Beta is the well-known risk coefficient in the capital asset pricing model (CAPM) for pricing stocks and other assets by William Sharpe, John Lintner and Jack Treynor. The three authors, coincidentally, were working on the same questions in the early 1960s. Sharpe’s paper was published first, but Lintner and Treynor discussed their work with him and, for various reasons, did not hit academic mainstream journals with their versions. Ironically, the Journal of Finance, initially rejected Sharpe’s paper because the editor felt that the assumption that all investors acted in the same way was “preposterous.” Merton Miller went to bat for Sharpe and eventually convinced the journal to publish what quickly became the same most-cited paper in finance.

The CAPM contends that a stock’s risk versus the market is the only risk that matters, since risk that is specific to the stock can, and should, be diversified away by investors seeking mean-variance efficient portfolios. Beta represents this measure of market risk, also called systematic risk. Alpha, the other coefficient of the model, represents stock-specific risk. High beta stocks have higher volatility than the market and, consequently, should have higher returns.

While that is the theory, a fairly large body of empirical evidence suggests otherwise. Value stocks—those with low price/earnings (P/E) and low price/book (P/B) ratios—have lower beta but tend to have higher returns than small stocks (which are the opposite: high P/E and P/B ratios, higher betas but lower returns).

CAPM uses mean-variance efficient portfolio selection and assumes unlimited borrowing and lending. It presents returns available to the investor for different levels of cash and securities, including negative cash (i.e., borrowing). The 100% invested point on the mean-variance efficient frontier represents the cap-weighted market index of all stocks. Efficient market theory evolved out of this construct, filling in the assumptions that rationalize the cap-weighted market’s position as the efficient portfolio.

The notion that returns go hand in hand with risk is at the heart of the model and is intuitively appealing. However, the theory doesn’t always hold up in practice—a realization that emerged not long after Sharpe’s paper in 1964. In particular, there was an exhaustive study by Fama and French that examined the NYSE, ASE and NASDAQ listed stocks between 1929 and 2006. It found there was almost no relationship between returns and beta.

From the behavioural investing perspective, James Montier sums it up: “There is an overwhelming amount of evidence that CAPM simply does not work.” CAPM woefully under-predicts the returns to low beta stocks and massively overestimates the returns to high beta stocks.” Montier’s own research found the same low beta and high returns in global, European and Japanese markets.

Theory and Practice

The likely reason that empirically observed betas differ from theory is the instability of betas over time. Two recent papers by Fama and French identify “migration” and “convergence” as evidence of the instability of betas. “Migration” appeared in the Financial Analyst’s Journal in June 2007; “The Anatomy of Value and Growth Stock Returns” appeared in the journal in December 2007.

Migration is used to describe the movement of stocks between factor categories: size (large cap and small cap) and style (value and growth). The related paper measures the returns from migration of stocks (similar data to the 2004 study: NYSE, ASE and NASDAQ stocks from 1927 to 2006). With respect to style migration, three factors contribute to the variance premium (i.e., value stocks outperforming growth stocks):

1. More value stocks surprised on the upside (“plus” transition).
3. When value and growth stocks did not migrate, value outperformed due to dividends.

Convergence is used to describe the movement or reversion to a mean of P/B ratios. One way to put this is that convergence is a cause of migration. The convergence paper and the migration paper provide evidence that betas change over time. The convergence paper differs from the first, though, because it examines the anatomy or causes of the migration. Using a data set of two other papers, it attributes the value premium to various factors—the dividend yield plus three capital factors: growth in book equity, convergence in P/B ratios and upward drift in P/B ratios.

The convergence paper found that, from 1964 onward, dividends contributed more to returns of value stocks than growth stocks and also more to large cap stocks than to small caps. Upward drift in P/B ratios is evident over the whole period but is a relatively small contributor to returns, compared to growth in book value of equity and convergence in P/B ratios. Overall, these papers offer fairly reasonable arguments as to why actual betas don’t fit with theory. Betas appear to be unstable over time, as low beta (value stocks) surprise investors on the upside and, in the process, move away from their status as value stocks. High beta (growth stocks) are more likely to disappoint and lose their lustre as growth stocks.

The Use of Beta

About four years ago, following the bursting of the tech bubble and the worst three years in U.S. equities since 1929, I wrote a brief article, “The Alpha vs. Beta Debate,” for Benefits Canada. That article discussed the general disappointment with alpha, the beta-adjusted residual, as in the above two strategies, may become problematic.

Hedge funds are often criticized for having hidden beta. Various studies have found that total returns can be decomposed into alpha, beta, bias and fees. The argument matters because hedge funds typically charge 2% management and 20% performance fees. Fees for beta, which is passively achievable, should be very cheap.

The instability of beta raises the question, Are measures of hidden beta accurate? Also, if betas are unstable, shouldn’t strategies that attempt to capture convergence deserve active fees? That article discussed the general disappointment with alpha, the beta-adjusted residual, as in the above two strategies, may become problematic.

Overall, while the limitations of beta are not new, the reasons for observed betas not fitting theory are somewhat new. The apparent instability of betas over time suggests some caution in strategies that use beta as a risk measure.

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