

Corrective Lenses

Some experts contend that Options-Pricing models give a better view of cost of capital than CAPM.

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Quick, what's your company's cost of capital? Not sure? That's OK — you're far from alone. Finance executives have long wrestled with that question when establishing hurdle rates for investments. During the last throes of the bull market, with capital dirt-cheap, it didn't much matter. But the bear market has made capital dear once again, and brought the question of its exact cost back to center stage.

Calculating the price of debt is not the problem: subtract the prevailing interest rate on Treasury bonds from the rate on a company's equivalently timed debt, and the resulting spread will serve as a perfectly reliable measure of investors' expectations that the company will default on those obligations. That spread can then be used to establish the returns an investment must produce to satisfy bondholders that the risk of default is worth taking.

The rub comes in trying to reckon the cost of a company's equity. There is simply no way — yet — of definitively measuring the risk that a company won't be able to satisfy shareholders as well as bondholders, who after all have first dibs on a company's assets in the event of bankruptcy. In the absence of a better alternative, for nearly 40 years many academics and finance executives have accepted the capital asset pricing model (CAPM), or some variation of it, as an adequate means of approximating the cost of equity.

Recently, however, proponents of a new methodology have claimed that companies can use options-pricing theory to estimate their cost of equity, and therefore capital, to a far greater degree of accuracy than ever before. Is it time to throw away the old yardstick?

Beta Blockers

Introduced in 1963 by Stanford University professor William Sharpe, and building on the pioneering portfolio-optimization theory of Harry Markowitz, CAPM was designed to help investors develop a diversified portfolio of assets. (Both Sharpe and Markowitz won Nobel prizes for their work.) But CAPM also found its way into corporate offices as a standard formula for establishing minimum acceptable returns for capital allocation of all kinds, including acquisitions, product development, and restructuring projects.

The trouble is, CAPM isn't particularly well suited for corporate purposes, as both theorists and practitioners have come to acknowledge. "A square peg in a round hole" is how Tony D. Yeh, a principal in the San Francisco-based consulting firm Pacifica Strategic Advisors LLC, describes CAPM's application to hurdle rates. He's not alone. "I don't think there's any question that CAPM is not appropriate" to calculate hurdle rates, declares Robert Reilly, managing director of Chicago — based consulting firm Willamette Management Associates.

What's wrong with CAPM? Yeh, Reilly, and others say the model's basic flaw is the way it calculates the equity risk premium — the amount of return that equity investors require above and beyond the rate available on bonds.

In calculating this premium, CAPM relies on a measure known as beta, which multiplies the volatility of an asset's price by its correlation, or the degree to which the price moves in line with prices of other assets. The result works well when the goal is to select assets that serve to diversify a portfolio. After all, an asset's price may be hugely volatile but pose little risk for a diversified portfolio if it is totally uncorrelated to prices of other assets. (Indeed, a volatile asset will actually decrease a portfolio's overall risk if other assets' price movements are in exactly the opposite direction.)

But because of the way CAPM takes correlation into account, it fails to measure the overall risk of the asset — and by extension, the value of an investment in it. That, experts say, is a significant drawback for corporate managers, who are paid to ensure that a company's assets do better than match average returns. While it might once have made sense to consider each of a company's investments in terms of how it fit into a diverse portfolio, the current consensus is that managers should focus on investments that capitalize on a core business competency.

Sharpe himself disputes the notion that CAPM isn't suitable for setting hurdle rates. He says managers who focus on company-specific risk are likely to set hurdle rates too high, depriving investors of opportunities they would prefer that the company exploit.

Up Close and Flawed

Yet CAPM clearly produces some odd results. Look, for instance, at Atlanta — based home-improvement retailer Home Depot, which sported a beta of 1.6 in 1995. That figure suggested that the company's stock was more than half again as risky as the overall market and more than twice as risky as, for instance, Wolohan Lumber Co., a small competitor based in Saginaw, Michigan, whose beta was only 0.75 at the time.

Considering risk strictly on the basis of beta, however, would have missed the fact that Home Depot's profit margins were steadily rising while Wolohan's were shrinking. Three years later, in fact, both companies had a beta of 0.70. Whatever its virtues as a historical measure of risk, beta, as this and other examples demonstrate, has no particular predictive value.

As a result of beta's unreliability, many companies simply ignore CAPM, choosing an arbitrary hurdle rate based on a gut-level sense of what all of a company's various investments should earn. A former finance executive at Boston — based Gillette Co. says that until recently the shaving-products company adhered to a hurdle rate of 20 percent, no matter what type of project was under consideration.

Companies that do use beta frequently adjust their hurdle rates to reflect such factors as a company's size, financial leverage, and the specific type of investment involved. In fact, Willamette's Reilly says such adjustments are critical. "When you get to investment-specific issues," he says, "you have to apply some judgment."

That's clearly the tack taken by Stamford, Connecticut — based office-equipment maker Pitney Bowes Inc. Instead of one across-the-board rate, Pitney uses a range of 10 percent to 12 percent based on the returns the company has generated in the past and has led investors to expect, says Dessa Bokides, the company's treasurer. Within that range, it makes adjustments based on such considerations as where a particular business stands in relation to its cycle. But, says Bokides, the process doesn't involve "a huge mathematical calculation."

A New Option

Still, new methodologies based on options pricing aim to reduce the amount of judgment involved, and as a result are drawing more interest from finance executives.

One such approach has been dubbed the Market-derived Capital Pricing Model (MCPM). This model was formulated by Yeh and James J. McNulty, president of the Chicago Mercantile Exchange, and refined by William S. Schultz, a professor at the Weatherhead School of Management at Case Western University, and Michael H. Lubatkin, a professor at the University of Connecticut's School of Business.

Instead of relying on adjustments to beta, MCPM uses options-pricing models to estimate the equity risk premium from a stock's volatility. In other words, the two methods have a much different approach to measuring risk: whereas CAPM uses both volatility and correlation to gauge it, MCPM focuses on volatility alone. In addition, MCPM adds the risk premium to the estimated yield of a company's debt, instead of the risk-free rate on Treasuries, to obtain its cost of equity. (**Editor's note:** to read more on how MCPM is calculated, go to the sidebar at the end of this article.)

Yeh says a growing number of companies are employing the methodology to set hurdle rates, though he says he can't disclose their identities. Another consultant reports that Procter & Gamble expressed interest in applying the approach not long after a *Harvard Business Review* article on MCPM appeared, in 2002. Home Depot CFO Carol Tomé says her company uses both CAPM and an options-based approach to estimate its cost of capital, though she contends that setting hurdle rates under either is still "more of an art than a science."

Yeh nevertheless contends that MCPM is more useful than a CAPM approach, even after adjustments to beta. For one thing, he says, MCPM is forward-looking, based as it is on traded financial instruments, whereas CAPM uses historical market data. As a result, he says, MCPM gives corporate managers a sense of the returns that investors actually expect, rather than what they've received in the past (which, after all, is no guarantee of future performance). What's more, says Yeh, a company's cost of capital changes with the daily price of its equity, and that's reflected in the prices of options, bonds, and other financial instruments. In contrast, beta involves an unchanging or "static" estimate based on the historical time frame used to measure returns. And while that estimate varies with the

period chosen for analysis, any decision involving a historical period can't help but be arbitrary.

Critical Assumptions

The new methodology is not without critics. Willamette's Reilly, for one, points out that cost estimates based on either method must be taken with a large grain of salt, because both CAPM and MCPM make important assumptions about returns on equity. "The real question is how you make quantitative adjustments," he says.

Some critics go further. Assumptions about returns, whether based on history or on expectations, are so critical as to render measurements of volatility with or without market correlation insignificant, these critics say. And they suggest that CFOs are better off paying less attention to hurdle rates than to their expectations that investments will grow earnings. Home Depot, for one, spends more time questioning its assumptions about returns on capital than its cost. "Pick a number" for the latter, recommends Tomé, and then "grow the spread" between your returns and that number.

The issue, ultimately, comes down to just how big a difference in a given company's cost of capital the two methods will produce. Home Depot, for its part, has found that the difference isn't very significant, according to Tomé, "so why bother" spending much time on the question, she asks.

Elsewhere, however, Pacifica finds the cost of equity varies much more widely under the two methods. While, for example, the consulting firm found little difference in the case of Sears, Roebuck and Co.'s 10-year cost of equity-9.7 percent under CAPM compared with 9.5 percent under MCPM-much wider variations were found at its competitors, Wal-Mart Stores and Target, and among such computer makers as Apple and Gateway.

Whatever its merits, Pacifica's methodology is not without practical obstacles. It obviously isn't designed for small, privately held companies, and even many public companies lack options or bonds from which to derive a market-based calculation. Yeh responds that proxies for both are easy enough to find for most companies. Still, if a company has to compare itself with others to calculate its cost of equity under MCPM, it might as well adjust CAPM to take beta's flaws into account. "There's lots of judgment involved anyway," says Reilly.

Yeh concedes that MCPM is just a starting point for allocating capital. All he's really claiming is that the financial markets represent a better place to begin the process than CAPM. And finance executives of companies for which the two models produce widely varying cost estimates have good reason to put his claim to the test.

Sidebar: How MCPM Works

The methodology developed by Pacifica Strategic Advisors LLC to calculate the equity risk premium for purposes of estimating a company's cost of capital is based on five steps:

1. Calculate the stock's forward break-even price. To find out how well the share price must perform to compensate equity investors for their additional risk, Pacifica first determines the minimal capital gains that they will require over a given term to do as well as bondholders. That gain equals the yield on the company's debt minus any dividends likely to be paid during the period.
2. Estimate the stock's future volatility. Next Pacifica determines how likely it is that a company will fail to reach the break-even price. It does that by analyzing the prices of options on the company's stock, using an options-pricing model.
3. Calculate the cost of the risk implied. Pacifica then combines its estimate of volatility with the forward break-even price to determine the price investors would be prepared to pay to insure against the chances that their shares will fall below the forward break-even price. This premium reflects the extra risk of equity over debt.
4. Annualize the premium. Next, Pacifica expresses the dollar cost of that equity risk premium as an annual percentage.
5. Create a term structure of equity. Finally, Pacifica repeats the calculation for different intervals to create a term structure of equity, which it then uses with the corporate bond term structure to determine the appropriate weighted cost of capital for a given project.