Valuing dot-coms

Introduction

You don't have to step through the looking glass into a parallel universe to understand the valuations of Internet stocks. Discounted-cash-flow analysis can focus your mind on the right issues, help you see the risks, and separate the winners from the losers.

In the present era of cheap and accessible capital, Internet entrepreneurs have succeeded in quickly transforming their business ideas into billion-dollar valuations that seem to defy the common wisdom about profits, multiples, and the short-term focus of capital markets. Valuing these high-growth, high-uncertainty, high-loss firms has been a challenge, to say the least; some practitioners have even described it as a hopeless one.

In this article, we respond to that challenge by using a classic discounted-cash-flow (DCF) approach to valuation, buttressed by microeconomic analysis and probability-weighted scenarios. Although DCF may sound suspiciously retro, we believe that it works where other methods fail, reinforcing the continuing relevance of basic economics and finance, even in uncharted Internet territory. Yet it is important to bear in mind that while the valuation techniques we sketch out can help bound and quantify uncertainty, they won't make it disappear. Internet stocks are highly volatile for sound and logical reasons, and they will remain highly volatile.

DCF analysis when there is no CF to D

Three related factors make it hard to value Internet companies. First, like many start-ups, they typically have losses or very small profits for a few years, partly because of the high marketing costs (aimed at attracting customers) that they must write off against current earnings. Second, these companies are growing at very high rates; successful ones will increase their revenues by 100 times or more in the early going. Finally, the fate of these companies is quite uncertain.

Shorthand valuation approaches, including price-to-earnings and revenue multiples, are meaningless when there are no earnings and revenues are growing astronomically. Some analysts have suggested benchmarks such as multiples of customers or multiples of revenues three years out. These approaches are fundamentally flawed: speculating about a future that is only three or even five years away just isn't very useful when high growth will continue for an additional ten years. More important, these shorthand methods can't account for the uniqueness of each company.

The best way of valuing Internet companies is to return to economic fundamentals with the DCF approach, which
makes the distinction between expensed and capitalized investment, for example, unimportant because accounting treatments don't affect cash flows. The absence of meaningful historical data and positive earnings to serve as the basis for price-to-earnings multiples also doesn't matter, because the DCF approach, by relying solely on forecasts of performance, can easily capture the worth of value-creating businesses that lose money for their first few years. The DCF approach can't eliminate the need to make difficult forecasts, but it does address the problems of ultrahigh growth rates and uncertainty in a coherent way.

In this discussion, we assume that the reader has a basic knowledge of the DCF approach. Three twists are required to make this approach more useful for valuing Internet companies: starting from a fixed point in the future and working back to the present, using probability-weighted scenarios to address high uncertainty in an explicit way, and exploiting classic analytical techniques to understand the underlying economics of these companies and to forecast their future performance.

We illustrate this approach with a valuation of Amazon.com, the archetypal Internet company. In the four years since its launch, it has built a customer base of ten million and expanded its offerings from books to compact discs, videos, digital video discs, toys, consumer electronics goods, and auctions. In addition, Amazon has invested in branded Internet players such as pets.com and drugstore.com, and since the end of September 1999 it has allowed other retailers to sell their wares on its Web site through what it calls its 'associates program.' Indeed, the company has become a symbol of the new economy; market research shows that 101 million people in the United States recognize the Amazon brand name.

All this activity has been rewarded with a high market capitalization: $25 billion as of mid-November 1999. Yet Amazon has never turned a profit and is expected to lose at least $300 million for the year, so it has become the focus of a debate about whether Internet stocks are greatly overvalued.

**Start from the Future**

In forecasting the performance of high-growth companies like Amazon, don't be constrained by current performance. Instead of starting from the present - the usual practice in DCF valuations - start by thinking about what the industry and the company could look like when they evolve from today's high-growth, unstable condition to a sustainable, moderate-growth state in the future; and then extrapolate back to current performance. The future growth state should be defined by metrics such as the ultimate penetration rate, average revenue per customer, and sustainable gross margins. Just as important as the characteristics of the industry and company in this future state is the point when it actually begins. Since Internet-related companies are new, more stable economics probably lie at least 10 to 15 years in the future.

But consider what Amazon has already achieved. Its ability to enter and dominate categories is unprecedented, both in the off- and the on-line worlds. In 1998, for example, it took the company only a bit more than three months to banish CDNOW to second place among on-line purveyors of music. In early 1999, Amazon assumed the leadership among on-line purveyors of videos in 45 days; recently, it became the leading on-line consumer electronics purveyor in 10.

Let us create a fairly optimistic scenario based on this record. Suppose that Amazon were the next Wal-Mart, another US retailer that has radically changed its industry and taken a significant share of sales in its target markets. Say that by 2010, Amazon continues to be the leading on-line retailer and has established itself as the overall leading retailer, both on- and off-line, in certain markets. If the company could take a 13 and 12 percent share of the total US book and music markets, respectively, and captured a roughly comparable share of some other markets, it would have revenues of $60 billion in 2010, when Wal-Mart's
revenues will probably have exceeded $300 billion.

What operating profit margin could Amazon.com earn on that $60 billion? The superior market share of the company is likely to give it significant purchasing power. Remember too that Amazon will earn revenues and incur few associated costs from other retailers using its site. In this optimistic scenario, Amazon, with an average operating margin in the area of 11 percent, would most likely do a bit better than most other retailers.

And what about capital? In the optimistic scenario, Amazon may well need less working capital and fewer fixed assets than traditional retailers do. In almost any scenario, it should need less inventory because it can consolidate its stock-in-trade in a few warehouses, and it won't need retail stores at all. We assume that Amazon's 2010 capital turnover (revenues divided by the sum of working capital and fixed assets) will be 3.4, compared with 2.5 for typical retailers.

Combining these assumptions gives us the following financial forecast for 2010: revenues, $60 billion; operating profit, $7 billion; total capital, $18 billion. We also assume that Amazon will continue to grow by about 12 percent a year for the next 15 years after 2010 and that its growth will decline to 5.5 percent a year in perpetuity after 2025, slightly exceeding the nominal growth rate of the gross domestic product. To estimate Amazon's current value, we discount the projected free cash flows back to the present. Their present value, including the estimated value of cash flows beyond 2025, is $37 billion.

How can we credibly forecast ten or more years of cash flows for a company like Amazon? We can't. But our goal is not to define precisely what will happen but instead to offer a rigorous description of what could.

Weighting for Probability

Uncertainty is the hardest part of valuing high-growth technology companies, and the use of probability-weighted scenarios is a simple and straightforward way to deal with it. This approach also has the advantage of making critical assumptions and interactions far more transparent than do other modeling approaches, such as Monte Carlo simulation. The use of probability-weighted scenarios requires us to repeat the process of estimating a future set of financials for a full range of scenarios - some more optimistic, some less. For Amazon, we have developed four of them (Exhibit 1).

### Exhibit 1: Potential outcomes

<table>
<thead>
<tr>
<th>Scenario</th>
<th>US book sales, $ billion</th>
<th>US music sales, $ billion</th>
<th>Other sales, $ billion</th>
<th>Total sales, $ billion</th>
<th>Margin of earnings before interest, taxes, and amortization, percent</th>
<th>Discounted-cash-flow value, $ billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario A</td>
<td>24</td>
<td>13</td>
<td>48</td>
<td>85</td>
<td>14</td>
<td>79</td>
</tr>
<tr>
<td>Scenario B</td>
<td>20</td>
<td>9</td>
<td>31</td>
<td>60</td>
<td>11</td>
<td>37</td>
</tr>
<tr>
<td>Scenario C</td>
<td>16</td>
<td>6</td>
<td>19</td>
<td>41</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Scenario D</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>17</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>

1Books and music sold outside the United States as well as sales of videos, digital video discs, toys, and consumer electronic goods in any market.

2Real GDP growth has averaged about 3 percent a year for the past 40 years, and the long-term expected inflation rate built into current interest levels is probably about 2 to 2.5 percent a year.
In Scenario A, Amazon becomes the second-largest retailer (on- or off-line) based in the United States. It uses much less capital than traditional retailers do because it is primarily an on-line operation. It captures much higher operating margins because it is the on-line retailer of choice; even if its prices are comparable to those of other on-line retailers, it has more purchasing clout and lower operating costs. This scenario implies that Amazon was worth $79 billion in the fourth quarter of 1999.

Scenario B has Amazon capturing revenues almost as large as it does in Scenario A, but its margins and need for capital fall in the range between those of the first scenario and the margins and capital requirements of a traditional retailer. This second scenario implies that Amazon had a value of $37 billion as of the fourth quarter of 1999.

Amazon becomes quite a large retailer in Scenario C, though not as large as it does in Scenario B, and the company's economics are closer to those of traditional retailers. This third scenario implies a value for Amazon of $15 billion.

Finally, in Scenario D, Amazon becomes a fair-sized retailer with traditional retailer economics. On-line retailing mimics most other forms of the business, with many competitors in each field. Competition transfers most of the value of going on-line to consumers. This scenario implies that Amazon was worth only $3 billion.

We now have four scenarios, in which the company's value ranges from $3 billion to $79 billion. Although the spread is quite large, each scenario is plausible. Now comes the critical phase of assigning probabilities and generating the resulting values for Amazon (Exhibit 2). We assign a low probability, 5 percent, to Scenario A, for though the company might achieve outrageously high returns, competition is likely to prevent this. Amazon's current lead over its competitors suggests that Scenario D too is improbable. Scenarios B and C - both assuming attractive growth rates and reasonable returns - are therefore the most likely ones.

When we weight the value of each scenario, depending on its probability, and add all four of these values, we end up with $23 billion, which happened to be the company's market value on October 31, 1999. It therefore appears that Amazon's market valuation can be supported by plausible forecasts and probabilities.

Now, however, look at the sensitivity of this valuation to changing probabilities. As Exhibit 3 shows, relatively small variations lead to big swings in value. Indeed, the volatility of the share prices of companies like Amazon has been precipitated by

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3 We capture cash-flow risk through the probability-weighting of scenarios, so the cost of equity applied to each of them shouldn't include any extra premium; it can consist of the risk-free rate, an industry-average beta, and a general market-risk premium.
small changes in the market's view of the likelihood of different outcomes. Nothing can be done about this volatility.

From Probability to Reality

The last difficult aspect of valuing very high-growth companies is relating future scenarios to current performance. How can you tell a soon-to-be successful Internet play from a soon-to-be-bankrupt one? Here, classic micro-economic and strategic skills play a critical role because building sound scenarios for a business and understanding that business both require knowledge of what actually drives the creation of value. For Amazon and many other Internet companies, customer-value analysis is a useful approach. Five factors drive the customer-value analysis of a retailer like Amazon:

- The average revenue per customer per year from purchases by its customers, as well as revenues from advertisements on its site and from retailers that rent space on it to sell their own products
- The total number of customers
- The contribution margin per customer (before the cost of acquiring customers)
- The average cost of acquiring a customer
- The customer churn rate (that is, the proportion of customers lost each year)

Let us see how Amazon could achieve the financial performance predicted by Scenario B and compare this with the company's current performance. As Exhibit 4 shows, the biggest changes over the next ten years involve the number of Amazon's customers and the average revenue for each. In Scenario B, Amazon's customer base increases from 9 million a year in 1999 to about 120 million worldwide by 2010 - 84 million in the United States and 36 million outside it. We assume that Amazon will remain the number-one US on-line retailer and achieve an attractive position abroad.

Scenario B also calls for Amazon's average revenue per customer to rise to $500 by 2010, from $140 in 1999. That $500 could be accounted for by two CDs at $15 each, three books at $20 each, two bottles of perfume at $30 each, and one personal organizer at $350. Amazon will probably continue to dominate its core book and music markets. It will probably enter adjacent categories and may come to dominate them.

In Scenario B, Amazon's 2010 contribution margin per customer before the cost of acquiring customers is 14 percent, a figure in line with that of current top-notch large-scale retailers - Wal-Mart, for instance. Despite competition, this seems rational in view of Amazon's likely ability to gain offsetting economies of scale through devices such as renting other retailers space to market their products on Amazon's Web sites.

Scenario B predicts that Amazon will have acquisition costs per customer of $50 in 2010. Despite the argument that these costs will rise once all on-line customers have been claimed, this is a reasonable figure if the company can achieve brand dominance and advertising economies of scale. The cost of acquiring new customers is closely linked to the customer churn rate, which at 25 percent suggests that once Amazon acquires customers it will keep them four years. This implies a truly world-class (or addictive) customer offer and a deeply loyal (or lazy) customer base.

Looking at customer economics in this way makes it possible to generate the kind of information that is assigned to assess the probabilities needed to various scenarios. Consider how two hypothetical young companies, Loyalty.com and Turnover.com,
with different customer economics might evolve over time (Exhibit 5, on page 6). Each had $100 million in revenues in 1999 and an operating loss of $3 million. On traditional financial statements, the two companies look very much the same. Deeper analysis, however, using the customer economics model, reveals striking differences.

The lifetime value of a typical Loyalty.com customer is $50 over an average of five years; the typical Turnover.com customer is worth $1 over two years. The difference in the value of a customer reflects the churn rate (20 percent attrition each year for Loyalty.com versus 46 percent for Turnover.com) and Turnover.com’s higher acquisition costs.

Even though Turnover.com earns higher revenues per customer than Loyalty.com does and has similar contribution margins, its economic model is not sustainable. Loyalty.com will find it much easier to grow because it doesn’t have to find as many new customers each year. Since Loyalty.com will have substantially lower customer acquisition costs than Turnover.com, Loyalty.com’s figures for earnings before income tax (EBIT) will turn more positive quickly. If Loyalty.com and Turnover.com invested the same amount of money in efforts to acquire customers over the next ten years, and other factors remained the same, the revenue growth and EBIT patterns of the two companies would vary a good deal (Exhibit 6). This in turn means that their DCF values would differ radically, despite similar short-term financial results.

**Uncertainty is Here to Stay**

By using the adapted DCF approach outlined here, we can generate reasonable valuations for seemingly unreasonable businesses. But investors and companies entering fast-growth markets like those related to the Internet face huge uncertainties. Look at what could happen under our four scenarios to an investor who holds a share of Amazon stock for ten years after buying it in 1999.

If Scenario A plays out, the investor will earn a 23 percent annual return, and it will seem that in
1999 the market significantly undervalued Amazon. If Scenario C plays out, the investor will earn about 7 percent a year, and it will seem that the company was substantially overvalued in 1999. These high or low returns should not, however, be interpreted as implying that its 1999 share price was irrational; they reflect uncertainty about the future.

A great deal of this uncertainty is associated with the problem of identifying the winner in a large competitive field: in the world of high-tech initial public offerings, not every Internet company can become the next Microsoft or Cisco systems. History shows that a small number of players will win big while the vast majority will toil away amid obscurity and worthless options, and it is hard to predict which companies will prosper and which will not. Neither investors nor companies can do anything about this uncertainty, and that is why investors are always told to diversify their portfolios - and why companies don't pay cash when acquiring Internet firms.

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4 Morgan Stanley research on 1,243 technology initial public offerings has shown that more than 86 percent of the value created in them during the past decade came from only 5 percent of the companies.
By Dennis Bingham, CBA, CMA, CFM

Making Persuasive Presentations in Court

Introduction
Business appraisers frequently encounter problems effectively communicating financial data to non-financially oriented audiences. Because of this communication gap with users, the value of effective communications by business appraisers cannot be emphasized enough.

Appraisers frequently present data in a format suitable for their own needs and forget the needs of their audience. Consequently, an important step in improving the communication of data is recognizing that users - business owners, attorneys, judges, and jurors - generally have non-financial backgrounds.

According to Elaine Lewis, a nationally known witness consultant, "although it is of great value to have an expert who is thorough in his valuations, if the material isn't 'packaged' well in court, it is difficult to persuade anyone to 'buy' it over the other product. Therefore, once an expert is clear on how to handle the basics, it is time to give attention to other techniques that can make presentation of the expert - experienced or not - more powerful and persuasive in court."

Presentation Ideas
The remainder of this article presents ideas for making your presentations more persuasive, and more likely to be understood and remembered. Not all of these ideas will be applicable in all circumstances. Use your judgment as to which of these ideas are most appropriate for a particular case.

1. Know Your Audience
Remember your audience is the trier of fact (i.e., judge, jury, or arbitrator). Your audience is not the attorneys or other experts in the case.
The opposing counsel and expert may object, roll their eyes, groan, or furiously take notes. Ignore them! It is their job to present their case and to refute yours. It is your job to present your case to the trier of fact in a convincing and helpful manner. So concentrate on them, speak to them, and read their reactions. Remember the trier of fact is your audience.

2. Be Conversational
Many, if not most, people speak differently when they are deposed or testifying than when having a normal conversation.
However, our most effective communication generally occurs when we talk to people naturally. Accordingly, try to maintain your normal conversation style and tone. If appropriate, you should occasionally speak more softly, causing the trier of fact to "listen up", when presenting key points and/or immediately after key points. Remember your objective is to be understood and remembered.

3. Time - Use It Wisely
The attention span of most judges and jurors is very short. You have only about 15 to 20 seconds to communicate your ideas and/or answers to questions (the average broadcast sound bite). Accordingly, get to the point immediately and be concise.

4. Visit the Courtroom
Visit the courtroom before the trial so you have an accurate view of the layout, including where you will be in relation to the judge and jury. Determine if the courtroom is setup for video displays or overheads and if microphones are available.

Before preparing your exhibits, think about how far the exhibit will be from the judge and jury. Then consider the point type and type selection needed to read the exhibits comfortably. In order to read an exhibit comfortably from 10 to 15 feet you should consider a minimum of a 36-point type and preferably a 48-point type. However, readability also depends on type selection - characteristics of the font in terms of character weight, width, and spacing. Because of these
factors, typefaces that are equal in point size may not actually look as though they are the same height.

5. Use Graphics

While we are all familiar with the old adage “a picture is worth a thousand words,” it is surprising how often presentations fail to fully utilize graphics. You should remember that while information shown in financial statements may indicate a trend, the use of graphics can more quickly communicate this same information. Graphs are particularly useful when you want to communicate simple trends.

For example, the use of a chart such as that shown in Figure 1 would likely stay in the trier of fact’s mind longer than a row of numbers.

6. Eliminate Unnecessary Data

Strive to eliminate unnecessary and/or redundant information when preparing financial presentations. Remember, your goal is to help the user understand your data, and the best way to accomplish this goal is to keep the information relevant.

For instance, suppose you believe a 30 percent control premium is appropriate in your valuation and to support this position you present table 1 as shown at the bottom of this page.

A closer look at this table indicates it may be possible to present only a fraction of the information and still support your proposed premium. The user would then be dealing with only the most pertinent portion of the original data.

In his book “The Articulate Executive,” Granville Toogood states “Putting too much on a slide is counterproductive in a number of ways:

• The more information, the smaller the numbers and letters, and the more difficult to read.

<table>
<thead>
<tr>
<th>Year</th>
<th>Observations</th>
<th>5 Day</th>
<th>30Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>60</td>
<td>23.4%</td>
<td>32.3%</td>
</tr>
<tr>
<td>1993</td>
<td>120</td>
<td>31.5%</td>
<td>36.1%</td>
</tr>
<tr>
<td>1994</td>
<td>201</td>
<td>26.2%</td>
<td>33.5%</td>
</tr>
<tr>
<td>1995</td>
<td>279</td>
<td>28.1%</td>
<td>39.2%</td>
</tr>
<tr>
<td>1996</td>
<td>414</td>
<td>23.9%</td>
<td>31.1%</td>
</tr>
<tr>
<td>1997</td>
<td>372</td>
<td>28.0%</td>
<td>37.8%</td>
</tr>
<tr>
<td>All Years</td>
<td>1446</td>
<td>27.0%</td>
<td>35.7%</td>
</tr>
</tbody>
</table>


• The more information, the larger the distraction from what you are saying and the more likely the audience will be out of sync with that you are saying.

• The more information, the bigger the chance of confusion and questions which lead to frustration.

Table 2
Review of Control Premiums Sorted by Year of Acquisitions (Amended)

<table>
<thead>
<tr>
<th>Year</th>
<th>Observations</th>
<th>5 Day</th>
<th>30Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>60</td>
<td>23.4%</td>
<td>32.3%</td>
</tr>
<tr>
<td>1993</td>
<td>120</td>
<td>31.5%</td>
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<td>1994</td>
<td>201</td>
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<tr>
<td>1997</td>
<td>372</td>
<td>28.0%</td>
<td>37.8%</td>
</tr>
<tr>
<td>All Years</td>
<td>1446</td>
<td>27.0%</td>
<td>35.7%</td>
</tr>
</tbody>
</table>


Figure 1
Returns on Investment

Table 1
Review of Control Premiums Sorted by Year of Acquisitions

<table>
<thead>
<tr>
<th>Year</th>
<th>Observations</th>
<th>P/E</th>
<th>B/Book Value</th>
<th>P/Revenue</th>
<th>TIC/EDITDA</th>
<th>5 Day</th>
<th>30Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>60</td>
<td>21.08</td>
<td>N/A</td>
<td>0.53</td>
<td>N/A</td>
<td>23.4%</td>
<td>32.3%</td>
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<tr>
<td>1993</td>
<td>120</td>
<td>17.58</td>
<td>N/A</td>
<td>0.66</td>
<td>N/A</td>
<td>31.5%</td>
<td>36.1%</td>
</tr>
<tr>
<td>1994</td>
<td>201</td>
<td>20.42</td>
<td>N/A</td>
<td>0.69</td>
<td>N/A</td>
<td>26.2%</td>
<td>36.1%</td>
</tr>
<tr>
<td>1995</td>
<td>279</td>
<td>19.15</td>
<td>3.75</td>
<td>1.23</td>
<td>11.4</td>
<td>28.1%</td>
<td>39.2%</td>
</tr>
<tr>
<td>1996</td>
<td>414</td>
<td>23.51</td>
<td>2.87</td>
<td>1.39</td>
<td>9.42</td>
<td>23.9%</td>
<td>31.1%</td>
</tr>
<tr>
<td>1997</td>
<td>372</td>
<td>23.87</td>
<td>2.84</td>
<td>1.84</td>
<td>9.09</td>
<td>26.0%</td>
<td>37.8%</td>
</tr>
<tr>
<td>All Years</td>
<td>1446</td>
<td>22.17</td>
<td>2.97</td>
<td>1.33</td>
<td>9.42</td>
<td>27.0%</td>
<td>35.7%</td>
</tr>
</tbody>
</table>

• The more information, the more likely that you are straying away from the central theme and telling the audience more - maybe a lot more - than they have to know.

In addition to slides, I believe the above comments apply equally well to all types of exhibits; charts, and overheads.

7. Round Numbers

There is no one right answer as to how or when to round numbers. However, you should consider rounding to aid in the communication of information to the user(s) of the data. In addition, rounding can indicate the estimated accuracy with which a rate or value is known.  

You should be aware that... 'when trying to understand numbers, most people round them mentally. This brings them to a size that the mind can manipulate more easily. In practice, the rounding is to two figures.' However; when rounding to two figures not all numbers are rounded the same. To illustrate:

• 10,452 would be rounded to 10,000
• 1,497 to 1,500
• 923 to 920
• 16.3 to 16
• 4.3 to 4.3 (no rounding necessary)

According to Dr. Targett, 'rounding to two effective figures puts numbers in the form in which mental arithmetic is naturally done. The numbers are therefore assimilated more quickly.'

Considering this information, it would seem we would be well advised to establish a logical and consistent approach concerning when and how to round numbers.  

8. Rank Order the Data

Financial data will be better understood and relationships more easily identified, if numbers are arranged in size order.

Generally, the basis of how data should be ordered is a matter of which data in the chart is the most important in your case. Tables 3 and 4 provide an example of how data might be rank ordered. (Note: the data has been rounded.) Table 3 is ordered alphabetically by product, while table 4 is rank ordered by revenue.

<p>| Table 3 |
| Product Line Sales and Gross Profit |</p>
<table>
<thead>
<tr>
<th>Product</th>
<th>Revenue</th>
<th>Gross Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$538,000</td>
<td>$147,600</td>
</tr>
<tr>
<td>B</td>
<td>$296,000</td>
<td>$24,700</td>
</tr>
<tr>
<td>C</td>
<td>$704,000</td>
<td>$50,400</td>
</tr>
<tr>
<td>D</td>
<td>$64,000</td>
<td>$17,300</td>
</tr>
<tr>
<td>Total</td>
<td>$1,600,000</td>
<td>$240,000</td>
</tr>
</tbody>
</table>

<p>| Table 4 |
| Product Line Sales and Gross Profit |</p>
<table>
<thead>
<tr>
<th>Product</th>
<th>Revenue</th>
<th>Gross Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$538,000</td>
<td>$147,600</td>
</tr>
<tr>
<td>B</td>
<td>$296,000</td>
<td>$24,700</td>
</tr>
<tr>
<td>C</td>
<td>$704,000</td>
<td>$50,400</td>
</tr>
<tr>
<td>D</td>
<td>$64,000</td>
<td>$17,300</td>
</tr>
<tr>
<td>Total</td>
<td>$1,600,000</td>
<td>$240,000</td>
</tr>
</tbody>
</table>

9. Present Important Comparisons Down Columns

The most important comparisons should be presented down columns, not across rows. Comparing numbers in a column rather than a row generally places important numbers closer together allowing for easier analysis, speedier comparisons, and easier mathematical manipulation. For example, Tables 5 and 6:

<p>| Table 5 |
| Region |</p>
<table>
<thead>
<tr>
<th>Revenue</th>
<th>East</th>
<th>South</th>
<th>North</th>
<th>West</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product A</td>
<td>$1,400</td>
<td>$1,100</td>
<td>$1,300</td>
<td>$1,200</td>
<td>$5,000</td>
</tr>
<tr>
<td>Product B</td>
<td>720</td>
<td>530</td>
<td>430</td>
<td>570</td>
<td>2,250</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$2,120</td>
<td>$1,630</td>
<td>$1,730</td>
<td>$1,770</td>
<td>$7,250</td>
</tr>
</tbody>
</table>

<p>| Table 6 |
| Product |</p>
<table>
<thead>
<tr>
<th>Region</th>
<th>A</th>
<th>B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>$1,400</td>
<td>$720</td>
<td>$2,120</td>
</tr>
<tr>
<td>North</td>
<td>1,300</td>
<td>430</td>
<td>1,730</td>
</tr>
<tr>
<td>West</td>
<td>1,200</td>
<td>570</td>
<td>1,770</td>
</tr>
<tr>
<td>South</td>
<td>1,100</td>
<td>530</td>
<td>1,630</td>
</tr>
<tr>
<td>Total</td>
<td>$5,000</td>
<td>$2,250</td>
<td>$7,250</td>
</tr>
</tbody>
</table>
10. Provide Summary Measures

Summary measures provide a focus for the eye and make it easier to determine if a number falls above or below the general level of the rest of the row or column.

Many users of financial data do not understand industry jargon such as mean and median.

Accordingly, when appropriate, it is better to use the word average instead of mean as shown in Table 7 below. In addition, perhaps we should even consider using the term middle value or mid-point to describe the median.

11. Minimize the Use of White Space

The inclusion of gridlines and unnecessary white space can make the task of reading and understanding tables difficult.

“When you plan tables with columns of figures or words, place the columns as close together as possible, not spread out to fill the pages width. The most difficult task for a reader of a table is to read from one column to another without getting lost. Anything to reduce eye travel between columns will help.” In addition, it is easier to identify patterns and exceptions when gridlines and white space are removed.

Table 9 provides the trier of fact with the same information as Table 8, but is much easier to read and absorb than Table 8.

12. Use Meaningful Titles and/or Captions

Titles and/or captions should be used to help charts, tables, and graphs to be understood without explanation.

Suppose you are testifying in court and are asked to present a demonstrative exhibit (Figure 2) justifying why you selected a 20 percent capitalization rate.

Which of the following choices most clearly communicates the message you want the trier of fact to remember?

![Figure 2](image-url)

**Title: ABC's Capitalization Rate is 20%**

**Caption: Small Privately Held Companies Require Higher Rates of Return Than Large Public Companies**

The answer, it depends. What idea, concept, or message do you want the trier
Table 8

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of Partnerships</th>
<th>Average Discount</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leveraged / nondistributing</td>
<td>21</td>
<td>67.6%</td>
<td>86.1%</td>
</tr>
<tr>
<td>Low debt / nondistributing</td>
<td>4</td>
<td>60.9%</td>
<td>67.1%</td>
</tr>
<tr>
<td>Leveraged / lessthan 5% distributing</td>
<td>11</td>
<td>60.7%</td>
<td>80.9%</td>
</tr>
<tr>
<td>Low debt / lessthan 5% distributing</td>
<td>16</td>
<td>47.4%</td>
<td>66.0%</td>
</tr>
<tr>
<td>High Distributing - more than 5%</td>
<td>41</td>
<td>34.0%</td>
<td>57.3%</td>
</tr>
</tbody>
</table>

Table 9

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of Partnerships</th>
<th>Average Discount</th>
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<td>57.3%</td>
</tr>
</tbody>
</table>

of fact to remember? Possibly both a concise, descriptive title and an explanatory caption are appropriate.

13. Add Interest With Colour

Computer software allows for the use of a vast range of colours. However, some simple principles of colour can help in selecting the right colour(s) for your presentation.

Although colours are neither warm nor cool in a physical sense, they can impart feelings of warmth or coolness. To the eye, warm colours tend to advance and cool colours tend to recede. Generally, cool colours are good for close-up viewing and warm colours are better for dramatic displays. Red, orange, and yellow are considered "warm" colours; green, blue, and violet are considered "cool" colours.

When using colour, use it to emphasize important points and use it consistently to represent categories or classes throughout your presentation. Remember, you can use too much colour!

Note: Colour can often be confusing when attempting to present an ordered hierarchy. However, because grays have a natural hierarchy, varying shades can often show quantities better than colour.

14. Review Your Presentation For Reasonableness

The last idea for making your presentations more persuasive is to review your presentation. Ask yourself the following questions:

Has the source of the data been disclosed?

- Has the data been obtained from a reliable neutral source or has the data been obtained from a source with a possible bias?
- Is the data representative of the entity being valued?

Has a complete and accurate description of the data analysis been provided?

- Have terms such as “average” been defined. For example: in most disputes each side indicates a different value for average earnings. Are earnings after taxes, before taxes, before taxes and interest, or before taxes, interest and depreciation?
- What time period was used in determining average earnings - the most recent twelve months, the most recent fiscal years or a weighted average of several years?
Has a scale been clearly indicated for all graphs?
- Is the scale clearly shown on the graph? If a scale is not shown or concealed, the wrong impression may be drawn.
- If more than one variable is shown in a graph, have different scales been used? Different scales can lead to the wrong impression being drawn.

Is the conclusion consistent with the facts?
- Is there a casual relationship shown by the analysis?
- Is your premise really supported by the data presented?

These questions can also be used when reviewing an opposing expert's presentation.

Conclusion:
The bottom line, if your audience does not understand or remember what you have said, it will make no difference how well you understand or prepare a business appraisal. Focus on your audience's needs in order to improve the likelihood that they will understand and remember your message.

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Philip Brady, Using Type Right, NTC Business Books, 1998, p. 52

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What’s It Worth?
A General Manager’s Guide To Valuation

Introduction

The following journal article from the Harvard Business Review was originally printed in 1997 and provides an excellent discussion of the Weighted Average Cost of Capital (WACC) valuation method and the tradeoffs that a valuator faces in order to gain the simplicity the WACC method had to offer. With some benefit of hindsight it is interesting to consider the author’s “prediction” that usage of the WACC method is likely to wane in favour of other methods such as the adjusted Present Value method.

Behind every major resource-allocation decision a company makes lies some calculation of what that move is worth. Whether the decision is to launch a new product, enter a strategic partnership, invest in R&D, or build a new facility, how a company estimates value is a critical determinant of how it allocates resources. And the allocation of resources, in turn, is a key driver of a company’s overall performance.

Today valuation is the financial analytical skill that general managers want to learn and master more than any other. Rather than rely exclusively on finance specialists, managers want to know how to do it themselves. Why? One reason is that executives who are not finance specialists have to live with the fallout of their companies’ formal capital-budgeting systems. Many executives are eager to see those systems improved, even if it means learning more finance. Another reason is that understanding valuation has become a prerequisite for meaningful participation in a company’s resource-allocation decisions.

Most companies used a mix of approaches to estimate value. Some methodologies are formal, comprising a theory and a model; others are informal, operating by ad hoc rules of thumb. Some are applied explicitly, and others implicitly. They may be personalized by individual executives’ styles and tastes or institutionalized in a system with procedures and manuals.

Though executives estimate value in many different ways, the past 25 years has seen a clear trend toward methods that are more formal, explicit, and institutionalized. In the 1970s, discounted-cash flow analysis (DCF) emerged as best practice for valuing corporate assets. And one particular version of DCF became the standard. According to the method, the value of a business equals its expected future cash flows discounted to present value at the weighted-average cost of capital (WACC).

Today that WACC-based standard is obsolete. This is not to say that it no longer works – indeed, with today’s improved computers and data, it probably works better than ever. But it is exactly those advances in computers and software, along with new theoretical insights, that make other methods even better. Since the 1970s, the cost of financial analysis has come down commensurately with the cost of computing – which is to say, breathtakingly. One effect of that drop in cost is that companies do a lot more analysis. Another effect is that it is now possible to use valuation methodologies that are better tailored to the major kinds of decisions that managers face.

What do generalists (not finance specialists) need in an updated valuation tool kit? The resource-allocation process presents not one, but three basic types of valuation problem. Managers need to be able to value operations, opportunities and ownership claims. The common practice now is to apply the same basic valuation tool to all problems. Although valuation is always a function of three fundamental factors – cash, timing and risk – each type of problem has structural features that set it apart from the others and present distinct analytical challenges.
Fortunately, today's computers make a one-size-fits-all approach unnecessary and, in fact, suboptimal. Three complementary tools – one for each type of valuation problem - will outperform the single tool (WACC-based DCF) that most companies now use as their workhorse valuation methodology.

Valuing Operations: Adjusted Present Value

The most basic valuation problem is valuing operations, or assets-in-place. Often managers need to estimate the value of an ongoing business or of some part of one - a particular product, market or line of business. Or they might be considering a new equipment purchase, a change in suppliers, or an acquisition. In each case, whether the operation in question is large or small, whether it is a whole business or only a part of one, the corporation either has already invested in the activity or is deciding now whether to do so. The question is, How much are the expected future cash flows worth, once the company has made all the major discretionary investments? That is precisely the problem at which traditional DCF methods are aimed. A discounted-cash-flow analysis regards businesses as a series of risky cash flows stretching into the future. The analyst's task is first, to forecast expected future cash flows, period by period, and second, to discount the forecasts to present value at the opportunity cost of funds. The opportunity cost is the return a company (or its owners) could expect to earn on an alternative investment entailing the same risk. Managers can get benchmarks for the appropriate opportunity cost by observing how similar risks are priced by capital markets, because such markets are a part of investors' set of alternative opportunities.

Opportunity cost consists partly of time value - the return on a nominally risk-free investment. This is the return you earn for being patient without bearing any risk. Opportunity cost also includes a risk premium - the extra return you can expect commensurate with the risk you are willing to bear. The cash-flow forecasts and the opportunity cost are combined in the basic DCF relationship. (See the exhibit, "The Basic Logic of Discounted-Cash-Flow Valuation.").

Today most companies execute discounted-cash flow valuations using the following approach: First, they forecast business cash flows (such as revenues,
expenses, and new investment), deliberately excluding cash flows associated with the financing program (such as interest, principal, and dividends). Second, they adjust the discount rate to pick up whatever value is created or destroyed by the financing program. WACC is by far the most common example of such an adjustment. It is a tax-adjusted discount rate, intended to pick up the value of interest tax shields that come from using an operation's debt capacity.

The practical virtue of WACC is that it keeps calculations used in discounting to a minimum. Anyone old enough to have discounted cash flows on a handheld calculator – a tedious, time-consuming chore – will understand immediately why WACC became the valuation methodology of choice in the era before personal computers.

But WACC's virtue comes with a price. It is suitable only for the simplest and most static of capital structures. In other cases (that is, in most real situations), it needs to be adjusted extensively – not only for tax shields but also for issue costs, subsidies, hedges, exotic debt securities, and dynamic capital structures. Adjustments have to be made not only project by project but also period by period within each project. Especially in its sophisticated, multi-layered, adjusted-for-everything versions, the WACC is easy to misestimate. The more complicated a company's capital structure, tax position, or fund-raising strategy, the more likely it is that mistakes will be made. (See the insert 'The Limitations of WACC.')

Today's better alternative for valuing a business operation is to apply the basic DCF relationship to each of a business's various kinds of cash flow and then add up the present values. This approach is most often called adjusted present value, or APV. It was first suggested by Stewart Myers of MIT, who focused on two main categories of cash flows: "real" cash flows (such as revenues, cash operating costs, and financial costs), and "tax savings" (the discounted value of taxes on future expected earnings). The advantage of APV is that it is a natural way to take into account the impact of tax changes on the firm's value.

New Valuation Practices Are on the Way

Valuation practices are changing already. The question is not whether companies will adapt, but when. Business schools and textbooks continue to teach the method based on the weighted-average cost of capital (WACC) because it is the standard, not because it performs best. But some business schools already teach alternative methodologies. Consulting and professional firms are actively studying and modifying their approaches to valuation. And new valuation books, software, and seminars are appearing on the market.

Here's some of what's coming:

- Companies will routinely use more than one formal valuation methodology. The primary purpose will not be redundancy (to get more than one opinion about a project's value), but analytical tailoring (to use a methodology that fits the problem at hand).
- Discounted cash flows will remain the foundation of most formal valuation analyses. But WACC will be displaced as the DCF methodology of choice by adjusted present value or something very much like it.
- Many companies will routinely evaluate the opportunities inherent in such activities as R&D and marketing by using tools derived from option pricing, simulation, and decision-tree analysis. The primary purpose of such evaluation will not be to arbitrate go-or-no-go decisions (Should we invest or not?) but to make more refined comparisons (Should we invest this way or that way?) and to support line managers with more formal analyses (How can we take further advantage of our position in this market?).
- Enhanced analytical capabilities will reside inside corporations, not solely in fee-for-service professional boutiques. The power of valuation analyses is enhanced more by a deep understanding of the business than by general experience with valuation. Insiders can learn valuation more readily than outsiders can learn the business.
- Good corporate capital-budgeting processes will be less rigid and more adaptive. Note mere systemizations of a single valuation approach, they will synthesize insights from different approaches according to the business characteristics of the project or opportunity. This should come as good news to line managers.
- The trend toward more active participation by the CFO and other financial executives in strategy formulation and business development (both of which precede capital budgeting) should continue. In fact, it may accelerate.
The Limitations of WACC

The WACC formula is a tax-adjusted discount rate. That is, when used as a discount rate in a DCF calculation, WACC is supposed to pick up the tax advantage associated with corporate borrowing. For a simple capital structure:

\[ \text{WACC} = \frac{\text{debt/debt+equity}) \times \text{cost of debt}}{(1- \text{corporate tax rate})} + \left( \frac{\text{equity/debt+equity}) \times \text{cost of equity}} {\right) } \]

The cost of debt and the cost of equity are both opportunity costs, each consisting of time value and its own risk premium. But WACC also contains capital structure ratios and an adjustment reflecting the term 1 minus the corporate tax rate. Together, these have the effect of modestly lowering WACC. This in turn gives a higher present value than one would obtain by discounting at a non-tax-adjusted opportunity cost. When WACC works as intended, the exact value of interest shields is automatically included in the present value of the project.

Note that to use WACC in this fashion is to rely on one term - 1 minus the corporate tax rate - in this discount rate to automatically make all the adjustments required by a complex capital structure. How many corporations inhabit a world so neat that one parameter can summarize it? Accordingly, some specialists customize their estimates of WACC with subtle adjustments. Unfortunately, the adjustments then are buried in an intimidating formula, one and a half lines long, in a single cell of a spreadsheet. Errors and assumptions, whatever they are, will probably remain hidden from view.

And errors are indeed likely. The ‘automatic’ feature of WACC relies on fairly restrictive assumptions to get the value of interest tax shields just right. With nonplain-vanilla debt securities (such as high-yield debt, floating-rate debt, original-issue-discount debt, convertible debt, tax-exempt debt, and credit-enhanced debt), WACC has an excellent chance of misvaluing the interest tax shields or, which is probably worse, misvaluing the other cash flows associated with the project or its financing. In general, companies with complex tax positions will be poorly served by WACC. It is even more unrealistic for the sort of complexity encountered in, for example, cross-border capital-budgeting problems.

and capital expenditures) associated with the business operation; and ‘side effects’ associated with its financing program (such as the values of interest tax shields, subsidized financing, issue costs and hedges). More generally, APV relies on the principle of value additivity. That is, it’s okay to split a project into pieces, value each piece, and then add them back up.

What are the practical payoffs from switching to APV from WACC? If all you want from a valuation analysis is to know whether the net present value is positive or negative and if you already use WACC properly, the payoff will be low. The two approaches, skillfully applied, seldom disagree on that question. But there is a lot of room for improvement once you have answered it.

APV helps when you want to know more than merely, is NPV greater than zero? Because the basic idea behind APV is value additivity, you can use it to break a problem into pieces that make managerial sense. Consider an acquisition. Even after the deal has closed, it helps to know how much value is being created by cost reductions rather than operating synergies, new growth, or tax savings. Or consider an investment in a new plant. You may negotiate specific agreements with, for example, equipment suppliers, financiers, and government agencies. In both examples, different people will be in charge of realizing individual pieces of value. APV is a natural way to get information about those pieces to managers – or for them to generate that information for themselves.

Executives are discovering that APV plays to the strength of now-ubiquitous spreadsheet software: each piece of the analysis corresponds to a subsection of the spreadsheet. APV handles complexity with lots of subsections rather than complicated cell formulas. In contrast, WACC’s historical advantage was precisely that it bundled all the pieces of an analysis together, so an analyst had to discount only once. Spreadsheets permit unbundling, a capability that can be powerfully informative. Yet traditional WACC analyses do not take advantage of it. Indeed,
many managers use their powerful spreadsheets merely to generate dozens of bundled valuation analyses, rather than to produce unbundled analyses that would be managerially relevant.

WACC still has adherents, most of whom argue that it works well enough when managers aim for a constant debt-to-capital ratio over the long run. Some go even further, saying that managers ought to aim for exactly that – and therefore WACC is appropriate. But whether managers ought to behave thus is highly questionable; that they do not, in fact, follow this prescription is indisputable. To decree that managers should maintain constant debt ratios because that policy fits the WACC model is to let the tail wag the dog.

Valuing Opportunities: Option Pricing

Opportunities – the second type of commonly encountered valuation problem – may be thought of as possible future operations. When you decide how much to spend on R&D, or on which kind of R&D, you are valuing opportunities. Spending now creates, not cash flow from operations, but the opportunity to invest again later, depending on how things look. Many marketing expenditures have the same characteristic. Spending to create a new or stronger brand probably has some immediate payoff. But it also creates opportunities for brand extensions later. The opportunity may or may not be exploited ultimately, but it is valuable none-the-less. Companies with new technologies, product development ideas, defensible positions in fast-growing markets, or access to potential new markets own valuable opportunities. For some companies, opportunities are the most valuable things they own.

How do corporations typically evaluate opportunities? A common approach is not to value them formally until they mature to the point where an investment decision can no longer be deferred. At that time, they join the queue of other investments under consideration for funding. Critics have long decried this practice as myopic; they claim that it leads companies to undervalue the future and hence, to underinvest.

What actually happens appears to be more complicated and to depend a great deal on how managers are evaluated and rewarded. The absence of a formal valuation procedure often gives rise to personal, informal procedures that can become highly politicized. Champions arise to promote and defend the opportunities that they regard as valuable, often resulting in overinvestment rather than underinvestment.

Some companies use a formal DCF-based approval process but evaluate strategic projects with special rules. One such rule assigns strategic projects a lower hurdle rate than routine investments to compensate for DCF’s tendency to undervalue strategic options. Unfortunately, in many cases DCF’s negative bias is not merely overcome but overwhelmed by such an adjustment. Once again, overinvestment can occur in practice when theory would have managers worry about underinvestment. Another special rule evaluates strategic opportunities off-line, outside the routine DCF system. For better or worse, experienced executives make a judgment call. Sometimes that works well, but even the best executives (perhaps especially the best) inform their judgment with sound analyses when possible.

In general, the right to start, stop, or modify a business activity at some future time is different from the right to operate it now. A specific important decision – whether or not to exploit the opportunity – has yet to be made and can be deferred. The right to make that decision optimally – that is, to do what is best when the time comes – is valuable. A sound valuation of a business opportunity captures its contingent nature: “If R&D proves that the concept is valid, we’ll go ahead and invest.” The unstated implication is that “if it doesn’t, we won’t”.

The crucial decision to invest or not will be made after some uncertainty is resolved or when time runs out. In financial terms, an opportunity is analogous to an option. With an option, you have
the right – not the obligation – to buy or sell something at a specified price on or before some future date. A call option on a share of stock gives you the right to buy that share for, say, $100 at any time within the next year. If the share is currently worth $110, the option clearly is valuable. What if the stock is worth only $90? The option still is valuable because it won't expire for a year, and if the stock price rises in the next few months, it may well exceed $100 before the year passes. Corporate opportunities have the same feature: "If R&D proves that the concept is valid" is analogous to "if the stock price rises in the next few months."

Similarly, 'we'll go ahead and invest' is analogous to 'we'll exercise the option.'

So an option is valuable, and its value clearly depends on the value of the underlying asset: the stock. Yet owning the option is not the same as owning the stock. Not surprisingly, one must be valued differently than the other. In considering opportunities, cash, time value, and risk all still matter, but each of those factors enters the analysis in two ways. Two types of cash flows matter: cash from the business and the cash required to enter it, should you choose to do so. Time matters in two ways: the timing of the eventual cash flows and how long the decision to invest may be deferred. Similarly, risk matters in two ways: the riskiness of the business, assuming that you invest in it, and the risk that circumstances will change (for better or worse) before you have to decide. Even simple option-pricing models must contain at least five or six variables to capture information about cash, time, and risk and organize it to handle the contingencies that managers face as the business evolves. (See the exhibit ‘What Makes Opportunities Different?’)

Because it handles simple contingencies better than standard DCF models, option-pricing theory has been regarded as a promising approach to valuing business opportunities since the mid-1970s. However, real businesses are much more complicated than simple puts and calls. A combination of factors – big, active competitors, uncertainties that do not fit neat probability distributions, and the sheer number of relevant variables – makes it impractical to analyze real opportunities formally. Just setting up the valuation problem, never mind solving it, can be daunting. As a result, option pricing has not yet been widely used as a tool for valuing opportunities.

Interest in option pricing has picked up in recent years as more powerful computers have aided sophisticated model building. Nevertheless, models remain the domain of specialists. In my view, generalists will get more out of option pricing by taking a different approach. Whereas technical experts go questing for objective truth - they want the "right" answer -- generalists have a business to manage and simply want to do a better job of it. Getting closer to the truth is good, even if you don't get all the way there. So an options-based analysis of value need not be perfect in order to improve on current practice.

The key to valuing a corporate investment opportunity as an option is the ability to discern a simple correspondence between project characteristics and option characteristics. The potential investment to be made corresponds to an option's exercise price. The operating assets the company would own, assuming it made the investment, are like the stock one would own after exercising a call option. The length of time the company can wait before it has to decide is like the call option's time to expiration. Uncertainty about the future value of the operating assets is captured by the variance of returns on them; this is analogous to the variance of stock returns for call options. The analytical tactic here is to perform this mapping between the real project and a simple option, such as a European call option. (A European call can be exercised only on the expiration date, making it the simplest of call options.) If the simple option captures the contingent nature of the project, then by pricing the option we gain some additional, albeit imperfect, insight into the value of the project.

To illustrate, suppose a company is
considering whether to invest $1 million to modify an existing product for an emerging market. A DCF analysis of the expected cash flows shows them to be worth only about $900,000. However, the market is volatile, so that value is likely to change. A combination of patents and know-how will protect the company's opportunity to make this investment at least two more years. After that, the opportunity may be gone. Viewed conventionally, this proposal's NPV is negative $100,000. But the opportunity to wait a couple of years to see what happens is valuable. In effect, the company owns a two-year call option with an exercise price of $1 million on underlying assets worth $900,000. We need only two more pieces of information to value this business opportunity as a European call option: the risk-free rate of return (this is the same as the time value referred to above - suppose it's 7%); and some measure of how risky the cash flows are. For the latter, suppose that annual changes in the value of these cash flows have a standard deviation of 30% per year, a moderate figure for business cash flows. Now, a simple option-pricing model, such as the Black-Scholes model, gives the value of this call as about $160,000.¹

What did the company learn from option pricing? The value of the opportunity is positive, not negative. That is always true as long as time and uncertainty remain. The company should not invest the $1 million now — to do so would be to waste $100,000 — but neither should it forget about ever investing. In fact, the odds are pretty good that it will want to invest two years from now. In the meantime, the product or country manager monitors developments. He or she focuses not only on NPV but also on the proper timing of an investment. Alternatively, if the company doesn't want to invest and doesn't want to wait and see, it can think about how to capture the value of the opportunity now. The option value gives it an idea of what someone might pay now for a license to introduce the new product. In the same way, the option value can help a company think about how much to pay to acquire such a license or to acquire a small business whose most interesting asset is such an opportunity.

Long-lived opportunities in volatile business environments are so poorly handled by DCF valuation methods than an option-pricing analysis does not have to be very sophisticated to produce worthwhile insight. A pragmatic way to use option pricing is as a supplement, not a replacement, for the valuation methodology already in use. The extra insight may be enough to change, or least seriously challenge, decisions implied by traditional DCF analyses.

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¹ The Black-Scholes model assumes that the underlying asset pays no dividends; if it does, the model needs to be modified.

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<table>
<thead>
<tr>
<th>What Makes Opportunities different?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets-in-place looks like this:</strong></td>
</tr>
<tr>
<td><img src="assets-in-place.png" alt="Diagram" /></td>
</tr>
<tr>
<td><strong>Opportunities look like this:</strong></td>
</tr>
<tr>
<td><img src="opportunities.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

Here we make a decision, then find out what happens.  
Traditional DCF methods are designed for this kind of problem.  
These two scenarios must have different values; they also must be managed differently.
Here's another way to think about the analytical strategy I am recommending. Values for fairly illiquid or one-of-a-kind assets (real estate, for example) are often benchmarked against values of assets or transactions regarded as comparable but not identical. Many terrific business opportunities are one-of-a-kind, and many are illiquid. Lacking a comparable benchmark for the example above (modifying our product to enter an emerging market), the company synthesized one by setting up a simple European call option. By pricing the synthetic opportunity (the call option), it gained additional insight into the real opportunity (the product introduction proposal). This insight is valuable as long as the company doesn't expect the synthesis or the resulting estimate of value to be perfect.

What the generalist needs, then, is an easy to learn tool that can be used over and over to synthesize and evaluate simple options. Furthermore, because the goal is to complement, not replace, existing methods, managers would like a tool that can share inputs with a DCF analysis, or perhaps use DCF outputs as inputs. My favourite candidate is the Black-Scholes option-pricing model, the first and still one of the simplest models. An intuitive mapping between Black-Scholes variables and project characteristics is usually feasible. And even though the model contains five variables, there is an intuitive way to combine these five into two parameters, each with a logical, managerial interpretation. This intuitive process lets a manager create a two-dimensional map, which is much easier than creating one with five variables. Finally, the Black-Scholes model is widely available in commercial software, which means that if you can synthesize the comparable option, your computer can price it for you. The crucial skills for the generalist are to know how to recognize real options and how to synthesize simple ones, not how to set up or solve complex models.

Valuing ownership Claims: Equity Cash Flows

Claims that companies issue against the value of their operations and opportunities are the last major category of valuation problem. When a company participates in joint ventures, partnerships, or strategic alliances, or makes large investments using project financing, it shares ownership of the venture with other parties, sometimes many others. Managers need to understand not simply the value of the venture as a whole but also the value of their company's interest in it. That understanding is essential to deciding whether or not to participate as well as how to structure the ownership claims and write good contracts.

Suppose your company is considering investing in a joint venture to develop an office building. The building itself has a positive NPV – that is, constructing it will create value. What's more, the lead developer is confident that lenders will provide the necessary debt financing. You are being asked to contribute funds in exchange for an equity interest in the venture. Should you invest? If all you've done is value the building, you can't tell yet. It could be that your partner stands to capture all the value created, so even though the building has a positive NPV, your investment does not. Alternatively, some ventures with negative NPVs are good investments because a partner or the project's lenders make the deal very attractive. Some partners are simply imprudent, but others - governments, for example – deliberately subsidize some projects.

A straightforward way to value your company's equity is to estimate its share of expected future cash flows and then discount those flows at an opportunity cost that compensates the company for the risk it is bearing. This is often referred to as the equity cash flow (ECF) approach; it is also called flows to equity. It is, once again, a DCF methodology, but both the cash flows and the discount rate are different from those used either in APV or the WACC-based approach. The business cash flows must be adjusted for fixed financial claims (for example, interest and principal payments), and the discount rate must be adjusted for the risk associated with holding a financially leveraged claim.
Handling leverage properly is most important when leverage is high, changing over time, or both. In those situations, lenders' interests may diverge from those of shareholders, and different shareholders' interests may diverge from one another. Such divergence is especially common in transactions that produce or anticipate substantial changes in the business or its organization – in mergers, acquisitions, and restructuring, for example.

Unfortunately, leverage is most difficult to treat properly precisely when it is high and changing. When leverage is high, equity is like a call option, owned by shareholders, on the assets of the company. If the business is successful, managers acting in the best interests of shareholders will “exercise the option” by paying lenders what they are owed. Shareholders get to keep the residual value. But if the business runs into serious trouble, it will be worth less than the loan amount, so the borrower will default. In that situation, the lenders will not be repaid in full; they will, however, keep the assets in satisfaction of their claim.

It is widely understood that highly levered equity is like a call option because of the risk of default. Why not use an option-pricing approach to value the equity? Because the options involved are too complicated. Every time a payment (interest) or principal) is due to lenders, the borrower has to decide again whether or not to exercise the option. In effect, levered equity is a complex sequence of related options, including options on options. Simple option-pricing models are not good enough, and complicated models are impractical. That is why it's worthwhile to have ECF as a third basic valuation tool.

It's important to state that an ECF valuation, no matter how highly refined, is not option pricing, and therefore will not give a 'correct' value for a levered equity claim. But ECF can be executed so that its biases all run in the same direction - toward a low estimate. So, although the answer will be wrong, the careful analyst knows that it will be low, not high, and why.

The key to using ECF is to begin the analysis at a point in the future beyond the period in which default risk is high. At that point, an analyst can establish a future value for the equity using conventional DCF methods. Then ECF works backward year by year to the present, carefully accounting for yearly cash flows and changes in risk along the way, until it arrives at a present value. The procedure is quite straightforward when built into a spreadsheet, and if certain formulaic rules are adopted for moving from later to earlier years, ECF's biases contribute to underestimate the true equity value. The formulaic rules amount to an assumption that borrowers will not really walk away from the debt even when it is in their best interests to do so. Obviously, this assumption deprives them of something valuable – in real life, they might indeed walk away, so the real-life equity is more valuable than the contrived substitute.

An ECF analysis also shows explicitly how changes in ownership structures affect cash flow and risk, year by year, for the equity holders. Understanding how a program of change affects the company's owners helps to predict their behavior – for example, how certain shareholders might vote on a proposed merger, restructuring, or recapitalization of the venture. Such insight is available only from ECF or its variations.

What do companies use now instead of ECF analysis? Some evaluate equity claims by first valuing the entire business (with WACC-based DCF) and then subtracting the value of any debt claims and other partners' equity interests. This approach requires managers to presume they know the true value of those other claims. In practice, they don't know those values unless they apply ECF to estimate them. Another common approach is to apply a price-earnings multiple to your company's share of the venture's net income. That has the virtue of simplicity. But finding or creating the right multiple is tricky, to say the least. Skillfully chosen price-earnings ratios may indeed yield reasonable values, but even then they don't contribute the other managerial insights that flow naturally from the structure of an ECF analysis.
Taxonomy of Valuation Problems and Methods

What are the different types of valuation problems encountered? Think of a stylized “balanced sheet” for the business.

<table>
<thead>
<tr>
<th>Past investment decisions</th>
<th>Future investment decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Operations (assets-in-place)</td>
<td>2. opportunities (real options)</td>
</tr>
<tr>
<td>2. Opportunities (real options)</td>
<td>3. Equity claims</td>
</tr>
</tbody>
</table>

Each type of problem calls for a different valuation method.

Companies use a broad range of valuation methodologies.

<table>
<thead>
<tr>
<th>Problem types</th>
<th>Recommended valuation method</th>
<th>Less formal</th>
<th>sampling of alternate valuation methods</th>
<th>More formal</th>
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</thead>
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<tr>
<td>1. Operations (assets-in-place)</td>
<td>Adjusted present value</td>
<td>Sales multiples</td>
<td>EBIT multiples</td>
<td>WACC-based DCF</td>
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<tr>
<td>2. Opportunities (real options)</td>
<td>Simple option pricing</td>
<td>Installed-base multiples</td>
<td>Customer subscriber multiples</td>
<td>Simulation scenario analysis</td>
</tr>
<tr>
<td>3. Equity claims</td>
<td>Equity cash flow</td>
<td>Net income multiples</td>
<td>WACC-based DCF minus debt</td>
<td>Simulation scenarios analysis</td>
</tr>
</tbody>
</table>

Learning New Tools:
Costs and Benefits

As companies adopt valuation techniques made more powerful or accessible by desktop computers, the good news is that the tools a generalist needs are not very hard to learn. The time and effort necessary before the techniques pay off naturally will depend on a company’s situation and its current finance capabilities.

Benefits will be high for companies that expect to invest heavily in the near future. For them, the suboptimal execution of a large, multiyear investment program will be costly. Consider, for example, an industry such as telecommunications, in which capital intensity is coupled with rapid growth and technological change. Success requires a sequence of good investments, and getting even one of them wrong can be very expensive. Or consider industries with only a few significant players that compete head-on in nearly all aspects of their businesses. Companies able to take swift advantage of a competitor’s mistakes should expect the benefits of insightful analyses – and the penalties for poor analyses – to be particularly high. Similarly, any company working now to exploit a first mover advantage is highly dependent on the success of early investments.

The costs of upgrading capabilities are likely to be low for companies that meet one or more of the following three criteria:
They already use DCF valuation in their capital-budgeting processes and have built the related systems for use on desktop computers.

They have many managers, not just finance staff who are comfortable with the basics of modern corporate finance and will not find the new tools difficult to acquire.

They are currently upgrading their staff capabilities for other reasons, so the incremental cost of installing a better system is minor.

Let's look at what's involved in learning the three valuation methods:

**Adjusted Present Value.** There are few tools as powerful and versatile as APV that require as little time to learn. My experience is that executives already schooled in WACC can learn the basics of APV in about two hours, either on their own or with an instructor. Within another half a day, people already comfortable with spreadsheet software are able to apply APV effectively to real problems. Today it is no exaggeration to say that a company not using spreadsheets for valuation is far behind the times. And companies that are using spreadsheets, not APV, are underutilizing their software.

Generally speaking, systems that can accommodate WACC can handle APV.

**Option Pricing.** This tool is costlier. There's more to learn, and for some people, it is less intuitive. Nevertheless, it is by no means inaccessible. Basic option pricing can be learned from a textbook. What is more difficult is the application of this tool to corporate problems, as opposed to simple puts and calls.

Corporate applications require a synthesis of option pricing and DCF-based valuation; that is, a way to use DCF outputs as option-pricing inputs and a way to reconcile the different values generated by each methodology. Simple frameworks embodying such a synthesis can be learned in a day or less. Simple applications require another day.

Normally, half of this time is devoted to running numbers and the other half to a more subtle but important tasks of interpreting and qualifying results and exploring the limitations of both the framework and the methodology.

Option pricing does not fit naturally into most companies' existing capital-budgeting systems. Neither, for that matter, do tools such as decision-tree analysis, simulation, or scenario analysis, which are sometimes offered as alternatives to option pricing. Thus, the most practical way to begin using options-based analyses is to run them in sequence with DCF analyses. I mean that in two senses: first, in the sense that you do option pricing after you've already done a DCF analysis (such as present values and capital expenditures) become inputs for option-pricing (such as underlying asset value and exercise price). Most companies will not find it worthwhile to build separate systems to support each methodology. Indeed, if DCF and option pricing are set up as mutually exclusive rivals – you pick one or the other, but not both – option pricing will lose, for now.

Eventually, many companies will locate their most high-powered technical expertise within a small finance or business-development group. The rest of the company, both line managers and top-level managers, will be trained to use that resource effectively. Therefore, the ability to formulate simple option-pricing analyses will be widespread. If only the specialists know anything about valuing opportunities, either of two unattractive outcomes is likely: the model builders will become high priests who dominate the capital-budgeting process; or they will become irrelevant geeks whose valuable talents go unexploited.

**Equity Cash Flows.** Managers already familiar with some kind of DCF valuation tool can learn ECF, along with a basic application, in less than a day. Companies that might be heavy users of this tool will want to adapt it to the particular kind of business or transactions they engage in most frequently. Probably the most common uses are in project and trade finance, mergers and acquisitions, buyouts, and joint ventures and alliances.

Adapting ECF and corporate systems to each
other is not necessarily difficult or costly but needs to be assessed case by case. ECF is a more specialized valuation tool than either APV or option pricing because it addresses a more specific question. APV and option pricing ask, What is the value of this bundle of operations and opportunities? In contrast, ECF asks, What is the value of an equity claim on this bundle of assets and opportunities, assuming they are financed in this fashion? ECF therefore requires more support or, at a minimum, more inputs from corporate financial and capital-budgeting systems. But presumably, a company engaged in significant numbers of joint ventures or project financings, for example, must support these activities anyway, regardless of the valuation tools it chooses to build into a particular system.

For most companies, getting from where they are now to this vision of the future is not a corporate finance problem — the financial theories are ready and waiting — but an organizational development project. Motivated employees trying to do a better job and advance their careers will naturally spend time learning new skills, even financial skills. That is already happening. The next step is to use this broadening base of knowledge as a platform to support an enhanced corporate capability to allocate and manage resources effectively.

An active approach to developing new valuation capabilities — that is, deciding where you want your company to go and how to get there — should allow you to develop those capabilities faster than a passive, laissez-faire approach, and it ought to yield more focused and powerful results. Of course, it's also probably more expensive. However, the question is not whether it's cheaper to let nature take its course, but whether the more powerful corporate capability will pay for itself. That is, how much is that capability worth?


2. For a more formal and extended discussion of such options, see Avinash K. Dixit and Robert S. Pindyck, “The Options Approach to Capital Investment,” HBR May-June 1995, pp. 105-15. In particular, Dixit and Pindyck highlight the common, critically important characteristic of irreversibility in capital investments. When a risky investment is both irreversible and deferrable, common sense suggests waiting to invest.


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The Investment Value of Brand Franchise

Brand loyalty manifests itself in consumers' willingness to pay a higher price for the brand they prefer. Some manufacturers choose to limit their output, sell only to customers loyal to their brand (their franchise), and charge the higher price. Others choose to charge a lower price rather than limit their output. Because franchises can contribute as much, or more, to future cash flows as their plants contribute, companies in the first group support their franchises by large investments in advertising, introducing new versions of their products, and so on. Accountants, however, are reluctant to capitalize the expenditures that support franchises, which causes gaps between market value and book value. If the fixed marketing costs can be identified, however, analysts can estimate the investment value of the franchise and the manufacturer's efficiency in defending it.

Economists have a lot to say about the value of plant, property, and equipment, but they are silent on an element of investment value that, for some companies, is even more important — brand franchise. Investors cannot afford to ignore the value of a brand franchise for a company's future cash flows. Economists, by indiscriminately invoking the Law of One Price, treat all industries as commodity industries, in which brand franchise has no value. As a result of the strategic choices companies make, however, consumers experience the reality — the Law of Two Prices — on the shelves of their friendly retailers every day. The neglect by economists of the reality of franchise pricing results in a wholly unnecessary mystique regarding these high prices — unnecessary because the marketing and economic aspects of brand franchises are easily linked.

Accounting principles exacerbate the problem of valuing brand franchises. Churchill once said that the United States and Britain were two nations separated by a common language. Investment analysts and marketing strategists are two groups of professionals separated by the language of accounting, which calls investments in brand franchises (e.g., research and development, advertising) "expenses." The neglect by accountants of the implications brand franchises have for future cash flows results in high price-to-book ratios and high price-to-earnings ratios.

This article describes an approach analysts can use, if the fixed costs of supporting a brand franchise can be identified, to estimating the investment value of a manufacturer's franchise and the manufacturer's efficiency in defending it. The valuation model has elements recognizable to the marketing strategist — such as franchise, marketing effort, and level of rivalry — as well as elements recognizable to the investment analyst — such as cash flow, present value, and return on investment. But the model can hardly be called "traditional." The traditional approach to estimating value has been to ask what data public companies provide and then to let those data define the valuation methods. This article defines what data analysts and investors need to value a company's investment in its brand franchise and explains how to use the data.

A valuation model cannot be formulated, of course, with total disregard for the kind of data the model requires. The data required for a satisfactory model should have the following characteristics:

- The data should be verifiable, at least in principle. When data are verifiable, 'objectivity' ceases to be an issue. The data should not be opinions about the future. Opinions cannot be verified.
- Data specific to a particular asset should reflect the specifics of the asset—not the interaction of the asset with general economic conditions or someone's opinion about future prosperity. A simple test for the specificity of the data is whether the data would be the same in a different economic or market climate.
• The data should not depend on arbitrary decisions by anybody—not the U.S. SEC, not the Financial Accounting Standards Board, and certainly not the reporting company.

Brand Franchise Power

The key to the value of brand franchises lies in consumer anxiety. The Law of One Price asserts that, in the absence of transportation and distribution costs, roughly simultaneous transactions in a given good or service will have the same price. The law assumes, however, that the parties to the transaction have what lawyers call a "meeting of the minds." In actual transactions, the parties have their own mental images of what is being transacted, and these two images are rarely the same.

For example, in many markets, the seller knows more than the buyer. This information asymmetry is typical of the markets for used cars and second-hand watches, and even more characteristic of markets for consumables-headache remedies, toothpaste, corn flakes, ketchup, soup, and so on. In consumables, the manufacturer knows what raw materials, what equipment, and what workers were used in the product's manufacture. In most cases, all the consumers can see at the point of purchase is an opaque container.

The result is anxiety in the mind of the consumer, which often has its origins in the way the product is manufactured over its life cycle. Exhibit 1 summarizes the differences between a fledgling and a mature industry. When an industry is new, the very definition of the product is fluid and demand is low. So, using general-purpose rather than dedicated machine shops, foundries, and heat-treating facilities makes economic sense (what Buffa [1984] called "process-focused" production). Quality at this stage is inevitably uneven and almost impossible to control. But it is precisely at this point in the life cycle of the product that consumers are having their first experiences with the product and forming first impressions that will be as lasting as their first impressions of people.

<table>
<thead>
<tr>
<th>Exhibit 1. Life-Cycle Characteristics</th>
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<tbody>
<tr>
<td>Fledgling Industry</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Product concept evolving rapidly</td>
</tr>
<tr>
<td>Size of market uncertain</td>
</tr>
<tr>
<td>Process-centered manufacturing</td>
</tr>
<tr>
<td>Fluid supplier relationships</td>
</tr>
<tr>
<td>Quality hard to control</td>
</tr>
<tr>
<td>Consumer disappointments common</td>
</tr>
</tbody>
</table>

Later, when the role of the product is well defined and potential demand is clearer, manufacturers build production facilities dedicated to the new product (what Buffa called "product-focused production"). Day in and day out, the same people perform the same steps in the manufacturing process. The source of quality problems is identified. Learning takes place, and as production problems are solved, knowledge about solutions circulates throughout the industry.

Consumers, however, cannot forget the pain of the early disappointments. They are still anxious, which is what gives the power to brand names. Indeed, brands can continue to be important long after the industry has solved its quality problems. The day consumers do conquer the last of their anxieties is the day the industry becomes a commodity industry. Fresh milk is an example. When pasteurization was new, the reputation of the dairy (e.g., Borden, Beatrice, Hood) was important. Today, nobody worries about milk quality, and dairy brands with their premium prices have largely disappeared.

Marketing is most important in the middle of the cycle, when brand identities have been established in consumers' minds but consumers are still worried about quality: "Almost as good as a Xerox." "Not exactly like Hertz." Marketing experts have known for years that consumers deal with their anxiety
about transactions by focusing on the manufacturer's brand. In a process not unlike falling in love, consumers replace their generalized ideal of what a product should be with the highly particularized image of a specific brand. If they prefer Fords, then every way in which a Chevy differs from a Ford makes the Chevy less desirable. Their preferred brands become the standards by which all other similar products are judged. Consumers are not unwilling to buy the others, but they are willing to pay more for their ideal brands. Of course, which competing product is the ideal differs for different consumers. Each brand, Chevy and Ford, has its own group of loyal customers—its brand franchise.

Marketing and the Brand Franchise

Ideally, a manufacturer would price each sale transaction according to whether the buyer was in its franchise or not, but this approach is usually impractical. In practice, the manufacturer that chooses the lower price can sell everything that it can economically make at that lower price (in economics, can realize the full value of the scarcity rents on its plant capacity) and, of course, because sales are not restricted to its franchise, the manufacturer who chooses to sell at the lower price is free not to engage in product innovation, advertising, or promotion. The manufacturer that chooses the higher price is restricting its branded output, irrespective of how much capacity the manufacturer has, to the size of its franchise market. Therefore, this manufacturer does whatever it can to increase its franchise—product innovation, advertising, and promotion. The manufacturer uses the higher-priced marketing effort to increase (or defend) its share of the franchise in its industry.

When consumers choose to buy at the lower price, they are not affecting total supply or total demand. So, their choice is not affecting the scarcity of production capacity or the scarcity rents on that capacity. Because the choice merely shifts consumers from one brand to another or to unbranded competitive products, it has nothing to do with scarcity or market equilibrium—hence, nothing to do with price theory. So, the task of analyzing the value of a franchise has little in common with the task of analyzing the value of plant, property, and equipment.

The costs of marketing often include a significant fixed element. When the size of that element is not known (i.e., when firms do not report their fixed costs separately for manufacturing and for marketing), pricing that investment is a challenge. But analysts can estimate the costs. This discussion of how to value a brand franchise considers three issues that brand franchise raises for investors:

- the estimation problem in the case where fixed costs are either known or small enough to ignore,
- the economics of brand franchise when fixed costs are important, and
- the impact of brand franchise on monopoly power, with particular attention to fixed costs, sunk costs, and ease of entry.

The Estimation Problem.

Customers are fickle. An industry may appear to have stable and unchanging franchise shares, but it is actually in constant flux. The competitors' franchise shares are like swimming holes in a river; water is constantly flowing in and flowing out, although the overall level of each hole may change little. To maintain its franchise, a manufacturer must take customers away from its competitors as fast as they are taking away customers from the manufacturer.

To begin estimating the costs of supporting a brand franchise, assume that, net of any fixed marketing costs in the industry, a competitor can romance away twice as many potential customers if it spends twice as much and vice versa. If a manufacturer's franchise is measured by its gross cash "flow-back," \( z \) (franchise share multiplied by brand premium) and its marketing effort net of fixed marketing costs is defined as \( v \) (both variables at annual rates), then one-period changes in gross
flow-back, $\Delta z$, satisfy the equation

$$\Delta z = \alpha v - \beta z,$$

(1)

where $\alpha$ and $\beta$ are coefficients that express the sensitivity of change in franchise to, respectively, marketing effort and initial franchise size.

At every point in time, gains and losses in franchise share sum to zero; that is,

$$\sum \Delta z = 0;$$

(2)

so, if we assume that $\beta$, unlike $\alpha$, is the same for all competitors, then

$$0 = \sum \alpha v - \beta \sum z,$$

(3)

with the result that

$$\beta = \frac{\sum \alpha v}{\sum z}.$$  

(4)

Obviously, $\beta$, even if it is the same for all competitors at a point in time, can vary across time.

But the efficiency with which competitors transform dollars of marketing effort into change in franchise (gross of the $\beta$-related losses) is in a certain sense relative to the other competitors. So, then, an appropriately weighted average of the individual efficiencies should be constant across time—even if individual efficiencies or associated weights are changing. Let that average be $\hat{\beta}$. Then, without any loss of generality, we can write

$$\sum \alpha v = \hat{\beta} \sum v,$$

(5)

and assert that $\hat{\beta}$ is constant across time.

The basic model then becomes

$$\Delta z = \alpha v - \hat{\beta} \left( \frac{\sum v \sum z}{\sum z} \right),$$

(6)

where the expression in parentheses, like $v$, is observable. The unknown coefficient $\alpha$ is not necessarily constant across time for the same competitor.

Consider regression estimates of the undetermined coefficients $\alpha$ and $\hat{\beta}$: In the cross-section, large $v$s are likely to be associated with large $z$s and, therefore, with large values of $\sum v \sum z$. So, the two independent variables are highly correlated. Standard errors of estimate will be correspondingly large. We can minimize this problem by recasting the regression in the form

$$\frac{\Delta z}{z} = \hat{\beta} \left( \frac{\sum v}{\sum z} \right),$$

(7)

Now, consider a single-variable regression of $\Delta z$ on $\sum v \sum z$. The suppressed explanatory variable $v/z$ is plausibly uncorrelated with $\sum v \sum z$, both across competitors and across time. We use the resulting estimate of $\hat{\beta}$ to compute values of $\alpha$ for each data point (i.e., for each competitor at each point in time).

We can use this result to distinguish, competitor by competitor and period by period, between level of marketing effort and efficiency. A small gain in franchise share achieved with high efficiency may represent a better job of marketing management than a large gain achieved with an exorbitant effort. We can make this useful distinction, however, only when fixed costs are little known or unimportant.

**The Economic Impact of Fixed Costs.**

The fixed costs of product development and advertising represent the competitor’s admission ticket to the variable-cost game. We can measure competitors’ total marketing efforts by the cash outflow $u$ and their total fixed marketing costs (assuming the costs can be measured) by $F$ (all variable annual rates). Then, the variable-cost portion of a company’s marketing effort is $u - F$. In industries where fixed advertising and development costs are important, change in franchise is

$$\Delta z = \alpha (u - F) - \beta z.$$  

(8)

The value of $z$ to investors is reduced by the marketing effort required to maintain the company’s market share. The maintenance value of $u$ (the value at which franchise gains just offset franchise losses) can be termed $u^*$; substituting $u^*$ for $u$ in the expression for franchise change produces

$$\alpha (u^* - F) - \beta z = 0,$$

$$\frac{u^* - F}{z} = \frac{\beta}{\alpha},$$

and

$$u^* = \frac{\beta}{\alpha} z + F.$$  

(9)

Net flow-back from the investment is gross flow-back minus the maintenance level of
\[ z - u^* = z - \left[ \frac{\beta}{\alpha} z + F \right] \]  
\[ = z \left( 1 - \frac{\beta}{\alpha} \right) - F. \]  

For the industry as a whole, we have
\[ \sum \Delta z = \alpha \sum u - \alpha \sum F - \beta \sum z \]  
\[ = 0 \]  

hence,
\[ \alpha \sum (u - F) = \beta \sum z \]  
and
\[ \frac{\beta}{\alpha} = \frac{\sum (u - F)}{\sum z}. \]  

Substituting in the expression for net flow-back produces
\[ z - u^* = z \left( 1 - \frac{\beta}{\alpha} \right) - F. \]  

Recall that our first criterion for a satisfactory model was that the data be verifiable. One variable in the formula for measuring franchise value should probably be treated as a forecast rather than as a verifiable fact – and, indeed, a forecast that depends on events outside the industry. That variable is \( \sum z \) – the industry's total franchise, measured in gross cash flow. It depends on overall industry sales, which usually depend on prosperity beyond the industry. When investors forecast this number, they are "timing" the industry. The way to avoid such timing is to use the forecast that best explains the current market prices of companies in the industry. (The current value of \( \sum z \) is observable but probably not relevant.)

The other variables in the formula are verifiable. They are specific to the firm and its industry, and they are not influenced by anybody's forecasts or anybody's arbitrary rules:
\[ \frac{\Delta z}{z} = \alpha \left( \frac{v}{z} \right) - \frac{\hat{\alpha}}{\sum z} \]  

Maintenance level \( v^* \) of \( v \) is defined by
\[ 0 = \alpha \left( \frac{v^*}{z} \right) - \frac{\hat{\alpha}}{\sum z} \]  
\[ \frac{\alpha}{z} \left( \frac{v^*}{z} \right) - \frac{\hat{\alpha}}{\sum z} = \frac{\Delta}{z}. \]

so
\[ v^* = z \left( \frac{\hat{\alpha}}{\alpha} \right) \left( \frac{\sum v}{\sum z} \right). \]  

Then, net flow-back is
\[ z - v^* = z \left[ 1 - \left( \frac{\alpha}{\alpha} \right) \left( \frac{\sum v}{\sum z} \right) \right]. \]  

In this result, fixed costs are not explicit. When we introduced fixed costs, we defined \( v \) as equal to \( u - F \) and \( v^* \) as equal to \( u^* - F \) if, on average, all competitors have the same fixed costs. On the other hand, Equations 13-19 assume away differences in marketing efficiency – that is, assume \( \alpha = \hat{\alpha} \) for different competitors.

The present value of a franchise share \( z \) discounted at market rate \( \rho \) is
\[ \frac{z}{\rho} = \frac{\sum (u - F)}{\sum z}. \]

For an established competitor, the incremental rate of return is
\[ \frac{\partial (z - u^*)}{\partial u} = \frac{\partial (z - u^*)}{\partial z} \frac{\partial z}{\partial u}. \]

\[ \frac{\alpha}{z} \left( \frac{v^*}{z} \right) - \frac{\hat{\alpha}}{\sum z} = \alpha \left[ 1 - \frac{\sum (u - F)}{\sum z} \right] < \alpha. \]  

The rate of return goes up with the gross flow-back from the industry's franchise, goes down with the level of rivalry, \( \sum u \) and goes up with the number of competitors.

**Brand Franchise and Monopoly Power.**

In a marketing war, the level of rivalry is so high that net flow-back becomes negative. The bigger the franchise share, the bigger the rate of loss. Marketing wars are basically wars of attrition intended to exhaust competitors' borrowing power. For example, if Competitor A has the same size franchise as Competitor B (and the same marketing efficiency) but more untapped borrowing power, B will run out of steam sooner than A; A will win the war. If, on the other hand, A and B have equal untapped borrowing power but A's franchise
(hence, its rate of loss) is bigger, then B will win the war. To win such a war, a company must have a higher ratio of borrowing power to franchise than its competitors have. Because the purpose of a marketing war is to force a competitor to abandon its franchise, no rational lender will rely on franchise value as the security for a loan. So, borrowing power depends on the value of the plant (less liabilities). A marketing war ends when a competitor either exhausts its borrowing power or, seeing that its cause is hopeless, abandons defense of its franchise. Either way, a marketing war shifts franchise share toward the competitor with the highest ratio of borrowing power to franchise. And because marketing wars benefit those competitors, they can be more aggressive in marketing peace. When rivalry escalates, high-ratio competitors lead the way, with low-ratio competitors following willy-nilly.

But there is no point entering an industry if you aren't sufficiently well capitalized to defend your entry. Companies do not have to compete for franchise in order to enter an industry, but when they enter the battle for brand franchise, they incur the maintenance-level costs of their marketing efforts. So, maintenance cost (see Equation 9),

$$u^* = z \frac{u-F}{z} + F,$$

(20a)
can be used as the measure of ease for entrants that expect to compete for franchises. We can rewrite this expression as

$$u^* = F \left(1 - n \frac{z}{\sum z}\right) + z \frac{u}{\sum z}.$$

(20b)

Differentiating with respect to \( n \) produces

$$\frac{\partial u^*}{\partial n} = \frac{Fz}{\sum z}.$$

(21)

Because \( F, z, \) and \( \sum z \) are all positive, entry of a competitor always lowers maintenance cost for existing competitors. We conclude that what established competitors should fear is not entry but, rather, entry of financially strong competitors.

Lawyers often assume that higher fixed costs will make entry more difficult. Does it pay established competitors to increase the industry's fixed marketing costs—for example, by increasing the frequency of new-product introductions?

Differentiating the maintenance cost expression with respect to \( F \) produces

$$\frac{\partial u^*}{\partial F} = 1 - n \frac{z}{\sum z}.$$

(22)

A new competitor's maintenance level of \( u \) will fall with increasing \( F \) if its franchise satisfies

$$z > \frac{\sum z}{n} = \text{Average } z.$$

(23)

So, acquiring competing companies, if they are large, evidently pays. (Consider the extreme case of Company Q acquiring a company of negligible size: Company Q's \( z \) does not increase, but its \( n \) falls by 1.) Calculating

$$\frac{\partial}{\partial n} \left(\frac{\sum z}{n}\right) = -\frac{\sum z}{n^2},$$

(24)

shows that when a company is acquired (i.e., when \( n \) falls by 1), the industry average increases by \( \sum z/n^2 \). So, the rule is: Never acquire a company with franchise \( z \) such that \( z > \sum z/(n^2) \). Large established firms benefit by encouraging new firms, not merely because entry reduces their maintenance costs, but because it lowers the threshold for acquisition targets. (Small companies who would prefer to be priced as potential takeover targets will also favor entry.)

The Two Meanings of "Competition"

When economists talk about competition, their ideal is an industry that pushes output up to the point where marginal cost equals price. Unless demand is perfectly price elastic, however, increments in output will lower equilibrium price—penalizing all output and causing marginal revenue to be less than price. So, it usually pays an industry not to produce up to the perfectly competitive level.

The owner of the industry's marginal capacity, however, is concerned only with the price penalty on its own output. If this manufacturer is small—if it has limited capacity—the price penalty will be less
important to it than if it is big. The manufacturer will push output closer to the point at which the unit cost of producing on the marginal capacity equals the price—that is, behaving more like the economist's ideal. So, the economist worries when, as a result of business combinations or barriers preventing new entrants from starting small, an industry is divided up among a few large firms.

The word "competition" has a different meaning for marketing strategists than its meaning for economists or accountants. They use it to refer to the battle for brand franchise. In industries where such franchises are valuable, companies often spend hundreds of millions of dollars a year in the battle. (As in "competitive sports," one company's franchise gain is another's loss.) When the level of rivalry is high enough, however, it takes more money than the brand itself can generate. At that point, competitors turn to their other financial resources—scarcity rents on their plant capacity. But the only plant capacity with high scarcity rents is capacity with a low variable unit cost of producing, which, of course, is why the valuable franchises end up in the hands of low-cost producers.

"Low" and "high" as they apply to cost, however, are relative. How does the high-production-cost type survive in such an industry? By not competing for franchise share. Instead, their output is distributed as off-brand, generic, or house brand products. So, such industries have two types of companies—competitors who battle for franchise share and producers who do not—and two kinds of entry.

The producer type is critical to the industry's willingness to use its high-cost capacity. Because producer types own that capacity, they decide whether or not to use it, even though the decision affects selling prices for all the companies in the industry, including the competitor types.

If the industry has important fixed costs that are the same for small companies as for large companies small-scale attempts at entry will fail. If marketing expenditures entail significant fixed costs—space in national media, creative spots for ads good enough to justify the space, development of new products good enough to justify the ads—it does not pay a company to have a franchise unless it is a big franchise. (Introductions of new brands into such an industry may be few and far between.) A big marketing effort is needed to defend a big franchise. And if the industry requires low-cost capacity to defend a franchise, it takes a lot of low-cost capacity to defend a big franchise. In such industries, low production costs and big franchises tend to go together.

When competitor types are large, they have a big stake in industry pricing. When competitors are low cost, they have a big stake in output. Will they, nevertheless, withhold some of their production? If a competitor produces less than its own franchise demands, the competition benefits at the expense of the competitor, which weakens the competitor's ability to defend its franchise. (Because marginal producers will increase their output when a low-cost competitor reduces its output, the net reduction in industry output a competitor can achieve is never more than half its gross reduction.)

Entry into the battle for franchise is obviously daunting. But for a producer type, entry requires only some plant with a high unit variable cost of producing and, hence, a low second-hand value. Some industries have fixed costs of production, but even those costs are usually small compared with the fixed costs of marketing. So, in an industry with high fixed marketing costs, producer types tend to be small compared with competitor types.

Implications for Antitrust

When high fixed costs in an industry are associated with marketing rather than production, they put pressure on competitor types to become as large as possible, which discourages entry into the battle for franchise and produces industries in which the low-cost companies are large and the high-cost companies are small—which is to say, industries in which the companies that own the marginal capacity have little incentive not to use it.
High fixed costs may have discouraged entry and competitive pricing in the commodity industries—the railroads, steel companies, and oil companies—that preoccupied trust busters in the 1890s. Trying to extrapolate that experience to the kind of modern industries discussed here may lead to confusion between the two meanings of “competition” with consequences that are disappointing or even perverse.

Appendix A: Sunk Costs versus Fixed Costs

Antitrust lawyers have recently discovered the concept of sunk costs. The lawyers’ discovery attests to their recognition of industries in which marketing, as well as production, is important—in which competitor types as well as producer types are important.

A sunk cost is an investment that is certain to be worthless if you change your mind. Examples are:
- leasehold improvements,
- creative costs of a discarded advertising program,
- investment in a discarded brand, and
- abandoned new-product development programs.

Sunk costs differ from simply making risky investments. If you make an investment in a liquid security and change your mind, although you have no guarantee that you can recover the cost (so, the investment is risky), you do have a chance to recover it. If the buyer’s expectations are sufficiently rosy, you can sell the investment and recover the cost. Sunk costs are gone with no possibility of recovery.

One kind of investment has social value; the original investor is merely the first of what may ultimately be several owners. The sunk cost has value only to the original investor.

By this test, investment in capital goods—in productive capacity—is rarely a sunk cost. In particular, if the original buyer fails, the plant still has potential value to other buyers. (To be sure, most capital goods are not as liquid as securities. They raise the same kind of uncertainties in a potential buyer’s mind that a used car raises.)

By the same test, investment in a brand franchise is almost always a sunk cost:
- It has no social value. Instead, it merely transfers franchise from one competitor to another.
- If the owner abandons the brand, or an acquiring firm replaces it with its own brand, all prior investment in that brand becomes worthless.

These considerations suggest that if sunk costs pose a special problem for new entrants, it is the costs of marketing, rather than the costs of production, that pose the problem.
Notes

1. Classic examples of fixed marketing costs are the creative costs of an advertising campaign – costs that must be incurred before a single TV spot or page in Newsweek has run. Costs of developing a new product may also be considered part of marketing costs. Development costs must be incurred before the sales force can sell the product, before advertising can promote it, and so on. Typically, these fixed costs must be incurred in order for the "variable" costs of marketing to have any value, and the fixed costs are independent of the scale of the marketing program, specifically, of sales volume, the size of the sales force, the size of the media buy, and so on. A car maker can choose to economize on its manufacturing fixed costs—rearranging the chrome, for example, when a competitor introduces a genuinely new model. But this choice is not rigidly dictated by the size of its franchise or the scale of its marketing effort. And the car maker is deferring, rather than actually reducing, its costs. For long-range planning or investment analysis, representative or long-term averages of fixed marketing costs are appropriate.

2. The cost of product development is a marketing cost. Does the competitor develop its new products (or product improvements) in a corner of the factory? Do the key professionals wear laboratory smocks rather than the power suits favored by the company's salesforce? If so, should we conclude that product development is a cost of production rather than marketing? No because what matters (in analyzing production, as well as marketing) is the purpose for which the competitor incurs the costs.

When we distinguish between competitors, who care about the size of their brand franchise, and producers, who do not, we find that product development, like advertising, is a cost producers choose not to incur. So, we know what the purpose of product development is.

3. The value of the plant derives from its economic, or scarcity, rent. This rent is the difference between the unit variable cost of producing in that plant and (in a competitive industry) marginal cost – the unit cost of producing in the marginal plant. On the one hand, per unit of capacity, the higher the unit variable cost of producing in the plant, the lower the rent on the plant. On the other hand, the risk regarding the future rent depends only on the unit cost for the industry's marginal plant (i.e., on uncertainty about which plant will be marginal). So, the absolute risk is the same for all plants irrespective of the absolute rent. And when industry demand expectations change, competitors' borrowing power does not change proportionately. Still, a useful generalization is possible: Other things being equal, the competitors with low-cost plants cope more effectively with both marketing wars and marketing peace.

4. Keep in mind that lawyers make an important distinction between fixed costs and sunk costs (see Appendix A).

References


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