Essays on Trading Strategies and Long Memory

A Dissertation
Presented to the Graduate School
of
University of Exeter
in Candidacy for the Degree of
Doctor of Philosophy
in
ECONOMICS

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February 2012

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.
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Abstract

Present value based asset pricing models are explored empirically in this thesis. Three contributions are made. First, it is shown that a market timing strategy may be implemented in an excessively volatile market such as the S&P500. The main premise of the strategy is that asset prices may revert to the present value over time. The present value is computed in real-time where the present value variables (future dividends, dividend growth and the discount factor) are forecast from simple models. The strategy works well for monthly data and when dividends are forecast from autoregressive models. The performance of the strategy relies on how discount rates are empirically defined. When discount rates are defined by the rolling and recursive historic average of realized returns, the strategy performs well.

The discount rate and dividend growth can also be derived using a structural approach. Using the Campbell and Shiller log-linearized present value equation, and assuming that expected and realized dividend growth are unit related, a state space model is constructed linking the price-dividend ratio to expected returns and expected dividend growth. The model parameters are estimated from the data and, are used to derive the filtered expected returns and expected dividend growth series. The present value is computed using the filtered series. The trading rule tends to perform worse in this case. Discount rates are again found to be the major determinant of its success. Although the structural approach offers a time series of discount rates which is less volatile, it is on average higher than that of the historical mean model.

The filtered expected returns is a potential predictor of realized returns. The predictive performance of expected returns is compared to that of the price-dividend ratio. It is found that expected returns is not superior to the price-dividend ratio in forecasting returns both in-sample and out-of-sample. The predictive regression included both simple Ordinary Least Squares and Vector Autoregressions.

The second contribution of this thesis is the modeling of expected returns using autoregressive fractionally integrated processes. According to the work of Granger and Joyeux(1980), aggregated series which are derived from utility maximization problems follow a Beta distribution. In the time series literature, it implies that the series may have a fractional order ($I(d)$). Autoregressive fractionally models may have better appeal than models which explicitly posit unit roots or no unit roots. Two models are presented. The first model, which incorporates an ARFIMA(p,d,q) within the present value through the state equations, is found to be highly unstable. Small sample size may be a reason for this finding. The second model involves predicting dividend growth from simple OLS models, and sequentially netting expected returns from the present value model.

Based on the previous finding that expected returns may be a long memory process, the third contribution of this thesis derives a test of long memory based on the asymptotic properties of the variance of aggregated series in the context of the Geweke Porter-Hudak (1982) semiparametric estimator. The test makes use of the fact that pure long memory process will have the same autocorrelation across observations if the observations are drawn at repeated intervals to make a new series. The test is implemented using the Sieve-AR bootstrap which accommodates long range dependence in

stochastic processes. The test is relatively powerful against both linear and nonlinear specifications in large samples.

Contents

List of Tables

List of Figures