

“Estimating Systematic Risk: The return interval and estimation period issue: evidence from Malaysia 2000-2006”

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Abstract

Estimating the beta coefficient is central to the CAPM concept of rewarding the investors according to the systematic risk of an asset. However, while the concept is intuitively appealing, the estimation is biased by measurement issues such as thin trading, regression tendency, stability and choice of interval issues. While techniques have been developed to address the regression tendency, thin trading biases, no specific rules on the interval issues have been formulated. The trade-off between a longer estimation period for more observations and accuracy has to be weighted for a biased coefficient resulting from higher measurement errors. The results for this study provided support that daily returns provided the most efficient estimation in terms of smallest estimated coefficient errors but biased as any estimation period more than three years saw half of the sample experiencing a shift in their estimated beta.

Introduction

The Capital Asset Pricing Model states that the expected return of an asset is linearly related to its systematic risk (beta), the higher the systematic risk, the higher the required return. However, true beta is unobservable and need to be estimated. While estimating the beta of an asset is a straight forward regression of the market model, biases in estimating the beta coefficient could arise due to the regression tendency of betas to regress to the grand mean of one, thin trading of securities, time varying nature of the beta coefficients and the numerous return interval options available.

Common compensation of the above biases have been via the Blume and Vasicek techniques for the regression tendency, Scholes and Williams and Dimson techniques for the thin trading effect, and an estimation period of four to five years at monthly or

weekly intervals to address the stability issue. Unlike the other biases no specific techniques exist to compensate the return interval biases.

The optimal estimation period and return interval of the regression of an asset is not defined in the market model and the most common methodology is an estimation period of five years based on monthly returns. This is a measurement issue commonly known as the return interval issue.

Statistically true beta is estimated as lying within two standard errors of the estimated beta. Hence, the smaller the error of the estimated beta, the greater the reliability and confidence that we have the true beta in our estimate.

The issue requires a trade off between a longer estimation with more observation to improve estimation accuracy but this increases the likelihood that the estimated beta may not be relevant as the capital structure, business risk, core business and business operations may have shifted.

A shorter estimation period is more relevant to capture the latest systematic risk of the business, but too few observations leads to suspect unreliable results.

Literature Review

Literature investigating the return measurement issues includes Pogue and Solnik (1974) who examined the impact of varying the return intervals frequency over five years and seven European markets and suggested that beta measurement is dependent on the return interval with the ratio of monthly and daily beta being indicative of market efficiency.

Smith(1978) also showed that estimates of beta were influenced not only by the choice of interval but also the character of whether the estimated beta were aggressive or defensive.

Cohen, Hawanini, Maier, Schwartz and Whitecomb(CHMSW)(1983) argued that the market friction biased short term estimation and these should be adjusted for a long term asymptotic beta .

Larson and Moore (1987) applies a modified CHMSW technique for a similar conclusion in the Hong Kong market.