

---

## A POSTSCRIPT

Both discounted cash flows models and relative valuation approaches can be used to value technology firms, though the challenges in estimating the inputs can be significant, especially for new technology firms with negative earnings and limited history. There are many analysts who do not share this view. They argue that discounted cash flow valuation will not work at technology firms for a number of reasons: there is too much uncertainty about the future or too much of the value comes from the terminal value. They suggest new paradigms for valuing these firms that often deviate significantly from what are viewed as first principles in traditional valuation models. In this chapter, you ~~will~~ confront three fundamental propositions about valuation in technology firms, and draw general lessons for both investors and managers.

### **The Fundamentals don't change**

There are three fundamentals that determine the value of a business – its capacity to generate cash flows from existing investments, the expected growth in these cash flows over time and the uncertainty associated with whether these cash flows will be generated in the first place. These fundamentals remain the same no matter what type of firm you are valuing - large or small, manufacturing or service and technology or non-technology., though the emphasis placed on each may be different for different firms.

### ***Cash Flow, Growth and Risk***

At the risk of repeating a mantra oft stated through this book, consider again how the three determinants of value interact with value.

- Firms that generate *higher cash flows* from existing investments should be *worth more* than firms that generate lower or negative cash flows.
- Firms that *expect to grow faster* in the future should have *higher value* than firms that have lower growth rates.

- *Less uncertainty about future cash flows* should translate into *higher value* for firms than more uncertainty about future cash flows

In discounted cash flow valuations, the relationship between fundamental variables and value was made explicit by making assumptions about each, with uncertainty showing up in the discount rate. In relative valuations, the relationship is implicit and often shows up in the form of adjustments made to multiples when firms are compared to each other.

It is true that the cash flows from existing investments are negative for some new technology firms, but that changes little that has been said here. These firms usually have to generate much higher positive cash flows in the future to compensate for their current negative cash flows. The uncertainty about these cash flows for these firms can compound this effect.

### ***Lessons for Investors***

With technology firms, the allure of high growth often blinds investors to the other fundamentals that determine value. While higher growth generally does justify assigning a higher value for a firm, you should add three qualifiers.

- The first is that it is not growth in revenues or earnings but growth in cash flows generated for investors that creates value. There are firms that generate astounding growth in revenue but never make it to profitability, and still other firms that make it to profitability but have little or no cash flows to show because of their reinvestment needs.
- The second is that higher expected growth in cash flows, other things remaining equal, can be used to justify a higher price for an asset but not any price. The term “growth at a reasonable price” is used commonly to justify the prices paid for technology stocks, but seems to be ignored just as often by investors who seem to be willing to pay any price for high growth.

- The third is that the other fundamentals – risk and cash flow generating capacity – continue to determine value, even for the highest growth firms. Investors who choose to ignore these fundamentals do so at their own peril.

You cannot avoid dealing with fundamentals by choosing to do relative valuation. Investors who compare a the multiple (such as price to sales) that a firm is trading at to the average for other firms in the sector and use it as justification for a stock being under or over valued should realize that they making implicit assumptions about the risk, growth, and cash flow characteristics of the firms being compared.

### *Lessons for managers*

This may come as a surprise to some managers, but analysts do not determine stock prices. In fact, the evidence seems to suggest that analysts follow the market rather than lead it; buy recommendations on a stock often proliferate after a stock has gone up, and sell recommendations, rare though they might be, often show up after a stock has gone down. Notwithstanding this, the managers of some technology firms seem to run their firms with the singular objective of keeping equity research analysts who follow their firms happy. These managers focus on meeting quarterly earning targets or delivering revenue growth or whatever else analysts consider important at the moment, often ignoring fundamentals in the process. While this may deliver short-term rewards in the form of favorable recommendations from analysts, these managers may be putting their enterprises at risk and destroying value.

Good management requires that the emphasis return to fundamentals, even if it makes analysts unhappy in the short term. Thus, an action that increases target operating margins in the long term at the expense of short-term revenue growth may disappoint some analysts, but it will increase value. The stock price may even drop, as a consequence, but the value will increase, and markets have to be trusted to recognize their mistakes over time.

## **Grow, Grow, Grow...**

While cash flows, growth and risk remain the determinants of value for all firms, growth plays a disproportionately large role in determining the values of technology firms. Not surprisingly, both investors and managers in these firms consider higher growth to be the key to higher value.

### ***Growth and Value***

The first lesson that emerges from that the last chapter on value enhancement is that it is not growth that creates value, but growth with excess returns. Thus, firms can grow at high rates and create no value or even destroy value, because they earn less than what is required (the cost of capital) on their new investments.

The second lesson is that the relationship between growth and value is generally not linear. As the expected growth rate in cash flows doubles or triples, the value of the firm will generally not change proportionately.

### ***Lessons for Investors***

The fact that much of the value of technology firms comes from future growth has important implications for investors. Every action taken by these firms has to be screened for potential effects not just on current earnings but, more importantly, on future growth. Actions that increase current earnings but reduce future growth prospects can do significant damage to firm value. Technology firms are particularly susceptible to making this trade off for two reasons. First, small earnings surprises, where the actual earnings exceeds analyst earnings estimates by a few cents, can result in large increases in stock prices. Second, the fact that research and development expenses are treated as operating expenses gives firms some discretionary power over reported earnings. A technology firm, faced with earnings estimates that it will not be able to beat, may be tempted to reduce R&D expenses or resort to other accounting shenanigans to beat these estimates.

When technology firms announce acquisitions or investments, the key question that you should have for these firms is: What effect will this action have on this firm's capacity to generate growth with excess returns? If this effect is negative, investors should weight this a great deal more than whether the announcement will have a positive or a negative effect on earnings. The same can be said of earnings reports. Earnings reports can be misleading, especially when reinvestment costs are expensed (as is the case with research, development and long-term marketing expenses). Thus, when a firm with high-growth potential and poor earnings reports a significant improvement in earnings, investors should examine the report for the reasons. If the earnings are improving because the costs of generating current revenues are coming down (due to economies of scale or pricing power), this is clearly good news. If, however, the earnings are increasing because the firm has reduced or eliminated discretionary reinvestment expenditures (such as development costs), the net effect on value can be very negative, since future growth is being put at risk.

#### *Lessons for managers*

Managers in growth firms often focus on increasing growth at the expense of all else in the firm. Actions that increase growth are viewed as good, while actions that decrease growth are viewed negatively. This is simplistic, because there are three factors that have to be considered when managing growth.

- Increasing the growth rate in revenues is the easier half of the equation. Increasing target operating margins and returns on capital is much more difficult, but if accomplished, much more important in value creation.
- When a significant or substantial portion of firm value comes from expected growth, increasing firm value may mean investing more back into the firm. If the investment takes the form of research and development expenses, the earnings reported by the firm may fall below expectations. Consequently,

- As the firm matures, managers have to change with the firm. A greater proportion of firm value will come from existing assets, and reinvestment needs have to be reduced as the growth rate decreases.

The emphasis on growth also points to the limitations in the mechanisms that are used to judge firm performance and to compensate management. In chapter 12, you saw that neither economic value added nor CFROI work well with technology firms and using either may result in managers taking actions that lower firm value. A good compensation mechanism in technology firms will reward their managers for high quality growth (growth with excess returns) and not for growth per se.

### **Live with Noise**

There are no precise valuations. Anyone who has valued a business knows that the inputs into a valuation are estimates, and that the value that emerges is, therefore, an estimate as well. With technology firms, with short product life cycles and volatile technologies, the estimated value will have even more error associated with it.

### ***Noise in the Valuation of Technology firms***

The valuation of a technology firm will have substantial estimation error, and the noise in the valuation will be magnified if you are valuing a new technology firm, with negative earnings and a limited history. One way to present this noise is in terms of a range in estimated value, and the range on the value of technology firms will be large. This is often used as an excuse by analysts who do not want to go through the process of valuing such firms. It also provides critics with a simplistic argument against trusting the numbers that emerge from these models.

You should take a different view. The noise in the valuation is not a reflection of the quality of the valuation model, or the analyst using it, but of the underlying real uncertainty about the future prospects of the firm. This uncertainty is a fact of life when it comes to investing in technology firms. In a discounted cash flow valuation, you attempt

to grapple with this uncertainty and make your best estimates about the future. Note that those who disdain valuation models for their potential errors end up using far cruder approaches, such as comparing price/sales ratios across firms.

### ***Implications for Investors***

From a valuation perspective, there are a number of useful lessons that emerge for investors in technology firms from the discussion above.

- *Diversify*: This age-old rule of investing becomes even more critical when investing in stocks that derive the bulk of their value from uncertain future growth. The antidote to estimation noise is a more diversified portfolio both across firms and across sectors. Investors who choose to concentrate their bets on a few technology stocks are asking for trouble. Even if they have done their homework and the firms are undervalued, the noise in the process is so great that they could end up losing large portions of their portfolio.
- *Keep your eyes on the prize*: Focus on sustainable margins and survival, rather than quarter-to-quarter or even year-to-year swings in profitability in your firm. Understanding what a firm's operating margins will look like when it reaches financial health might be the single most important determinant of whether one is successful investing, in the long term, in such firms. Separating those firms that have a greater chance of surviving and reaching financial health is a closely connected second determinant. After all, most start-up firms never survive to enjoy their vaunted growth prospects.
- *Be ready to be wrong*: The noise in these valuations is such that no matter how much information is brought into the process and how carefully a valuation is done, the value obtained is an estimate. Thus, investors in technology stocks will be spectacularly wrong sometimes, and it is unfair to judge them on individual

valuations. They will also be spectacularly right in other cases, and all that you can hope for is that with time as an ally, the successes outweigh the failures.

There are two other points to make about the precision in the valuation of technology stocks. First, even if a valuation is imprecise, it provides a powerful tool to answer the question of what has to occur for the current market price of a firm to be justified. Investors can then decide whether they are comfortable with these assumptions, and make their decisions on buying and selling stock in these firms. Second, even if individual valuations are noisy, portfolios constructed based upon these valuations will be more precisely valued. Thus, an investor who buys 40 stocks that he or she has found to be undervalued using traditional valuation models, albeit with significant noise, should find noise averaging out across the portfolio. The ultimate performance of the portfolio then should reflect the valuation skills, or the absence of them, of the analyst.

### ***Implications for Managers***

If the future growth potential for a firm is uncertain, what are the implications for managers? The first is that the uncertainty about future growth will almost certainly translate into more uncertainty in traditional investment analysis. It is far more difficult to estimate cash flows and discount rates for individual projects in technology firms than in more stable sectors. While the reaction of some managers at these firms is to give up and fall back on more intuitive approaches, the managers who persevere and attempt to estimate cash flows will have a much better sense of what they need to do to make new investments pay off.

The second is that the uncertainty, which generally increases cost of capital, also increases the value of the options owned by the firm. It is entirely possible that the value of real options will be higher at higher levels of uncertainty, while existing investments become less valuable.

### **Conclusion**



The first principles of valuation do not change as you move from valuing manufacturing to valuing technology firms. Firms with higher cash flows from existing assets, higher expected growth and lower uncertainty about the future should be worth more than firms without these characteristics. While technology firms that have negative cash flows from existing investments may seem like exceptions to this rule, they are not, and the fundamentals matter just as much, if not more, for these firms.

Growth is a key driver on value at technology firms, and both managers and investors in these firms sometimes fall into the trap of assuming that higher growth will always lead to higher value. If you accept the proposition that it is growth with excess returns that create value, not growth per se, you can see that it is possible for firms do grow and destroy value simultaneously. When technology firms report earnings or new investments, investors have to consider the implications for both expected growth rates and excess returns. Thus, announcements that seem to contain good news (in the form of higher earnings or acquisitions that seem to make sense from a strategic standpoint) may, in fact, have negative consequences for value.

Finally, noise is a fact of life when valuing a technology firm. While the uncertainty about the future does increase the range of value that you may assign the firm, it does not make the valuation less useful. Investors should hedge their bets more, by diversifying, when investing in technology firms, because of the uncertainty. Managers have to consider ways in which they can take advantage of uncertainty to create value.