

Measuring the Degree of Misspecification of Linear Factor Models with HJ Distance

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ABSTRACT

The composition of the factor, what model to examine the efficiency of financial markets has been the key to financial theory for a long time. According to semi-strong form efficient market definition, every investor in financial markets will use all available information he has to predict stock prices. Therefore in this definition, because investors can not get excess profits, that is, if we want to find out the real linear factor model that can represent the financial market, we must use the general method of moments described in Cochrane (2001) for statistical inferences. However, because in GMM numerical optimizing process, the weighting matrix will be continuously updated, models can not be compared with each other. This fact results in no consensus about what model can represent the true one in efficient market during the sample period. Thus we use the HJ distance statistic developed by Hansen, Heaton and Luttmer (1995) and Hansen and Jagannathan (1997) to do this research. We take the true stochastic discount factor of asset pricing model as unknown, and measure how far the distance is between the model's stochastic discount factor and the true one. This paper use four popular stochastic discount factors and compare their misspecification. Using the approaches of Heaton and Luttmer (1995) and Hansen and Jagannathan (1997) respectively, we design two kinds of null hypotheses. The first null hypothesis is that HJ distance is zero,

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and we use it to test if there is model misspecification. The second is that HJ distance is that of compared model, and we use it to test if the nested model is better than the null model. We use 30 industry-portfolios in the sample period from 1952Q2 to 2002Q3, and find that there is misspecification in four models all. The minimum misspecification among four models is three-factor one. However, the results of nested tests show that three-factor model is not significantly better than the two-factor model, so is two-factor model than one-factor model. To sum up, there do exist misspecification in linear factor models, so we can still improve them.

Keywords: HJ distance, Linear Factor Model, Model Misspecification

