Interest Rates and Asset Prices under Financial Liberalization

Jingxian Hu • Boise State University

Introduction

Financial liberalization introduces uncertainty into open economies through the fluctuations of the exchange rates, the asset prices, and the international capital flows across borders. This uncertainty has become a great concern for the stability of open economies. As the financial markets deepen, higher borrowing capacities and leverages further amplify the effects of this uncertainty.

This paper studies the determination and the dynamics of interest rates, equity prices, bond prices, and exchange rates under the financial liberalization and development, as well as the cyclicality of monetary policy to financial risks in an uncertain international financial market.

Model

To answer the questions introduced above, I construct a two-country general equilibrium model in continuous time.

Agents in both countries hold endowment claims, money, domestic government bonds, and foreign government bonds. The tax rate on capital outflows reflects the level of capital account openness. The ratio of total liabilities to total assets measures the level of financial development.

Money is introduced into the model via the Cash-in-Advance constraint. Central banks are monetary-fiscal authorities. They issue the sovereign bonds, purchase and sell the sovereign bonds through the open market operations, and set the interest rates in the inflation-targeting regime. Money grows at the rate δ_t and the central banks transfer the seigniorage to the agents.

To capture the non-stationarity of the asset prices and the exchange rate, this paper assumes that the asset prices and the exchange rate follow the geometric Brownian motion processes.

In equilibrium, the markets for consumption goods, endowment claims, and international bonds clear. The aggregate wealth equals the value of the endowment claim. The balance of payment holds in each country.

The exchange rate, as the state variable of the model, is solved as the relative wealth level of two countries in equilibrium.

Main Findings

Exogenous and Endogenous Risks

Take the domestic equity price as an example:

$$\frac{dQ_t}{Q_t} = \mu_Q(E_t)dt + \sigma_Q(E_t)dZ_t$$

- Z_t is a Wiener process. It is the exogenous driving force of the uncertainty.
- $\sigma_Q(E_t)$ is a function of the state variable of the model, the exchange rate. It can be solved endogenously within the model.

Uncovered Interest Rate Parity

- UIP-Floating Exchange Rate Model

$$\frac{\mu_Q + \frac{Y_t}{Q_t}}{\sigma_Q} = \frac{i_t - \pi_t - \sigma_P(\sigma_B - \sigma_P)}{\sigma_B - \sigma_P} = \frac{\mu_E + i_t^* - \pi_t^* + (\sigma_E - \sigma_{P^*})(\sigma_{B^*} - \sigma_{P^*})}{\sigma_E + \sigma_{B^*} - \sigma_{P^*}}$$

- UIP-Fixed Exchange Rate Model

$$\frac{\mu_Q + \frac{Y_t}{Q_t}}{\sigma_Q} = \frac{i_t - \pi_t - \sigma_P(\sigma_B - \sigma_P)}{\sigma_B - \sigma_P} = \frac{i_t^* - \pi_t^* - \sigma_{P^*}(\sigma_{B^*} - \sigma_{P^*})}{\sigma_{B^*} - \sigma_{P^*}}$$

- UIP-Sticky Price Model

$$\frac{\mu_Q + \frac{Y_t}{Q_t}}{\sigma_Q} = \frac{i_t}{\sigma_B} = \frac{\mu_E + i_t^* + \sigma_E\sigma_{B^*}}{\sigma_E + \sigma_{B^*}}$$

Equilibrium Interest Rates

Allowing the exchange rate to float provides a mechanism to stabilize the interest rate.

- When exchange rates float, capital account openness increases the real interest rate in equilibrium, whereas financial development lowers the equilibrium real interest rate.
- In the fixed exchange rate model, financial development increases the equilibrium real interest rate.

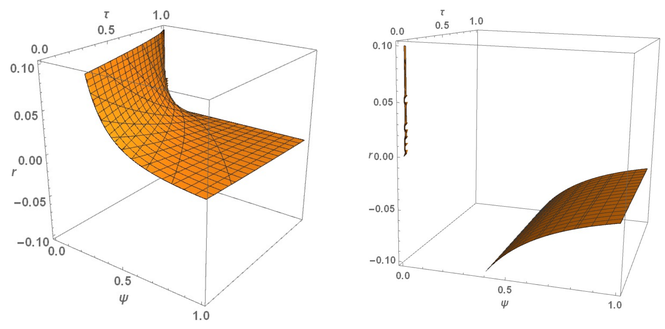

Fig 1. Floating Exchange Rate Model (Left) and Fixed Exchange Rate Model (Right)

Markov Equilibrium

In the Markov equilibrium, asset prices are functions of the state variable, and its law of motion is solved in equilibrium. The differential equations of asset prices are solved as the boundary value problems. The stationary distribution of the state variable is simulated with the numerical method.

Asset Prices and Exchange Rates

The liberalization of capital account and the development of financial market decrease the volatilities of equity price and bond price, and make the home currency appreciate at the stochastic steady state.

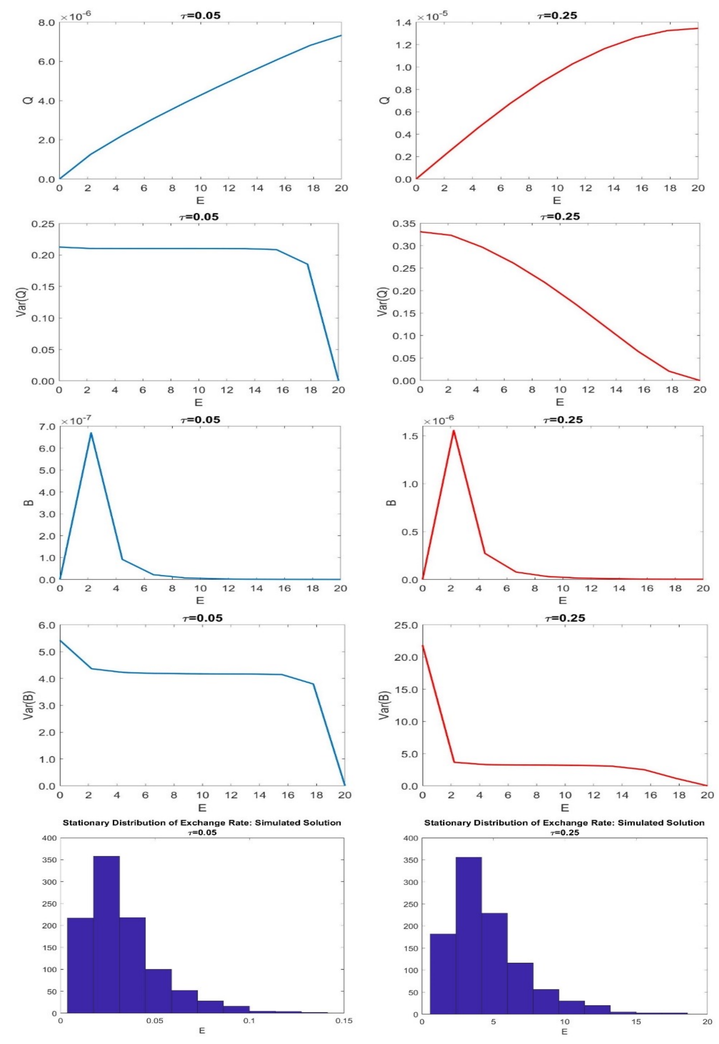

Fig 2. Comparative Statics
(Effects of the Capital Account Openness)

Implications for the Trilemma

Proper reactions to the financial risks make central banks less constrained by the Mundell-Fleming trilemma and leave space for the policy rate adjustments under both exchange rate regimes.

The policy rate is negatively correlated with the foreign bond price volatility, the exchange rate volatility, and the volatilities of domestic equity price and bond price.

Conclusions

This paper provides a novel view to understand the role of risks and uncertainty in the exchange rate and asset prices during the process of financial globalization. In contrast to the view of capital controls and the fear of floating, I emphasize the importance of modeling and estimating the endogenously determined financial risks using computational methods. With the knowledge of financial risks, the monetary policy can better serve the goal of maintaining the macroeconomic stability.

Further Information

Comments and questions are welcome. Please contact Jingxian Hu at jingxianecon@gmail.com.