

# Essays on Learning in International Macroeconomics

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## **Declaration**

The contents of thesis are the results of original research and have not been submitted for a higher degree to any other university or institution. Except where otherwise indicated, this thesis is my own original work except where due reference is made in the thesis.

Kang Yong Tan

20 January 2006

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To my parents and Ling Chin

## **Abstract**

The objective of this thesis is to explore the feasibility of learning as an alternative explanation for phenomena observed in international macroeconomics. There are two main areas of applications. The first part of the thesis (Chapters 2 to 4) deals with the effects of adaptive learning (Evans and Honkapohja, 2001) in the transmission of shocks across borders. In particular, learning has been introduced to two major classes of models, and these are the Mundell-Fleming Dornbusch and McKibbin-Sachs Global models. The second part of the thesis (Chapters 5 to 6) begins by examining the learning behaviors of international creditors about the credibility of an exchange rate regime using reputation game theory. Using the Pooled Mean Group methodology, this part also conducts an empirical analysis to investigate how creditors learn about the credibility of gold standard adopted by a country during the pre-World War I era.

Chapter 1 provides a literature review on various learning theories and discusses its scope of applications in international macroeconomics. Chapter 2 examines adaptive learning in multivariate models. The learning literature has mainly focused on reduced form model involving forward-looking expectational variables. Here we analyze learning within a bivariate model and examine how E-stability conditions and real time learning respond in nonstochastic and stochastic models. This Chapter also

contributes to the adaptive learning literature by conducting various robustness and sensitivity checks (initial conditions, nature of shocks, choice of gain sequences and choice of learning algorithms) to evaluate their performance in matching the rational expectations benchmark.

Chapter 3 investigates the effects of learning in the modelling of inter-country linkages within a symmetric two-country Mundell-Fleming Dornbusch model. The domestic and cross-border consequences of four types of persistent and permanent shocks (monetary policy, demand shock, supply shock and exchange rate risk premium) were examined. For the shocks considered, learning result in significant relative deviations from rational expectations in the short run. Learning has also led to excessive volatilities during the transition period. These results are however sensitive to the choice of initial conditions and gain sequences in the recursive least squares algorithm.

Chapter 4 extends this framework to study the international transmission of shocks within a two-country symmetric MSG3 model. This model has more complexity and realism as it involves further disaggregation of sectors. Further there are more forward-looking variables including nominal exchange rate, Tobin's  $q$  of various sectors of production, and human wealth. We investigate the propagation mechanism within and across borders for various shocks within the United States: changes in monetary policy (inflation target shock); a demand shock (fiscal policy); a supply shock (productivity); and a change in the equity risk premium. Adaptive learning is found to change the short run sign of transmission in each case except the mone-

tary/inflation target shock. An important aspect of the change in the transmission of shocks between countries is the role of asset markets.

On the choice of exchange rate regime, Chapter 5 examines the original sin problem, that is, the inability of countries to borrow in domestic currency terms. This Chapter examines how the choice of fixing the exchange rate is able to signal financial probity and influence the currency composition of debt. To examine the interaction between a country's reputation and past track record of successful borrowing from international capital markets, reputation game theoretical approach was adopted. Bayesian learning methodology was used to model the updating of creditors' perceptions on the type of policymakers that they are dealing with. The hysteresis effect generated by collective reputations suggests that a substantial amount of time is required for policymaker to build reputation for borrowing in domestic currency terms.

Chapter 6 explores the determinants of sovereign bond yield spreads in the London market during the pre-World War I gold standard era. Following Obstfeld and Taylor (2003), a cross-country panel dataset of twenty-two countries, spanning the period 1872 to 1913, was assembled. Using the Pooled Mean Group methodology, the gold standard as a policy regime serves as a short hand device that facilitate the gain of trust of international creditors. Since this conveys better information to investors, gold standard allows country risk to be priced more effectively. The result also suggests that investors pay significant attention to fundamental factors in the

determination of a country's creditworthiness in the long run instead of the exchange rate regime adopted.



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