

From Cradle to Grave—Life Cycle and Valuation

Chapter Five

Promise Aplenty

Valuing Young Growth Companies

In late 2010, Google (GOOG) attempted to buy a young Internet company called Groupon for \$6 billion. At the time, Groupon had been in existence for only a year, had about \$500 million in revenues, and was reporting operating losses. The firm clearly had growth potential but there were huge uncertainties about its business model. While Google's bid failed, analysts were nonplussed, unsure about how to value a company with almost no operating history and market price data.

If every business starts with an idea, young companies can range from idea companies (those with no revenues or products), to start-up companies that are testing out product appeal, to second-stage companies that are moving on the path to profitability. Figure 5.1 illustrates the diversity of young growth companies.

Figure 5.1 The Early Stages of the Business Life Cycle
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Most young growth companies tend to be privately owned and funded, either entirely by their founder/owner or by venture capitalists. In the last two decades, though, companies in some sectors such as technology and biotechnology have been able to leapfrog the process and go public. When they do go public, they offer a blend of promise and peril to investors who are willing to grapple with the uncertainties that come with growth potential. Young companies share some common attributes:

- *No historical performance data:* Most young companies have only one or two years of data available on operations and financing and some have financials for only a portion of a year.
- *Small or no revenues, operating losses:* Many young companies have small or nonexistent revenues. Expenses often are associated with getting the business established, rather than generating revenues. In combination, the result is significant operating losses.

- *Many don't survive:* One study concluded that only 44 percent of all businesses that were founded in 1998 survived at least four years and only 31 percent made it through all seven years.
- *Investments are illiquid:* Even those that are publicly traded tend to have small market capitalizations and relatively few shares traded (low float). A significant portion of the equity is usually held by the founders, venture capitalists and other private equity investors.
- *Multiple claims on equity:* It is not uncommon for some equity investors to have first claims on cash flows (dividends) and others to have additional voting right shares.

While each of these characteristics individually does not pose an insurmountable problem, their coming together in the same firm creates the perfect storm for valuation. It is no wonder that most investors and analysts give up.

Valuation Issues

In intrinsic valuation, estimating each of the four pieces that determine value—cash flows from existing assets, expected growth in these cash flows, discount rates, and the length of time before the firm becomes mature—all become more difficult for young firms. Existing assets often generate little or negative cash flows, and estimating future revenues and discount rates becomes more difficult because of limited or nonexistent historical data. This estimation challenge gets even more daunting when we bring in the possibility that the firm may not survive to become a stable firm and that there may be multiple claims on equity. As a consequence, most investors don't even try to value young growth companies on an intrinsic basis and rely instead on compelling stories to justify investment decisions.

Some analysts try to value young companies using multiples and comparables. However, this task is also made more difficult by the following factors:

- *What do you scale value to?* Young companies often lose money (both net income and EBITDA are negative), have little to show in terms of book value, and have miniscule revenues. Scaling market value to any of these variables is going to be difficult.
- *What are your comparable companies?* Even if a young company operates in a sector where there are many other young companies, there can be significant variations across companies. For young companies in mature sectors, the task will be even more challenging.
- *How do you control for survival?* Intuitively, we would expect the relative value of a young company (the multiple of revenues or earnings

that we assign it) to increase with its likelihood of survival. However, putting this intuitive principle into practice is not easy to do.

In summary, there are no easy valuation solutions to the young firm problem.

Valuation Solutions

In this section, we will begin by laying out the foundations for estimating the intrinsic value of a young company, move on to consider how best to adapt relative valuation for the special characteristics of young companies, and close with a discussion of how thinking about investments in these companies as options can offer valuation insights.

Intrinsic Valuation

When applying discounted cash flow models to valuing young companies, we will move systematically through the process of estimation, considering at each stage how best to deal with the characteristics of young companies. To illustrate the process, we will value Evergreen Solar (ESLR), a manufacturer of solar panels and cells, in early 2009. The firm had exploited high fuel prices to some success and showed high growth potential but reported an operating loss of \$50 million on revenues of \$90 million in the 12 months leading up to the valuation.

Estimating Future Cash Flows

There are three key numbers in forecasting future cash flows. The first is revenue growth, which can be obtained by either extrapolating from the recent past or by estimating the total market for a product or service and an expected market share. The potential market for a company will be smaller, if the product or service offered by the firm is defined narrowly, and will expand if we use a broader definition. Defining Evergreen as a solar panel company will result in a smaller market than categorizing it as an alternative energy company. The next step is to estimate the share of that market that will be captured by the firm being analyzed, both in the long term and in the time periods leading up to it. It is at this stage that you will consider both the quality of the products and management of the young company and the resources that the company can draw on to accomplish its objectives. Evergreen's management has shown competence and creativity and

we will assume that the growth rate in revenues will be 40 percent a year for the next 5 years and then taper down to 2.25 percent in year 10.

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Value Driver #1: Revenue Growth

Small revenues have to become big revenues. How quickly can your company grow?

A firm can have value only if it ultimately delivers earnings. Consequently, the next step is estimating the operating expenses associated with delivering the projected revenues, and we would separate the estimation process into two parts. In the first part, we would focus on estimating the target operating margin when the firm becomes mature, primarily by looking at more established companies in the business. We assume that Evergreen's pre-tax operating margin, currently an abysmal -55.31 percent, will improve to 12 percent, the average margin of more mature companies in the business, over the next 10 years. In the second part, we can then look at how the margin will evolve over time; this "pathway to profitability" can be rockier for some firms than others, with fixed costs and competition playing significant roles in the estimation. The product of the forecasted revenues and expected operating margins yields the expected operating income. To estimate taxes due on this income, consider the possibility of carrying forward operating losses from earlier years to offset income in later years. The net operating loss that Evergreen has accumulated in the past and the losses it is expected to generate over the next three years shelter its income from taxes until the seventh year.

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Value Driver #2: Target margins

You can lose money today but you have make money in the future. When mature, what is the likely profit margin for your company?

Growth requires reinvestment. With a manufacturing firm, this will take the form of investments in additional production capacity, and with a technology firm it will include not only investments in R&D and new patents but also in human capital (hiring software programmers and researchers). For Evergreen Solar, the reinvestment is estimated by assuming that every \$2.50 in additional revenue will require a dollar in capital invested; this ratio comes from industry averages. In Table 5.1, we estimate the revenues, earnings, and cash flows for Evergreen Solar. The expected cash flows are negative for the next eight years, and existing equity investors will see their share of the ownership either reduced (when new equity investors come in) or be called upon to make more investments to keep the business going.

Comp: Align columns on decimal. Use minus sign before amounts, not hyphen.
Align column heads at bottom.

Table 5.1 Expected Revenues, Earnings, and Cash Flows for Evergreen Solar
[table in text]

| Year | Revenues | Revenue Growth | Operating Margin | Operating Income | After-tax Operating Income | Reinvestm ent | FCFF |
|---------|----------|----------------|------------------|------------------|----------------------------|---------------|--------|
| Current | \$90 | | -55.31% | -\$50 | -\$50 | \$267 | -\$317 |
| 1 | \$126 | 40.00% | -28.39% | -\$36 | -\$36 | \$29 | -\$64 |
| 2 | \$176 | 40.00% | -12.23% | -\$22 | -\$22 | \$40 | -\$62 |
| 3 | \$247 | 40.00% | -2.54% | -\$6 | -\$6 | \$56 | -\$63 |
| 4 | \$345 | 40.00% | 3.28% | \$11 | \$11 | \$79 | -\$68 |
| 5 | \$483 | 40.00% | 6.77% | \$33 | \$33 | \$111 | -\$78 |
| 6 | \$628 | 30.00% | 8.86% | \$56 | \$56 | \$116 | -\$60 |
| 7 | \$786 | 25.00% | 10.12% | \$79 | \$73 | \$126 | -\$52 |
| 8 | \$943 | 20.00% | 10.87% | \$102 | \$61 | \$126 | -\$64 |
| 9 | \$1,037 | 10.00% | 11.32% | \$117 | \$70 | \$75 | -\$5 |
| 10 | \$1.089 | 5.00% | 11.59% | \$126 | \$76 | \$41 | \$34 |

Estimating Discount Rates

There are two problems that we face in estimating discount rates for young companies. The first is that the market history available is too short and volatile to yield reliable estimates of beta or cost of debt. The second is that the cost of capital can be expected to change over time as the young company matures. To overcome the lack of history, we would suggest an approach that looks past the company and at the business the company operates in, and adjusting for key differences. In effect, we use sector averages for discount rates, adjusted for the higher risk of younger companies. Thus, in the early years, costs of equity and capital will be much higher for young companies than for more mature counterparts in the same business. To incorporate the changes over time, move the cost of capital toward sector averages, as the young company grows and matures. For Evergreen Solar, the current cost of capital of 10.21 percent reflects a high beta (1.60), a high after-tax cost of debt (8.25 percent), and a debt ratio of 45.64 percent that is unsustainable, given its operating losses. As the firm matures, Table 5.2 illustrates the drop in the cost of capital to 7.20 percent as the beta moves towards one and the tax benefit of debt kicks in.

Comp: align numbers on decimal.

Table 5.2 The Dropping Cost of Capital of Evergreen Solar [table in text]

| Year | Beta | Cost of Equity | Cost of Debt | After-Tax Cost of Debt | Debt Ratio | Cost of Capital |
|------|------|----------------|--------------|------------------------|------------|-----------------|
| 1 | 1.60 | 11.85% | 8.25% | 8.25% | 45.64% | 10.21% |
| 2 | 1.60 | 11.85% | 8.25% | 8.25% | 45.64% | 10.21% |
| 3 | 1.60 | 11.85% | 8.25% | 8.25% | 45.64% | 10.21% |
| 4 | 1.60 | 0.00% | 8.25% | 8.25% | 45.64% | 10.21% |
| 5 | 1.60 | 11.85% | 8.25% | 8.25% | 45.64% | 10.21% |
| 6 | 1.48 | 11.13% | 7.60% | 7.60% | 40.51% | 9.70% |
| 7 | 1.36 | 10.41% | 7.44% | 6.85% | 39.23% | 9.01% |
| 8 | 1.24 | 9.69% | 7.17% | 4.30% | 37.09% | 7.69% |
| 9 | 1.12 | 8.97% | 6.63% | 3.98% | 32.82% | 7.33% |
| 10 | 1.00 | 8.25% | 5.00% | 3.00% | 20.00% | 7.20% |

Estimating Value Today and Adjusting for Survival

Once cash flows for the forecast period have been estimated and discounted, you still have to determine what will happen at the end of the forecast period, adjust the value for the possibility of failure, and examine the impact of losing key people in the company.

Terminal Value

The *terminal value* can be 80, 90, or even more than 100 percent of value for a young firm; the more than 100 percent will occur when cash flows are very negative in the near years, requiring fresh capital infusions. The basic principles that govern terminal value remain unchanged: the growth rate used has to be less than the growth rate of the economy, the cost of capital has to converge on that of a mature firm, and there has to be enough reinvestment to sustain the stable growth. Evergreen Solar is assumed to become a mature company after year 10, growing at 2.25 percent a year, with a cost of capital of 7.20 percent befitting its mature firm status, and reinvesting 22.5 percent of its earning to sustain this growth (based on a return on capital of 10 percent forever).

[AU: Align equals signs and words preceding and following vertically on equation. Set “rate” lowercase. Use word spaces around minus signs. Make “g” italic]

$$\begin{aligned} \text{Terminal value} &= \frac{\text{After-tax operating income} (1 - \text{Reinvestment rate})}{\text{Cost of capital}_{\text{stable}} - \text{Stable growth rate}} \\ &= \frac{134 (1 - .225)}{.072 - .0225} = \$1,255 \text{ million} \end{aligned}$$

Discounting the expected cash flows for the next 10 years and the terminal value back at the cost of capital yields a value of \$192 million for the operating assets today. Adding the current cash balance (\$285 million) and subtracting out debt (\$374 million) yields a value for the equity of \$103 million; dividing by the number of shares outstanding today (164.875 million) results in a value per share of \$0.63, significantly lower than the stock price of \$2.70 per share at the time of the valuation.

Adjust for Survival

To deal with the risk of failure in a young firm, try a two-step approach. In the first step, value the firm on the assumption that it survives and makes it to financial health. This, in effect, is what we are assuming when we use a terminal value and discount cash flows back to today at a risk-adjusted discount rate. In the second step, bring in the likelihood that the firm will not survive. The probability of failure can be assessed most simply, by using sector averages. Earlier in the chapter I noted a study that used data from the Bureau of Labor Statistics to estimate the probability of survival for firms in different sectors from 1998 to 2005. For an energy firm that has been in existence for one year, for instance, the likelihood of failure over a five-year period would be assessed at 33 percent. (These sector averages can then be adjusted for specifics about the firm being valued: the quality of its management, its access to capital, and its cash balances. The value of the firm can be written as an expected value of the two scenarios – the intrinsic value (from the discounted cash flows) under the going concern scenario and the distress value under the failure scenario. The need to raise capital each year for the next eight years to cover negative cash flows exposes Evergreen to significant risk. If we assume that the likelihood of failure is 33 percent for the firm and that the equity will be worth nothing if that happens, the adjusted value per share is \$0.42 ($\$0.63 \times .67$).

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Value Driver #3: Survival Skills

For young firms to become valuable, they have to survive. What are the factors that may cause your firm to fail?

Key Person Discounts

Young companies, especially in service businesses, are often dependent upon the owner or a few key people for their success. Consequently, the value we estimate for these businesses can change significantly if one or more of these key people will no longer be associated with the firm. To assess a key person discount in valuations, first value the firm with the status quo (with key people involved in

the business), and then value it again with the loss of these individuals built into revenues, earnings, and expected cash flows. To the extent that earnings and cash flows suffer when key people leave, the value of the business will be lower with the loss of these individuals, thus leading to a “key person discount.” With Evergreen Solar, the value derives more from key technologies than from key people at the firm; hence, there is no need for a key-person discount.

Relative Valuation

Relative valuation is more challenging with young firms that have little to show in terms of operations and face substantial risks in operations and threats to their existence, for the following reasons:

- *Life cycle affects fundamentals:* To the extent that we are comparing a young firm to more mature firms in the business, there are likely to be significant differences in risk, cash flows, and growth across the firms.
- *Survival:* A related point is that there is a high probability of failure in young firms. Firms that are mature and have a lower probability of failure should therefore trade at higher market values, for any given variable such as revenues, earnings, or book value, holding all else (growth and risk) constant.
- *Scaling variable:* Young firms often have very little revenues to show in the current year and many will be losing money; the book value is usually meaningless. Applying a multiple to any one of these measures will result in outlandish numbers.
- *Liquidity:* Since equity in publicly traded companies is often more liquid than equity in young growth companies, the value obtained by using these multiples may be too high if applied to a young company.

There are simple practices that can not only prevent egregious valuation errors but also lead to better valuations:

- *Use forward revenues/earnings:* Since young firms often have small revenues and negative earnings, one solution is to forecast the operating results of the firm further down the life cycle and use these forward revenues and earnings as the basis for valuation. In effect, we will estimate the value of the business in five years, using revenues or earnings from that point in time. While Evergreen Solar has revenues of only \$90 million in the current year, it is projected to have \$483 million in revenues in year 5.
- *Adjust the multiple for the firm’s characteristics at the forward period:* Consider a simple illustration. Assume that you have a company that is expected to have revenue growth of 50 percent for the next 5 years and 10 percent thereafter. The multiple that you apply to revenues or

earnings in year five should reflect an expected growth rate of 10 percent (and not 50 percent). To estimate a value for Evergreen Solar in year five, we use 1.55, the multiple of revenues at which larger, mature firms in the sector trade at today.

- *Adjust for time value and survival risk:* When forward multiples are used to derive value, we need to adjust for the time value of money and the likelihood that the firm will not survive to get to the forward value. Incorporating the expected revenues for Evergreen Solar, applying the sector average multiple, and adjusting for the likelihood of failure (33 percent):

Estimated enterprise value in year 5 = $\$483 * 1.55 = \749 million

Estimated enterprise value today = $\$749/1.1021^5 = \457 million

Survival-adjusted enterprise value = $\$457 * .67 = \305 million

Adding the current cash balance (\$285 million) and subtracting out debt (\$374 million) yields a value for the equity of \$216 million and a value per share of \$1.31, a little closer to the current market price of \$2.70. However, both the intrinsic and relative valuations suggest that the stock is overpriced.

Are We Missing Something?

In both discounted cash flow and relative valuation, we build in our expectations of what success will look like in terms of revenues and earnings. Sometimes, success in one business or market can be a stepping-stone to success in other businesses or markets.

- Success with an existing product can sometimes provide an opening for a firm to introduce a new product. The success of the iPod laid the foundations for the introduction of the iPhone and the iPad for Apple.
- Companies that succeed with a product in one market may be able to expand into other markets with similar success. The most obvious example of this is expanding into foreign markets to build on domestic market success, a pathway adopted by companies like Coca Cola, McDonald's, and many retail companies. The more subtle examples are products that are directed at one market that serendipitously find new markets: An ulcer drug that reduces cholesterol would be a good example.

Why cannot we build expectations about new products and new markets into our cash flows and value? We can try, but there are two problems. First, our forecasts about these potential product and market extensions will be very hazy at the time of the initial valuation and the cash flows will reflect this uncertainty.

Apple would not have been able to visualize the potential market for the iPhone at the time that they were introducing the iPod. Second, it is the information gleaned and the lessons learned during the initial product launch and subsequent development that allows firms to take full advantage of the follow-up offerings. It is this learning and adaptive behavior that gives rise to value that adds to the estimated intrinsic value.

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Value Plays

There are many reasons why young growth companies fail: Revenue growth may lag, target margins may be lower than expected, capital markets may shut down, or key people may leave. Investors can improve their odds of success by focusing on the following:

- *Big potential market:* The potential market for the company's products and services has to be large enough to absorb high revenue growth for an extended period, without being overwhelmed.
- *Expense tracking and controls:* Young companies can become undisciplined in tracking and controlling expenses, while chasing growth. Set targets for margin improvement and view failure to meet these targets as reasons to sell.
- *Access to capital:* Capital access is critical to both growth and success. Look for firms with larger cash balances and institutional investor bases because they are better positioned.
- *Dependence on key individuals:* Young firms are often dependent upon key individuals or founders. Focus on firms that have built up a solid bench to back up key personnel.
- *Exclusivity:* Success will attract competition, often from larger companies with deep pockets. You want young firms that have products that are difficult for others to imitate, whether this exclusivity comes from patents, technology or brand name. As a bonus, with exclusivity, success is also more likely to feed on itself, allowing a firm to enter new markets and introduce new products.

In summary, you want to invest in young companies with tough-to-imitate products that have huge potential markets, are working at keeping expenses under control, and have access to capital. Not easy to do, but done right, it is a high risk, high return proposition.