Industry Costs of Equity

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The authors conduct an empirical analysis of industry costs of equity by using the capital asset pricing model and a three-factor model and find great uncertainty in estimates of industry costs of equity. Imprecise estimates of risk factor sensitivities contribute to this variation, but uncertainty about market and factor risk premiums are even more important.

Analysts typically evaluate investment projects by comparing the present value of expected future cash flows with a project's initial outlay. In addition to deciding which asset valuation model to use, an analyst faces a lack of precision in estimating sensitivities to the model's risk factors and imprecision of measured factor risk premiums. The authors statistically analyze these problems and their implications for industry cost of equity (CE) estimates.

The authors apply the capital asset pricing model (CAPM) and their own three-factor model to monthly data on 48 U.S. industry groups for the 1963–94 period. The CAPM measure of an asset's risk is its beta coefficient—the slope of a regression of the asset's excess return on the excess return of the market. In addition to the market excess return, the three-factor model includes regression terms representing the difference in returns between small and large stocks—small minus big (SMB)—and between high- and low-book-to-market stocks—high minus low (HML).

Small average standard errors of regressions for the entire period indicate that both models estimate factor sensitivities precisely. This precision is misleading, however, because the estimates vary

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through time. For example, a two-standard-deviation rule results in a current cost of capital in excess of the risk-free rate that may be anywhere between 3.92 percent and 6.40 percent for an industry with a full-period CAPM beta of 1.0. CAPM market slopes are more variable than those estimated by the three-factor model, suggesting that the SMB and HML variables reduce CE variation. Conditional regressions on these variables confirm this result.

If risk factor sensitivities wander over time, a shorter time frame provides a better forecast estimate. If sensitivities are mean reverting, a longer time frame is better. The authors provide estimates using full-period regressions; three-, four-, and five-year rolling regressions; and three-factor model conditional regressions. They find that industry CAPM betas are mean reverting. Thus, full-period slopes provide a slight advantage in forecasting near-term and long-term CE estimates. In the three-factor model, mean reversion exists for some industries but not for others. Conditional estimates appear to identify permanent changes in sensitivities that are not found in full-period regressions. Even though conditional estimates provide slightly more accurate return forecasts, it is unclear which three-factor model regressions are better.

The three statistical approaches produce only small differences in risk factor sensitivities, but this finding may not be true for resulting CE estimates. CAPM CE estimates differ among industries only moderately. The three-factor model produces greater differences in CE estimates because the slopes of the SMB and HML variables differ among industries. Large differences in three-factor model CE estimates also occur between conditional and five-year rolling regressions. CAPM CE estimates may also vary considerably relative to those of the three-factor model. In some industries, CAPM and three-factor model differences are small. Large differences occur in growth industries, where the three-factor model assigns relatively low CE estimates, and in industries where returns co-vary with small-stock returns or behave like distressed stocks, where the three-factor model assigns relatively high CE estimates.

Varying sensitivities of risk factors clearly contribute to uncertainty about risk premiums and thus the cost of equity. If the mar-

ket risk premium were known with certainty, factor sensitivities would create substantial uncertainty in CE estimates. Variations in the market risk premium and the three-factor model SMB and HML risk premiums are an even greater source of variance in CE estimates. Assuming that industry CAPM betas and three-factor SMB and HML coefficients are known with certainty, standard errors of 3.0 percent annually are typical for estimates of CE. For example, the two-standard-deviation bounds for the CE of a project with a true CAPM beta of 1.0 are –0.26 percent and 10.58 percent. This uncertainty is further compounded by uncertainty as to the correct asset pricing model. The authors conclude that estimates of the cost of equity are "distressingly imprecise" and question whether a superior approach exists for valuing projects.