

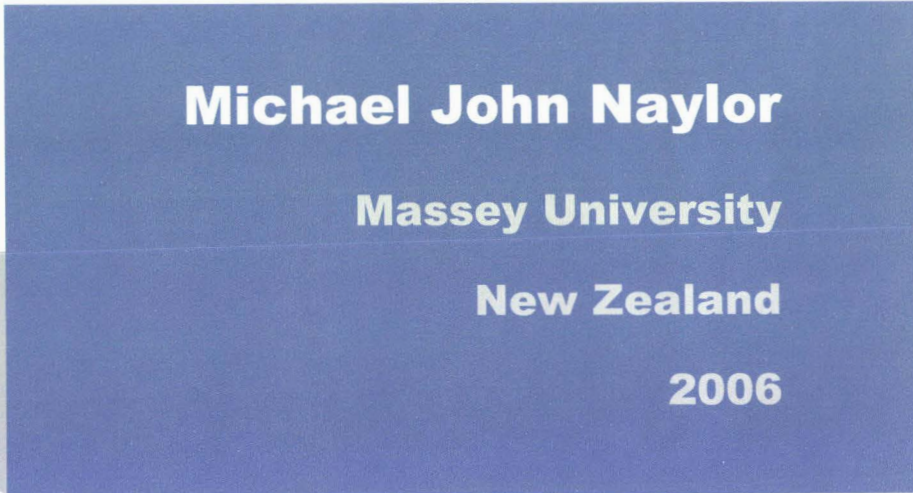
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A NETWORK TOPOLOGICAL APPROACH to CURRENCY CASCADES



**A thesis presented in fulfilment of the
requirements for the degree of
Doctor of Philosophy
in Finance**

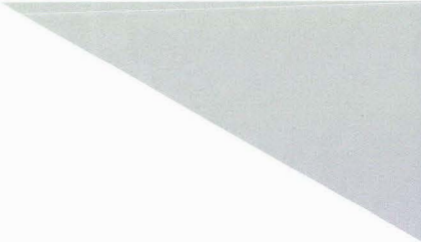


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Abstract

The stability of international financial markets is an important issue for academics and policymakers. Crises in currency markets have become increasingly common with the 1990s in particular experiencing major episodes of currency turmoil. The causation and frequency of these crises is a puzzle, especially for semi-free-floating currencies.

In this thesis recent currency crises are introduced and examined. Theories and methodologies which evolved in complexity and network sciences are then shown to have analogies to currency crises and to offer insights for finance. Common factors of recent currency crises are shown to be explainable using complexity and network sciences, and that price determinant influences exhibit characteristics of a complex network. An alternative approach to currency crises based on binary choices using an agent-based model in an explicit topological sparsely clustered network is proposed. This is shown to be capable of generating complex dynamics, including cascades.

A proxy topology of currency influences is then extracted from the international foreign exchange price matrix and shown to exhibit a robust taxonomy. This topology is then subjected to cascade simulation analysis. The results show that node threshold values and the density of external links are the key parameters in terms of cascade propagation. It is thus shown that a simple parsimonious model of trader interaction within a foreign exchange network can produce dynamics which are complex and contingent, and match the proposed stylised facts of currency crises. Policy issues flowing from these findings are discussed. The results increase our understanding of price dynamics in financial markets.

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