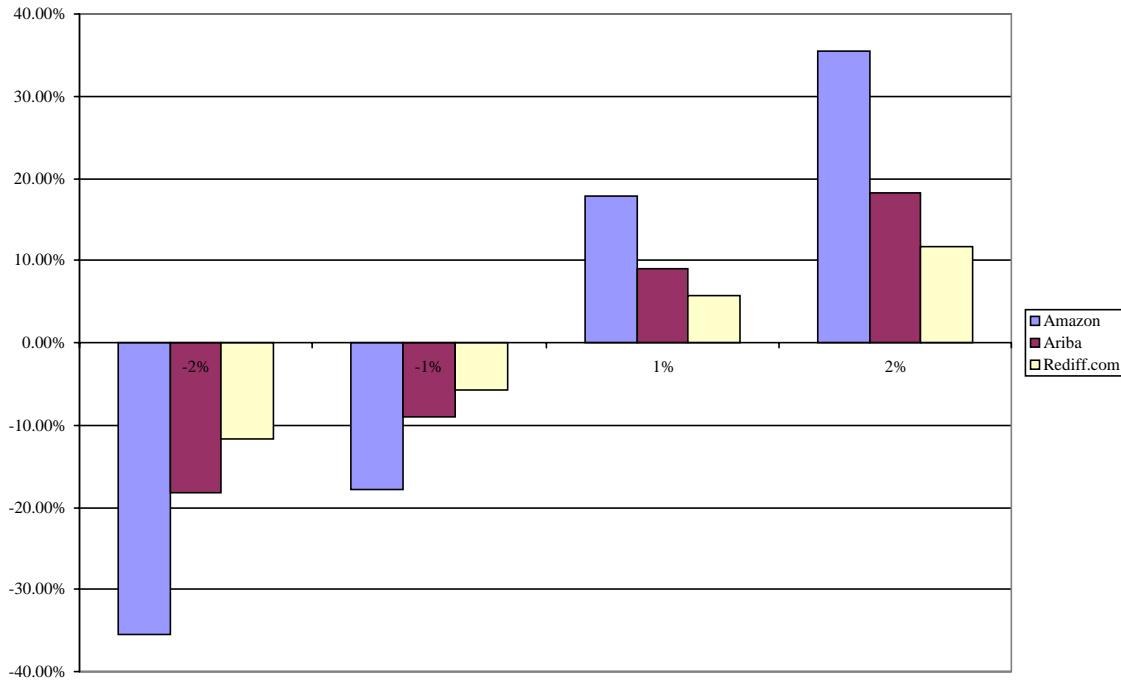
Figure 12.3: Revenue Growth and Value per Share



Thus, Amazon’s value per share is almost doubled when the compounded revenue growth rate increases 20% from the base case of 40% to 60%. The changes in value per share tend to be smaller for Ariba and Rediff, because the base case compounded growth rate in revenues is much higher for these firms. A 10% change in that growth rate thus has a smaller effect on value per share.

For all three firms, higher margins also translate into higher values per share. Figure 12.4 shows the value per share as a function of the target margin.

Figure 12.4: Change in Margins and Value per Share



Here, again the effects of changes in the margin are greatest for Amazon, where the base case margin is the lowest, and least for Rediff.com, where the base case margin is the highest.

For Amazon, the trade off between revenue growth and margins is made more explicit in Table 12.7, which shows value per share as a function of both variables.

Table 12.7: Margin versus Revenue Growth: Amazon

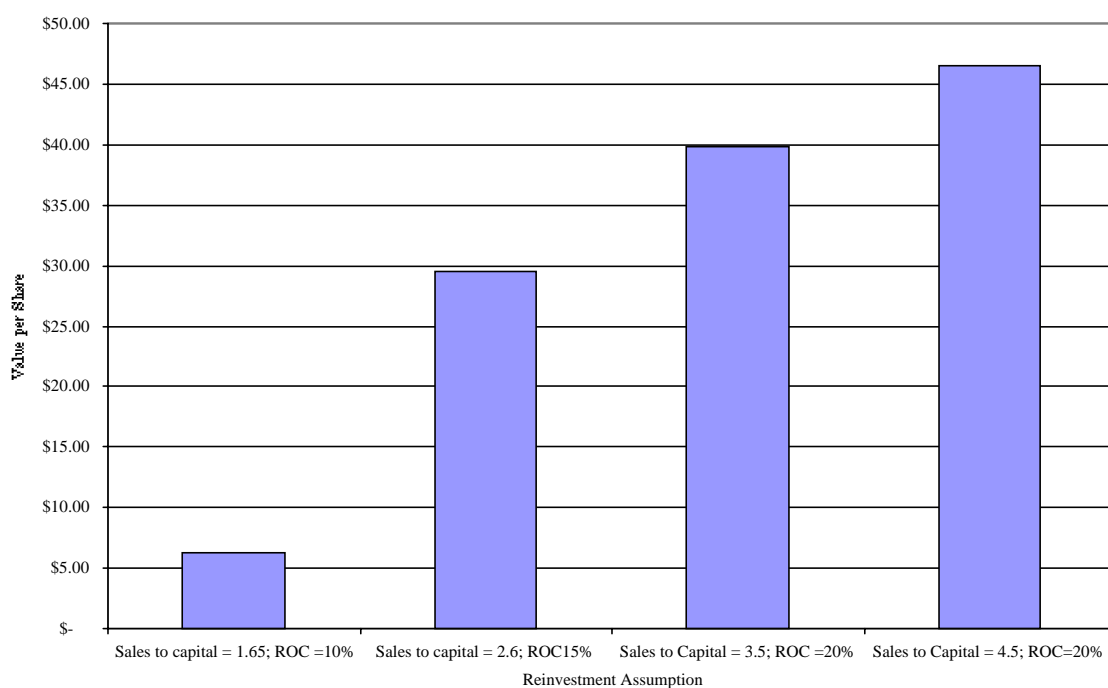
		Target Operating Margin (in 10 years)				
		6%	8%	10%	12%	14%
Revenue	30%	\$6.91	\$12.28	\$17.62	\$22.94	\$28.24
	40%	\$14.37	\$25.02	\$35.63	\$46.22	\$56.80
	50%	\$28.42	\$48.87	\$69.27	\$89.67	\$110.05
	60%	\$53.85	\$91.83	\$129.78	\$167.73	\$205.66

Amazon's value varies widely depending upon the combination of revenue growth and margins that you assume. In practical terms, this also provides Amazon with a sense of the trade off between higher revenue growth and lower target margins.

Finally, a higher sales to capital ratio (which translates into a higher return on capital in 10 years) leads to a higher value per share for all three firms. Figure 12.5 presents the effects on value per share of assuming a different sales to capital ratio over the high growth period for Amazon.

Figure 12.5: Effects of Changing Sales to Capital Ratio: Amazon

Figure 12.8: Value per Share and Reinvestment Assumptions



As the sales to capital ratio (and the terminal return on capital) increases, the value per share of Amazon also increases.

While the relationship between value and these three drivers of value is direct, it is not clear whether there is potential for value creation in any of these firms, given the favorable assumptions that have been made about each of the variables in the base case valuation. It is conceivable that Amazon could increase its revenue growth rate beyond the estimated 40%, but can it do so with 10% pre-tax margins? Ariba might be able to

have higher sales to capital ratio, but will it be able to earn more than the assumed 20% return on capital in perpetuity?

3. Lengthen the Period of High Growth

Every firm, at some point in the future, will become a stable growth firm, growing at a rate equal to or less than that of the economy in which it operates. In addition, growth creates value only if the firm earns excess returns on its investments. With excess returns, the longer the high growth period lasts, other things remaining equal, the greater the value of the firm. No firm should be able to earn excess returns forever in a competitive product market, since competitors will be attracted to the business by the excess returns. Thus, implicit in the assumption that there will be high growth with excess returns is the assumption that there also exist some barriers to entry that prevent competing firms from entering the market and eliminating the excess returns that prevail.

One way firms can increase value is by increasing existing barriers to entry and erecting new ones. In other words, companies earning excess returns have significant competitive advantages. Nurturing these advantages can increase value.

3.1: The Brand Name Advantage

When valuing firms, you are often accused of overlooking intangible assets such as brand name value in your estimations. This is not true, since the inputs to the traditional discounted cash flow valuation incorporate the effects of brand name. In particular, firms with more valuable brand names are either able to charge higher prices than the competition for the same products (leading to higher margins) or sell more than the competitors at the same price (leading to higher turnover ratios). They usually have higher returns on capital and greater value than their competitors in the industry.

Creating a brand name is a difficult and expensive process that may take years to achieve, but firms can often build on existing brand names and make them valuable. Consider the extraordinary success that Coca Cola has had in increasing its market value

over the last two decades. Some attribute its success to its high return on equity or capital, yet these returns are not the cause of its success but the consequence of it. The high returns can be traced to the company's relentless focus on making its brand name more valuable globally⁵. Conversely, the managers of a firm who take over a valuable brand name and then dissipate its value will reduce the values of the firm substantially. The near-death experience of Apple Computers in 1996 and 1997, and the travails of Quaker Oats after the Snapple acquisition, suggest that managers can quickly squander the advantage that comes from valuable brand names.

3.2: Patents, Licenses and Other Legal Protection

The second competitive advantage that companies can possess is a legal one. Firms may enjoy exclusive rights to produce and market a product because they own the patent rights on the product, as is often the case in the pharmaceutical industry. Alternatively, firms may have exclusive licensing rights to service a market, as is the case with regulated utilities in the United States.

The key to value enhancement is not just to preserve but to increase any competitive advantages that the firm possesses. If the competitive advantage comes from its existing patents, the firm has to work at developing new patents that allow it to maintain this advantage over time. While spending more money on research and development (R&D) is clearly one way, the efficiency of reinvestment also matters. The companies that have the greatest increases in value are not necessarily those that spend the most on R&D, but those that have the most productive R&D departments not only in generating patents but also in converting patents into commercial products.

⁵ Companies like Coca Cola have taken advantage of the global perception that they represent American culture, and used it to grow strongly in other markets.

The competitive advantage from exclusive licensing or a legal monopoly is a mixed blessing and may not lead to value enhancement. When a firm is granted these rights by another entity, say the government, that entity usually preserves the right to control the prices charged and margins earned through regulation. In the United States, for instance, much of the regulation of power and phone utilities was driven by the objective of ensuring that these firms did not earn excess returns. In these circumstances, firms may actually gain in value by giving up their legal monopolies, if they get pricing freedom in return. You could argue that this has already occurred, in great part, in the airline and long-distance telecommunications businesses, and will occur in the future in other regulated businesses. In the aftermath of deregulation, the firms that retain competitive advantages will gain value at the expense of others in the business.

3.3: Switching Costs

There are some businesses where neither brand name nor a patent provides adequate protection against competition. Products have short life cycles, competition is fierce and customers develop little loyalty to companies or products. This describes the computer software business in the 1980s, and it still applies to a significant portion of that business today. How, then, did Microsoft succeed so well in establishing its presence in the market? Although many would attribute its success entirely to its ownership of the operating system needed to run the software, there is another reason. Microsoft recognized earlier than most firms that the most significant barrier to entry in the software business is the cost to the end-user of switching from one product to a competitor. In fact, Microsoft Excel, early in its life, had to overcome the obstacle that most users were working with Lotus spreadsheets and did not want to bear the switching cost. Microsoft made it easy for end-users to switch to its products (by allowing Excel to open Lotus spreadsheets, for instance), and it made it more and more expensive for them to switch to a competitor by creating the Microsoft Office Suite. Thus, a user who has Microsoft

Office installed on his or her system and who wants to try to switch from Microsoft Word to WordPerfect has to overcome multiple barriers - Will the conversion work well on the hundreds of Word files that exist already? Will the user still be able to cut and paste from Microsoft Excel and Power Point into Word documents? The end result, of course, is that it becomes very difficult for competitors who do not have Microsoft's resources to compete with it in this arena.

There are a number of other businesses where the switching cost concept can be used to augment an argument for value enhancement or debunk it. For instance, there are many who argue that the high valuations of Internet companies such as Amazon.com and eToys reflect their first-mover advantage, i.e, the fact that they are pioneers in the online business. However, the switching costs in online retailing seem to be minimal, and these companies have to come up with a way of increasing switching costs if they want to earn high returns in the future.

3.4: Cost Advantages

There are several ways in which firms can establish a cost advantage over their competitors and use it as a barrier to entry:

- In businesses where scale can be used to reduce costs, economies of scale can give bigger firms advantages over smaller firms.
- Owning or having exclusive rights to a distribution system can provide firms with a cost advantage over its competitors.
- Having access to lower-cost labor or resources can also provide cost advantages.

These cost advantages will influence value in one of two ways: The firm with the cost advantage may charge the same price as its competitors but have a much higher operating margin. Or the firm may charge lower prices than its competitors and have a much higher capital turnover ratio. In fact, the net effect of increasing margins or turnover ratios (or both) will increase the return on capital, and through it expected growth.

The cost advantage of economies of scale can create high capital requirements that prevent new firms from entering the business. In businesses such as aerospace and automobiles, the competition is almost entirely among existing competitors. The absence of new competitors may allow these firms to maintain above-normal returns, though the competition between existing firms will constrain the magnitude of these returns.

Illustration 12.6: Potential for Increasing the Length of the High Growth Period

The competitive advantages are different for the five firms being analyzed in this book and the potential for building on these advantages is different as well.

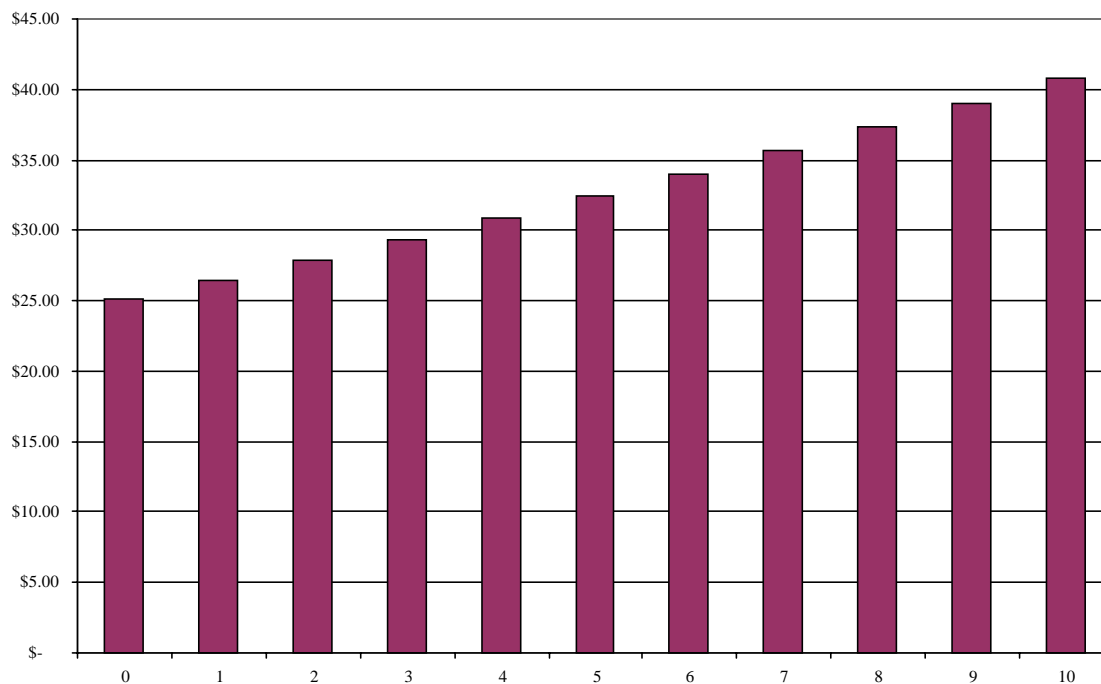
- Cisco's most significant differential advantage seems to be its capacity to generate much larger excess returns on its new investments than its competitors. Since most of these investments take the form of acquisitions of other firms, Cisco's excess returns rest on whether it can continue to maintain its success in this area. The primary challenge, however, is that as Cisco continues to grow, it will need to do even more acquisitions each year to maintain the growth rate it had the previous year. It is possible that there might be both external and internal constraints on this process. The number of firms that are potential takeover targets is limited, and the firm may not have the resources to replicate its current success if the number of acquisitions doubles or triples.
- Motorola's research capabilities and the patents that emerge from the research represent its most significant competitive advantage. However, it is not viewed as the technological leader in either of the two businesses that it operates in. Firms like Nokia are viewed as more innovative when it comes to mobile communications (cellular phones) and Intel is considered the leading innovator among large semiconductor manufacturers.
- Amazon has two significant advantages associated with it. The first is that it is a pioneer in internet retailing, giving it a first-mover advantage over Barnes and Noble,

Border's and other brick and mortar firms that came later. The second is the brand name value that Amazon has acquired in the few years that it has been in existence. It is clearly one of the more recognized names in e-commerce, and has also acquired a reputation for good service in a sector (online retailing) where the gap between promise and practice has been large. The challenge for Amazon is to convert these two advantages into high profit margins. Given the ease of entry into the online retailing business, it will take substantial work.

- Ariba is a pioneer in the B2B business but it also has a technological component to its success. If Ariba is able to make its technology the default for the business, it will be able to capture a large portion of a huge market. Whether it will succeed in this endeavor will be partially in its own hands, partially in the hands of its competitors (like Commerce One) and will partially rest in whether customers are willing to switch to new technologies.
- Rediff.com's largest advantage comes from the market that it serves – the Indian online market. This market is a small one, but potentially could have very high growth. Rediff's strength lies in its ability to deal with the linguistic and regional differences in the Indian market, and to take advantages of changes in this market. To build on this strength, it has to continue to accumulate information about the market that will give it an edge over its competition.

For each of these firms, the payoff from a successful strategy can be very large. For instance, Motorola which has a value per share of \$32.39 with a high growth period of 5 years would be able to increase its value if it were able to grow longer (see figure 12.6)

Figure 12.6: Length of Growth Period and Value per Share



For Cisco, where a growth period of 12 years has been assumed, the risk is that the firm's competitive advantages may not be sustainable and that the value per share will drop off accordingly.

4. Reduce the cost of financing

The cost of capital for a firm is a composite cost of debt and equity financing. The cash flows generated over time are discounted to the present at the cost of capital. Holding the cash flows constant, reducing the cost of capital will increase the value of the firm. In this section, you explore the ways in which a firm may reduce its cost of capital, or more generally, increase its firm value by changing both financing mix and type.

4.1. Change Operating Risk

The operating risk of a firm is a direct function of the kinds of products or services it provides and the degree to which these products or services are discretionary to the customer. The more discretionary they are, the greater the operating risk faced by the

firm. Both the cost of equity and cost of debt of a firm are affected by the operating risk of the business or businesses in which it operates. In the case of equity, only that portion of the operating risk that is not diversifiable affects value.

Firms can reduce their operating risk by making their products and services less discretionary to their customers. Advertising clearly plays a role, but finding new uses for a product or service is another.

4.2: Reduce Operating Leverage

The operating leverage of a firm measures the proportion of its costs that are fixed. Other things remaining equal, the greater the proportion of the costs of a firm that are fixed, the more volatile its earnings will be, and the higher its cost of capital. Reducing the proportion of the costs that are fixed will make firms much less risky and reduce their cost of capital. Firms can reduce their fixed costs by using outside contractors for some services; if business does not measure up, the firm is not stuck with the costs of providing this service. They can also tie expenses to revenues; for instance, tying wages paid to revenues made will reduce the proportion of costs that are fixed.

This basic idea of tying expenses to revenues is often described as *making the cost structure more flexible*. A more flexible cost structure influences three inputs in a valuation. It leads to a lower unlevered beta (due to the lower operating leverage), reduces the cost of debt (because of the reduction in default risk) and increases the optimal debt ratio. All three reduce the cost of capital and increase firm value.

4.3: Change the Financing Mix

A third way to reduce the cost of capital is to change the mix of debt and equity used to finance the firm. As noted in chapter 4 in the discussion of cost of capital, debt is always cheaper than equity, partly because lenders bear less risk and partly because of the tax advantage associated with debt. This benefit has to be weighed off against the additional risk of bankruptcy created by the borrowing; this higher risk increases both the

beta for equity and the cost of borrowing. The net effect will determine whether the cost of capital will increase or decrease as the firm takes on more debt.

Note, however, that a firm's value will increase as the cost of capital decreases, if and only if the operating cash flows are unaffected by the higher debt ratio. If, as the debt ratio increases, the riskiness of the firm's increases, and this, in turn, affects the firm's operations and cash flows, the firm value may decrease even as cost of capital declines. If this is the case, the objective function when designing the financing mix for a firm has to be restated in terms of firm value maximization rather than cost of capital minimization.

Illustration 12.7: The Effect of Financing Mix on Value

To analyze the effect of changing the financing mix on value, you would need to estimate the costs of equity and debt at each debt ratio. In table 12.8 below, the costs of equity and debt are estimated for Motorola for debt ratios from 0% to 90%:

Table 12.8: Cost of Capital and Firm Value: Motorola

<i>Debt Ratio</i>	<i>Beta</i>	<i>Cost of Equity</i>	<i>Bond Rating</i>	<i>Interest rate on debt</i>	<i>Tax Rate</i>	<i>Cost of Debt (after-tax)</i>	<i>WACC</i>	<i>Firm Value (G)</i>
0%	1.16	10.63%	AAA	6.20%	35.00%	4.03%	10.63%	\$74,912
10%	1.24	10.96%	A-	7.25%	35.00%	4.71%	10.33%	\$80,253
20%	1.34	11.38%	B-	10.25%	35.00%	6.66%	10.43%	\$78,348
30%	1.48	11.91%	CC	12.00%	35.00%	7.80%	10.68%	\$73,986
40%	1.72	12.90%	C	13.50%	26.34%	9.94%	11.72%	\$59,716
50%	2.07	14.28%	C	13.50%	21.07%	10.66%	12.47%	\$52,238
60%	2.63	16.54%	D	16.00%	14.82%	13.63%	14.79%	\$37,161
70%	3.51	20.05%	D	16.00%	12.70%	13.97%	15.79%	\$32,881
80%	5.27	27.07%	D	16.00%	11.11%	14.22%	16.79%	\$29,394
90%	10.54	48.14%	D	16.00%	9.88%	14.42%	17.79%	\$26,498

Note that the cost of equity is estimated based upon the levered beta. As the debt ratio increases, the beta increases as well.⁶ The cost of debt is estimated based upon a synthetic rating that is determined by the interest coverage ratio at each debt ratio. As the debt ratio

⁶ Levered Beta = Unlevered Beta (1 + (1 - tax rate) (Debt/ Equity))

increases, the interest expense increases leading to a drop in the ratings and higher costs of debt. As Motorola moves from a 0% debt ratio to a 10% debt ratio, the cost of capital decreases (and firm value increases). Beyond 10%, though, the trade off operates against debt, as the cost of capital increases as the debt ratio increases.

Similar analysis were done for Cisco, Amazon, Ariba and Rediff.com, and the results on the actual and optimal debt ratios are summarized in Table 12.9:

Table 12.9: Actual versus Optimal Debt Ratios

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
<i>Current</i>					
Debt Ratio	7.81%	0.15%	0.18%	6.86%	0.00%
Cost of Capital	12.56%	13.12%	11.71%	10.39%	13.60%
<i>Optimal</i>					
Debt Ratio	0.00%	0.00%	0.00%	10.00%	0.00%
Cost of Capital	12.40%	13.11%	11.71%	10.33%	13.60%
Change in value per share	\$1.37	\$0.03	(\$0.09)	\$0.52	\$0.00

The optimal debt ratio is 0% for all of the firms except Motorola. For the three firms that have negative operating income currently, this should not be surprising. A firm that is reporting operating losses cannot afford to add the additional charge of interest payments, and gets no tax benefit to boot. For Cisco, which does make more than \$ 3 billion in operating income, the absence of excess debt capacity may seem puzzling. Note, however, that the operating income (and EBITDA) is a small percentage of the market value of Cisco as a firm:

$$\text{EBITDA/ Market Value of Firm}_{\text{Cisco}} = \$3,941 / 446,989 = 0.89\%$$

Why does this matter? The debt ratio that is being assessed is a market value debt ratio. Even at a 10% debt ratio, Cisco would have \$ 44.7 billion in debt outstanding, and the interest expense on this debt would push Cisco to a D rating.

4.4: Change Financing Type

A fundamental principle in choosing what kind of financing a firm should use to fund its operations is that the financing of a firm should be designed to ensure, as far as possible, that the cash flows on debt match as closely as possible the cash flows on the asset. By matching cash flows on debt to cash flows on the asset, a firm reduces its risk of default and increases its capacity to carry debt, which, in turn, reduces its cost of capital, and increases value.

Firms that mismatch cash flows on debt and cash flows on assets (by using short-term debt to finance long-term assets, debt in one currency to finance assets in a different currency or floating-rate debt to finance assets whose cash flows tend to be adversely impacted by higher inflation) will have higher default risk, higher costs of capital and lower firm value. Firms can use derivatives and swaps to reduce these mismatches and, in the process, increase firm value. Alternatively, they can replace their existing debt with debt that is more closely matched to their assets. Finally, they can use innovative securities that allow them to pattern cash flows on debt to cash flows on investments.

The potential for value enhancement from this source is likely to be small for technology firms, since they tend not to have much debt to begin with and little debt capacity to exploit. As they mature, though, this will change and should consider using debt that best fits their cash flow characteristics.

The Value Enhancement Chain

You can categorize the range of actions firms can take to increase value in several ways. One is in terms of whether they affect cash flows from assets in place, growth, the cost of capital or the length of the growth period. There are two other levels at which you can distinguish between actions that create value:

- *Does an action creates a value trade off or is it a pure value creator?* Very few actions increase value without any qualifications. Among these are the divestitures of

assets when the divestiture value exceeds the continuing value, and the elimination of deadweight costs that contribute nothing to the firm's earnings or future growth. Most actions have both positive and negative effects on value, and it is the net effect that determines whether these actions are value enhancing. In some cases, the tradeoff is largely internal, and the odds are much better for value creation. An example is a firm changing its mix of debt and equity to reduce the cost of capital. In other cases, however, the net effect on value will be a function of how competitors react to a firm's actions. As an example, changing pricing strategy to increase margins may not work as a value enhancement measure, if competitors react and change prices as well.

- *How quickly do actions pay off?* Some actions generate an immediate increase in value. Among these are divestitures and cost cutting. Many actions, however, are designed to create value in the long term. Thus, building up a respected brand name clearly creates value in the long term but is unlikely to affect value today.

Illustration 12.8: A Value Enhancement Plan

Reviewing the discussion of value enhancement at Amazon, Ariba, Cisco, Motorola and Rediff.com, the following conclusions seem to hold:

- For Cisco, there seems to be little potential for enhancing value beyond the initial estimate. The firm earns high excess returns on its existing investments, nurtures its competitive advantage zealously and has a financing mix (100% equity) that befits its cash flows. Upholding the old adage of doing no harm, Cisco is obviously doing things right and needs to maintain rather than change the way it is run.
- For Amazon, Ariba and Rediff.com, firms that have little in terms of existing investments, the agenda for value enhancement is clear. The firms should focus on increasing revenue growth, while keeping reinvestment needs in check. In the process, they need to lay the groundwork for the competitive advantages that will allow them to earn high margins on their revenues in the future. These competitive advantages

range from brand name for Amazon to technology for Ariba to localized knowledge (about the Indian market) for Rediff.com.

- Motorola seems to offer the most promise for value enhancement. Its returns on existing investments lag its competitors, its competitive advantages in technology are small and need augmenting and the firm does have some excess debt capacity. If you could increase the return on capital on existing investments to industry averages, improve the firm's research capabilities and use its debt capacity, the value of Motorola could be increased substantially.

Alternatives to the Traditional Valuation Model

The traditional discounted cash flow model provides for a rich and thorough analysis of all the different ways in which a firm can increase value, but it can become complex, as the number of inputs increases. It is also very difficult to tie management compensation systems to a discounted cash flow model, since many of the inputs need to be estimated and can be manipulated to yield the results management wants.

If you assume that markets are efficient, you can replace the unobservable value from the discounted cash flow model with the observed market price and reward or punish managers based upon the performance of the stock. Thus, a firm whose stock price has gone up is viewed as having created value, whereas one whose stock price has fallen has destroyed value. Compensation systems based upon the stock price, including stock grants and warrants, have become a standard component of most management compensation package.

While market prices have the advantage of being up to date and observable, they are also noisy. Even if markets are efficient, stock prices tend to fluctuate around the true value, and markets sometimes do make mistakes. Thus, a firm may see its stock price go up, and its top management rewarded, even as it destroys value. Conversely, the managers of a firm may be penalized as its stock price drops, even though the managers may have

taken actions that increase firm value. The other problem with stock prices as the basis for compensation is that they are available only for the entire firm. Thus, stock prices cannot be used to analyze the managers of individual divisions of a firm, or for their relative performance.

In the last decade, while firms have become more focused on value creation, they have remained suspicious of financial markets. While they might understand the notion of discounted cash flow value, they are unwilling to tie compensation to a value that is based upon dozens of estimates. In this environment, new mechanisms for measuring value that are simple to estimate and use, do not depend too heavily on market movements, and do not require a lot of estimation, find a ready market. The two mechanisms that seem to have made the most impact are:

- *Economic Value Added*, which measures the dollar surplus value created by a firm on its existing investment, and
- *Cash Flow Return on Investment*, which measured the percentage return made by a firm on its existing investments

In this section, you look at how each is related to discounted cash flow valuation. You also look at the conditions under which firms using these approaches to judge performance and evaluate managers may end up making decisions that destroy value rather than create it.

Economic Value Added

The **economic value added** (EVA) is a measure of the dollar surplus value created by an investment or a portfolio of investments. It is computed as the product of the "excess return" made on an investment or investments and the capital invested in that investment or investments.

Economic Value Added = (Return on Capital Invested – Cost of Capital) (Capital Invested)

In this section, you begin by looking at the measurement of economic value added, then consider its links to discounted cash flow valuation and close with a discussion of its limitations as a value enhancement tool.

Calculating EVA

The definition of economic value added, outlines three basic inputs you need for its computation - the return on capital earned on investments, the cost of capital for those investments and the capital invested in them. In measuring each of these, you make many of the same adjustments discussed in the context of discounted cash flow valuation.

How much *capital is there invested* in existing assets? One obvious answer is to use the market value of the firm, but market value includes capital invested not just in assets in place but in expected future growth⁷. Since you want to evaluate the quality of assets in place, you need a measure of the market value of just these assets. Given the difficulty of estimating market value of assets in place, it is not surprising that you turn to the book value of capital as a proxy for the market value of capital invested in assets in place. The book value, however, is a number that reflects not just the accounting choices made in the current period, but also accounting decisions made over time on how to depreciate assets, value inventory and deal with acquisitions. At the minimum, the three adjustments you made to capital invested in the discounted cashflow valuation – converting operating leases into debt, capitalizing R&D expenses and eliminating the effect of one-time or cosmetic charges – have to be made when computing EVA as well. The older the firm, the more extensive the adjustments that have to be made to book value of capital to get to a reasonable estimate of the market value of capital invested in assets in place. Since this

⁷ As an illustration, computing the return on capital at Microsoft using the market value of the firm, instead of book value, results in a return on capital of about 3%. It would be a mistake to view this a sign of poor investments on the part of the firm's managers.

requires that you know and take into account every accounting decision over time, there are cases where the book value of capital is too flawed to be fixable. Here, it is best to estimate the capital invested from the ground up, starting with the assets owned by the firm, estimating the market value of these assets and cumulating this market value.

To evaluate the return on this invested capital you need an estimate of the *after-tax operating income* earned by a firm on these investments. Again, the accounting measure of operating income has to be adjusted for operating leases, R&D expenses and one-time charges to compute the return on capital.

The third and final component needed to estimate the economic value added is the *cost of capital*. The cost of capital should be estimated based upon the market values of debt and equity in the firm, rather than book value. There is no contradiction between using book value for purposes of estimating capital invested and using market value for estimating cost of capital, since a firm has to earn more than its market value cost of capital to generate value. From a practical standpoint, using the book value cost of capital will tend to understate cost of capital for most firms, and will understate it more for more highly levered firms than for lightly levered firms. Understating the cost of capital will lead to overstating the economic value added.

Illustration 12.8: Estimating Economic Value Added

In this illustration, you estimate the economic value added by Amazon, Ariba, Cisco, Motorola and Rediff.com in the most recent year. To make these estimates, the operating income from that year is used in conjunction with the book value (adjusted for operating leases and R&D expenses) in Table 12.10:

Table 12.10: Economic Value Added

	<i>Amazon</i>	<i>Ariba</i>	<i>Cisco</i>	<i>Motorola</i>	<i>Rediff.com</i>
EBIT(1-t)	-\$276.00	-\$163.70	\$2,245.75	\$2,090.40	-\$6.92
Capital Invested	\$ 1,746.94	\$ 152.24	\$ 9,944.43	\$ 25,542.60	\$ 5.67
Return on Capital	-7.18%	-218.10%	34.07%	12.18%	-73.69%
Cost of Capital	12.56%	13.11%	11.71%	10.39%	25.82%

EVA	-\$344.79	-\$351.99	\$2,224.39	\$455.49	-\$5.64
-----	-----------	-----------	------------	----------	---------

The results are not surprising. The firms with negative operating earnings had negative economic value added last year. Both Cisco and Motorola reported positive economic value added last period, but Cisco's high return on capital results in a much higher economic value added for the firm.



eva.xls: There is a dataset on the web that summarizes economic value added (EVA) by industry group in the United States for the most recent year

Economic Value Added, Net Present Value and Discounted Cashflow Valuation

One of the foundations of investment analysis in traditional corporate finance is the net present value rule. The net present value (NPV) of a project, which reflects the present value of expected cash flows on a project, netted against any investment needs, is a measure of dollar surplus value on the project. Thus, investing in projects with positive net present value will increase the value of the firm, while investing in projects with negative net present will reduce value. Economic value added is a simple extension of the net present value rule. The net present value of the project is the present value of the economic value added by that project over its life⁸.

$$NPV = \sum_{t=1}^{t=n} \frac{EVA_t}{(1+k_c)^t}$$

where EVA_t is the economic value added by the project in year t , and the project has a life of n years.

This connection between economic value added and NPV allows you to link the value of a firm to the economic value added by that firm. To see this, begin with a simple

⁸ This is true, though, only if the expected present value of the cash flows from depreciation is assumed to be equal to the present value of the return of the capital invested in the project. A proof of this equality can be found in my paper on value enhancement in the Contemporary Finance Digest in 1999.

formulation of firm value in terms of the value of assets in place and expected future growth:

$$\text{Firm Value} = \text{Value of Assets in Place} + \text{Value of Expected Future Growth}$$


Note that in a discounted cash flow model, the values of both assets in place and expected future growth can be written in terms of the net present value created by each component:

$$\text{Firm Value} = \text{Capital Invested}_{\text{Assets in Place}} + \text{NPV}_{\text{Assets in Place}} + \sum_{t=1}^{\infty} \text{NPV}_{\text{Future Projects}, t}$$

Substituting the economic value added version of net present value into this equation, you get:

$$\text{Firm Value} = \text{Capital Invested}_{\text{Assets in Place}} + \sum_{t=1}^{\infty} \frac{\text{EVA}_{t, \text{Assets in Place}}}{(1 + k_c)^t} + \sum_{t=1}^{\infty} \frac{\text{EVA}_{t, \text{Future Projects}}}{(1 + k_c)^t}$$

Thus, the value of a firm can be written as the sum of three components, the capital invested in assets in place, the present value of the economic value added by these assets, and the expected present value of the economic value that will be added by future investments.

 *fcffeva.xls*: This spreadsheet allows you to value a firm based upon expected economic value added in future years, and compares it to a discounted cash flow value estimate of value.

EVA and Market Value

Will increasing economic value added cause market value to increase? Not necessarily. This is so because the market value has built into it expectations of future economic value added. Thus, a firm like Microsoft is priced on the assumption that it will earn large and increasing economic value added over time. Whether a firm's market value increases or decreases on the announcement of higher economic value added will depend in large part on what the expected change in economic value added was. For mature firms, where the market might have expected no increase or even a decrease in economic value added, the announcement of an increase will be good news and cause the market

value to increase. For firms that are perceived to have good growth opportunities and are expected to report an increase in economic value added, the market value will decline if the announced increase in economic value added does not measure up to expectations. This should be no surprise to investors, who have recognized this phenomenon with earnings per share for decades; the earnings announcements of firms are judged against expectations, and the earnings surprise is what drives prices.

You would, therefore, not expect any correlation between the magnitude of the economic value added and stock returns, or even between the change in economic value added and stock returns. Stocks that report the biggest increases in economic value added should not necessarily earn high returns for their stockholders⁹. These hypotheses are confirmed by a study done by Richard Bernstein at Merrill Lynch, who examined the relationship between EVA and stock returns:

- A portfolio of the 50 firms which had the highest absolute levels¹⁰ of economic value added earned an annual return on 12.9% between February 1987 and February 1997, while the S&P index returned 13.1% a year over the same period.
- A portfolio of the 50 firms that had the highest growth rates¹¹ in economic value added over the previous year earned an annual return of 12.8% over the same time period.

Economic Value Added at Technology Firms

⁹ A study by Kramer and Pushner found that differences in operating income (NOPAT) explained differences in market value better than differences in EVA. O'Byrne (1996), however, finds that changes in EVA explain more than 55% of changes in market value over 5-year periods.

¹⁰ See Quantitative Viewpoint, Merrill Lynch, December 19, 1997.

¹¹ See Quantitative Viewpoint, Merrill Lynch, February 3, 1998

The fact that the value of a firm is a function of the capital invested in assets in place, the present value of economic value added by those assets and the economic value added by future investments, points to some of the dangers of using it as a measure of success or failure for technology firms. Firms can increase their economic value added from assets in place, and see their value decrease if:

- The increase in economic value added is the result of a shrinking of the capital invested in the firm. Note that restructuring charges and stock buybacks can reduce capital invested and make the economic value added a much larger number, while yielding no gain in value or even a reduction in value.
- The increase in economic value added from existing assets is generated by sacrificing future investments and the economic value that would have been added by those investments.
- The increase in economic value added is accompanied by an increase in risk and cost of capital. In this case, the negative effect (of a higher discount rate) can more than offset the positive effect of a higher economic value added.

Finally, it is unlikely that there will be much correlation between actual changes in economic value added at technology firms and changes in market value. The market value is based upon expectations of economic value added in future periods, and investors expect a firm like Cisco to report an economic value added that grows substantially each year. Thus, if Cisco's economic value added increases, but by less than expected, you could see its market value drop on the report.

Illustration 12.11: Analyzing Economic Value Added

Consider again the economic value added estimates for the five firms that are being analyzed in the last illustration. Cisco and Motorola have positive economic value added, while the other three firms – Amazon, Ariba and Rediff.com – have negative economic value added. Is this an indication of good management at the first two firms,

and poor management in the last three? Not necessarily. Even if you assume that the operating income measures the earnings from existing investments, and that the book capital measures the capital invested in these assets, the economic value added is a measure of the performance of these assets in one period. To the extent that asset cash flows change over its life, Amazon, Ariba and Rediff.com might have value creating investments that are currently losing money.

In fact, it would be dangerous to push the managers of these firms to increase the economic value added and to reward them on that basis. Consider a firm like Cisco. Its existing investments earn attractive returns, but the bulk of the firm's value still comes from growth potential in the future. If managers sacrifice even a small portion of the latter to increase the economic value added from existing assets, the firm might become a less valuable firm.

Cash Flow Return on Investment

Unlike economic value added, which is a dollar value, the CFROI is a percentage rate of return on existing investments. In fact, the CFROI is the internal rate of return on existing investments, based upon real cash flows, and it is compared to the real cost of capital to make judgments about the quality of these investments.

Calculating CFROI

The cash flow return on investment for a firm is calculated using four inputs. The first is the *gross investment (GI)* the firm has in its existing assets, obtained by adding back cumulated depreciation and inflation adjustments to the book value. The second input is the *gross cash flow (GCF)* earned in the current year on that asset, which is usually defined as the sum of the after-tax operating income of a firm and the non-charges against earnings, such as depreciation and amortization. The third input is *the expected life of the assets (n)* in place at the time of the original investment, which varies from sector to sector but reflects the earning life of the investments in question. The *expected*

value of the assets (SV) at the end of this life, in current dollars, is the final input. This is usually assumed to be the portion of the initial investment, such as land and building, that is not depreciable, adjusted to current dollar terms. The CFROI is the internal rate of return of these cash flows, i.e, the discount rate that makes the net present value of the gross cash flows and salvage value equal to the gross investment, and it can thus be viewed as a composite internal rate of return, in current dollar terms.

An alternative formulation of the CFROI allows for setting aside an annuity to cover the expected replacement cost of the asset at the end of the project life. This annuity is called the economic depreciation and is computed as follows:

$$\text{Economic Depreciation} = \frac{\text{Replacement Cost in Current dollars } (k_c)}{(1 + k_c)^n - 1}$$

Where n is the expected life of the asset and the expected replacement cost of the asset is defined in current dollar terms to be the difference between the gross investment and the salvage value. The CFROI for a firm or a division can then be written as follows:

$$\text{CFROI} = \frac{\text{Gross Cash Flow} - \text{Economic Depreciation}}{\text{Gross Investment}}$$


For instance, assume that you have existing assets with a book value of 2,431 million, a gross cash flow of \$ 390 million, an expected salvage value (in today's dollar terms) of \$607.8 million and a life of 10 years. The conventional measure of CFROI is 11.71% and the real cost of capital is 8%. The estimate using the alternative approach is computed below:

$$\text{Economic Depreciation} = \frac{(\$2.431 \text{ bil} - \$0.6078 \text{ bil}) (.08)}{(1.08^{10} - 1)} = \$125.86 \text{ mil}$$

$$\text{CFROI} = (\$390.00 \text{ mil} - \$125.86 \text{ mil}) / \$ 2,431 \text{ mil} = 10.87\%$$

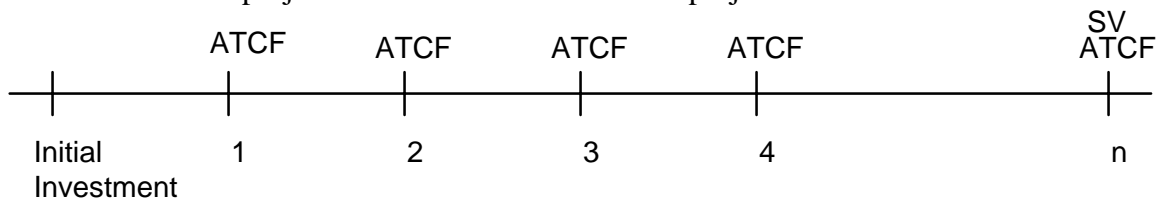
The differences in the reinvestment rate assumption accounts for the difference in CFROI estimated using the two methods. In the first approach, intermediate cash flows get reinvested at the internal rate of return, while in the second, at least the portion of the

cash flows that are set aside for replacement get reinvested at the cost of capital. In fact, if you estimated that the economic depreciation using the internal rate of return of 11.71%, the two approaches would yield identical results¹².

 cfroi.xls: This spreadsheet allows you to estimate the CFROI for an investment or a firm.

Cashflow Return on Investment, Internal Rate of Return and Discounted Cashflow Value

If net present value provides the genesis for the economic value added approach to value enhancement, the internal rate of return is the basis for the CFROI approach. In investment analysis, the internal rate of return on a project is computed using the initial investment on the project and all cash flows over the project’s life:



Where the ATCF is the after-tax cash flow on the project, and SV is the expected salvage value of the project assets. This analysis can be done entirely in nominal terms, in which case the internal rate of return is a nominal IRR and is compared to the nominal cost of capital, or in real terms, in which case it is a real IRR and is compared to the real cost of capital.

At first sight, the CFROI seems to do the same thing. It uses the gross investment in the project (in current dollars) as the equivalent of the initial investment, assumes that the gross current-dollar cash flow is maintained over the project life and computes a real internal rate of return. There are, however, some significant differences.

¹² With a 11.71% rate, the economic depreciation works out to \$105.37 million, and the CFROI to 11.71%.

- The internal rate of return does not require the after-tax cash flows to be constant over a project's life, even in real terms. The CFROI approach assumes that real cash flows on assets do not increase over time. This may be a reasonable assumption for investments in mature companies, but will understate project returns if there is real growth. Note, however, that the CFROI approach can be modified to allow for real growth.
- The second difference is that the internal rate of return on a project or asset is based upon incremental future cash flows. It does not consider cash flows that have occurred already, since these are viewed as "sunk." The CFROI, on the other hand, tries to reconstruct a project or asset, using both cash flows that have occurred already and cash flows that are yet to occur.

To link the cash flow return on investment with firm value, begin with a simple discounted cash flow model for a firm in stable growth:

$$\text{Firm Value} = \frac{\text{FCFF}_1}{(k_c - g_n)}$$

where FCFF is the expected free cash flow to the firm, k_c is the cost of capital and g_n is the stable growth rate. Note that this can be rewritten, approximately, in terms of the CFROI as follows:

$$\text{Firm Value} = \frac{(\text{CFROI} * \text{GI} - \text{DA})(1 - t) - (\text{CX} - \text{DA}) - \Delta \text{WC}}{(k_c - g_n)}$$

where CFROI is the cash flow return on investment, GI is the gross investment, DA is the depreciation and amortization, CX is the capital expenditure and ΔWC is the change in working capital. To illustrate, consider a firm with a CFROI of 30%, a gross investment of \$ 100 million, capital expenditures of \$ 15 million, depreciation of \$ 10 million and no working capital requirements. If you assume a 10% cost of capital, a 40% tax rate and a 5% stable growth rate, it would be valued as follows:

$$\text{Firm Value} = \frac{(.30 * 100 - 10)(1 - .4) - (15 - 10) - 0}{(.10 - .05)} = \$ 140 \text{ million}$$

More important than the mechanics, however, is the fact that firm value, while a function of the CFROI is also a function of the other variables in the equation – the gross investment, the tax rate, the growth rate, the cost of capital and the firm's reinvestment needs.

Again, sophisticated users of CFROI do recognize the fact that value comes from the CFROI not just on assets in place but also on future investments. In fact, Holt Associates, one of CFROI's leading proponents, allows for a fade factor in CFROI, where the current CFROI fades towards the real cost of capital over time. The "fade factor" is estimated empirically by looking at firms in different CFROI classes and tracking them over time. Thus, a firm that has a current CFROI of 20% and real cost of capital of 8% will be projected to have lower CFROI over time. The value of the firm, in this more complex format, can then be written as a sum of the following:

- The present value of the cash flows from assets in place over their remaining life, which can be written as $\sum_{t=1}^{t=n} \frac{CFROI_{aip} * GI_{aip}}{(1 + k_c)^t}$, where $CFROI_{aip}$ is the CFROI on assets in place, GI_{aip} is the gross investment in assets in place and k_c is the real cost of capital.
- The present value of the excess cash flows from future investments, which can be written in real terms as $\sum_{t=1}^{t=\infty} \frac{CFROI_{t,NI} * \Delta GI_t}{(1 + k_c)^t} - \Delta GI_t$, where $CFROI_{t,NI}$ is the CFROI on new investments made in year t and ΔGI_t is the new investment made in year t. Note that if $CFROI_{t,NI} = k_c$, this present value is equal to zero.

Thus, a firm's value will depend upon the CFROI it earns on assets in place and both the abruptness and the speed with which this CFROI fades towards the cost of capital. Thus, a firm can therefore potentially increase its value by doing any of the following:

- Increasing the CFROI from assets in place, for a given gross investment,
- Reducing the speed at which the CFROI fades towards the real cost of capital
- Reduce the abruptness with which CFROI fades towards the cost of capital

Note that this is no different from the earlier analysis of firm value in the discounted cash flow approach, in terms of cash flows from existing investments (increase current CFROI), the length of the high growth period (reduce fade speed) and the growth rate during the growth period (keep excess returns from falling as steeply).

CFROI and Firm Value: Potential Conflicts

The relationship between CFROI and firm value is less intuitive than the relationship between EVA and firm value, partly because it is a percentage return. Notwithstanding this fundamental weakness, managers can take actions that increase CFROI while reducing firm value.

- *Reduce Gross Investment:* If the gross investment in existing assets is reduced, the CFROI may be increased. Since it is the product of CFROI and Gross Investment that determines value, it is possible for a firm to increase CFROI and end up with a lower value.
- *Sacrifice Future Growth:* CFROI, even more than EVA, is focused on existing assets and does not look at future growth. To the extent that managers increase CFROI at the expense of future growth, the value can decrease while CFROI goes up.
- *The Risk Trade Off:* While the CFROI is compared to the real cost of capital to pass judgment on whether a firm is creating or destroying value, it represents only a partial correction for risk. The value of a firm is still the present value of expected future cash flows. Thus, a firm can increase its spread between the CFROI and cost of capital but still end up losing value if the present value effect of having a higher cost of capital dominates the higher CFROI.

In general, then, an increase in CFROI does not, by itself, indicate that the firm value has increased, since it might have come at the expense of lower growth and/or higher risk.

CFROI and Market Value

There is a relationship between CFROI and market value. Firms with high CFROI generally have high market value. This is not surprising, since it mirrors what was noted about economic value added earlier. However, it is changes in market value that create returns, not market value per se. When it comes to market value changes, the relationship between EVA changes and value changes tends to be much weaker. Since market values reflect expectations, there is no reason to believe that firms that have high CFROI will earn excess returns.

The relationship between changes in CFROI and excess returns is more intriguing. To the extent that any increase in CFROI is viewed as a positive surprise, firms with the biggest increases in CFROI should earn excess returns. In reality, however, the actual change in CFROI has to be measured against expectations; if CFROI increases, but less than expected, the market value should drop; if CFROI drops but by less than expected, the market value should increase.

CFROI at Technology Firms

The cash flow return on investment, like economic value added, tends to work better at firms with substantial assets in place. Technology firms get a substantial portion of their value from future growth potential, and it is not clear whether the CFROI on existing assets provides much information about this potential. In addition, the emphasis placed on the gross investment to estimate CFROI makes it easier to use for a manufacturing firm with tangible assets and more difficult to analyze for a technology firm whose biggest assets might emerge from their research.

You would also expect much lower correlation between changes in CFROI and changes in market value at technology firms, because the expectation for these firms is that the CFROI will change over time. Thus, Motorola might report a higher CFROI next year than it reports this year, but the market value of Motorola may drop on the report, if

the increase does not match expectations. Cisco, on the other hand, might report a lower CFROI but it might see its market value go up, because the drop was less than expected.

Conclusion

The value of a firm has three components. The first is its capacity to generate cash flows from existing assets, with higher cash flows translating into higher value. The second is its willingness to reinvest to create future growth, and the quality of these reinvestments. Other things remaining equal, firms that reinvest well and earn significant excess returns on these investments will have higher value. The final component of value is the cost of capital, with higher costs of capital resulting in lower firm values. To create value then a firm has to

- Generate higher cash flows from existing assets, without affecting its growth prospects or its risk profile
- Reinvest more and with higher excess returns, without increasing the riskiness of its assets
- Reduce the cost of financing its assets in place or future growth, without lowering the returns made on these investments

All value enhancement measures are variants on these simple themes. Whether these approaches measure dollar excess returns, as does economic value added, or percentage excess returns, like CFROI, they have acquired followers because they seem simpler and less subjective than discounted cash flow valuation. This simplicity comes at a cost, since these approaches make subtle assumptions about other components of value that are often not visible or not recognized by many users. Approaches that emphasize economic value added and reward managers for increasing the same often assume that increases in economic value added are not being accomplished at the expense of future growth or by increasing risk. Practitioners who judge performance based upon the cash flow return on investment make similar assumptions.

As you look at various approaches to value enhancement, you should consider a few facts. The first is that no value enhancement mechanism will work at generating value unless there is a commitment on the part of managers to making value maximization their primary objective. If managers put other goals first, then no value enhancement mechanism will work. Conversely, if managers truly care about value maximization, they can make almost any mechanism work in their favor. The second is that while it is sensible to connect whatever value enhancement measure you have chosen to management compensation, there is a down side. Managers, over time, will tend to focus their attention on making themselves look better on that measure even if that can be accomplished only by reducing firm value. Finally, there are no magic bullets that create value. Value creation is hard work in competitive markets and almost involves a trade off between costs and benefits. Everyone has a role in value creation, and it certainly is not the sole domain of financial analysts. In fact, the value created by financial engineers is smaller and less significant than the value created by good strategic, marketing, production or personnel divisions.