

# **A Currency Board Model of Hong Kong**

January 2002

**Yue Ma**

Economics Department, Lingnan University

**Guy Meredith**

International Monetary Fund

and

**Matthew S. Yiu**

Hong Kong Institute for Monetary Research

## **Summary**

The need for a deeper understanding of Hong Kong's currency board arrangements was highlighted during the Asian financial crisis in 1998. A model-based approach built on hypothetical stochastic simulations would be useful for this purpose. Our paper serves three roles. The first is to formally present the currency board model of Hong Kong initiated by Meredith (1999). Secondly, it develops a new stochastic simulation procedure for a nonlinear model with forward-looking expectations under conditions of non-certainty-equivalence. Thirdly, it applies the new simulation procedure in the context of stochastic simulations of the currency board model.

It is generally recognised that it is difficult to conduct stochastic simulations on a nonlinear model with forward-looking expectations. Most of the existing literature implements stochastic simulations under the 'certainty equivalence' assumption. The simulation treats agents *as if* they believed that no shocks would occur in the future. Their expectations are then formed on the basis of the deterministic levels of the model's predictions, as opposed to the stochastic means. While the two will be the same in a linear model, they can be quite different in the presence of nonlinearities.

This paper develops a new procedure for implementing stochastic simulations under conditions of non-certainty-equivalence, such as the currency board model of Hong Kong. Our procedure can be regarded as a generalisation of the solution methodology for linear rational expectations model to nonlinear model, where we are approximating the analytical solution with the regressions, rather than solving for it exactly. A simple target-zone model of the exchange rate is used as an example to illustrate the difference between our new simulation procedure and existing procedures in the literature. Finally, the new procedure is applied to the currency board model to investigate the stochastic properties of endogenous variables under a wide range of shocks.

This new simulation procedure would allow a deeper understanding of the operation of currency board arrangements, which has important policy implications for the design of the arrangements in the context of a more volatile financial environment.