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Trend and Mean Reversion Modelling in a Market with Heterogeneous Investors:

A Dynamical Systems Approach

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Abstract

Periods of financial market instability and their effect on the economy have been repeatedly observed in history. Yet modelling the mechanisms at play has been a challenge for macroeconomic theory. This thesis investigates and applies a dynamical systems approach to modelling cycles in market valuations, assuming a heterogeneous market with fundamentalist and chartist investors. The model is investigated by performing stability analysis and simulation, and stability and bifurcation conditions of parts of the system are derived. Parameter spaces corresponding to regions with different behaviours of the model are identified. A system identification approach is then used to estimate the model on US economic data from 1952 to 2011. It is confirmed that the modelling approach is able to capture the cyclical nature of market valuation through Hopf bifurcations and non-linear effects, related to the proportions of chartists in the market. The estimation fit is calculated to be 85.25%, and out-of-sample forecasting successfully identifies the direction of changes in market valuation 75% of the time. The results demonstrate that this modelling approach provides some edge in forecasting economic and stock market cycles and could be a promising tool for financial industry practitioners and policy makers.