The Value of Synergy

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Many acquisitions and some large strategic investments are often justified with the argument that they will create synergy. In this paper, we consider the various sources of synergy and categorize them into operating and financial synergies. We then examine how best to value synergy in any investment and how sensitive this value is to different assumptions. We also look at how this synergy value should be divided between the parties (or companies) involved in the investment. We conclude with an empirical examination of how much synergy is actually created in corporate mergers, and how much is paid. Synergy, we conclude, is so seldom delivered in acquisitions because it is incorrectly valued, inadequately planned for and much more difficult to create in practice than it is to compute on paper.

When Carly Fiorina argued for Hewlett-Packard's acquisition of Compaq, she offered a number of of reasons the deal made sense. She noted that the combined company would be able to meet the demands of customers for "solutions capability on a truly global basis." She also claimed that the firm would be able to lead with its products "from top to bottom, from low end to high end." As her crowning argument, she claimed that the merger made sense because it would create "synergies that are compelling."

Synergy, the increase in value that is generated by combining two entities to create a new and more valuable entity, is the magic ingredient that allows acquirers to pay billions of dollars in premiums in acquisitions. It is true that investors have historically taken a jaundiced view of synergy, both in terms of its existence and its value and the track record on the delivery of synergy suggests that they have good reason for skepticism. In this paper, we will begin by considering potential sources of synergy and how best to value each of them. We will then also examine the problems that analysts often face in valuing synergy and why acquirers often fail to deliver the synergy that they promised at the time of the acquisition.

What is synergy?

Synergy is the additional value that is generated by combining two firms, creating opportunities that would not been available to these firms operating independently. It is the most widely used and misused rationale in mergers and acquisitions In this section, we will consider the potential sources of synergy and categorize them into two groups. Operating synergies affect the operations of the combined firm and include economies of scale, increasing pricing power and higher growth potential. They generally show up as higher expected cash flows. Financial synergies, on the other hand, are more focused and include tax benefits, diversification, a higher debt capacity and uses for excess cash. They sometimes show up as higher cash flows and sometimes take the form of lower discount rates.

Operating Synergy

Operating synergies are those synergies that allow firms to increase their operating income from existing assets, increase growth or both. We would categorize operating synergies into four types.

1. *Economies of scale* that may arise from the merger, allowing the combined firm to become more cost-efficient and profitable. In general, we would expect to see economies of scales in mergers of firms in the same business (horizontal mergers) – two banks coming together to create a larger bank or two steel companies combining to create a bigger steel company.

2. *Greater pricing power* from reduced competition and higher market share, which should result in higher margins and operating income. This synergy is also more likely to show up in mergers of firms in the same business and should be more likely to yield benefits when there are relatively few firms in the business to begin with. Thus, combining two firms is far more likely to create an oligopoly with pricing power.[1]

3. *Combination of different functional strengths*, as would be the case when a firm with strong marketing skills acquires a firm with a good product line. This can apply to wide variety of mergers since functional strengths can be transferable across businesses.

4. *Higher growth in new or existing markets*, arising from the combination of the two firms. This would be case, for instance, when a US consumer products firm acquires an emerging market firm, with an established distribution network and brand name recognition, and uses these strengths to increase sales of its products.

Operating synergies can affect margins, returns and growth, and through these the value of the firms involved in the merger or acquisition.

Financial Synergy

With financial synergies, the payoff can take the form of either higher cash flows or a lower cost of capital (discount rate) or both. Included in financial synergies are the following:

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[1] The irony is that this motive has to remain unstated or understated, since the anti-trust laws can be utilized to stop such mergers.

- A combination of a firm with excess cash, or *cash slack*, (and limited project opportunities) and a firm with high-return projects (and limited cash) can yield a payoff in terms of higher value for the combined firm. The increase in value comes from the projects that can be taken with the excess cash that otherwise would not have been taken. This synergy is likely to show up most often when large firms acquire smaller firms, or when publicly traded firms acquire private businesses.

- *Debt capacity* can increase, because when two firms combine, their earnings and cash flows may become more stable and predictable. This, in turn, allows them to borrow more than they could have as individual entities, which creates a tax benefit for the combined firm. This tax benefit usually manifests itself as a lower cost of capital for the combined firm.

- *Tax benefits* can arise either from the acquisition taking advantage of tax laws to write up the target company's assets or from the use of net operating losses to shelter income. Thus, a profitable firm that acquires a money-losing firm may be able to use the net operating losses of the latter to reduce its tax burden. Alternatively, a firm that is able to increase its depreciation charges after an acquisition will save in taxes and increase its value.

- *Diversification* is the most controversial source of financial synergy. In most publicly traded firms, investors can diversify at far lower cost and with more ease than the firm itself. For private businesses or closely held firms, there can be potential benefits from diversification.

Clearly, there is potential for synergy in many mergers. The more important issues relate to valuing this synergy and determining how much to pay for the synergy.

Valuing Synergy

The key question about synergy is not whether it can be valued but how it should be valued. After all, firms that are willing to pay billions in dollars for synergy have to be able to estimate a value for that synergy. In this section, we will consider how best to value different types of synergy and the sensitivity of this value to various assumptions.

I. Valuing Operating Synergies

There is a potential for operating synergy, in one form or the other, in many takeovers. Some disagreement exists, however, over whether synergy can be valued and, if so, what that value should be. One school of thought argues that synergy is too nebulous to be valued and that any systematic attempt to do so requires so many assumptions that it is pointless. If this is true, a firm should not be willing to pay large premiums for synergy if it cannot attach a value to it. The other school of thought is that we have to make our best estimate of how much value synergy will create in any acquisition before we decide how much to pay for it, even though it requires assumptions about an uncertain future. We come down firmly on the side of the second school.

While valuing synergy requires us to make assumptions about future cash flows and growth, the lack of precision in the process does not mean we cannot obtain an unbiased estimate of value. Thus we maintain that synergy can be valued by answering two fundamental questions.

(1) *What form is the synergy expected to take?* Will it reduce costs as a percentage of sales and increase profit margins (e.g., when there are economies of scale)? Will it increase future growth (e.g., when there is increased market power) or the length of the growth period? Synergy, to have an effect on value, has to influence one of the four inputs into the valuation process – higher cash flows from existing assets (cost savings and economies of scale), higher expected growth rates (market power, higher growth potential), a longer growth period (from increased competitive advantages), or a lower cost of capital (higher debt capacity).

(2) *When will the synergy start affecting cash flows?* — Synergies seldom show up instantaneously, but they are more likely to show up over time. Since the value of synergy is the present value of the cash flows created by it, the longer it takes for it to show up, the lesser its value.

Steps in Valuing Operating Synergy

Once we answer these questions, we can estimate the value of synergy in three steps:

- First, we <u>value the firms involved in the merger independently</u>, by discounting expected cash flows to each firm at the weighted average cost of capital for that firm.

- Second, we estimate the <u>value of the combined firm, with no synergy</u>, by adding the values obtained for each firm in the first step.

- Third, we build in the effects of synergy into expected growth rates and cash flows and we revalue the combined firm with synergy. The difference between the value of the <u>combined firm with synergy</u> and the value of the combined firm without synergy provides a value for synergy.

It is important at this stage that we keep the value of synergy apart from the value of control, which is the other widely cited reason for acquisitions. The value of control is the incremental value that an acquirer believes can be created by running a target firm more efficiently. To value control, we just revalue the target firm with a different and presumably better management in place and compare this value to the one we obtain with the status quo – existing management in place. While we will not consider the value of control in this paper, there is a companion paper that examines it in detail.[2] Figure 1 summarizes the effects of synergy and control in valuing a target firm for an acquisition.

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[2] Damodaran, A., 2005, *The Value of Control*, Working Paper, www.damodaran.com.

Figure 1: Valuing an Acquisition

Component	Valuation Guidelines
Synergy	*Value the combined firm with synergy built in.* This may include a. a higher growth rate in revenues: *growth synergy* b. higher margins, because of *economies of scale* c. lower taxes, because of tax benefits: *tax synergy* d. lower cost of debt: *financing synergy* e. higher debt ratio because of lower risk: *debt capacity* *Subtract the value of the target firm (with control premium) + value of the bidding firm (pre-acquisition). This is the value of the synergy.*
Control Premium	Value the company as if optimally managed. This will usually mean that investment, financing and dividend policy will be altered: Investment Policy: Higher returns on projects and divesting unproductive projects. Financing Policy: Move to a better financing structure; eg. optimal capital structure Dividend Policy: Return unused cash
Status Quo Valuation	Value the company as is, with existing inputs for investment, financing and dividend policy.

By separating out the value of control from the value of synergy, we accomplish two objectives. First, we ensure that there is no double counting. If, for instance, a firm has a low return on capital because its assets are inefficiently deployed, we show the increase in value that accrues from redeploying the assets and increasing the return on capital as part of the value of control. For synergy to create value, there has to be a further increase in return on capital to the combined firm. Second, we can devise strategies for acquisition bidding that can differentiate between control and synergy value. We may be willing to pay close to 100% of the control value (arguing that the target firm could have made the

changes on its own) but only a portion of synergy value (since it could not have been created without the acquiring firm).

Talking about paying for synergy also should highlight the importance of not only valuing control and synergy, but of paying the right price for a target firm. In figure 2, we break the price paid on an acquisition into a market price and a premium over that price. Notice the difference between this figure, which is based upon the market price of the target firm before and after the acquisition, and Figure 1 where we are looking at the value of the target firm with and without the premiums for control and synergy. A fair-value acquisition, which would leave the acquiring firm neither better nor worse off, would require that the total price (in Figure 2) be equal to the consolidated value (in Figure 1) with the synergy and control benefits built in. Note also the irrelevance of the accountant's estimate of goodwill (which is the difference between market and book value) to any of this discussion.

Figure 2: Breaking down the Acquisition Price
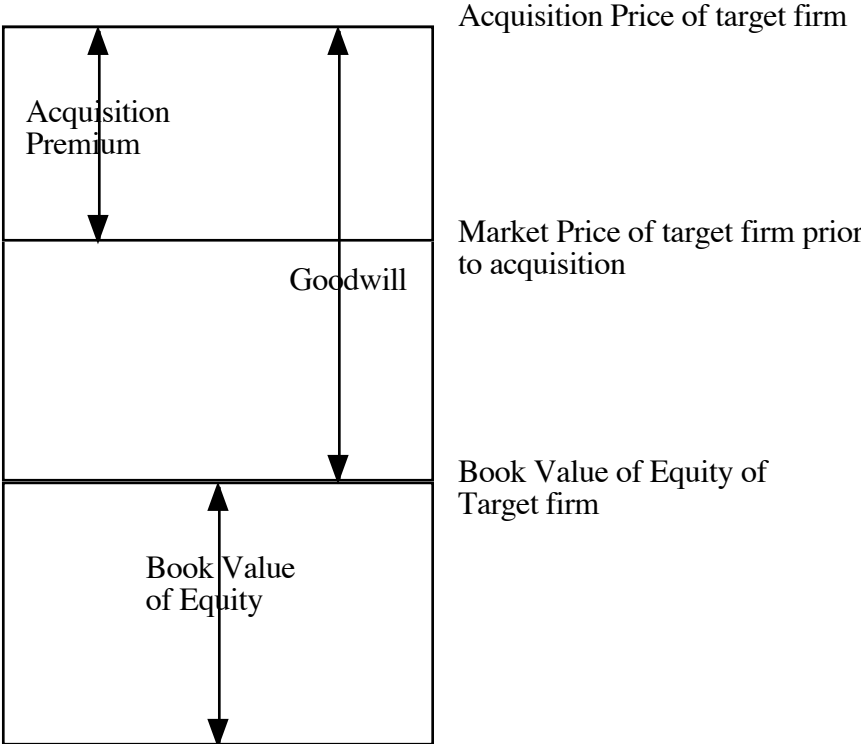
The acquisition price will determine whether an acquisition is value increasing or value destroying to acquiring company's stockholders. The synergy in a merger may well be

worth $ 2 billion, but paying $ 3 billion as a premium to get the acquisition done will destroy $ 1 billion of the acquiring company's stockholder wealth.

Valuing Operating Synergy in a DCF Framework

If we accept the proposition that synergy has be to valued by looking at the combined firm and building in the effects of the synergy, we have to also consider which inputs in a discounted cash flow model lend themselves best to valuing synergy. Looking at the various ways in which operating synergy can manifest itself, it should be quite clear that different types of synergy will require changing different inputs. If we categorize operating synergies into growth synergies and cost synergies, the inputs that are affected follow:

- Cost synergies are the operating synergies that are easiest to model. One-time cost savings will increase the cash flow in the period of the savings, and thus increase the firm value by the present value of the savings. Continuing cost savings will have a much bigger impact on value by affecting operating margins (and income) over the long term. The value will increase by the present value of the resulting higher income (and cash flows) over time.

- Growth synergies are more complicated because they can manifest themselves in so many different ways. There are at least three different types of growth synergies:

    o The combined firm may be able to earn higher returns on its investments than the firms were able to generate independently, thus increasing the growth rate.

    o The combined firm may be able to find more investments than the firms were able to invest in independently. The resulting higher reinvestment rates will increase the growth rate.

    o The combined firm may be in a much more powerful competitive position than the individual firms were, relative to their peer group. The payoff will be that the combined firm will be able to maintain excess returns and growth for a longer time period.

Both cost and growth synergies manifest themselves as higher expected cash flows in the future. Cost synergies, by their very nature, tend to be bounded – there is after all only so

much cost that you can cut. Growth synergies, on the other hand, are often unbounded and are constrained only by your skepticism about their being delivered.

Illustration 1: Valuing Cost Synergies

Table 1 summarizes the financial characteristics of two firms that are considering combining in a merger.

Table 1: Summary of Financial Characteristics of independent firms

	Acquiring firm	Target Firm
Beta	0.90	0.90
Pre-tax cost of debt	5.00%	5.00%
Tax rate	30.00%	30.00%
Debt to Capital Ratio	10.00%	10.00%
Revenues	$1,000.00	$500.00
Operating Income (EBIT)	$50.00	$25.00
Pre-tax return on capital	15.00%	15.00%
Reinvestment Rate =	70.00%	70.00%
Length of growth period =	5	5

Note that both firms have the same cost of capital , expect the same growth in the future and earn the same operating margin. The riskfree rate is 4.25% and the risk premium is 4%. For purposes of simplicity, we will assume that both firms will be in stable growth after year 5, growing 4.25% a year in perpetuity and earning no excess returns (i.e. return on capital = cost of capital).[3]

The first step in the process is to value the two firms independently. Table 2 summarizes the valuations and confirms that the value of the combined firm is the sum of the two independent firm values.

Table 2: Independent Firm Valuations

	Acquiring firm	Target firm	Combined firm value
Cost of Equity =	7.85%	7.85%	7.85%

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[3] This assumption allows us to compute a reinvestment rate for perpetuity as follows:
Reinvestment Rate = Expected growth Rate in perpetuity/ Return on capital
In this example, both firms have returns on capital of 7.42% in perpetuity and grow 4.25% a year. The resulting reinvestment rate is 57.28%(4.25%7.42%).

After-tax cost of debt =	3.50%	3.50%	3.50%
Cost of capital =	7.42%	7.42%	7.42%
After-tax return on capital =	10.50%	10.50%	10.50%
Reinvestment Rate =	70.00%	70.00%	70.00%
Expected growth rate=	7.35%	7.35%	7.35%
Value of firm			
PV of FCFF in high growth =	$52.40	$26.20	$78.61
Terminal value =	$701.53	$350.76	$1,052.29
Value of firm today =	$542.99	$271.50	$814.49

The expected growth rate for the next 5 years is the product of the reinvestment rate and the after-tax return on capital. The value of the combined firm is the sum of the firms valued independently.

To value synergy, assume that the combined firm will save $15 million in pre-tax operating expenses each year, pushing up the combined firm's pre-tax operating income by that same amount. In table 3, we report on the combined firm's value with the cost savings and estimate the value of synergy:

Table 3: Valuing Synergy with Cost Savings

	Combined firm value	Value of firm with synergy	Value of Synergy
Cost of Equity =	7.85%	7.85%	
After-tax cost of debt =	3.50%	3.50%	
Cost of capital =	7.42%	7.42%	
After-tax return on capital =	10.50%	10.50%	
Reinvestment Rate =	70.00%	70.00%	
Base-year Pre-tax operating income	$75.00	**$ 90.00**	
Expected growth rate=	7.35%	7.35%	
Value of firm			
PV of FCFF in high growth =	$78.61	$94.33	
Terminal value =	$1,052.29	$1,262.75	
Value of firm today =	$814.49	$977.39	$ 162.90

As a result of the cost savings, the value of the firm increases by $162.90 million.

Illustration 2: Valuing Growth Synergies

Consider again the two companies shown in the last example. Assume for this example that instead of the synergy taking the form of cost savings, it had manifested itself as an increase in marginal after-tax return on capital on new investments from 10.50% (pre-merger for both firms) to 12.60% for the combined firm. At the same time, assume that reinvestment rate remains unchanged as do the other assumptions in the valuation. The value of synergy is estimated in table 4.

Table 4: Valuing Synergy from Higher Growth – Better Projects (Higher ROC)

	Combined firm value	*Value of firm with synergy*	*Value of Synergy*
Cost of Equity =	7.85%	7.85%	
After-tax cost of debt =	3.50%	3.50%	
Cost of capital =	7.42%	7.42%	
After-tax return on capital =	10.50%	**12.60%**	
Reinvestment Rate =	70.00%	70.00%	
Base year Pre-tax Operating Income	$ 75.00	$75.00	
Expected growth rate=	7.35%	**8.82%**	
Length of growth period =	5 years	5 years	
Value of firm			
PV of FCFF in high growth =	$78.61	$81.89	
Terminal value =	$1,052.29	$1,126.34	
Value of firm today =	$814.49	$869.56	$ 55.07

The value of synergy from the higher return on projects is $ 55.07 million.

As an alternative, assume that the synergy had manifested itself not with higher returns on capital but as more investment opportunities. In this case, we would have left the after-tax return on capital unchanged at 10.50% but increased the reinvestment rate to 90%. Table 5 values the resulting synergy:

Table 5: Valuing Synergy from Higher Growth: More Projects (Higher Reinvestment Rate)

	Combined firm value	*Value of firm with synergy*	*Value of Synergy*
Cost of Equity =	7.85%	7.85%	
After-tax cost of debt =	3.50%	3.50%	

Cost of capital =	7.42%	7.42%	
After-tax return on capital =	10.50%	10.50%	
Reinvestment Rate =	70.00%	**90.00%**	
Base year Pre-tax Operating Income	$ 75.00	$75.00	
Expected growth rate=	7.35%	**9.45%**	
Length of growth period =	5 years	5 years	
Value of firm			
PV of FCFF in high growth =	$78.61	$27.78	
Terminal value =	$1,052.29	$1,159.32	
Value of firm today =	$814.49	$838.51	$ 24.02

The higher reinvestment rate pushes up expected growth during the high growth period and generates a value for synergy of $24.02 million.

Finally, assume that the synergy takes the form of strategic barriers to entry that will keep competition out for a longer period, though the return on capital and reinvestment rate do not change during the period. In table 6, we estimate the value of synergy from extending the period until the company will become a stable growth company:

Table 6: Valuing Synergy from Strategic Barriers: Longer Growth Period

	Combined firm value	*Value of firm with synergy*	*Value of Synergy*
Cost of Equity =	7.85%	7.85%	
After-tax cost of debt =	3.50%	3.50%	
Cost of capital =	7.42%	7.42%	
After-tax return on capital =	10.50%	10.50%	
Reinvestment Rate =	70.00%	70.00%	
Base year Pre-tax Operating Income	$ 75.00	$75.00	
Expected growth rate=	7.35%	7.35%	
Length of growth period	5 years	**10 years**	
Value of firm			
PV of FCFF in high growth =	$78.61	$125.66	
Terminal value =	$1,052.29	$1,301.79	
Value of firm today =	$814.49	$860.21	$ 45.72

The value of synergy from being able to sustain excess returns for a longer period is $45.72 million.

Illustration 3: Valuing Cost and Growth Synergies: P&G and Gillette

To consider valuing synergy in the more complicated real world scenario where there are many possible sources of synergy, we look at Procter and Gamble's acquisition of Gillette in 2004. To value synergy, we first valued Procter and Gamble (P&G) as a stand-alone firm, with the following assumptions.

- P&G had earnings before interest and taxes of $10,927 million on revenues of $56,741 million. The tax rate for the firm is 35%.

- The firm had total capital invested of $38,119 million, generating a pre-tax return on capital of 28.67%. (10927/38119 = .2867)

- The firm had a debt to capital ratio of 10%, a beta of 0.80 and a pre-tax cost of debt of 5%. If we use a riskfree rate of 4.25% and a risk premium of 4%, the resulting cost of capital for the firm is 7.03%.

   Cost of equity = 4.25% + 0.80 (4%) = 7.45%

   Cost of capital = 7.45% (.90) + 5% (1-.35) (.10) = 7.03%

- While the reinvestment rate has varied over time, we will assume that the average reinvestment rate of approximately 40% over the last 5 years will continue to hold in the future. This results in an expected growth rate of 7.45% a year for the next 5 years.

   After-tax return on capital = 28.67% (1-.35) – 18.63%

   Reinvestment Rate = 40%

   Expected Growth rate = Reinvestment rate * Return on capital = .40*.1863 = .0745

- After year 5, operating income and revenues are expected to grow 4.25% a year forever, and the firm will earn no excess returns; the after-tax return on capital will be equal to the cost of capital of 7.03%. As a result, the reinvestment rate after year 5 has to be recalculated:

   Return on capital after year 5 = 7.03%

   Reinvestment rate after year 5 = g/ ROC = 4.25%/7.03% = 60.46%

Based upon these inputs, the cash flows to P&G over the next 5 years and for the terminal value can be calculated (in table 7):

Table 7: Expected FCFF at P&G

Year	EBIT (1-t)	Reinvestment rate	Reinvestment	FCFF
1	$7,632	40.00%	$3,053	$4,579
2	$8,201	40.00%	$3,280	$4,920
3	$8,812	40.00%	$3,525	$5,287
4	$9,469	40.00%	$3,787	$5,681
5	$10,174	40.00%	$4,070	$6,105
Terminal year	$10,607	60.46%	$6,412	$4,194

The terminal value is estimated using the cash flows in the terminal year, the cost of capital in perpetuity (7.03%) and the expected growth rate of 4.25%:

Terminal value = $FCFF_{n+1}$/ (Cost of capital – Expected Growth Rate)

$$= 6412/ (.0703 - .0425) = \$150,879 \text{ million}$$

Discounting the expected free cashflows for the next 5 years and the terminal value back to the present yields a value for P&G of $128,985 million.

To value Gillette as a stand-alone firm, we made similar assumptions about cashflows, growth and reinvestment. In particular, we assumed that

- Gillette had earnings before interest and taxes of $2,645 million on revenues of $10,477 million. The tax rate for the firm is 35%.

- The capital invested at Gillette has been volatile, but we will assume that Gillette can earn a pre-tax return on capital of 25% on its new investments.

- The firm had a debt to capital ratio of 10%, a beta of 0.90 and a pre-tax cost of debt of 5%. If we use a riskfree rate of 4.25% and a risk premium of 4%, the resulting cost of capital for the firm is 7.39%.

  Cost of equity = 4.25% + 0.90 (4%) = 7.85%

  Cost of capital = 7.85% (.90) + 5% (1-.35) (.10) = 7.39%

- We will assume that the average reinvestment rate of approximately 50% over the last 5 years will continue to hold in the future. This results in an expected growth rate of 8.13% a year for the next 5 years:

  After-tax return on capital = 25% (1-.35) – 16.25%

  Reinvestment Rate = 50%

  Expected Growth rate = Reinvestment rate * Return on capital = .50*.1625 = .08125

- After year 5, operating income and revenues are expected to grow 4.25% a year forever, and the firm will earn no excess returns; the after-tax return on capital will be

equal to the cost of capital of 7.39%. As a result, the reinvestment rate after year 5 is as follows:

Return on capital after year 5 = 7.39%

Reinvestment rate after year 5 = g/ ROC = 4.25%/7.39% = 57.51%

Based upon these inputs, the cash flows to Gillette over the next 5 years and for the terminal value can be calculated as follows (in table 8):

Table 8: Expected FCFF at Gillette

Year	EBIT (1-t)	Reinvestment rate	Reinvestment	FCFF
1	$1,859	50.00%	$929	$929
2	$2,010	50.00%	$1,005	$1,005
3	$2,173	50.00%	$1,087	$1,087
4	$2,350	50.00%	$1,175	$1,175
5	$2,541	50.00%	$1,270	$1,270
Terminal year	$2,649	57.51%	$1,523	$1,125

The terminal value is estimated using the cash flows in the terminal year, the cost of capital in perpetuity (7.03%) and the expected growth rate of 4.25%:

Terminal value = $FCFF_{n+1}$/ (Cost of capital – Expected Growth Rate)

= 1523/ (.0739 - .0425) = $ 35,843 million

Discounting the expected free cashflows for the next 5 years and the terminal value back to the present yields a value for Gillette of $ 29,482 million.

The value of the combined firm (P&G + Gillette), with no synergy, should be the sum of the values of the firms valued independently. We add the value of P&G to the value of Gillette to arrive at the value of the combined firm:

Value of P&G	=	$128,985 million
Value of Gillette	=	$ 29,842 million
Value of combined firm =		$ 158,467 million

This would be the value of the combined firm in the absence of synergy.

To value the synergy, we made the following assumptions about the way in which synergy would affect cash flows and discount rates at the combined firm.

▪ The combined firm will have some economies of scale, allowing it to increase its current after-tax operating margin slightly. The annual dollar savings will be approximately $200 million. This will increase the combined firm's pre-tax operating income by $ 200 million.

- The combined firm will also be able to generate a slightly higher after-tax return on capital (an increase of about 1%) for the next 5 years, while maintaining the same reinvestment rate (as the independent firms would have). As a result, the growth rate over the next 5 years will be:[4]

  After-tax return on capital = 19.11%

  Reinvestment rate for combined firm= 41.95%

  Expected growth rate over next 5 years = Return on capital * Reinvestment rate = .1911*.4195 = .0802 or 8.02%

- The beta of the combined firm was computed in three steps. We first estimated the unlevered betas for P&G and Gillette.

  $$\text{P\&G's Unlevered Beta} = \frac{0.80}{1 + (1 - 0.30)(0.10/0.90)} = 0.7461$$

  $$\text{Gillette's Unlevered Beta} = \frac{0.90}{1 + (1 - 0.35)(0.10/0.90)} = 0.8394$$

  We then weighted these unlevered betas by the values of these firms to estimate an unlevered beta for the combined firm; P&G has a firm value[5] of $128.985 billion and Gillette's firm value was $29.482 billion.

  Unlevered Beta for combined firm

  $$= (0.7461)\left(\frac{128.985}{128.985 + 29.482}\right) + (0.8394)\left(\frac{29.482}{128.985 + 29.482}\right) = 0.7635$$

  We used the debt to equity ratio for the combined firm to estimate a new levered beta and cost of capital for the firm.

  New Levered Beta $= 0.7635(1 + (1 - 0.35)(0.10/0.90)) = 0.8186$

  Cost of equity = 4.25% + 0.8186 (4%) = 7.52%

  Cost of Capital = 7.52% (0.90) + 5% (1-.35) (0.10) = 7.10%

- Based on these assumptions, the cash flows and value of the combined firm, with synergy, can be estimated in table 9:

Table 9: Free Cash Flows to Combined Firm

Year	EBIT (1-t)	Reinvestment rate	Reinvestment	FCFF

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[4] To compute the combined firm's return on capital, we add the operating incomes of two firms prior to the merger and divide by the total capital of the two firms. This yields an after-tax return on capital of 18.11% for the firm:
Return on capital for combined firm = (10927+2645)(1-.35)/(38119+10580) = 18.11%

[5] The values that we used were the values immediately before the acquisition announcement. This is to prevent the biases that may be created when target prices increase once an acquisition is announced.

1	$9,670	41.95%	$4,056	$5,613
2	$10,455	41.95%	$4,386	$6,069
3	$11,305	41.95%	$4,742	$6,563
4	$12,223	41.95%	$5,128	$7,096
5	$13,216	41.95%	$5,544	$7,672
Terminal year	$13,216	59.88%	$7,915	$5,302

The terminal value is estimated using the cash flows in the terminal year, the cost of capital in perpetuity (7.10%) and the expected growth rate of 4.25%:

Terminal value = $FCFF_{n+1}$/ (Cost of capital – Expected Growth Rate)

$$= 5302/ (.0710 - .0425) = \$ 193,319 \text{ million}$$

Discounting the expected free cashflows for the next 5 years and the terminal value back to the present yields a value for the combined firm of $ 163,872 million.

The value of the combined firm, with synergy, is $ 163,872 million. This can be compared to the value of the combined firm, without synergy, of $158,467 million, and the difference is the value of the synergy in the merger.

Value of combined firm (with synergy) = $ 163,872 million

Value of combined firm (with no synergy) = $ 158,467 million

Value of Synergy = $ 5,405 million

This valuation is based on the presumption that synergy will be created instantaneously. In reality, it can take years before the firms are able to see the benefits of synergy. A simple way to account for the delay is to consider the present value of synergy. Thus, if it will take P&G and Gillette three years to create the synergy, the present value of synergy can be estimated, using the combined firm's cost of capital as the discount rate.

Present Value of Synergy $= \dfrac{\$\,5,405\text{ million}}{1.0710^3} = \$\,4,400\text{ million}$

The greater the delay in delivering synergy, the less is the value of the synergy.

Valuing Operating Synergies – A Real Options Framework

There are some who believe that discounted cash flow models are too limiting when it comes to valuing synergy. The synergy benefits in most acquisitions, they argue, can be better understood using an option framework. Consider the simple example of a U.S. consumer product company buying a small company in an emerging market with immense growth potential. The acquiring company is buying is an option to expand in the emerging market rather than a set of expected cash flows. Stripped down to brass tacks,

what real options proponents are proposing is that a premium be added on to the discounted cash flow value of the combined firm, reflecting the time premium on the option.[6] Smith and Triantis (1995) argue that many acquisitions create valuable options that discounted cash flow models do not capture. These options can be the result of more growth opportunities or a better competitive position for the combined firm or more advantageous timing of investments, and add value to the acquiring firm.[7]

The intuition behind the real options argument is sound. Acquisitions sometimes open up possibilities that would not have been available otherwise and these opportunities are difficult to convert into expected cash flows.[8] Some healthy skepticism is warranted in most cases, though. If the only way to enter an emerging market is by buying a company in that market and that acquisition gives exclusive rights to the acquiring firm to expand in the emerging market, there is good reason to apply an option premium. If, as is more common, acquiring a firm is one of many different ways of entering a competitive market, a discounted cash flow valuation is more than adequate for capturing expected synergies.

II. Valuing Financial Synergies

Synergy can also be created from purely financial factors. We will consider three legitimate sources of financial synergy - a greater "tax benefit" from accumulated losses or higher tax deductions, an increase in debt capacity and therefore firm value and better use for "excess" cash or cash slack. We will begin the discussion, however, with diversification, which though a widely used rationale for mergers, is not a source of increased value by itself, at least for publicly traded firms with diversified investors.

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[6] Childs, Paul D., Ott, Steven H. and Triantis, Alexander J., (1998), Capital Budgeting for Interrelated Projects: a Real Options Approach, *Journal of Financial and Quantitative Analysis*, vol. 33, n. º 3, p. 305-334.

[7] Smith, Kenneth W. and Triantis, Alexander J., (1995), The Value of Options in Strategic Acquisitions, in: "*Real Options Capital Investment: Models, Strategies and Applications*", ed. Lenos Trigeorgis, Westport Connecticut, London, Praeger.

[8] The real options argument is heavily dependent upon two concepts – the learning that occurs by being in a new market and the more informed decisions that flow from the learning.

Diversification

     A takeover motivated only by diversification considerations should, but by itself, have no effect on the combined value of the two firms involved in the takeover, when the two firms are both publicly traded and when the investors in the firms can diversify on their own. Consider the following example. Dalton Motors, which is in an automobile parts manufacturing firm in a cyclical business, plans to acquire Lube & Auto, which is an automobile service firm whose business is non-cyclical and high growth, solely for the diversification benefit. The characteristics of the two firms are summarized in table 10:

Table 10: Characteristics of Firms: Dalton Motors and Lube & Auto

	Dalton Motors	Lube Oil
Beta	1.20	0.90
Pre-tax cost of debt	5.00%	5.00%
Tax rate	30.00%	30.00%
Debt to Capital Ratio	10.00%	10.00%
Revenues	$1,000.00	$500.00
Operating Income (EBIT)	$50.00	$25.00
Pre-tax return on capital	15.00%	15.00%
Reinvestment Rate =	70.00%	70.00%
Length of growth period =	5	5

The treasury bond rate is 4.25% and the market premium is 4%. The calculations for the weighted average cost of capital and the value of the firms are shown in Table 11.

Table 11: Value of Lube & Auto, Dalton Motors and Combined Firm

	Acquiring firm	Target firm	Combined Firm
Cost of Equity =	9.05%	7.85%	8.60%
After-tax cost of debt =	3.50%	3.50%	3.50%
Cost of capital =	8.50%	7.42%	8.09%
After-tax return on capital =	10.50%	10.50%	10.50%
Reinvestment Rate =	70.00%	70.00%	70.00%
Expected growth rate=	7.35%	7.35%	7.35%
Value of firm			
PV of FCFF in high growth =	$50.86	$26.20	$77.14
Terminal value =	$612.34	$350.76	$963.10
Value of firm today =	$458.19	$271.50	$729.69

The cost of equity (debt) for the combined firm is obtained by taking the weighted average of the individual firm's costs of equity (debt); the weights are based upon the relative market values of equity (debt) of the two firms. Since these relative market values change over time, the costs of equity and debt for the combined firm also change over time.[9] The value of the combined firm is the same as the sum of the values of the independent firms, indicating that there is no value gain from diversification.[10]

This equality does not imply, however, that the shareholders in the bidding and target firms are indifferent about such takeovers, since the bidding firm pays a significant premium over the market price. To the extent that these firms were correctly valued before the merger, the payment of a premium over the market price will transfer wealth from the bidding firm to the target firm. There is also the possibility that diversifying into businesses that the acquiring firm has little expertise in can result in less efficient operations after the merger (reverse synergy). Lang and Stulz (1994) present evidence that firms that are in multiple businesses trade at a discount of between 5 and 10% on individual firm values and attribute this to a diversification discount.[11] Markets seem to recognize the failure of diversification to add value. Doukas, Holmen and Travlos (2001) report that markets react negatively to the announcements of diversifying acquisitions.[12]

The absence of added value from a diversification motivated merger may seem puzzling, given the fact that the two firms are in unrelated businesses and thus should gain some diversification benefit. If the earnings of the two firms are not highly correlated, the variance in earnings of the combined firm should be significantly lower than the variance in earnings of the individual firms operating independently. This

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[9] If the two firms that are being combined have different costs of capital and/or different growth rates, the relative value weights of the two firms will change over time. With growth, it easy to see why this happens. The firm whose earnings are growing faster will see its value increase faster over time and become a larger part of the combined firm. With different costs of capital, the reason is a little more subtle. The firm with the higher cost of capital can be expected to appreciate faster in value over time and become a larger part of the combined firm.

[10] The unlevered beta of the combined firm will be a weighted average of the betas of the individual firms, with the weights being market value weights. These weights themselves will change over time as the firms have different costs of capital. For the values to exactly match up, we have to compute the cost of capital each year, using the estimated value of the firms each year.

[11] Lang, L., and R. Stulz, 1994, *Tobin's q, corporate diversification, and firm performance*, Journal of Political Economy, 1248-1280.

[12] Doukas, J.A., M. Holmen and N.G. Travlos, 2001, *Corporate Diversification and Firm Performance: Evidence from Swedish Acquisitions*, Working Paper, SSRN. They looked at 93 bidding firms in Sweden

reduction in earnings variance does not affect value, however, because it is firm-specific risk, which is assumed to have no effect on expected returns. (The betas, which are measures of market risk, are always value-weighted averages of the betas of the two merging firms.) But what about the impact of reduced variance on debt capacity? Firms with lower variability in earnings can increase debt capacity and thus value. This can be the real benefit of conglomerate mergers, and we consider it separately later in this section.

Cash Slack

Managers may reject profitable investment opportunities if they have to raise new capital to finance them for two reasons. The first is limited access to capital markets and the resulting capital rationing constraint. Small firms and private businesses often have to reject good investments because they are unable to raise capital at a reasonable price. The other reason was put forth by Myers and Majluf (1984), who argued that managers know more than investors about prospective projects.[13] Consequently, new stock may have to be issued at less than true value to finance these projects, leading to the good projects being turned away. It may therefore make sense for a company with excess cash and no investment opportunities to take over a cash-poor firm with good investment opportunities, or vice versa. The additional value of combining these two firms is the present value of the projects that would not have been taken if they had stayed apart, but can now be taken because of the availability of cash.

Cash slack can be a potent rationale for publicly traded firms that have easy access to capital and/or large cash balances and want to acquire small, private firms that have capital constraints. It may also explain why acquisition strategies concentrating on buying smaller, private firms have worked fairly well in practice. Blockbuster video (video rental), Browning and Ferris (waste disposal) and Service Merchandise (funeral homes) are good examples.

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between 1980 and 1995 and they also report that operating performance deteriorates after diversifying acquisitions.

[13] Myers, S. and N. Majluf, 1984, *Corporate financing and investment decisions when firms have information that investors do not have*, Journal of Financial Economics. v13, 187-221.

Illustration 4: Valuing Cash Slack in a Merger

The value of cash slack in a merger is easy to compute. In its simplest variant, we would compute the net present values of the projects that the cash-poor firm would be forced to reject because of its cash constraint and add it on to the value of the combined firm. As a simple example, assume that firm A is cash rich and project poor and has a cash balance of $ 10 billion. Assume that firm B is cash poor and project rich and would have rejected projects with a collective net present value of $ 1 billion because of its cash constraints. The value of cash slack in this merger is $ 1 billion and can be considered synergy. However, this is based upon the assumption that failure to take these projects this year translates into losing them forever. To the extent that the cash poor firm could have deferred taking these investments to future years, the value of synergy will be the loss in present values in waiting to take these investments rather than the entire $ 1 billion.

Tax Benefits

Several possible tax benefits accrue from takeovers and quirks in the tax law are often exploited by firms to increase value. Consider three examples:

- If one of the firms has tax deductions that it cannot use because it is losing money, whereas the other firm has income on which it pays significant taxes, combining the two firms can result in tax benefits that can be shared by the two firms. The value of this synergy is the present value of the tax savings that result from this merger. In making this assessment, we do have to keep in mind that the tax authorities have tightened the constraints allowing firms to offset their gains with an acquired company's losses.

- A second potential benefit comes from being able to write up the depreciable assets of a target firm in an acquisition. This will result in higher tax savings from depreciation in future years. Note, though, that another accounting item that accrues from acquisitions, which is goodwill, does not yield the same tax benefits, since amortization of goodwill is generally not tax deductible.

- In some countries, acquirers get additional benefits that are related to the restated book value of equity in the combined firm. In Brazil, for instance, companies are allowed to claim a rate of return (specified by the tax authorities) on book equity

capital as a tax deduction (analogous to the interest tax deduction). Assume, for instance, that this specified rate of return is 12% and that the book value of equity in the combined firm increases by $ 2 billion after the merger. This firm will be able to claim $240 million in additional tax deductions in the year after the merger, and its value will increase by the present value of the interest tax savings.

It should be noted that mergers motivated entirely by tax considerations carry a cost for taxpayers, who after all subsidize these mergers.

Illustration 5: Valuing a Net Operating Loss Carry forward

Assume that an firm with expected operating income of $ 1 billion next year acquires a firm with a net operating loss carry forward of $ 1 billion. The computation of the synergy from this acquisition is the savings in taxes that accrue to the acquiring firm For instance, with a marginal tax rate of 40%, the savings in taxes this year (assuming that the tax authorities will allow offsetting the target firm's operating loss against the acquiring firm's gain is $ 400 million. This is the value of the tax savings synergy, if we assume that the target firm could never have used the net operating loss.

Things become progressively more complicated when the acquiring firm does not have the income to offset net operating losses immediately. For instance, if the acquiring firm in this example was expected to generate $250 million in operating income for the next 4 years and the target firm's net operating loss was used to shelter income in each year, the savings in taxes will still be $ 400 million, but spread out as $ 100 million in savings each year for four years. To value the tax saving synergy, we would have to discount these cash flows back to the present at a rate that reflects the uncertainty associated with receiving the benefits. Since this uncertainty is directly related to the variability in operating income for the combined firm, we would use the cost of capital of the combined firm as the discount rate. Thus, if the cost of capital of the combined firm is 8.10% and the savings are $ 100 million a year for the next 5 years, the present value of the savings can be estimated as follows:

Value of tax savings = $ 100 million (PV of annuity, 5 years, 8.10%) = $398 million

There are variations, where the cost of debt and the cost of equity are used to discount the expected tax benefits from debt. There seems to be no basis for using the former but there

can be some justification for using the latter, especially when computing the value of equity in a company directly.

 Illustration 6: Tax Benefits of writing up Asset Values after Takeover: Congoleum Inc.

One of the earliest leveraged buyouts (LBOs) occurred in 1979 and involved Congoleum Inc., a diversified firm in ship building flooring, and automotive accessories. Congoleum's own management bought out the firm. The favorable treatment that would be accorded the firm's assets by tax authorities was a major reason behind the takeover. After the takeover — estimated to cost approximately $400 million — the firm was allowed to write up its assets to reflect their new market values and to claim depreciation on these new values. The estimated change in depreciation and the present value effect of this depreciation based on a tax rate of 48%, discounted at the firm's cost of capital of 14.5%, are shown in Table 12.

Table 12: Depreciation Tax Benefits: Before and After Leveraged Buyout

Year	Depreciation before	Depreciation after	Change in Depreciation	Tax Savings	Present Value
1980	$8.00	$35.51	$27.51	$13.20	$11.53
1981	$8.80	$36.26	$27.46	$13.18	$10.05
1982	$9.68	$37.07	$27.39	$13.15	$8.76
1983	$10.65	$37.95	$27.30	$13.10	$7.62
1984	$11.71	$21.23	$9.52	$4.57	$2.32
1985	$12.65	$17.50	$4.85	$2.33	$1.03
1986	$13.66	$16.00	$2.34	$1.12	$0.43
1987	$14.75	$14.75	$0.00	$0.00	$0.00
1988	$15.94	$15.94	$0.00	$0.00	$0.00
1989	$17.21	$17.21	$0.00	$0.00	$0.00
1980-89	*$123.05*	*$249.42*	*$126.37*	*$60.66*	*$41.76*

Note that the increase in depreciation occurs in the first seven years, primarily as a consequence of higher asset values and accelerated depreciation. After year seven, however, the old and new depreciation schedules converge. The present value of the additional tax benefits from the higher depreciation amounted to $41.76 million, about 10% of the overall price paid on the transaction. In recent years, the tax code covering asset revaluations has been significantly tightened. While acquiring firms can still reassess the value of the acquired firm's assets, they can do so only up to fair value.

Debt Capacity

If the cash flows of the acquiring and target firms are less than perfectly correlated, the cash flows of the combined firm will be less variable than the cash flows of the individual firms. This decrease in variability can result in an increase in debt capacity and in the value of the firm. The increase in value, however, has to be weighed against the immediate transfer of wealth to existing bondholders in both firms from the stockholders of both the acquiring and target firms. The bondholders in the pre-merger firms find themselves lending to a safer firm after the takeover. The coupon rates they are receiving are based upon the riskier pre-merger firms, however. If the coupon rates are not renegotiated, the bonds will increase in price, increasing the bondholders' wealth at the expense of the stockholders.

There are several models available for analyzing the benefits of higher debt ratios as a consequence of takeovers. Lewellen analyzes the benefits in terms of reduced default risk, since the combined firm has less variable cash flows than do the individual firms.[14] He provides a rationale for an increase in the value of debt after the merger, but at the expense of equity investors. It is not clear, in his model, that the value of the firm will increase after the merger. Leland and Skarabot (2003) argue that mergers can increase debt capacity but at the expense of a loss of the individual firms' debt to equity choices and limited liabilities.[15] Stapleton evaluates the benefits of higher debt capacity after mergers using option pricing.[16] He shows that the effect of a merger on debt capacity is always positive, even when the earnings of the two firms are perfectly correlated. The debt capacity benefits increase as the earnings of the two firms become less correlated and as investors become more risk averse.

There is one final point to be made in the context of debt capacity. The debt capacity argument assumes that both the acquiring firm and target firms were at their optimal debt capacities prior to the merger. The merger reduced the overall risk in the combined firm and increased the optimal debt capacity. This argument cannot be used when the target firm or the acquiring firm are under levered to begin with and use the

[14] Lewellen, W.G., 1971, *A Pure Financial Rationale for the Conglomerate Merger*, Journal of Finance, v26, 521-537.
[15] Leland, H. and J. Skarabot, 2003, *Financial Synergies and the Optimal Scope of the Firm: Implications for Mergers, Spinoffs, and Off-Balance Sheet Finance*, Working paper, Haas School of Business.

acquisition to move up to their optimal debt capacities. In that case, there is no synergy value in the merger since either firm could have moved to the optimal on its own and generated the increase in value.

Illustration 7: Valuing Additional Debt Capacity in a Merger

Consider again the merger of Lube & Auto and Dalton Motor. The value of the combined firm was the same as the sum of the values of the independent firms. The fact that the two firms were in different business lines reduced the variance in earnings, but value was not affected, because the debt ratios of the firm remain unchanged after the merger, and the costs of equity and debt were the weighted averages of the individual firms' costs.

The reduction in variance in earnings can increase debt capacity, which can increase value. If, after the merger of these two firms, the debt capacity for the combined firm were increased to 20% from 10% (leading to an increase in the beta to 1.1866 and no change in the cost of debt), the value of the combined firm after the takeover can be estimated as shown in Table 13.

Table 13: Value of Debt Capacity – Lube & Auto and Dalton Motors

Computed Values	Acquiring firm	Target firm	Combined Firm
Cost of Equity =	9.05%	7.85%	9.00%
After-tax cost of debt =	3.50%	3.50%	3.50%
Cost of capital =	8.50%	7.42%	7.90%
After-tax return on capital =	10.50%	10.50%	10.50%
Reinvestment Rate =	70.00%	70.00%	70.00%
Expected growth rate=	7.35%	7.35%	7.35%
Value of firm			
PV of FCFF in high growth =	$50.86	$26.20	$77.56
Terminal value =	$612.34	$350.76	$987.03
Value of firm today =	$458.19	$271.50	$752.53

As a consequence of the added debt, the value of the firm will increase from $729.69 million to $ 752.53 million, thus creating synergy worth $22.84 million.

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[16] Stapleton, R.C., 1985, *A Note on Default Risk, Leverage and the MM Theorem*, Journal of Financial Economics, v2, 377-381.

III. Dubious Synergies

Now that we have valued operating and financial synergies, we turn to a third group of synergies that we consider of dubious merit. In this group, we will include those synergies that require gross misjudgments by markets to have value.

Accretive Acquisitions

In many firms, there is a focus on whether the acquisition will be accretive or dilutive. An accretive acquisition is one where the earnings per share of the acquiring firm will increase after the acquisition, whereas a dilutive acquisition is one where the earnings per share will decrease. What is wrong with this rationale? An accretive merger requires acquisition of companies with price earnings ratios lower than the acquiring company. Thus, a company with a PE ratio of 30 that acquires a company with a PE ratio of 20 will see earnings per share increase after the acquisition, whereas acquiring a company with a PE ratio of 40 will lower earnings per share.

Why are accretive acquisitions viewed more favorably than dilutive acquisitions? Using the rationale that some acquirers use, the market price per share for the acquirer should go up in an accretive acquisition because the earnings per share are higher. This presupposes that the market does not change the PE ratio for the company after the acquisition. That makes no sense since the target company presumably had a lower PE ratio for good reasons – high risk and low growth, for instance. If the market is reasonably forward-looking, the PE ratio for the acquirer should drop after the acquisition. Will the drop be proportionately higher or lower than the increase in earnings per share? That will depend upon whether the price paid for the target company exceeds or is lower than the value of the target. In other words, the PE ratio for the target, by itself, should be irrelevant to the process as should the question of whether earnings are accretive or dilutive.

Notwithstanding this point of view, some firms will continue to put earnings accretion front and center while doing acquisitions. They are betting that markets will not see through appearances and reward them with higher stock prices. In the short term, their bets may very well pay off. Andrade (1999) examined 224 transactions between 1975 and 1994 and found that stock prices for acquirers with accretive acquisitions

continued to go up for 18 months after the acquisition and that they go up more for firms with large percentages of unsophisticated investors.[17] However, the change in stock price is much smaller than would be expected given completely naïve investors. In other words, there is truth to the adage that you can fool some of the investors some of the time.

Quick Growth

Faced with the prospects of anemic growth internally, many firms look for ways to increase growth quickly. Internal investments may be prudent but they often have long gestation periods and waiting for growth to show up is not considered an option. It is not surprising that these firms are often the most aggressive acquirers and their primary targets are usually companies with significant growth prospects. Though the benefits of higher growth are undeniable, the price paid for that growth determines whether such acquisitions make sense. If the price paid for the growth exceeds the fair market value, the stock price of the acquiring firm will decline even though the expected future growth in its cash flows may increase as a consequence of the takeover.

This can be seen with a simple example. Assume that an acquiring firm with minimal growth prospects acquires a target firm with lucrative investment opportunities and high growth potential. Table 14 summarizes the characteristics of the two companies:

Table 14: Acquiring and Target Firms: Growth Merger

	Acquiring firm	Target Firm
Beta	0.80	1.20
Pre-tax cost of debt	5.00%	5.00%
Tax rate	30.00%	30.00%
Debt to Capital Ratio	10.00%	10.00%
Revenues	$1,000.00	$500.00
Operating Income (EBIT)	$50.00	$25.00
Pre-tax return on capital	12.00%	30.00%
Reinvestment Rate =	50.00%	80.00%
Length of growth period =	5	5

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[17] Adnrade, G., 1999, *Do appearances matter? The Impact of EPS Accretion and Dilution on Stock Prices,* Working Paper, Harvard Business School.

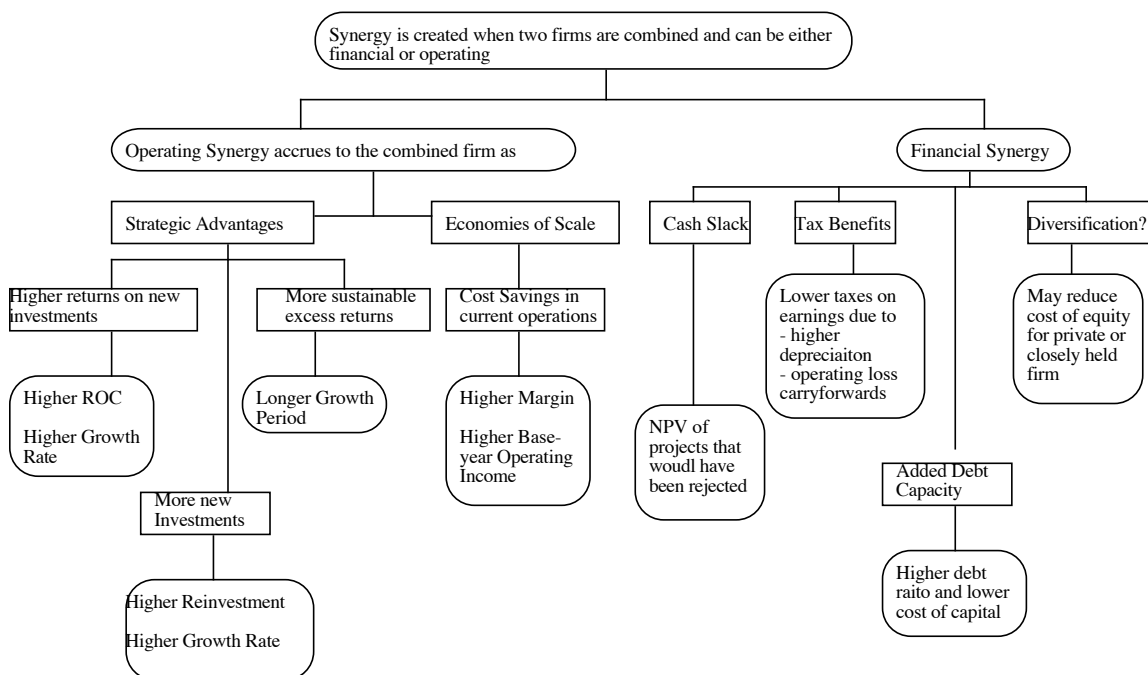Valuing these companies as independent companies yields the following estimates of value (in table 15):

Table 15: Acquiring and Target Company Valuations – Growth Merger

Computed Values	Acquiring firm	Target firm
Cost of Equity =	7.45%	9.05%
After-tax cost of debt =	3.50%	3.50%
Cost of capital =	7.06%	8.50%
After-tax return on capital =	8.40%	21.00%
Reinvestment Rate =	50.00%	80.00%
Expected growth rate=	4.20%	16.80%
Value of firm		
PV of FCFF in high growth =	$80.74	$21.95
Terminal value =	$635.31	$466.84
Value of firm today =	$532.55	$332.49

The acquiring firm, with an expected growth rate of 4.20%, is clearly buying growth since the target company has an expected growth rate of 16.80%. While this will translate into higher expected earnings growth for the acquiring firm after the acquisition, it will not necessarily translate into an increase in value for its stockholders. That will depend upon whether the acquiring firm paid more than the estimated value of the target ($332.49) or less. If it pays more, its stockholders will lose value whereas if its pays less, its stockholders will gain. The gain, though, is not because the firm was able to buy growth but because it was able to buy the target company for less than its estimated value.

In summary, synergy can come from operating and financial sources and can affect different inputs in valuation. Figure 3 summarizes the inputs that are most likely to be affected by each type of synergy and the effects on value.

Figure 3: Synergy and Value

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Synergy is created when two firms are combined and can be either financial or operating
├── Operating Synergy accrues to the combined firm as
│   ├── Strategic Advantages
│   │   ├── Higher returns on new investments
│   │   │   └── Higher ROC / Higher Growth Rate
│   │   ├── More sustainable excess returns
│   │   │   └── Longer Growth Period
│   │   └── More new Investments
│   │       └── Higher Reinvestment / Higher Growth Rate
│   └── Economies of Scale
│       └── Cost Savings in current operations
│           └── Higher Margin / Higher Base-year Operating Income
└── Financial Synergy
    ├── Cash Slack
    │   └── NPV of projects that woudl have been rejected
    ├── Tax Benefits
    │   └── Lower taxes on earnings due to - higher depreciaiton - operating loss carryforwards
    ├── Added Debt Capacity
    │   └── Higher debt raito and lower cost of capital
    └── Diversification?
        └── May reduce cost of equity for private or closely held firm
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The Evidence on Synergy – Value Created and Added

In the last section, we showed that synergy can have considerable value in many acquisitions, either by increasing expected cash flows or by lowering discount rates. In this section, we consider a question that is just as critical from the acquirer's standpoint, which is the price that should be paid for synergy. We will begin by looking at the evidence on the existence of synergy both at the time of the merger announcement and in the aftermath. We will follow up by laying out a framework for assessing how best to fairly share the benefits of synergy and where the odds are greatest for succeeding with a synergy-based acquisition strategy.

Evidence on Synergy

There are two ways we can evaluate the existence of the synergy. The first is on a forward-looking basis, by looking at market reactions to acquisition announcements and gauging what the expected synergy value is and who gets the gains. The second is to track mergers after they occur and evaluate the success of firms in delivering synergy gains.

I. Market Assessments at time of merger

Synergy is a stated motive in many mergers and acquisitions. Bhide (1993) examined the motives behind 77 acquisitions in 1985 and 1986 and reported that operating synergy was the primary motive in one-third of these takeovers.[18] Do markets believe these firms? If synergy is perceived to exist in a takeover, the market value of the combined firms, after a merger announcement, should be greater than the sum of the market values of the bidding and target firms, prior to that same announcement.

$$V(AB) > V(A) + V(B)$$

where

$V(AB)$ = Value of a firm created by combining A and B

$V(A)$ = Value of firm A, operating independently

$V(B)$ = Value of firm B, operating independently

Studies of stock returns around merger announcements generally conclude that the value of the combined firm does increase in most takeovers and that the increase is significant. Bradley, Desai, and Kim (1988) examined a sample of 236 inter-firms tender offers between 1963 and 1984 and reported that the combined value of the target and bidder firms increased 7.48% ($117 million in 1984 dollars), on average, on the announcement of the merger.[19] This result has to be interpreted with caution, however, since the increase in the value of the combined firm after a merger is also consistent with a number of other hypotheses explaining acquisitions, including under valuation and a change in corporate control. It is thus a weak test of the synergy hypothesis.

II. Post-merger Studies

The existence of synergy generally implies that the combined firm will become more profitable or grow at a faster rate after the merger than will the firms operating separately. A stronger test of synergy is to evaluate whether merged firms improve their performance (profitability and growth) *relative to their competitors*, after takeovers.

- McKinsey and Co. examined 58 acquisition programs between 1972 and 1983 for evidence on two questions: (1) Did the return on the amount invested in the

[18] Bhide, A., 1993, *Reversing Corporate Diversification*, in The New Corporate Finance- Where Theory meets Practice, ed. D.H. Chew Jr., McGraw Hill.

acquisitions exceed the cost of capital? (2) Did the acquisitions help the parent companies outperform the competition? They concluded that 28 of the 58 programs failed both tests, and six failed at least one test. In a follow-up study[20] of 115 mergers in the U.K. and the U.S. in the 1990s, McKinsey concluded that 60% of the transactions earned returns on capital less than the cost of capital and that only 23% earned excess returns. In 1999, KPMG examined 700 of the most expensive deals between 1996 and 1998 and concluded that only 17% created value for the combined firm, 30% were value neutral and 53% destroyed value[21].

▪ Moeller and Schlingemann (2004) broke down 4430 acquisitions between 1985 and 1995 into cross border and domestic acquisitions and conclude that U.S. acquirers overpay more in cross border acquisitions and have lower stock price and operating performance in the post-acquisition period. They attribute this to acquirers over estimating the value of synergy in cross border mergers or under estimating the difficulty of delivering this synergy.[22]

▪ A study[23] looked at the eight largest bank mergers in 1995 and concluded that only two (Chase/Chemical, First Chicago/NBD) subsequently outperformed the bank-stock index. The largest, Wells Fargo's acquisition of First Interstate, was a significant failure. Sirower (1996) takes a detailed look at the promises and failures of synergy and draws the gloomy conclusion that synergy is often promised but seldom delivered.[24]

▪ The most damaging piece of evidence on the outcome of acquisitions is the large number of acquisitions that are reversed within fairly short time periods. Mitchell and Lehn note that 20.2% of the acquisitions made between 1982 and 1986 were

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[19] Bradley, M., A. Desai and E.H. Kim, 1988, *Synergistic Gains from Corporate Acquisitions and their Division between the Stockholders of Target and Acquiring Firms*, Journal of Financial Economics, v21, 3-40.

[20] This study was referenced in an article titled "Merger Mayhem" that appeared in Barrons on April 20, 1998.

[21] KPMG measured the success at creating value by comparing the post-deal stock price performance of the combined firm to the performance of the relevant industry segment for a year after the deal was completed.

[22] Moeller, S.B. and F.P. Schlingemann, 2004, *Are cross border acquisitions different from domestic acquisitions? Evidence from stock and operating performance of U.S. acquirers*, Working Paper, SSRN.

[23] This study was done by Keefe, Bruyette and Woods, an investment bank. It was referenced in an article titled "Merger Mayhem" in Barrons, April 20, 1998.

[24] Sirower, M.L., 1996, *The Synergy Trap*, Simon & Schuster.

divested by 1988.[25] Studies that have tracked acquisitions for longer time periods (ten years or more) have found the divestiture rate of acquisitions rises to almost 50%, suggesting that few firms enjoy the promised benefits from acquisitions. In another study, Kaplan and Weisbach (1992) found that 44% of the mergers they studied were reversed, largely because the acquirer paid too much or because the operations of the two firms did not mesh.[26]

Reviewing the evidence, it is clear that markets think that there is potential for synergy at the time of mergers (albeit far less than manager assessments at the same time) but it is also clear that only a small proportion of mergers deliver substantial synergy. Both these findings are consistent with the notion that synergy does exist but that it is far more difficult to generate it in practice than it is on paper.

Sharing Synergy Gains

If synergy adds significant value, as it sometimes does, the next question becomes one of sharing these gains. Who should get the benefits of this synergy? In other words, should it be stockholders in the acquiring firm or stockholders in the target firm? In this section, we will begin by devising a way of fairly sharing this value between target and acquiring firms. We will then look at the evidence on how synergy benefits actually get shared between acquirer and target. We will conclude by examining how acquiring firms can improve their odds on getting a larger share of synergy benefits.

A Framework for Sharing

If synergy can create significant value under the right conditions in an acquisition, the next question becomes one of determining how this incremental value should be shared between the acquiring firm and target firm stockholders. While we will look at the specifics of each type of synergy below, the basic proposition for fair sharing is a simple one. Since synergy requires skills and strengths contributed by both the acquiring and target firms for its existence, the acquiring company's share of the synergy will depend

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[25] Mitchell, M.L. and K. Lehn, 1990, *Do Bad Bidders make Good Targets?*, Journal of Applied Corporate Finance, v3, 60-69.

[26] Kaplan, S. and M.S. Weisbach, 1992, *The Success of Acquisitions: The Evidence from Divestitures*, Journal of Finance, v47, 107-138.,

upon how unique the strengths it brings to the mix are. In the limiting case, if only the acquiring firm has the components necessary for the synergy firm, it should receive a large share of the synergy benefits. If the acquiring firm's strengths are not unique and could be offered by other firms as well, the bargaining power shifts to the target firm and its stockholders should receive the bulk of the benefits. Applying this principle to each of the sources of synergy described earlier in the paper yields the following conclusions:

a. <u>Cost Saving Synergies</u>: As we noted earlier, cost saving synergies are usually by products of horizontal mergers. If the cost savings are unique to the acquiring firm, it will be able to demand a higher percentage of the synergy benefits. This will often be the case with locational synergies. When Bank of America acquired Security Pacific in the late 1990s, a major cost saving item was the overlapping branches that these banks had in California specifically and on the West Coast more generally. It is unlikely that any other large bank (other than Bank of America) would have been able to generate the same savings, thus giving Bank of America an advantage in the bidding process. If the cost savings are more general and would be available to any other peer group firm, the target firm stockholders are likely to receive a larger share of the benefits. This would be the case, for instance, in a merger of two consumer product firms where the primary cost savings will come from integrating their advertising departments and saving on the resulting costs.

b. <u>Growth Synergies</u>: Growth synergies can take many forms but here again the acquiring company's share is likely to depend upon what it brings to the table as its strength. Consider two simple examples. Coca Cola considers acquiring an emerging market consumer product company, hoping to use its marketing muscle to increase growth for both its own and the target company's products. The strength that Coca Cola brings to the negotiating process is marketing expertise, but there are other consumer product companies (Diageo, Pepsi) that could match it. In contrast, Cisco frequently buys young technology companies in its business domain, and uses its skill in converting promising technology into commercial products to generate incremental value. This skill, which requires a blend of technological and marketing skill, is more difficult to replicate. We would expect Cisco to get a larger share of synergy benefits than Coca Cola when making acquisitions.

c. <u>Debt Capacity</u>: In synergies motivated by debt capacity and/or lower costs of debt, the two firms involved should be in different businesses and be risky as stand-alone entities. Given that neither firm has any unique strengths, we would expect a fairly equal sharing of synergy benefits.

d. <u>Cash Slack</u>: Since cash slack is best exploited when a mature firm with a significant cash balance and a growth firm with little cash (and great investment opportunities) come together, the sharing of benefits will depend a great deal on which of these strengths (cash or growth opportunities) is scarcer across the market. In an emerging growth economy where investment opportunities abound but companies are cash poor (perhaps because capital markets are not well developed), we would expect cash rich companies to get a larger share of the synergy gains from cash slack. In more mature economies with open capital markets, we would expect the companies with growth opportunities to have the upper hand in the bargaining process.

e. <u>Tax Benefits</u>: The tax benefits from an acquisition can either come from higher tax deductions after the merger (from depreciation write ups or amortization) or a lower tax rate. With both of these savings, the acquiring firm's share will depend upon how integral it is to receiving those tax benefits. If any acquiring firm can write up a target firm's assets after an acquisition, we would expect the target firm's stockholders to get almost all of the synergy benefit. If the acquiring firm participation is essential to the tax benefit being generated, it will command a larger share of the premium.

Overlaying this discussion is a practical issue. For a target firm to be able to extract the bulk of the synergy premium, it has to be able to open up the bargaining process and force the acquiring firm to match the bids of others. With publicly traded target firms, this is easy to do since the market plays the role of a competing bidder and forces the acquiring firm to ante up larger and larger shares of the synergy premium. In some cases, a competing bidder will enter and drive up the price. With private businesses, especially smaller ones, opening up the bidding process to other bidders is much more difficult to do. Consequently, acquirers are far more likely, with any given synergy value, to extract a larger proportion of that value.

Evidence on Synergy Sharing

In the last section, we looked at evidence that is consistent with the existence of synergy in many mergers. However, this does not always translate into gains for acquiring company stockholders, since that depends upon the price paid for the acquisition. The cumulative evidence on acquisition suggests that the stockholders of target firms are the clear winners in takeovers — they earn significant returns[27] not only around the announcement of the acquisitions, but also in the weeks leading up to it. In 1983, Jensen and Ruback reviewed 13 studies that look at returns around takeover announcements and reported an average return of 30% to target stockholders in successful tender offers and 20% to target stockholders in successful mergers.[28] In 1988, Jarrell, Brickley, and Netter examined the results of 663 tender offers made between 1962 and 1985 and noted that premiums averaged 19% in the 1960s, 35% in the 1970s and 30% between 1980 and 1985.[29] The price behavior of a typical target firm in an acquisition is illustrated in figure 3, from one of the studies,[30] in the 10 days before, the day of and the 10 days after an acquisition announcement.

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[27] The excess returns around takeover announcements to target firms are so large that using different risk and return models seems to have no effect on the overall conclusions.

[28] Jensen, M.C. and R.S. Ruback, 1983, *The Market for Corporate Control*, Journal of Financial Economics, v11, 5-50.

[29] Jarrell, G.A., J.A. Brickley and J.M. Netter, 1988, *The Market for Corporate Control: The Empirical Evidence since 1980*, Journal of Economic Perspectives, v2, 49-68.

[30] See Dennis, D. and J. McConnell, 1986, *Corporate Mergers and Security Returns*, Journal of Financial Economics, v16, 143-188.

Figure 3: Cumulative Excess Return to Target Company Stock
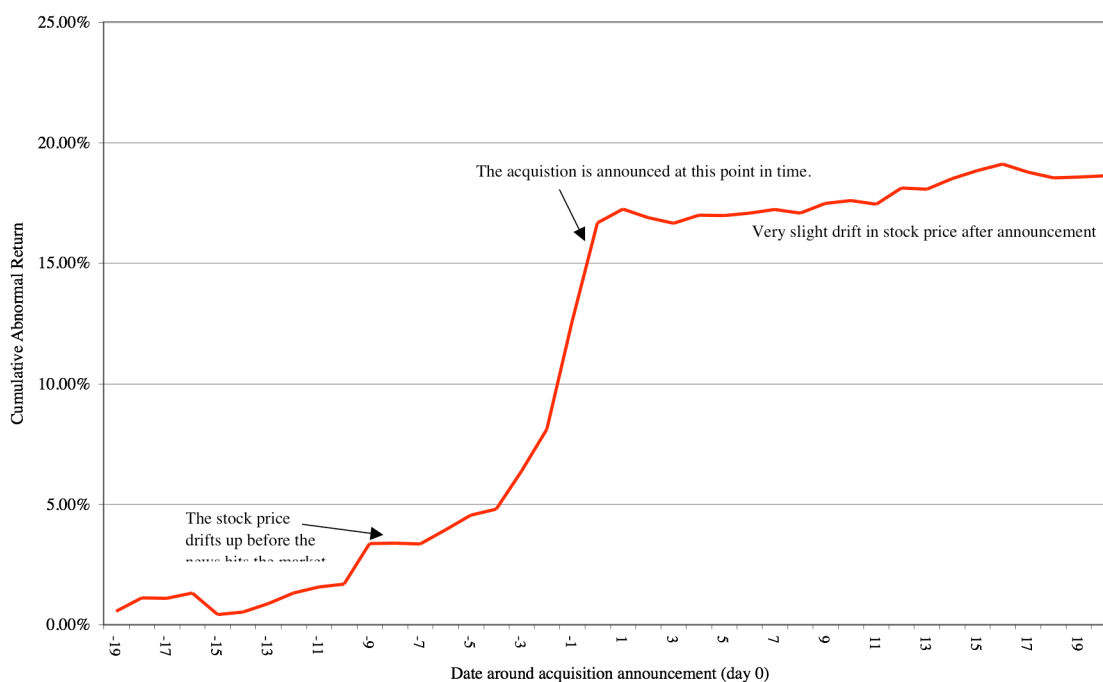
Note that about half the premium associated with the acquisition is already incorporated in the price by the time the acquisition is announced. This suggests that information about acquisitions is leaked to some investors who trade on that information. On the acquisition date, there is a decided jump in the stock price but little evidence of drift thereafter. When we categorize acquisitions based upon how the acquiring firm pays for them, we find that the stock prices of target firms tend to do much better on the announcement of cash-based acquisitions (where the acquirer uses cash only to pay for the acquired company's stock) than stock based acquisitions. The premiums in hostile acquisitions are larger than the premiums on friendly mergers and the premium on tender offers is slightly higher than the premium on mergers. Figure 4, extracted from one study[31], provides an illustration of the magnitude of the differences:

[31] Huang, R.D. and R. Walkling, 1987, *Acquisition Announcements and Abnormal Returns*. Journal of Financial Economic, v19, 329-350.

Figure 4: Target Firm Premiums in Acquisitions
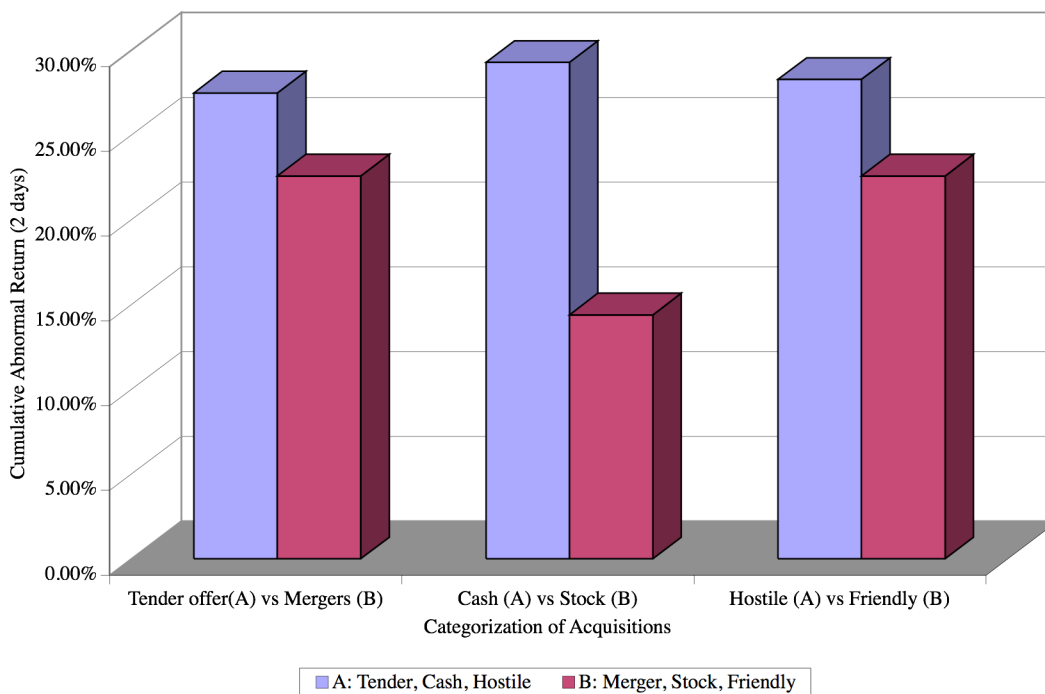
Source: Huang and Walkling

No matter how you categorize acquisitions, stockholders in target firms have little reason to complain since they walk away with healthy price gains.

The effect of takeover announcements on bidder firm stock prices is not as clear-cut as it is for target firms. In the study referenced earlier, Jensen and Ruback report excess returns of 4% for bidding firm stockholders around tender offers and no excess returns around mergers. Jarrell, Brickley and Netter, in their examination of tender offers from 1962 to 1985, note a decline in returns to bidding firm stockholders from 4.4% in the 1960s to 2% in the 1970s to -1% in the 1980s. Other studies indicate that approximately half of all bidding firms earn negative returns around the announcement of takeovers, suggesting that shareholders are skeptical about the perceived value of the takeover in a significant number of cases. In the most recent study, Moeller, Schlingemann and Stulz (2004) estimate that stockholders in acquiring firms lost 12 cents per dollar spent on acquisitions between 1998 and 2001, translating into a loss of $ 240 billion over the period. In contrast, they lost only $ 7 billion collectively through the entire 1980s. However, almost all of the lost shareholder wealth between 1998 and 2001

could be attributed to a few very large deals, where the acquiring firm overpaid (like the Time Warner/AOL deal).[32]

As a final point, it is worth noting that looking at the acquisition announcement day behavior of acquiring and target firm stock price to get a measure of the value of synergy and whether bidders are overpaying may be simplistic. After all, most acquisition announcements are not complete surprises and the market has often impounded its expectations into the stock price3. Hietala, Kaplan and Robinson (2000) develop an approach that considers stock price movements for the target firm and multiple bidding firms from the time a merger is announced to when it is consummated to back out the value of synergy and the extent of under or over payment by the acquiring firm.[33] Using this approach, they conclude that Viacom overpaid by $1.5 billion when it bought Paramount in 1994 and that QVC which lost the bidding war actually had higher synergies than Paramount did.

Considering the evidence, it is easy to see why bidding firm stockholders often do not share the enthusiasm that managers in these firms have about mergers and acquisitions. In most acquisitions, even those where synergy is real and creates value, the acquiring firm's stockholders get little or none of the benefits from synergy. In fact, in a significant percentage of acquisitions, acquiring firms pay more than 100% of the value of synergy, leaving their stockholders worse off than they would have been without the acquisition.

Why do bidders overpay for synergy?

Why do bidders over pay for synergy? There are a number of possible explanations for the phenomenon:

o <u>Biased Evaluation Process</u>: In most merger deals, the assessment of whether the deal makes sense (i.e., whether the target company is a bargain at the offered price) is done by the deal makers (the investment bankers for the acquiring firm). This process is clearly open to conflicts of interest and bias. The deal-makers fees rest on the deal

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[32] Moeller, S.B., F.P. Schlingemann and R.M. Stulz, 2004, *Wealth Destruction on a Massive Scale? A Study of Acquiring Firm Returns in the Recent Merger Wave*, Journal of Finance. V60, 757-792.

[33] Hietalla, P., S.N. Kaplan and D.T. Robinson, 2000, *What is the price of hubris? Using takeover battles to infer overpayments and synergies*, Working Paper, University of Chicago.

getting done and not on whether the deal makes sense. If we couple this bias with the fact that managers at most acquiring firms have already decided that they want to do the acquisition at any price, it is not surprising that so many bad deals go through with acquirers overpaying for synergy and control, even if they exist.

o Managerial Hubris: Roll (1986) argued that managerial pride was at the root of the overpayments in many acquisitions.[34] Acquiring firms seem to consistently over estimate how much synergy there is in mergers and under estimate how much time it will take them to deliver this synergy. This may seem irrational given the track record that other acquiring firms have on both counts. However, it reflects the belief that managers seem to have that they are better than average and thus immune from such mistakes. Roll's argument has been backed up by empirical studies that find that acquisition premiums tend to reflect the egos of the acquiring firm CEOs. Hayward and Hambrick, for instance, looked at 106 major acquisitions and measured the hubris of CEOs using three proxies – recent organizational success, media praise and relative power (measured by the ratio of the CEO's compensation to the next highest paid employee).[35] They found that high-profile, overly self-confident CEOs consistently overpaid on acquisitions.

o Failure to plan for synergy: The KPMG study that we referenced earlier on post-merger synergies also noted that many firms do not have explicit plans for delivering synergy. As a follow up, no one in these organizations is held responsible for generating the synergy. Firms that do not work at generating synergy will find that there is no synergy; after all, costs don't cut themselves and growth requires investment decisions.

Increasing the Likelihood of Success

The evidence on mergers adding value is murky at best and negative at worst. But some mergers clearly add value and some are successful at creating synergy. While they

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[34] Roll, Richard, 1986, *The Hubris Hypothesis of Corporate Takeovers*, Journal of Business, 59, 97–216.

[35] M. Hayward, D. Hambrick, "Explaining the premiums paid for large acquisitions: Evidence of CEO hubris," *Administrative Science Quarterly*, 42, 1997, 103-127. Every additional article in the media praising the CEO increased the acquisition premium by 1.6%.

may be more the exceptions rather than the rules, there seem to be lessons that the past hold for firms considering the daunting challenge of delivering synergy in mergers:

o   Mergers of equals (firms of equal size) seem to have a lower probability of succeeding than acquisitions of a smaller firm by a much larger firm[36]. This may be because the cultural clashes that are inevitable when two large firms come together (Citigroup and Travelers, for instance) will delay the process of implementing and delivering synergy.

o   Cost saving mergers, where the cost savings are concrete and immediate, seem to have a better chance of delivering on synergy than mergers based upon growth synergy. Growth synergies, after all, are not only more elusive but are less likely to be put down on paper and therefore less likely to have explicit mechanisms for follow-up and monitoring. A study by McKinsey on synergy values examined the proportion of promised synergy value delivered in cost savings and growth mergers and the results are summarized in figure 5:[37]

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[36] This might well reflect the fact that failures of mergers of equal are much more visible than failures of the small firm/large firm combinations.

[37] Christofferson, S.A., R. S. McNish and D. L. Sias, 2004, *Where Mergers go wrong*, McKinsey on Finance, Winter 2004.

Figure 5: Synergy - Delivered versus Promised
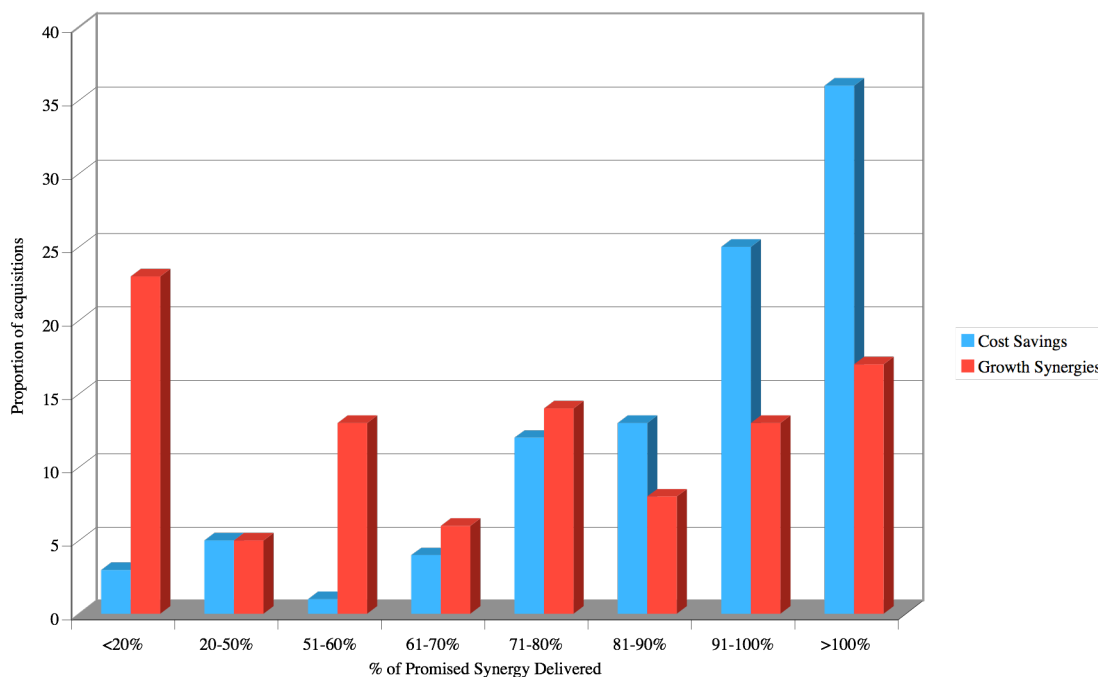
o   Acquisition programs that focus on buying small private businesses for consolidations have had more success than acquisition programs that concentrate on acquiring publicly traded firms. There are two key advantages to buying private businesses. The first is that private businesses operate under far tighter capital constraints and synergies (from using cash slack) are likely to be much greater than for publicly traded targets. The second is that the acquirer no longer has to begin with a market price, which may already reflect the value of synergy and add a premium to it. The value of a private company has to be estimated and is less likely include this market bias.

In conclusion, synergy is difficult to deliver but it is not impossible to create. Firms that are disciplined when making acquisitions and stay focused are better able to deliver promised synergy benefits.

Common Errors in Valuing Synergy

While firms are often willing to pay billions of dollars for synergy in mergers, there are several common errors that are made by analysts who are called upon to value

synergies. Acquiring firms often subsidize target firm stockholders by misidentifying sources of synergy or using the wrong discount rate on savings from synergy. It is also common to see a mixing up and double counting of synergy and control values. Finally, over optimism about when synergy gains will show up often lead to too high a value being attached to synergy.

a. Subsidizing Target Firm Stockholders

Acquiring firms should follow a simple rule when it comes to value. They should not render unto target firm stockholders premiums for items or strengths that these stockholders had no role in creating. Consider two very simple examples where we can see this subsidization of target firm stockholders by acquiring firms:

- An acquiring firm with a high debt rating acquires a target firm with a much lower debt rating. Assume, for purposes of this illustration, that the after-tax cost of debt for the acquiring firm is 3% and that of the target firm is 5% and that the debt ratio of the latter is 30%. In computing the cost of capital for the target firm, the analyst decides to use the acquiring firm's cost of debt, arguing that the acquisition will be funded with new debt at the lower cost. The lower cost of capital (arising from replacing the target firm's cost of debt with the acquirer's lower cost of debt) will result in a higher value for the target firm. Why should target firm stockholders, who played no role in the acquiring firm's higher rating, be paid a premium for that higher rating? Paying this higher value would result in a transfer of wealth from the acquiring firm's stockholders to the target firm's stockholders.

- An acquiring firm with excess debt capacity uses this debt capacity to fund the acquisition of a target firm. The target firm will be acquired with a disproportionate amount of debt, well in excess of what it could have used to finance its own operations. If we value the target firm with this high debt ratio, we will undoubtedly arrive at a much higher value. Paying that high value would be a mistake, though, since we would be subsidizing the target firm stockholders for something that they did not create – the acquiring firm's excess debt capacity.

At a more general level, acquiring firms have been all too willing to concede both the value of synergy and control to target firm stockholders in mergers. As we noted earlier

in the paper, a fair sharing of synergy should leave the acquiring firm's stockholders with at least some of the incremental value from synergy.

b. Wrong Discount Rate

Synergy usually generates incremental cash flows over future periods, and valuing these cash flows requires a discount rate. Using the wrong discount rate on synergy cash flows will result in synergy being misvalued. The general principle that governs the estimation of discount rates, which is that they should reflect the non-diversifiable risk in the cash flows, continues to hold when it comes to cash flows from synergies. Notwithstanding this principle, there are some common errors that continue to be made when it comes to valuing synergy:

- Cash flows generated by synergy accrue to the combined firm and not to the target or acquiring firm separately. We should be using the combined firm's cost of equity and/or capital to discount these cash flows. In many acquisitions, the cash flows from synergy are discounted at either the acquiring firm or the target firm's cost of equity/capital.

- As we noted earlier, analysts often discount tax savings that arise as a consequence of acquisitions at the riskless rate. Cash flows generated by synergy are never riskless and using the riskless rate to discount cash flows is inappropriate.

- If the synergy involves entering new businesses with very different risk characteristics than those in which either the acquiring or target firms are involved in at the time of the merger, the discount rate used for the cash flows should be different from both the acquiring and target firm's costs of capital.

c. Mixing Control and Synergy

While synergy is used as a reason for many mergers, the other oft-stated rationale in acquisitions is control. The value of control derives from changing the way a company is run and will be higher at poorly managed, poorly run firms. In many acquisition valuations, the value of control and synergy are assessed together and it is difficult to determine where one ends and the other begins. By combining the two, we also run ths risk of using the wrong discount rates to value each component. The value of control, is

very different from the value of synergy for the following reason. Synergy requires two entities (firms, businesses, projects) for its existence and is created by combining the two entities. Control, on the other hand, resides entirely in the target firm and does not require an analysis of the acquiring firm (or its valuation).

If both control and synergy are motives in the same acquisition, it is best to assess their values separately. In fact, the value of control should be estimated first by valuing the target firm twice, once on a status quo basis (with existing management) and once with the changes that are intended in how the company is run. Once the value of control has been estimated, the value of synergy can then be estimated using the framework devised earlier in this chapter.

Conclusion

Often promised and seldom delivered is perhaps the most apt way of describing synergy in most acquisitions. There is potential for synergy in many mergers, be it operating or financial. In this paper, we began by looking at the sources of synergy and how best to value each one. In general, operating synergies manifest themselves as higher cash flows, while financial synergies can affect both cash flows and discount rates. To value synergy, both the acquiring and target firms have to be valued independently first and the sum of these values can be compared to the value of the combined firm (with the synergy benefits built in) to estimate the value gain from synergy.

While there is some evidence of synergy in the aggregate across all acquisitions, most mergers fail in delivering any synergy. Even if we accept the fact that there is value to synergy, acquiring firm stockholders get almost none of the benefits of the increased value; in fact, they overpay for synergy in most acquisitions. We attribute this overpayment to a number of factors including managerial hubris, bias in the estimation process and a failure to plan for synergy. We close the paper by considering how best to improve the odds on delivering synergy and some common errors in the valuation of synergy.