Research Proposal

Name of Student

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**Empirical tests of asset pricing models with individual assets: Resolving the errors-in-variables bias in risk premium estimation**

**Introduction**

An important aspect of the financial economics is that investors who take on systematic risk can earn a higher return on investment. This proposal will explore the magnitudes of such returns and identities of the systematic risk (E.Fama & K.French, 1993). To start the discussion, the CAPM and the arbitrage theory will be discussed. These theories help us to identify a large number of risk factors. It is important for the new risks to affect the risk premium.

We will use a two-pass regression model in which the first pass will be a time series model including a single asset returns on the factors identified. This will help us to estimate factor loadings or coefficients of regression models. The second part of the model use these coefficients for a regression model of cross section of assets and betas obtained in the first part. The components of the second regression model use betas from first pass regression to estimate true betas with errors. Thus, they present a problem known as errors in variables. The estimates taken from the second part of regression are biased without any knowledge of the direction of these biases especially when there are many factors involved in the regression analysis. A method used to minimize the EIV bias is to use portfolios of stocks rather than individual stocks in the analysis. The process will begin by making groups of assets which have different levels of risks. These portfolios will be identified by characteristics of the individual stocks. An example of such characteristic may be the betas estimated over a period of time. The portfolios beta can be estimated with more accuracy as compared to the individual stock’s beta so that the magnitude of error is lower (E.Fama & .Macbeth, Risk,return and equilibrium: empirical tests , 1973). There are certain shortcomings of this method. The power of regression model may be reduced because there is a lower level of dimensionality in the assessment. The explanatory variables in portfolios are lower in number as compared to the individual stock’s analysis. Assets with higher market values are overpriced and vice versa. Any portfolio using other criteria for grouping the assets can ignore such difference of prices in assets.

**Methodology**

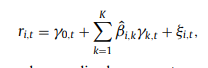
The ex post risk premiums will be consistently estimated by the independent variable estimator when there is a very large number of assets in the sample. The approach is called N-consistency and is a property of estimators. There will be some simulation experiments which will allow us to examine the small sample properties of the estimator. We will test whether there is a significant difference between the actual betas and the values attained from the short- and long-term time series data. The test size and power will also be tested with small and large samples.



The above model will show the K-factor asset pricing model for individual assets. This asset will earn a risk-free rate of return if risk free lending and borrowing is allowed. The first stage of regression analysis is undertaken with the help of following model.



This model shows the realization factor k for the time t. The second stage regression model will use the estimates of factor sensitivities as the independent variables to estimate factor-risk premiums. At any given time, t,



In order to analyze the small sample properties of the independent variable method, the following regression model will be analyzed.



The independent variable is the market excess returns. The following regression model will be used to analyze the first stage regression model for individual betas.



All these regression models will let us know the various properties of the IV tests in terms of size power and error terms (Jegadeesh, Noh, Pukthuanthong, Roll, & Wang, 2019).

# **References**

E.Fama, & .Macbeth. (1973). Risk,return and equilibrium: empirical tests . *Journal of political economy*, 607-636.

E.Fama, & K.French. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial Economics*, 3-56.

Jegadeesh, N., Noh, J., Pukthuanthong, K., Roll, R., & Wang, J. (2019). Empirical tests of asset pricing models with individual assets: Resolving the errors-in-variables bias in risk premium estimation. *Journal of Financial Economics*, 273-298.