
VALUE ENHANCEMENT: A DISCOUNTED CASHFLOW VALUATION FRAMEWORK

In much of this book, we have taken on the role of a passive investor valuing going concerns. In this chapter, we switch roles and look at valuation from the perspective of those who can make a difference in the way a company is run and hence its value. Our focus is therefore on how actions taken by managers and owners can change the value of a firm.

We will use the discounted cash flow framework that we have developed in earlier parts of the book to explore the requirements for an action to be value creating and then go on to examine the different ways in which a firm can create value. In the process, we will also examine the role that marketing decisions, production decisions, and strategic decisions have in value creation.

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.

1. increase the cash flows generated by existing investments
2. increase the expected growth rate in earnings
3. increase the length of the high growth period
4. 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.

- Stock dividends and stock splits change the number of units of equity in a firm but do not affect cash flows, growth or value. These actions can have price effects, though, because they alter investors' perceptions of the future of the company.

- 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, firms have spent an increasing amount of time on the management and smoothing of earnings and seem to believe that there is a value payoff in doing this.
- When making acquisitions, firms often try to structure the deals 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.
- In the late 1990s, a number of firms that have issued tracking stock on their high-growth divisions. Since these divisions remain under the complete control of the parent company, we would argue that the issue of tracking stock, by itself, should not create value.

Some would take issue with some of these propositions. When a stock splits or a firm issues tracking stock, they would argue, the stock price often goes up¹ significantly. While this is true, we would emphasize that it is value, not price, that we claim is unaffected by these actions.

While paying stock dividends, splitting stock and issuing tracking stock are value neutral actions, they can still be useful tools for a firm that perceives itself to be undervalued by the market. These actions can change market perceptions about growth or cash flows and thus act as signals to financial markets. 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 even 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

The value of a firm can be increased by increasing cash flows from assets in place, increasing expected growth and the length of the growth period and by reducing the cost of capital. In reality, however, none of these is easily accomplished or likely to reflect all the qualitative factors that we, as financial analysts, are often accused of ignoring in valuation. In this section, we will consider how actions taken by a firm on a variety of fronts – marketing, strategic and financial – can have an effect on value.

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 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 we 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 will depend 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.

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

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

How does a divestiture affect a firm's value? To answer, we compare the price received on the divestiture to the present value of the expected cash flows that the firm would have received from the divested assets. There are three possible scenarios.

1. If the divestiture value is equal to the present value of the expected cash flows, the divestitures will have no effect on the divesting firm's value.
2. If the divestiture value is greater than the present value of the expected cash flows, the value of the divesting firm will increase on the divestiture.
3. If the divestiture value is less than the present value of the expected cash flows, the value of the firm will decrease on the divestiture.

The divesting firm receives cash in return for the assets and can choose to retain the cash and invest it in marketable securities, invest the cash in other assets or new investments, or return the cash to stockholders in the form of dividends or stock buybacks. This action, in turn, can have a secondary effect on value.

Illustration 31.1: Potential for value creation from divestiture: Boeing

While it is difficult to make judgments about individual investments that firms might have and their capacity to generate continuing value, you can make some observations about the potential for value creation from divestitures and liquidation by looking at the cost of capital and return on capital earned by different divisions of a firm. For instance, Boeing earned a return on capital of 5.82% in 1998, while its cost of capital was 9.18%. Breaking down Boeing's return, by division, we obtain the numbers in Table 31.1.

Table 31.1: Return and Cost of Capital

	<i>Commercial Aircraft</i>	<i>Information, Space & Defense</i>	<i>Firm</i>
Operating Income	\$ 75	\$ 1,576	\$ 1,651

Capital Invested	\$ 18,673	\$ 9,721	\$ 28,394
After-tax ROC	0.40%	16.21%	5.82%

At Boeing's annual meeting in 1999, Phil Condit, Boeing's CEO, was candid in admitting that 35% of Boeing's capital was in investments that earned less than the cost of capital. He revealed little, however, about whether it would be feasible to liquidate² or divest these investments and get more than continuing value from such actions.

Assume that Boeing is interested in selling its information, space and defense systems division and that it has found a potential buyer who is willing to pay \$11 billion for the division. The division reported cash flows before debt payments, but after reinvestment needs and taxes, of \$393 million in the most recent year and the cash flows are expected to grow 5% a year in the long term. The cost of capital for the division is 9%, a little lower than the cost of capital for the entire firm. The division, as a continuing part of Boeing, can be valued.

$$\text{Value of Division} = \frac{(\$393)(1.05)}{(0.09 - 0.05)} = \$10,316 \text{ million}$$

With the divestiture value of \$11 billion, the net effect of the divestiture will be an increase in Boeing's value of \$684 million.

$$\begin{aligned} \text{Net Effect on Value} &= \text{Divestiture Value} - \text{Continuing Value} = \$11,000 \text{ mil} - \$10,316 \text{ mil} \\ &= \$ 684 \text{ million} \end{aligned}$$

Reasons for Divestitures

Why would a firm sell assets or a division? There are at least three reasons. The first is that the divested assets may have a higher value to the buyer of these assets. For assets to have a higher value, they have to either generate higher cash flows for the buyers or result in lower risk (leading to a lower discount rate). The higher cash flows can occur because the buyer is more efficient at utilizing the assets or because the buyer finds synergies with its existing businesses. The lower discount rate may reflect the fact that the owners of the buying firm are more diversified than the owners of the firm selling the

² In 1999, Lockheed, Boeing's leading competitor in the sector, announced plans to divest itself of approximately 15% of its assets as a remedy for its poor stock price performance.

assets. In either case, both sides can gain from the divestiture and share in the increased value.

The second reason for divestitures is less value-driven and more a result of the immediate cash flow needs of the divesting firm. Firms that find themselves unable to meet their current operating or financial expenses may have to sell assets to raise cash. For instance, many leveraged acquisitions in the 1980s were followed by divestitures of assets. The cash generated from these divestitures was used to retire and service debt.

The third reason for divestitures relates to the assets not sold by the firm, rather than the divested assets. In some cases, a firm may find the cash flows and values of its core businesses affected by the fact that it has diversified into unrelated businesses. This lack of focus can be remedied by selling assets or businesses that are peripheral to the main business of a firm.

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.

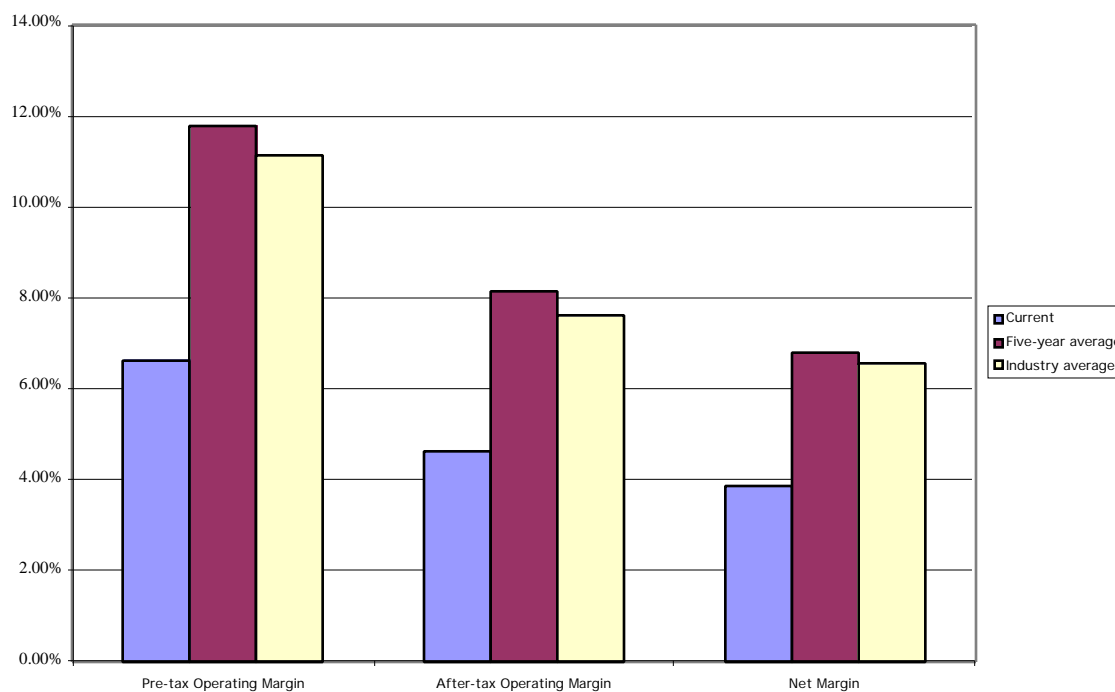
In most firms, the first step in value enhancement takes the form of cost cutting and layoffs. These actions are value enhancing only if the resources that are pruned do not contribute sufficiently either to current operating income or to future growth. Companies can easily show increases in current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

Illustration 31.2: Operating Margin Comparisons

In Chapter 22, we valued Marks and Spencer in 2000 and noted that its value was depressed because its operating margins had dropped over the previous two years. In

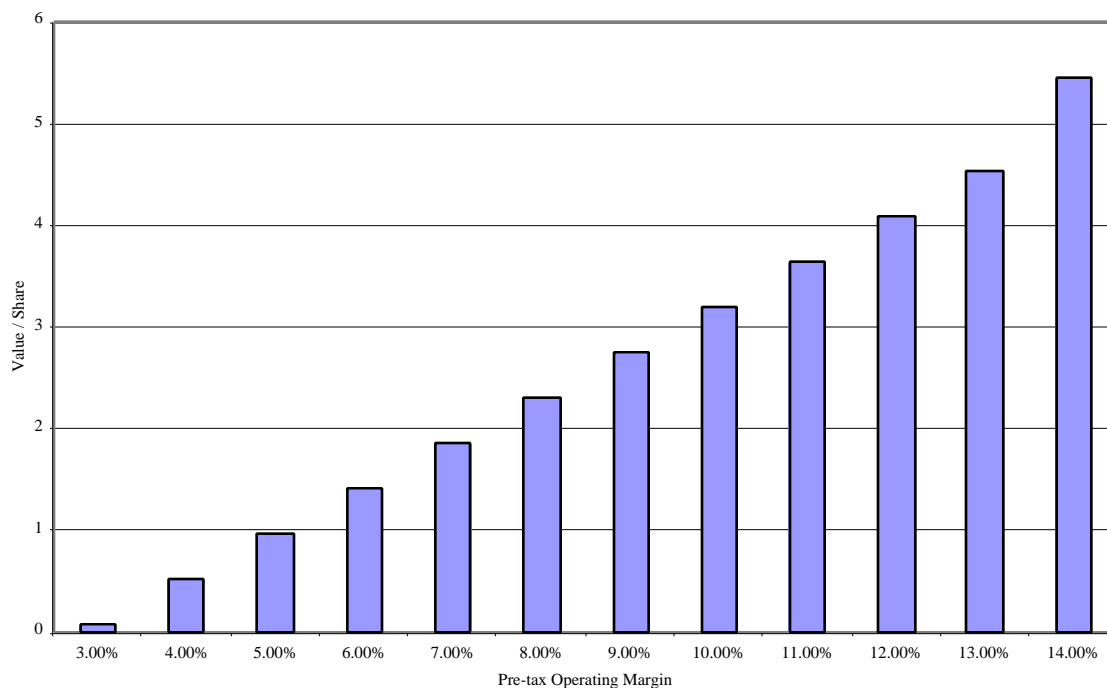
Figure 31.1, we compare the after-tax operating margins at Marks and Spencer in 2000 with the average after-tax margin earned by the firm over the previous five years and the average after-tax margin in 2000 for other firms in the sector.

Figure 31.1: Marks and Spencer: Margin Comparisons



Marks and Spencer's current margins lag both its own historical levels and the average for the sector. We estimated the effect on value per share, at Marks and Spencer, of improvements in the operating margin from the current level. Figure 31.2 summarizes the effect of these changes.

Figure 31.2: Operating Margin and Value per Share: Marks and Spencer



While it is not surprising that the value per share is sensitive to changes in the operating margin, you can see that the decline in operating margins from historical levels to the current one have had a significant impact on value. Any value enhancement the firm plans, therefore, has to be centered on improving operating margins.

Some Thoughts on Cost Cutting

Firms embark on cost cutting with a great deal of fanfare but seem to have trouble carrying through. Cost cutting is often promised by firms, especially after acquisitions or new management comes into the firm, but seldom delivered. We would make the following general conclusions about cost cutting.

- The greater the absolute magnitude of the cost cuts promised, the more likely it is that they will not be delivered.
- Cost cutting is never painless – not only is the human cost associated with layoffs large, but there is an associated loss of morale that can be just as expensive.
- The initial phases of cost cuts go much more smoothly than the later phases. Part of the reason for this is that the easy cost cuts come first and the tough ones come later.

- It is far more difficult to separate those costs that do not generate benefits for the firm from those that do than it seems at the outset, especially if we think of benefits in the long term.
- Cost cutting that is promised in the abstract is less likely to happen than cost cutting that is described in detail – an example would be a bank merger where the branches that will be closed after the merger are specified as opposed to one where the bank just specified that economies of scale will lower costs.

From a valuation perspective, you should first evaluate the credibility of the management that is making the cost cutting claims and, even if you believe the managers, you should phase the costs cuts in over a long period – the larger the firm and the bigger the cost cuts, the longer the period.

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 another³.
- 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

³ 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.

rates⁴. This is especially the case when a firm faces a windfall or supernormal profit taxes.

Illustration 31.3: Tax Burden and Valuation

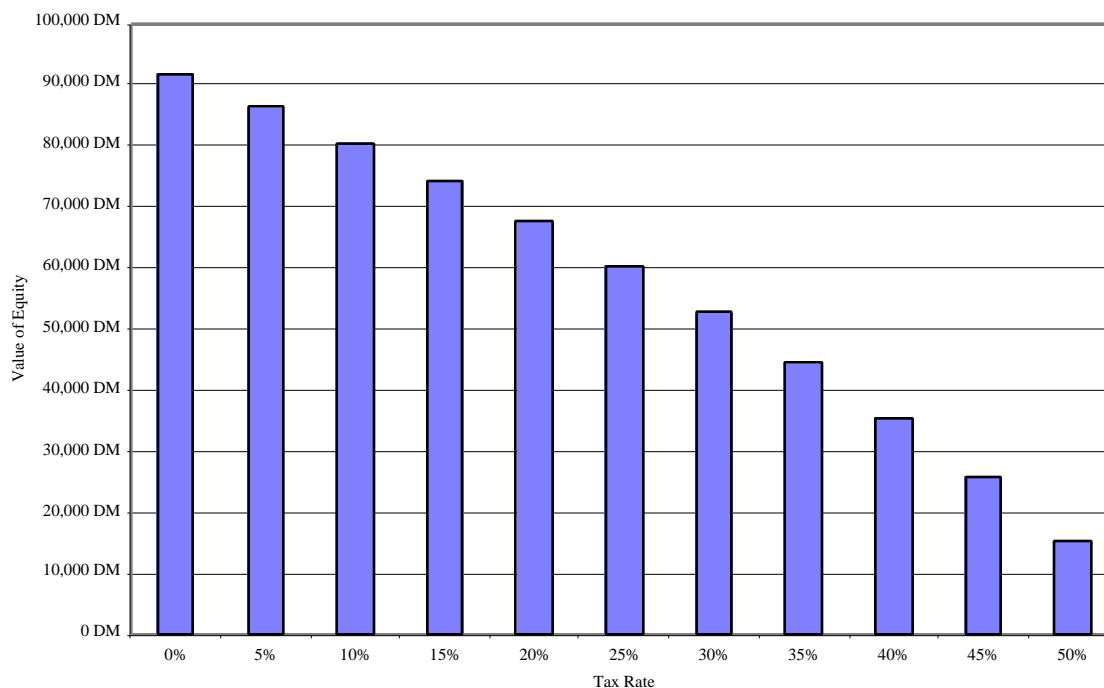
In Chapter 22, we valued Daimler Chrysler, using a tax rate of 44%, which is much higher than the tax rates we have used for other companies that we have valued. As a German company, Daimler is clearly much more exposed to high tax rates, but there are two forces that may change this tax rate.

- With the acquisition of Chrysler and the increasing globalization of its business, Daimler Chrysler has far more options when it comes to moving income to lower tax locales.
- As a result of expected changes in German law, the tax rate in Germany will decline over the next 5 years.

We show the impact on the value of equity at Daimler Chrysler of changes in the tax rate from 0% to 50% in Figure 31.3.

⁴ Stulz (1996) makes this argument for risk management. He also presents other ways in which risk management can be value enhancing.

Figure 31.3: Daimler Chrysler: Tax Rate versus Value of Equity



The value of equity changes dramatically as the tax rate changes and would triple from the base case value, if the tax rate were zero. This is notwithstanding the fact that the tax benefits from depreciation and interest expenses also decline as the tax rate drops.

1.4: Reduce net capital expenditures on existing investments

The net capital expenditures is the difference between capital expenditures and depreciation. 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 part is to maintain existing assets. If a firm can reduce its net capital expenditures on existing assets, it will increase value. During short periods, the capital expenditures can even be lower than depreciation for those assets, creating a cash inflow from net capital expenditures.

There is generally a trade off between capital maintenance expenditures and the life of existing assets. A firm that does not make any capital expenditures on its assets 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 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

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. For retailers and service firms, non-cash working capital may be a much larger drain on cash flows than traditional capital expenditures.

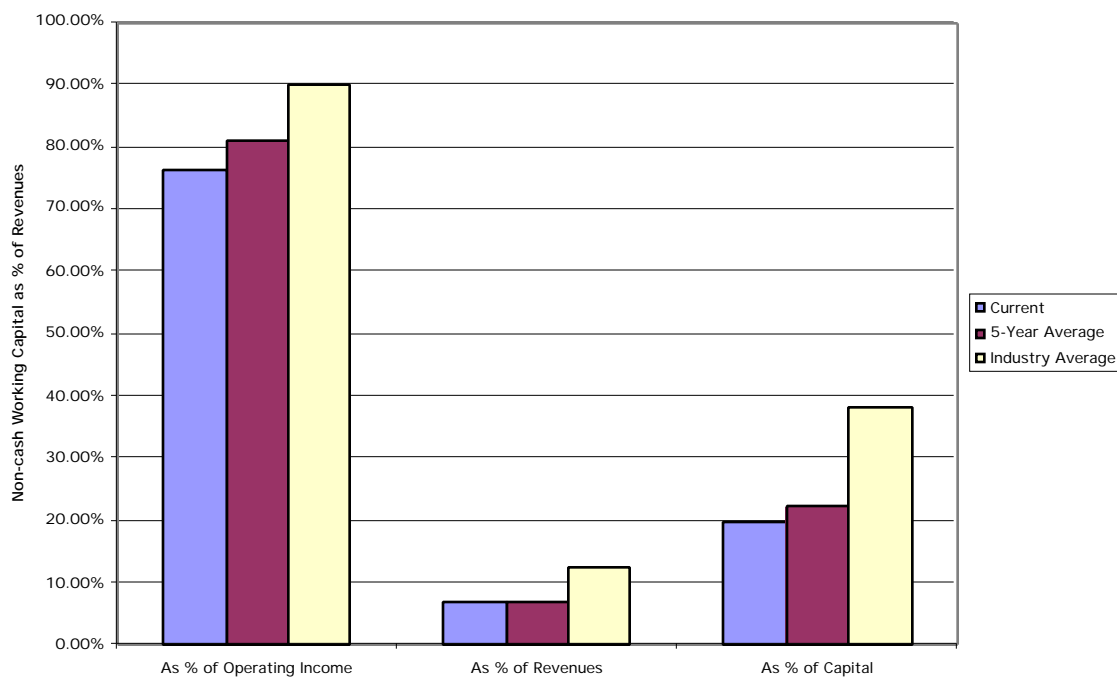
The path to value creation seems simple. Reducing non-cash working capital as a percent of revenues should increase cash flows and therefore, value. This assumes, however, that there are no negative consequences for growth and operating income. Firms generally maintain inventory and provide credit because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

The availability of updated reliable data has made it easier for firms to plan and reduced the need for inventory and working capital. In fact, the average non-cash working capital as a percent of revenues at major U.S. corporations has dropped from 17.6% in 1988 to 14.5% in 1998.

Illustration 31.4: Non-Cash Working Capital: The Home Depot

Consider a large retail firm like the Home Depot. It has significant investments in working capital and changes in this input can make a significant difference to the value of equity in the firm. In Figure 31.4, we compare non-cash working capital as a percent of revenues, operating income and book value of capital invested for the Home Depot for 1998 with the previous five years and the average for the sector.

Figure 31.4: Home Depot's Working Capital Investment



Due to its economies of scale, the Home Depot carries far less working capital than its competitors and this has a positive effect on both cash flows and value. In 1998, we valued the Home Depot using the following inputs for the valuation.

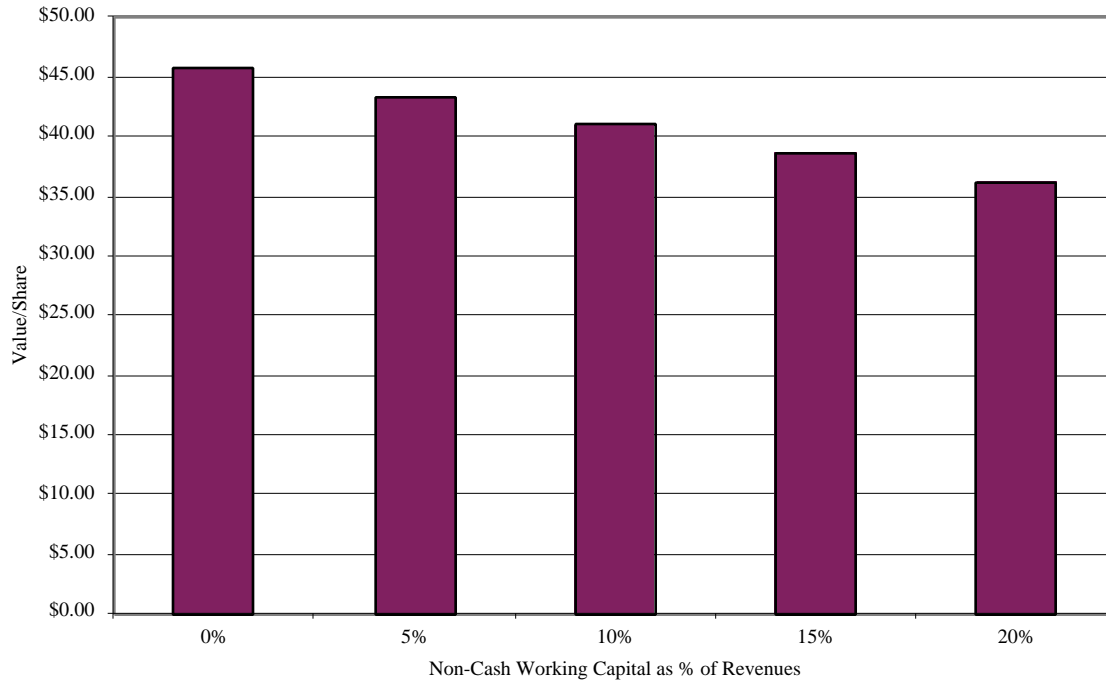
Table 31.2: Valuing the Home Depot

	High Growth Phase	Stable Growth Phase
Length	10 years	Forever after year 10
Growth Inputs		
- Reinvestment Rate	88.62%	35.46%
- Return on Capital	16.37%	14.10%
- Expected Growth rate	14.51%	5.00%
Cost of Capital Inputs		
- Beta	0.87	0.87
- Cost of Debt	5.80%	5.50%
- Debt Ratio	4.55%	30.00%
- Cost of Capital	9.52%	7.92%
General Information		
- Tax Rate	35%	35%

The value per share that we obtained, which is summarized in Figure 31.5, was \$42.55. We looked at the impact on The Home Depot's value of changing the non-cash working

capital as a percent of revenues. As non-cash working capital increases, the value of equity decreases and the results are graphed in Figure 31.6.

Figure 31.6: The Home Depot: Working Capital and Value/Share

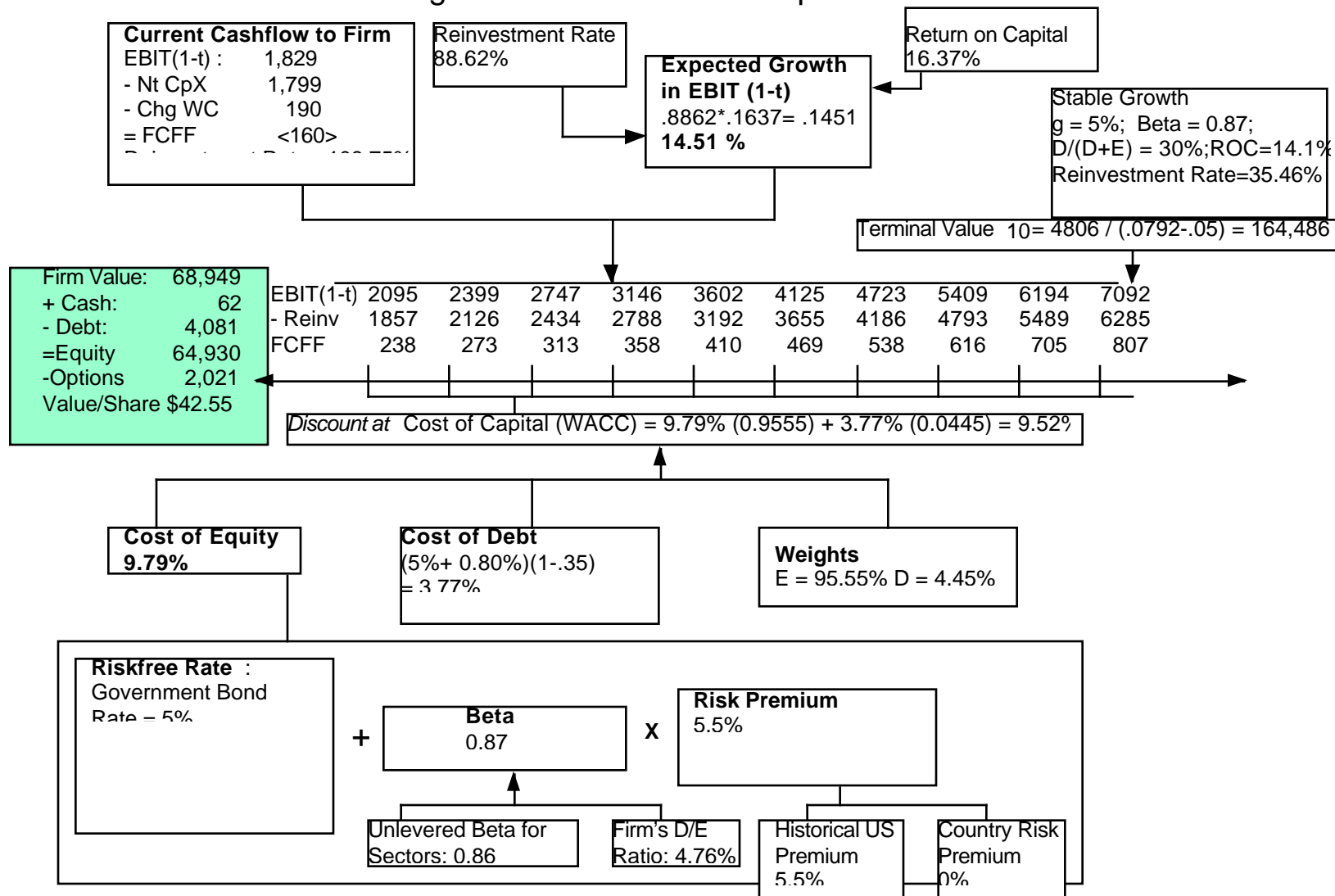


As the non-cash working capital increases from 0% to 20% of revenues, the value per share decreases by approximately 20%.



cfbasics.xls: There is a dataset on the web that summarizes operating margins, tax rates and non-cash working capital as a percent of revenues by industry group for the United States.

Figure 31.5: The Home Depot: A Valuation



2. Increase Expected Growth

A firm with low current cash flows can still have high value if it is able to grow quickly. For profitable firms, the growth will be defined in terms of earnings but for money-losing firms, you have to consider the nexus of revenue growth and higher margins.

I. Profitable Firms

Higher growth either arises from increases in reinvestment or a higher return on capital. It does not always translate into higher value, though, since higher growth can be offset by changes elsewhere in the valuation. Thus, higher reinvestment rates usually result in higher expected growth but at the expense of lower cash flows, since reinvestment reduces the free cash flows. Higher returns on capital also cause expected growth to increase, but value can still go down if the new investments are in riskier businesses and there is a more than proportionate increase in the cost of capital.

The trade off from increasing the reinvestment rate is listed in Table 31.3. 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 31.3: Trade off on Reinvestment Rate

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

We 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 we 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 we 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 will 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, we 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. The increase in growth will increase value, and there are generally no offsetting effects. 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.

Using the comparison between return on capital and cost of capital, a firm that earns a return on capital that is less than its cost of capital can get an increase in value by accepting higher return investments, but it would get an even greater increase in value by not investing at all and returning the cash to the owners of the business. Liquidation or partial liquidation might be the most value enhancing strategy for firms trapped in businesses where it is impossible to earn the cost of capital.

Illustration 31.5: Reinvestment Rates, Return on Capital and Value

In 1998, Boeing earned a return on capital of 6.59% and had a reinvestment rate of 65.98%. If you assume a cost of capital of 9.17% for the firm, you would value the equity in the firm at \$13.14 a share. In the same year, the Home Depot had a return on

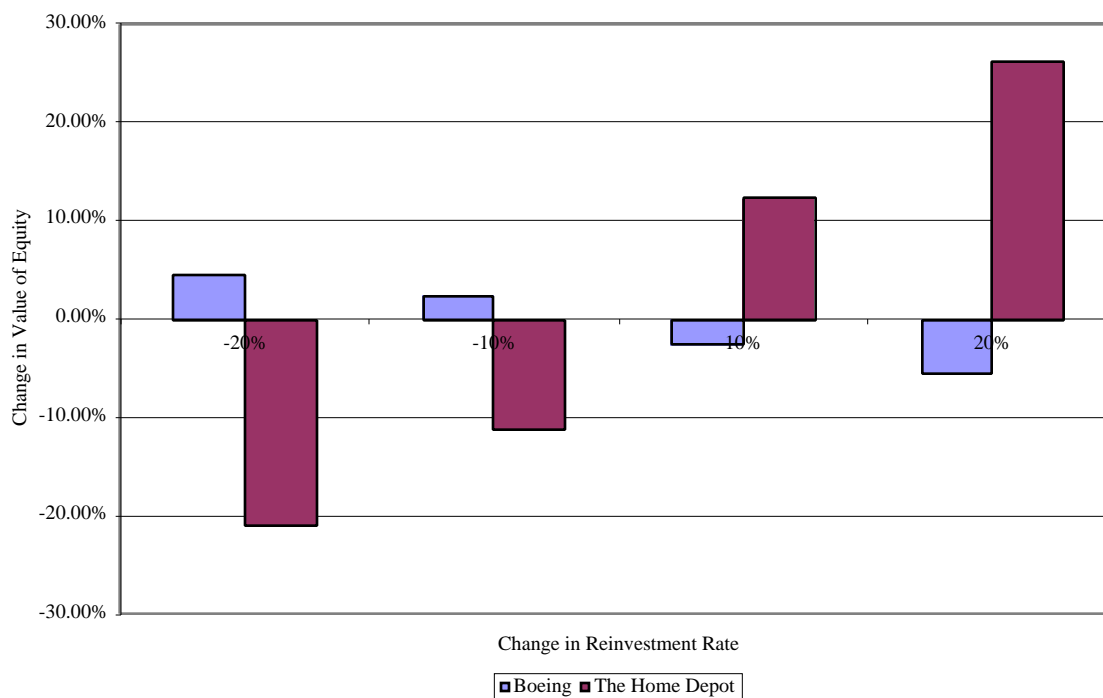
capital of 16.38%, a reinvestment rate of 88.62% and a cost of capital of 9.51%, resulting in a value per share of \$42.55.

Table 31.4: Value per Share

	<i>Boeing</i>	<i>The Home Depot</i>
Cost of Capital	9.17%	9.51%
Return on Capital	6.59%	16.38%
Reinvestment Rate	65.98%	88.62%
Expected Growth Rate	4.35%	14.51%
Value Per Share	\$13.14	\$42.55

If the Home Depot could increase its reinvestment rates, without affecting its returns on capital, the effect on value will be positive, because it is earning excess returns. For Boeing, the effect of increasing the reinvestment rate at the current return on capital will be negative, since the firm's return on capital is less than its cost of capital. In Figure 31.7, we summarize the impact on the value of equity of changing the reinvestment rate at both firms, keeping the cost of capital.

Figure 31.7: Effect of Changes in the Reinvestment Rate on the Value of Equity



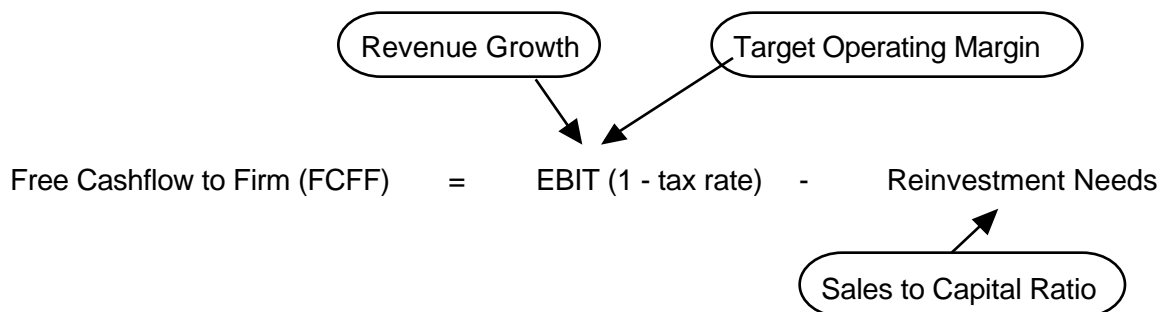
To illustrate, we reduced the reinvestment rate at Boeing from 65.98% to 45.98% and examined the percentage effect on value of equity; the change was + 4.49%. The effects of a similar change at the Home Depot was negative. The effect of changes in the reinvestment rate were dramatic at the Home Depot, because the high growth period lasts 10 years.

fundgrEB.xls: There is a dataset on the web that summarizes returns on capital and reinvestment rates by industry group for the United States.

II. 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 31.8 summarizes the impact of each of these variables on the cash flows.

Figure 31.8: 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 take⁵. 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. If the return on capital substantially exceeds the cost of capital, new competitors will

⁵ “Competitive Strategy”, Michael Porter

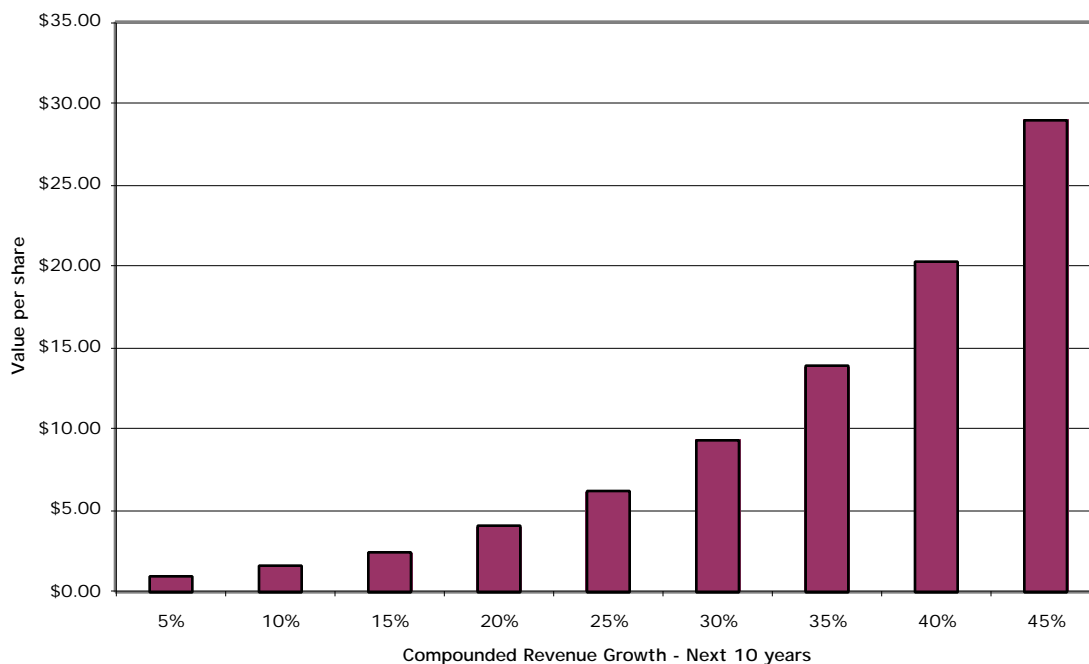
enter the market, making it more difficult to sustain the expected operating margins and revenue growth.

Illustration 31.6: Revenue Growth, Operating Margins and Sales to Capital Ratios

In Chapter 23, we valued Commerce One, a firm with an operating loss of \$529 million and only \$537 million in revenues. Using a compounded revenue growth rate of 40.24%, a target operating margin of 14.72% in ten years and a sales to capital ratio of 2.20, we estimated a value for the firm of \$4.8 billion and value per share of \$19.26. Changes in these inputs can have a dramatic effect on the value of the firm, as we noted in Chapter 23.

As you would expect, higher revenue growth translates into higher values per share. Figure 31.9 graphs the change in value per share for Commerce One as a function of the change in expected growth rate in revenues over the next decade.

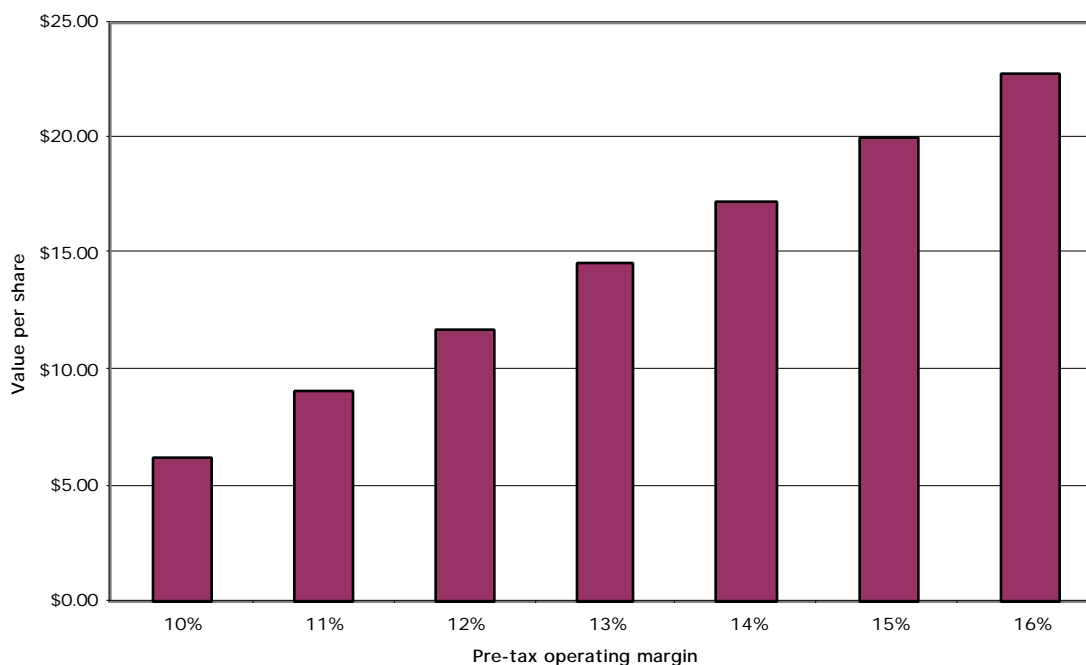
Figure 31.9: Revenue Growth and Value per share



Thus, Commerce One's value per share increases by 50% if the compounded revenue growth over the next 10 years is 45% instead of 40%. By the same token, the value per share drops by a third if the growth rate is 35%.

While higher revenue growth clearly increases value, we assumed that the target margin would remain unchanged as we change the growth rate. The target margin is just as important, if not more so, than revenue growth in determining value. In Figure 31.10, we estimate the value per share, holding revenue growth at 40.24% and changing the target margin.

Figure 31.10: Value per share and Sustainable Margins



Every 1% change in the target operating margin changes the value by approximately \$3 per share.

The trade off between revenue growth and margins is made more explicit in Table 31.5, which shows value per share as a function of both variables.

Table 31.5: Margin versus Revenue Growth: Commerce One

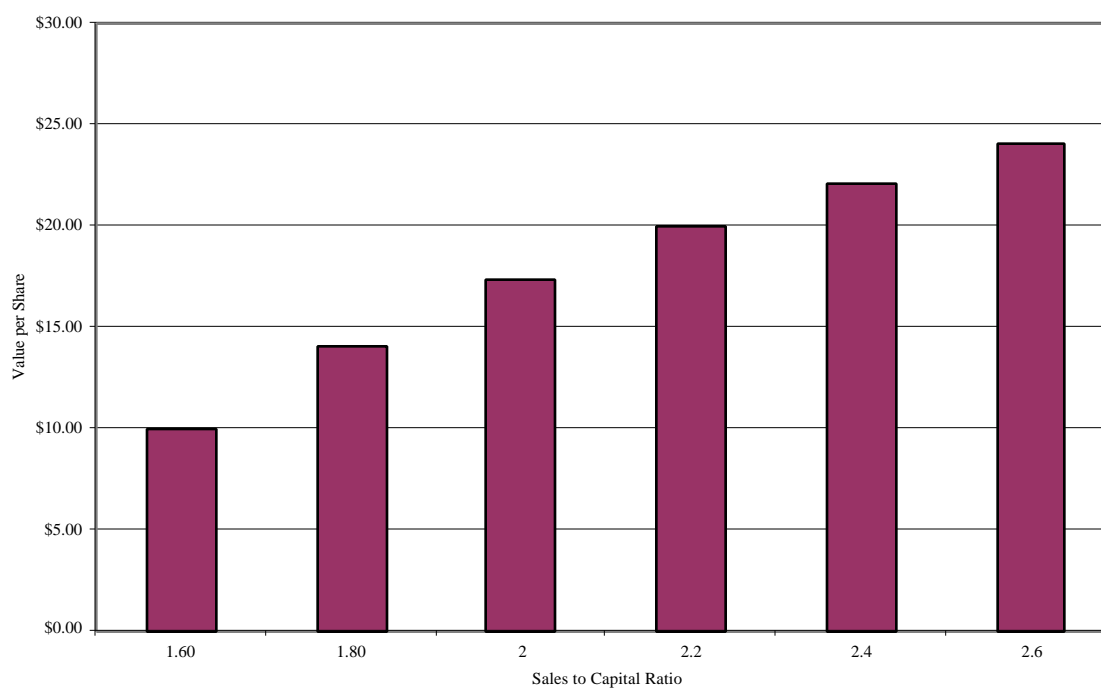
		Target Pre-tax Operating Margin in 10 years				
		8%	10%	12%	14%	16%
Compounded Revenue Growth over	10%	\$0.00	\$0.00	\$0.00	\$0.47	\$1.08
	20%	\$0.00	\$0.18	\$1.46	\$2.91	\$4.29
	30%	\$0.02	\$2.98	\$5.74	\$8.47	\$11.18

<i>next 10 years</i>	40%	\$3.51	\$8.94	\$14.36	\$19.77	\$25.17
	50%	\$10.31	\$20.74	\$31.16	\$41.56	\$51.97

Commerce One's value varies widely depending upon the combination of revenue growth and margins that you assume. In practical terms, this also provides the firm 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, because it determines both how much Commerce One has to reinvest to generate its expected growth rate. Figure 31.11 presents the effects on value per share of changing the sales to capital ratio over the high growth period for Commerce One. As we change the sales to capital ratio, we also change the return on capital in stable growth – it increases as the sales to capital ratio increases.

Figure 31.11: Value per Share versus Sales to Capital



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

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 for any length of time 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. Another way to express this idea is that companies earning excess returns have significant competitive advantages. Nurturing these advantages can increase value.

3.1: The Brand Name Advantage

As we noted earlier in the book, 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. Brand management and advertising can contribute in value creation. 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 globally⁶. 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 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 applies here. 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.

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

⁶ 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.

return. We 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 other 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 WordPerfect 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, if any, 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. This is the advantage, for instance, that the Home Depot has used to gain market share at the expense of its smaller and often local competitors.
- Owning or having exclusive rights to a distribution system can provide firms with a cost advantage over its competitors. For instance, American Airlines' ownership of the Sabre airline reservation system gave it an advantage over its competitors in attracting customers.
- Having access to lower-cost labor or resources can also provide cost advantages. Thus Southwest Airlines, with its non-unionized labor force, has an advantage over its unionized competitors, as do natural resource companies with access to reserves that are less expensive to exploit.

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 31.7: Potential for Increasing the Length of the High Growth Period

We examine the potential for increasing barriers to entry and by extension the excess returns and the length of the high growth period at Cisco and Motorola. The competitive advantages are different for the two firms 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.

We begin by valuing each of these firms using their current returns on capital and estimated reinvestment rates as inputs for the high growth period. Table 31.6 summarizes the inputs used in the base case valuations and the value per share estimated with these assumptions.

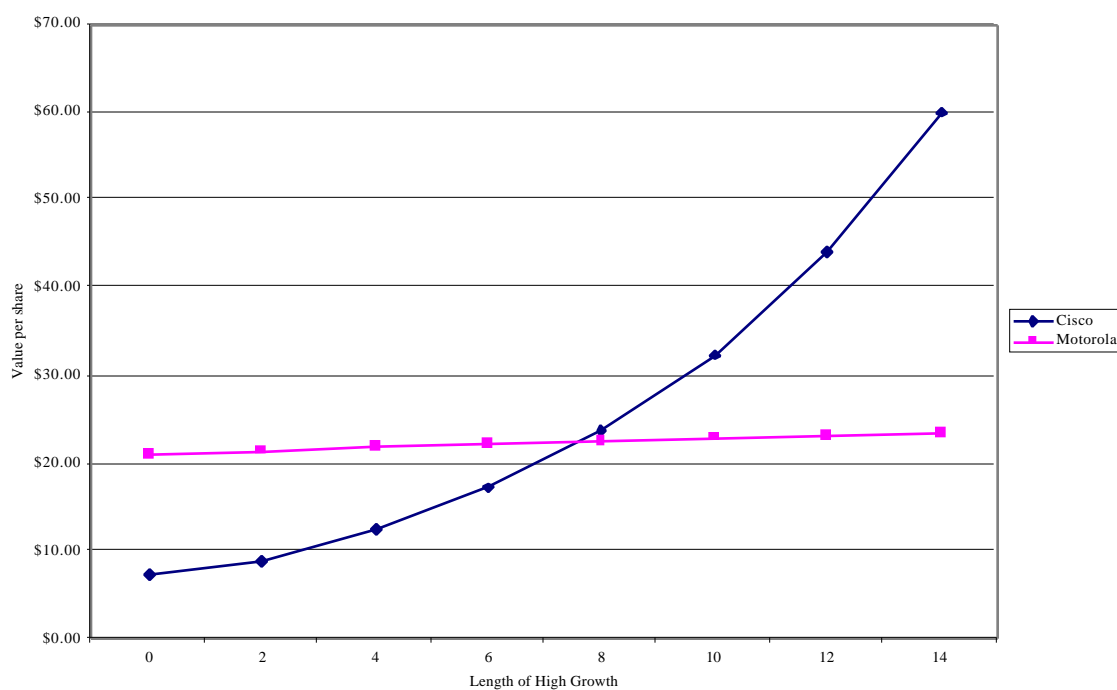
Table 31.6: Inputs for valuing Cisco and Motorola

	Cisco		Motorola	
	High Growth	Stable Growth	High Growth	Stable Growth
Beta	1.43	1.00	1.21	1.00

Cost of Equity	11.72%	10.00%	10.85%	10.00%
After-tax Cost of Debt	4.03%	4.03%	4.23%	4.23%
Debt Ratio	0.18%	10.00%	6.86%	6.86%
Cost of Capital	11.71%	9.40%	10.39%	9.58%
Return on Capital	34.07%	16.52%	12.12%	12.12%
Reinvestment Rate	106.8%	30.27%	52.99%	41.07%
Expected Growth Rate	36.39%	5.00%	6.45%	5.00%
Value per share	\$44.13		\$20.99	

In the base case, we assume 12 years of high growth for Cisco – six years of high growth and six years of transition – and 5 years of high growth for Motorola. We then consider how much the value per share changes as we change the growth period in Figure 31.12.

Figure 31.12: Value per Share and Length of High Growth



The effect of changing the length of the growth period is very different for the two firms. For Cisco, the value per share changes significantly as the length of the growth period change, increasing as it gets longer. For Motorola, the effect is muted and the value per share is relatively insensitive to changes in the length of the growth period. The reason lies in the excess returns that we are assuming for the two firms over the length of the growth period. For Cisco, the excess returns are very large and thus the impact on value is also large. For Motorola, we assume that the excess returns are relatively small and the effect on value is also much lower.

Lead Times from Competitive Advantages

A key question that we often face when looking at the effects of a competitive advantage on value is how long a competitive advantage lasts. This is a difficult question to answer because there are a number of firm specific factors but there are few interesting studies in corporate strategy that try to address the issue. Levin, Klevorick, Nelson and Winter (1987) estimate, for instance, that it takes between 3-5 years to duplicate a patented product or process and 1-3 years to duplicate an unpatented product or process. In the same study, they find that patenting is often much less effective at preventing imitation than moving quickly down the learning curve (producing more advanced versions of the product at lower cost) and establishing efficient sales and service networks. For example, Intel was able to maintain its competitive advantages even as its computer chips were being cloned by AMD by using the lead time it had to move quickly to the next generation chips.

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, we will 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 will affect 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 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 we argued in the chapters on capital structure, 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 firm 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 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.



wacc.xls: There is a dataset on the web that summarizes debt ratios and costs of capital by industry group for the United States.

Illustration 31.8: 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 31.7, the costs of equity and debt are estimated for Motorola for debt ratios from 0% to 90%.

Table 31.7: 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>
0%	1.16	10.63%	AAA	6.20%	35.00%	4.03%	10.63%
10%	1.24	10.96%	A-	7.25%	35.00%	4.71%	10.33%
20%	1.34	11.38%	B-	10.25%	35.00%	6.66%	10.43%
30%	1.48	11.91%	CC	12.00%	35.00%	7.80%	10.68%
40%	1.72	12.90%	C	13.50%	26.34%	9.94%	11.72%
50%	2.07	14.28%	C	13.50%	21.07%	10.66%	12.47%
60%	2.63	16.54%	D	16.00%	14.82%	13.63%	14.79%
70%	3.51	20.05%	D	16.00%	12.70%	13.97%	15.79%
80%	5.27	27.07%	D	16.00%	11.11%	14.22%	16.79%
90%	10.54	48.14%	D	16.00%	9.88%	14.42%	17.79%

Note that the cost of equity is estimated based upon the levered beta. As the debt ratio increases, the beta increases as well.⁷ 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 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). At a 10% debt ratio, Motorola's cost of capital is 10.33%, which is lower than the current cost of capital of 10.39%. Beyond 10%, though, the trade off operates against debt, the cost of capital increases as the debt ratio increases.

4.4: Change Financing Type

A fundamental principle in corporate finance 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 use of catastrophe bonds by insurance companies and commodity bonds by natural resource firms are good examples.

What about Miller-Modigliani?

⁷ Levered Beta = Unlevered Beta (1 + (1 - tax rate) (Debt/ Equity))

One of corporate finance's best known and most enduring propositions – the Miller-Modigliani theorem – argues that the value of a firm is independent of its capital structure. In other words, changing your financing mix should have no effect on your firm value. How would we reconcile our arguments in this section with the Miller Modigliani theorem? Note that the original version of the theorem was derived for a world with no taxes and default. With these assumptions, debt creates no tax advantages and no bankruptcy costs and does not affect value. In a world with taxes and default risk, you are much more likely to have to make trade offs and debt can increase value, decrease value or leave it unaffected depending upon how the trade offs operate.

The Value Enhancement Chain

We 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 we can distinguish between actions that create value.

- a. *Does an action create 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.
- b. *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.

Table 31.8 summarizes a value enhancement chain, where actions that create value are categorized both on how quickly they create value and on how much control the firm has over the value creation. Under the first column, titled "Quick Fixes", we have listed actions in which the firm has considerable control over the outcome and the benefit in terms of value creation is immediate. Under the second column, titled "Odds on", we have included actions that are likely to create value in the near or medium term and where the firm still continues to exercise significant control over the outcome. The third column, titled "Long Term", includes actions designed to create value in the long term. This is where the major strategic initiatives of the firm show up.

Illustration 31.9: A Value Enhancement Plan

In Illustration 31.7, we valued Motorola at \$22.05 using its current return on capital of 12.18% and debt ratio of 6.86% in the valuation. Figure 31.13 summarizes this valuation. Note, though, that the current return on capital is well below what the firm has earned historically and lags the industry average (of 22.36%) by almost 10%. If Motorola could increase its return on capital to 17.22% on its new investments (leaving its existing investments earning 12.18%) and increase its debt ratio to its optimal of 10%, its value per share would increase to \$23.86. The restructured valuation is summarized in Figure 31.14.



valenh.xls: This spreadsheet allows you to estimate the approximate effect of changing the way a firm is run on its value.

Figure 31.13: Motorola: A Status Quo Valuation

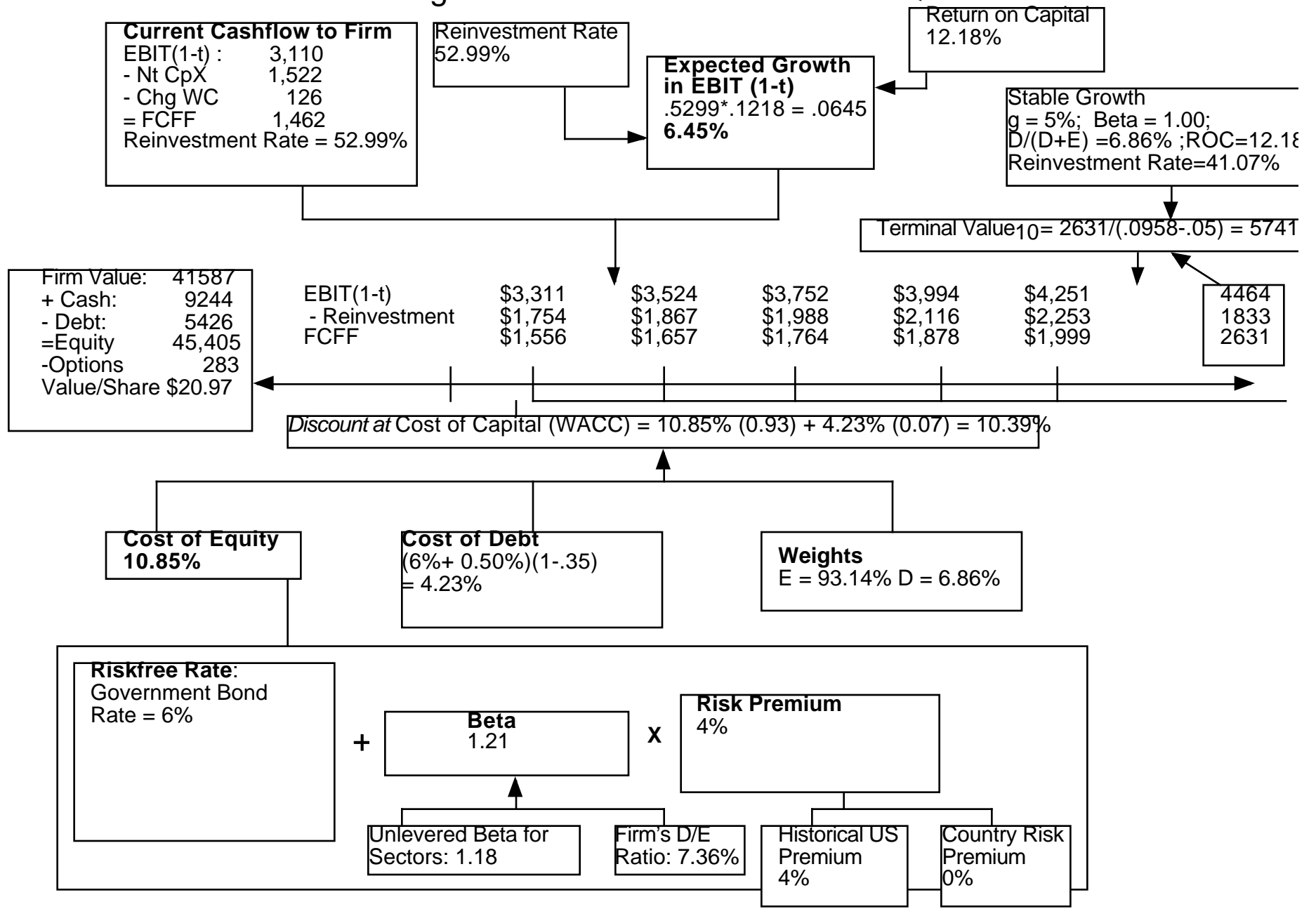


Figure 31.14: Motorola: A Restructured Valuation

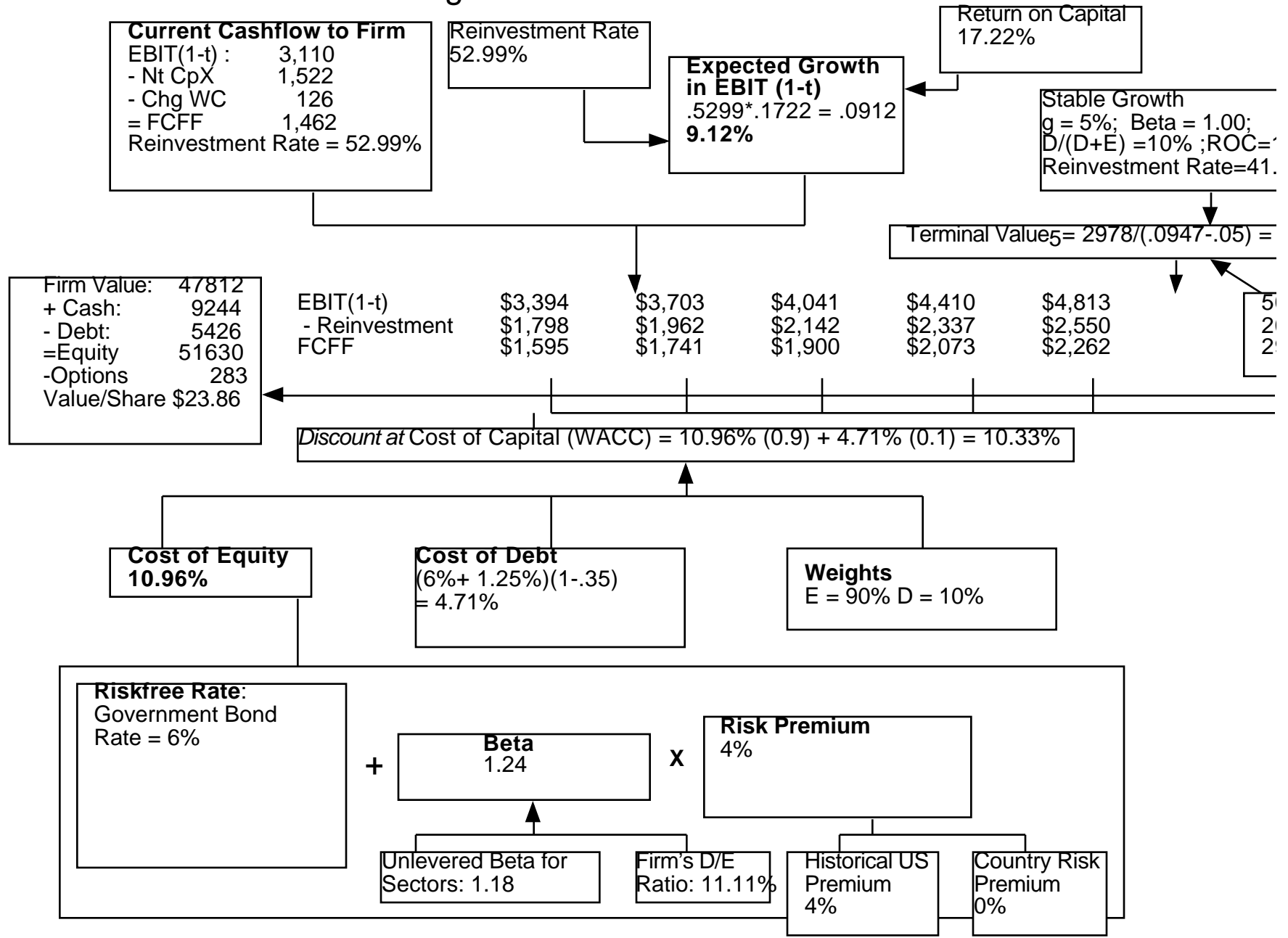


Table 31.8: The Value Enhancement Chain

More control

Less control

Payoff quickly

Payoff in long term



	<i>Quick Fixes</i>	<i>Odds on..</i>	<i>Long Term</i>
<i>Existing Investments</i>	<ul style="list-style-type: none"> a. Divest assets/projects with Divestiture Value > Continuing Value. b. Terminate projects with Liquidation Value > Continuing Value. c. Eliminate operating expenses that generate no revenues and no growth. d. Take advantage of tax law to increase cash flow. 	<ul style="list-style-type: none"> 1. Reduce net working capital requirements, by reducing inventory and accounts receivable, or by increasing accounts payable. 2. Reduce capital maintenance expenditures on assets in place. 3. Reduce marginal tax rate. 	<ul style="list-style-type: none"> 1. Change pricing strategy to maximize the product of profit margins and turnover ratio. 2. Move to more efficient technology for operations to reduce expenses and improve margins..
<i>Expected Growth</i>	Eliminate new capital expenditures that are expected to earn less than the cost of capital.	Increase reinvestment rate or marginal return on capital or both in firm's existing businesses.	Increase reinvestment rate or marginal return on capital or both in new businesses.
<i>Length of High Growth Period</i>	If any of the firm's products or services can be patented and protected, do so.	Use economies of scale or cost advantages to create higher return on capital.	<ul style="list-style-type: none"> a. Build up brand name. b. Increase the cost of switching from product and reduce cost of switching to it.
<i>Cost of Financing</i>	<ul style="list-style-type: none"> a. Use swaps and derivatives to match debt more closely to firm's assets. b. Recapitalize to move the firm towards its optimal debt ratio. 	<ul style="list-style-type: none"> a. Change financing type and use innovative securities to reflect the types of assets being financed. b. Use the optimal financing mix to finance new investments. c. Make cost structure more flexible to reduce operating leverage. 	Reduce the operating risk of the firm, by making products less discretionary to customers.

Closing Thoughts on Value Enhancement

Almost all firms claim to be interested in value enhancement but very few are able to increase value consistently. If value enhancement is as simple as it is made out to be in this chapter, you might wonder why this is so. There are four basic propositions you need to consider in the context of value enhancement.

1. *Value enhancement is hard work, takes time and may make life uncomfortable for existing managers:* There are no magic bullets that increase value painlessly. Increasing cash flows requires hard decisions on layoffs and cost cutting and, in some cases, admitting past mistakes. Increasing the reinvestment rate will require that you analyze new investments with more care and that you invest in the infrastructure you need to manage these investments. Increasing your debt ratio may also create new pressures to make interest payments and to deal with ratings agencies and banks.
2. *For a firm to enhance value, all of its component parts need to buy into the value enhancement plan:* You cannot increase value by edict and you cannot do it from the executive offices (or the finance department). As you probably noted in the discussion, every part of the firm has a role to play in increasing value. Table 31.9 summarizes the role of each part of the firm in the value enhancement actions that we have described in this chapter. Departments have to cooperate for value enhancement to become a reality.

Table 31.9: Value Enhancement Actions: Who is responsible?

Value enhancing action	Primary responsibility
Increasing operating efficiency	Operating managers and personnel, from shop-floor stewards to factory managers.
Reducing working capital needs	Inventory personnel Credit personnel
Increasing revenue growth	Sales and marketing personnel
Increasing return on capital/ reinvestment rate	Strategic Teams, with help from financial analysts

Build brand name	Advertising personnel
Other competitive advantages	Strategic analysts
Reduce cost of financing	Finance department

3. *Value enhancement has to be firm-specific:* No two firms in trouble share the same problems and using a cook-book approach seldom works in value enhancement. You have to begin by diagnosing the specific problems faced by the firm you are analyzing and tailor a response to these problems. Thus, the value enhancement plan you would devise for a mature firm with cost overruns will be very different from the plan you would devise for a young firm that has a product that no longer meets market needs.
4. *Price enhancement may not always follow value enhancement:* This is perhaps the most disappointing aspect of value enhancement. A firm that takes all the right actions may not necessarily be rewarded immediately by financial markets. In some cases, markets may even punish such firms because of the effects of these actions on reported earnings. We remain convinced that in the long terms, markets will recognize value enhancing actions and reward them, but the manager who took these actions may not be around to share in the rewards.

Summary

Value enhancement is clearly on the minds of many managers today. Building on the discounted cash flow principles developed in the last chapter, the value of a firm can be increased by changing one of the four primary inputs into valuation: the cash flows from assets in place, the expected growth rate during the high growth period, the length of the high growth period and the cost of capital. Conversely, actions that do not change any of these variables cannot create value. Cash flows from assets in place can be increased by cost cutting and more efficient operations, as well as by lowering taxes paid on income and reducing investment needs (capital maintenance and non-cash working capital investments). Expected growth can be increased by increasing the reinvestment rate or the return on capital, but increases in the reinvestment rate will generate value only if the return on capital exceeds the cost of capital. High growth, at least the value creating kind,

can be made to last longer by generating new competitive advantages or augments existing ones. Finally, the cost of capital can be lowered by moving towards an optimal debt ratio, using debt that is more suited for the assets being financed and by reducing market risk.

Problems

1. Marion Manufacturing, a steel company, announces that it will be taking a major restructuring charge that will lower earnings this year by \$500 million. Assume that the charge is not tax deductible and has no effects on operations.
 - a. What will the effect of this charge be on the value of the firm?
 - a. When the firm announces the charge, what effect would you expect it to have on the stock price? Is your answer consistent with your response to (a)?

2. Universal Health Care (UHC) is a company whose stock price has declined by 40% in the last year. In the current year, UHC earned \$300 million in pre-tax operating income on revenues of \$10 billion. The new CEO of the firm has proposed cost-cutting measures she anticipates will save the firm \$100 million in expenses, without any effect on revenues. Assume the firm is growing at a stable rate of 5% a year and its cost of capital is 10%; neither number is expected to change as a consequence of the cost cutting. The firm's tax rate is 40%. (You can assume that the firm reinvests \$100 million each year and that this reinvestment will not change as the firm cuts costs.)
 - What effect will the cost cutting have on value?
 - What effect will the cost cutting have on value, if the expected growth rate will drop to 4.5% as a consequence? (Some of the costs cut were designed to generate future growth)

3. Atlantic Cruise Lines operates cruise ships and is headquartered in Florida. The firm had \$100 million in pre-tax operating income in the current year, of which it reinvested \$25 million. The firm expects its operating income to grow 4% in perpetuity and maintain its existing reinvestment rate. Atlantic has a capital structure composed 60% of equity and 40% of debt. Its cost of equity is 12% and it has a pre-tax cost of borrowing of 8%. The firm currently faces a tax rate of 40%.
 - a. Estimate the value of the firm.
 - b. Assume now that Atlantic Cruise Lines will move its headquarters to the Cayman Islands. If its tax rate drops to 0% as a consequence, estimate the effect on value of the shift.

4. Furniture Depot is a retail chain selling furniture and appliances. The firm has after-tax operating income of \$250 million in the current year on revenues of \$5 billion. The firm also has non-cash working capital of \$1 billion. The net capital expenditures this year is \$100 million and expects revenues, operating income and net capital expenditures to grow 5% a year forever. The firm's cost of capital is 9%.

- a. Assume that non-cash working capital remains at the existing percent of revenues, estimate the value of the firm.
- b. Assume now that the firm is able to reduce its non-cash working capital requirement by 50%. Estimate the effect on value of this change.
- c. If as a consequence of this non-cash working capital change, earnings growth declines to 4.75%, what would the effect on value be of the drop in non-cash working capital?

5. General Systems is a firm that manufactures personal computers. As a top manager in the firm, you are considering changes in the way the firm is run. Currently, the firm has after-tax operating income of \$50 million on capital invested of \$250 million (at the beginning of the year). The firm also reinvests \$25 million in net capital expenditures and working capital.

- a. Estimate the expected growth rate in earnings, given the firm's current return on capital and reinvestment rate.
- b. Holding the return on capital constant, what would happen to the expected growth rate if the firm increased its reinvestment rate to 80%?
- c. What would the effect on growth be, if as the reinvestment rate increases to 80%, the return on capital on investments drops by 5%? (For instance, if the return on capital is currently 18%, it will drop to 13%.)

6. Compaq Computers has seen its stock price decline from \$45 to \$24. The firm is expected to reinvest 50% of its expected after-tax operating income of \$2 billion in new investments and to earn a return on capital of 10.69%. The firm is all equity financed and has a cost of equity of 11.5%.

- a. What is the firm's expected growth rate, assuming that it maintains its existing reinvestment rate and return on capital?

- b. Assuming that this growth is perpetual, what is the value of the firm?
 - c. How much value is being created or destroyed by the firm's new investments?
7. (Refer to problem 6) Now assume that Compaq's optimal debt ratio is 20%. Its cost of equity will increase to 12.5% and its after-tax cost of debt will be 4.5% at the optimal debt ratio.
- a. What is the firm's expected growth rate, assuming it maintains its existing reinvestment rate and return on capital?
 - b. Assuming this growth is perpetual, what is the value of the firm?
 - c. How much value is being created or destroyed by the firm's new investments?
8. Coca Cola is considered to have one of the most valuable brand names in the world. The firm has an after-tax operating margin of 20% on revenues of \$25 billion. The capital invested in the firm is \$10 billion. In addition, Coca Cola reinvests 50% of its after-tax operating earnings.
- a. Estimate the expected growth in operating earnings, assuming Coca Cola can sustain these values for the foreseeable future.
 - b. Assume generic soft drink manufacturers have after-tax operating margins of only 7.5%. If Coca Cola maintains its existing reinvestment rate but loses its brand name value, estimate the expected growth rate in operating earnings. (You can assume that, with the loss in brand name value, Coca Cola's operating margins would drop to 7.5%, as well.)
9. BioMask Genetics is a biotechnology firm with only one patent to its name. The after-tax operating earnings in the current year is \$100 million and the firm has no reinvestment needs. The patent will expire in 3 years and the firm will have a 15% growth rate in earnings during that period. After year 3, operating earnings are expected to remain constant forever. The firm's management is considering an advertising plan designed to build up the brand name of its patented product. The advertising campaign will cost \$50 million (pre-tax) a year over the next 3 years; the firm's tax rate is 40%. The firm believes this campaign will allow it to maintain a 15% growth rate for 10 years, as the brand name

compensates for the loss of the patent protection. After year 10, the operating earnings are expected to remain constant forever. The firm has a cost of capital of 10%.

- a. Estimate the value of the firm, assuming it does not embark on the advertising campaign.
- b. Estimate the value of the firm, with the advertising campaign.
- c. Assume there is no guarantee the growth rate will last 10 years as a result of the campaign. What would the probability of success need to be for the campaign to be financially viable?

10. Sunmask is a cosmetics firm that has seen its stock price fall and its earnings decline in the last year. You have been hired as the new CEO of the company and a careful analysis of Sunmask's current financials reveals the following.

- The firm currently has after-tax operating earnings of \$300 million on revenues of \$10 billion and a capital turnover ratio (sales/book value of capital) of 2.5.
- The firm is expected to reinvest 60% of its after-tax operating income.
- The firm is all equity financed and has a cost of capital of 10%.
 - a. Estimate the value of the firm, assuming existing policies continue forever. (Returns on capital and reinvestment rates remain constant forever, as well.)
 - b. Assume that you can increase operating margins from 3% to 5% without affecting the capital turnover ratio, that you can lower the reinvestment rate to 40%, and that the cost of capital will become 9%, if you shift to your optimal debt ratio. How much would your firm value increase if you were able to make these changes?