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Is co-skewness a better measure of risk in the downside than downside beta? Evidence in emerging market data

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Abstract

We define three measure of systematic co-skewness risk in a downside framework by extending three downside beta risk measures in the literature. In pricing models in a downside framework it may be sufficient to include a risk measure that accounts for co-semi-variance or co-semi-skewness and not both. Downside risk is appropriate when returns distribution is skewed—a common feature in emerging markets. A cross-sectional analysis provides evidence that downside co-skewness is a better explanatory variable of emerging market monthly returns than downside beta. Our conclusions remain largely unchanged when the analysis is subjected to various robustness checks.

JEL classification: G12; G15

Keywords: Beta; Downside risk; Skewness; Emerging markets

1. Introduction

The capital asset pricing model (CAPM) due to Sharpe (1964) and Lintner (1965) conveys the notion that securities are priced so that their expected return will compensate investors for their expected risk. Though the CAPM is still one of the most commonly used models of security price movement, researchers have strongly questioned the empirical validity of the assumptions

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underlying its derivation. Moreover, the CAPM performs poorly in empirical studies (Grauer, 2003). Among the reasons for the CAPMs failure are the assumption of a quadratic utility function and non-normal returns (Mills, 1995; Harvey et al., 2004).

In the mean–variance framework which the CAPM is built on, variance identifies extreme gains as well as extreme losses as undesirable. Advocating 'safety first' as the major concern of rational investors, Roy (1952) argues that investors would prefer the investment with the least probability of falling below a pre-specified acceptable return. Roy's concept of 'safety first' is thought to be instrumental in the suggestion that only downside risk may be relevant to an investor. A number of studies have investigated downside risk as a measure of security risk. First the concept of semi-variance that makes reference to a benchmark return emerged, and later several downside risk measures based on the semi-variance framework emerged. Semi-variance is applicable only when the portfolio return distribution is asymmetric (Nantell and Price, 1979).

Studies have revealed that downside beta has the potential to provide a better risk measure than CAPM beta and seems to be important for explaining the high average returns of small/value/winner stocks (Post and van Vliet, 2006). Estrada (2002), in a study of emerging markets, reveals that downside risk measures excel over the standard risk measures in explaining variability in the cross-section of returns. Pedersen and Hwang (2003) in an investigation of UK equity returns show that even though downside beta explains a proportion of equities in addition to the CAPM beta, the proportion of equities benefiting from using the downside beta is not large enough to improve asset pricing models significantly. Ang et al. (2004) observe that the cross-section of US stock returns reflects a premium for downside risk. They reveal that the reward for bearing downside risk is not simply compensation for CAPM beta, nor it is explained by characteristics such as co-skewness, size and momentum. Estrada and Serra (2005) conduct a multi-country study of individual stocks in emerging markets and find strong evidence in favour of downside beta over other measures of risk.

Downside risk is relevant only when the security returns distribution is skewed. When skewness of an asset returns distribution is negative, downside returns tend to be larger than upside returns. Therefore, investors with non-increasing risk aversion dislike securities with negative co-skewness with the market portfolio returns so that securities with low co-skewness tend to have high average returns. On the other hand, when the skewness of the security returns distribution is positive, upside returns will have a larger magnitude than the downside returns. Thus, when losses (gains) occur, they will be smaller (larger). Hence, investors prefer positively skewed markets and will be willing to pay a premium for positive co-skewness. Harvey and Siddique (2000) examine an extended CAPM that includes systematic co-skewness which is a standardized measure of co-skewness risk analogous to CAPM beta. They observe that a pricing model that incorporates conditional co-skewness enhances the cross-sectional variation in several assets returns and conditional co-skewness captures asymmetry in risk, in particular downside risk. Smith (2006) observes that both co-skewness and price of co-skewness risk is time-varying and that co-skewness is important in explaining the cross-section of asset returns.

Post and van Vliet (2006), while asserting that downside risk generally is not fully captured by skewness and kurtosis, report in their study of US stocks that the left tail of the return distribution explains asset prices and not the higher-order central moments. We investigate the issue of co-skewness as measure of risk in a downside framework. We argue that co-semi-variance and co-semi-skewness between security returns and market portfolio returns may be alternative measures of downside risk. In other words, in a downside framework it may be sufficient to include a measure that accounts for co-semi-skewness in the pricing model rather than a measure of co-semi-variance.