

Valuation: An Epistemological View

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Editor's Note

Valuation is a frequent topic in Strategic Investor Relations. This article and the following article by Aswath Damodaran deal with discounted-cash-flow valuation. For readers not completely comfortable with this method, here is a brief summary of how it works: A company's estimated future free cash flow is discounted back to the present at the company's weighted average cost of capital to calculate the company's equity value. Total enterprise value is equal to equity value plus long-term debt. Free cash flow is the cash flow that remains after capital expenditures and other investments such as increases in working capital required to grow the business. The weighted average cost of capital is a weighted average cost of the company's debt and equity capital with the cost of equity capital calculated according to the capital asset pricing model (CAPM). Under CAPM, the cost of equity capital is computed as follows:

$$\text{Cost of equity} = \text{current risk-free rate} + (\text{beta} \times \text{market risk premium for common stocks})$$

The risk-free rate most often used is U.S. Treasuries. Beta is a measure of stock-price volatility. The market risk premium for common stocks, based on historical averages, is released annually by Ibbotson Associates of Chicago in publications such as Stocks, Bonds, Bills, and Inflation.

Whether the stock market is booming or swooning, valuation is an integral part of fundamental analysis. Yet investors generally discuss valuation on a very superficial

level. Valuation discussions, if they can be so termed, usually focus on which rule of thumb (e.g., price/earnings multiple) to use and the appropriate level of that rule of thumb (e.g., the P/E should be 24). Here we attempt to address some of the harder issues surrounding valuation. In particular, we seek to answer some basic questions:

- What is the central role of valuation?
- What can we say, and not say, about the certainty of the valuation process?
- What analogies can help us understand how the market sets price?
- What does empirical evidence tell us?
- Why isn't the theory accepted in practice?

VALUATION DEFINED

Investing entails committing money today in order to gain a future financial return. Valuation is the mechanism by which investors trade cash today for future claims on cash flows. Investment industry luminary John Bogle says it more eloquently: "The purpose of any stock market... is simply to provide liquidity for stocks in return for the promise of future cash flows, enabling investors to realize the present value of a future stream of income at any time."

This simple statement is packed with meaning: It tells us that the combination of price (for a publicly traded security) and the valuation mechanism provides potentially useful insights about the market's *expectations* for magnitude, timing, and riskiness of future cash flows.

A brief diversion: It is important to clearly understand the distinction between price and value. Price reflects the collective expectations of investors. Value, if it is to be logically distinct from price, implies that an investor believes something *different* than what the market believes. In order for investors to have a firm grasp on where and why their views are different than the market, it is important that they understand where the market stands.

WHAT DO WE KNOW? WHAT DON'T WE KNOW?

At the end of the day, we can prove very little about valuation. The reason is simple: Stock prices (and the inputs that drive them) reflect investor *expectations*. *Changes* in investor expectations, in turn, largely dictate total shareholder returns. Investors often ask whether a particular financial measure (insert your favorite—cash flow, return on capital, earnings) correlates strongly with total shareholder returns over a particular time period. The answer is generally a disappointing “no,” because no single financial measure can thoroughly capture a set of expectations. Any direct link between price and a particular financial measure is likely to be ephemeral.

Think of it this way: We can best describe shareholder returns from time A to time B as the *change in expectations* from time A to time B. And while a company's financial performance during that time may influence the expectations set at time B, the market is always looking forward.

If expectation revisions largely dictate stock price movements, is it possible to intelligently decipher those expectations? Or, more to the point, what expectations do stock prices reflect? Sales growth? Earnings? Cash flows?

Even the most ardent finance theorist struggles with this answer. But scientists frequently use a technique that applies here. When trying to understand a complicated system, scientists often start by looking for a similar, but simpler, system. Understanding of the simpler system can provide useful insights about the workings of the more complicated system.

A SCIENTIFIC APPROACH

Want to understand human neuroscience? Start with the *Caenorhabditis elegans*, a common worm. Scientists have mapped all of *C. elegans*'s 302 neurons, providing them with the cellular basis of the neural computations that underlie behavior. Interested in genetics? Turn to *Saccharomyces cerevisiae*. Scientists decoded the complete genome of this com-

mon yeast years ago, allowing for a clearer understanding of gene action and interaction. In both cases, the simpler system provides critical clues for how to think correctly about its more complicated counterpart.

Investors can use the same approach to understand stock valuation better. A simpler and analogous system is the bond market. The bond market, just like the stock market, places a price today on a stream of future economic claims. But bond issuers, unlike equity issuers, are contractually obligated to make timely payments on their coupons and principal. As a result, bond market valuation is clear-cut: The value of a bond today is the present value of future cash flows. To value bonds, you need to answer three questions:

1. What will the cash flows be?
2. When will I receive them?
3. How risky are they?

Bond issuers must specify the answers to two of these three questions—magnitude and timing. Beyond the issue of defaulting on these obligations, the degree of risk and, hence, expected return is the primary issue for investors to weigh.

If indeed investors value bonds by discounting future cash flows, it stands to reason that they value stocks—a junior financial claim—in the same fashion. However, there is a big difference between stocks and bonds, because companies do not specify the timing and magnitude of cash flows for stocks (even dividends are, at best, a quasi-contract). So answering the three questions above is inherently more difficult. The whole valuation process is more uncertain. But this uncertainty does not obviate the basic mechanics of valuation. It's all about the present value of free cash flow.

JUST THE FACTS

We can now go one step further and consider whether or not the empirical research supports this observation. As it turns out, the evidence is quite clear. Specifically, we can summarize the relevant elements of the literature in three statements:

1. When reported earnings per share and cash flow diverge, the market follows the cash. It is possible for companies to increase their reported earnings but not increase shareholder value. This can occur when a company makes an incremental investment at a rate below the cost of capital. One example is an EPS-accretive acquisition that is net-present-value negative.

2. There is a trade-off between risk and reward (i.e., high risk equals high reward, low risk equals low reward). This relationship seems particularly pronounced across asset classes.
3. The stock market reflects expectations for long-term cash flows. It often takes 10 or more years of future cash flows to justify a company's current stock price.

Building on first principles, we can now strongly suggest that stock prices reflect expectations for future long-term cash flows. While most investors do not find reason to quarrel with the above language, they may claim that the logic is theoretical. Since the real world is a lot messier than the theory, the argument goes, investors have to back away from this theoretical approach.

GOOD THEORY, LIMITED PRACTICE

Specifically, investors who fail to embrace a discounted-cash-flow model fall into two broad camps. The first is based on a distrust of a discounted-cash-flow model itself. The argument is that certain inputs, such as the cost of capital and terminal value, are critical from a practical standpoint (i.e., small changes in these variables lead to large value swings) but poorly specified from a theoretical perspective.

The second camp expresses skepticism about the ideal of discounted cash flow, given that most investors use multiples to determine value. More bluntly, this group asks, "How can the market 'get' discounted cash flow when so few investors actually use it?" Neither objection holds up to careful scrutiny.

Multiples are not valuation; they are a shorthand for the valuation process.

The retort to the first objection—distrust of the model—has two parts. To begin, practical hurdles do not undermine the logical case of how to value a stock. That the capital asset pricing model is an imperfect representation of risk does not mean that an investor can neglect risk and reward. That our understanding of sustainable competitive advantage is incomplete does not mean that we can neglect a company's value growth duration.

There are ways to circumvent this garbage-in, garbage-out problem. The best, we believe, is to take the stock price and work backward—reverse-engineering the

expectations needed to equate to the current price. This decoding of prices allows investors to read the mind of the market using the language of the market. Investors then can intelligently judge whether or not the market is too optimistic or pessimistic.

The next response to discounted-cash-flow model distrust is to consider whether or not viable alternatives exist. Most valuation work in the financial community is based on multiples—multiples of sales, EBITDA, earnings, or book value. But investors must recognize the simple fact that multiples are not valuation, multiples are a shorthand for the valuation process. No investor should ever confuse the two.

The difficulty of creating a sound discounted-cash-flow model reflects the uncertainty inherent in corporate cash flows, not a flaw in the analytical approach.

Shorthand in general has the virtue of saving users' time. But shorthand is also, by definition, cruder than the reality it seeks to represent. That many investors are comfortable with multiples but uncomfortable with discounted cash flow reflects cognitive dissonance. The simplicity of multiples is a sign of inaccuracy, not accuracy. As Keynes said, "It is better to be vaguely right than precisely wrong." The difficulty of creating a sound discounted-cash-flow model reflects the uncertainty inherent in corporate cash flows, not a flaw in the analytical approach.

In short, the practical challenges in using a discounted-cash-flow model do not weaken its theoretical and pragmatic value. Indeed, the alternatives to a discounted cash flow framework inevitably represent a step away from economic reality.

The second objection—how the market "gets it"—appears on the surface to be more profound. It does not seem to make sense to assume that the market follows a discounted-cash-flow approach, either in theory or practice, if so few investors use the model. In the bond market, which we view as analogous, investors really *do* use a discounted cash flow model. But for the stock market, detailed valuation approaches are the exception, not the rule.

There are two possible responses to this objection. The first, while insufficient, is the standard answer in finance

circles. It is based on the idea that stock prices are set at the margin. So average investors don't matter, since they are price takers. Rather, the marginal price setter is the key. As the theory goes, the marginal price setter (think Warren Buffett) indeed does use a discounted-cash-flow model. Since the marginal price setter is effectively leading the other presumably less sophisticated investors, stock prices adhere to the discounted-cash-flow framework.

This approach has significant intuitive appeal and is sufficiently robust to persuade many investors of the importance of using a discounted-cash-flow approach. Unfortunately, it rests on assumptions that are not realistic: The number of marginal price setters and the capital they would require are too large to credibly suggest that they dictate stock market prices. Further, this model doesn't do an acceptable job of explaining the vagaries of the market—periodic booms and busts that are inconsistent with standard finance theory.

The collective market is consistently smarter than the average individual agent.

An alternative response that is more persuasive, and a very important mental model, is based on the idea that the stock market is a complex adaptive system. We can describe complex adaptive systems—which are ubiquitous in nature—in three parts. First, there is a heterogeneous group of agents (investors, in this case), each with evolving decision rules that attempt to anticipate changes in their environment. Second, the interaction of these agents leads to self-organization—often called emergence. Finally, the interaction creates a global system (the stock market) that has properties and characteristics distinct from the underlying agents themselves. Just as you can't understand an ant colony by interviewing an ant, you can't understand a stock market by interviewing an investor. There is no additivity. The sum is greater than the parts. Price is a manifestation of myriad investment strategies, time horizons, and investment beliefs. And, as it turns out, we can say that the collective (i.e., the market) is consistently “smarter” than the average agent.

One of the ways to appreciate why the market is so “smart” is to distinguish between the “problem” and the “solution.” The problem, in the case of the stock market, is how to determine the present value of future cash flows

for all publicly traded companies. The solution is how investors go about their task—a collage of technical and fundamental tacks.

Think of this problem/solution distinction in the context of a big maze. You are asked to “solve” the maze—that is, to get from the start to the finish. That is the problem. How you go about it is the “solution.” You might go at this in one of many ways. Your decision rule might be a little algorithm “two lefts, one right, two lefts, one right, etc.,” or may be a bit less structured “this way looks good.” And your decision rules are likely to evolve. The important point is that the problem is easier to define than the solution.

As it turns out, scientists actually have conducted such a maze experiment and found that the collective “path” of a group of individuals with diverse decision rules is consistently shorter—that is, better—than the average individual. Collective maze solving is more effective than individual maze solving.

So we can now see that the second objection to using the discounted-cash-flow model confuses the problem with the solution. That investors use a diverse set of solutions in no way changes the problem. Indeed, diverse approaches help assure that individuals solve the problem effectively. Further, it helps explain why empirical studies of the stock market show that it follows an economic model (collective problem solving), even though very few individuals adhere to the pure economic approach (various decision rules).

CONCLUSION

Imagine strolling into a casino. Would you be willing to join a card game and wager your money, with a hope of winning, if you didn't completely understand the workings of the game? Investors who lack a firm sense of valuation face just such a set of circumstances. Valuation is important in fundamental analysis. Thoughtful investors have a firm grasp of the market's mechanism, as well as what they can and can't know. We know that many individual investors with different strategies interact through a market-making mechanism and that fluctuating prices result. Further, scientists have conducted experiments that strongly suggest that the collective derives a better answer than the average individual. But given that stock prices are a function of *expectations*, there is no objective way to determine the “right” answer.

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