



THE UNIVERSITY OF
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Department of Statistics

MASTER'S THESIS PRESENTATION

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Functional Coefficient Models for Statistical Arbitrage

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ABSTRACT

This thesis studies extensions in the estimation of first-order autoregressive processes and cointegrated systems. We emphasize applications to statistical arbitrage in financial markets. Dynamic Linear (State-Space) Models and Quantile Regression as extensions to classical estimation methods are investigated. Quantile Regression is primarily implemented as a diagnostic tool to assess cointegrating regression and autoregressive coefficient stability across quantiles. We show that applying State-Space methods to dynamically model cointegrated assets improves hedging efficiency and induces stationarity on the residual series when classical methods fail to do so. These results are consistent in both high-frequency and daily financial time series. The resulting residual series can then be adequately modeled via classical autoregression, quantile autoregression, or by state-space modeling to assess the stability of mean-reversion, conduct statistical inference, and develop strategies for trading or risk management.

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