



The University of Chicago
Department of Statistics

Master's Seminar

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**GARCH Local Approximation for Non-stationary Financial Data
Through 1958-2007 and Its Influence in Value at Risk**

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ABSTRACT

Local approximation is a useful way to deal with globally non-stationary financial data in practice. In this paper, I show that for certain time periods when market is unstable, GARCH model with local approximation established both adequacy and accurate prediction for the mean and volatility structure of the data. Exploring the DJIA index from 1958 to 2007, I compare the goodness-of fit and root mean square error between locally approximated short-term (ST) GARCH models and long-term (LT) GARCH models. The findings support my argument that short-term GARCH models (ST) excel in both model adequacy and prediction accuracy. Besides, the Value at Risk (VaR) for January 2008 is constructed from both ST and LT model statistics. It turns out that the VaR from ST models reflects the recent market instability better than the VaR from the LT models.