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Stock markets and the real exchange rate: An intertemporal approach

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Abstract

We study the role of financial markets in the dynamics of the real exchange rate. To do so, we develop a model with stock markets, and we derive a closed-form solution for the real exchange rate. This solution stresses that a country's financial structure affects its real exchange rate, as well as the volatility of this exchange rate. We also contrast other implications of the model with the Balassa–Samuelson effect and with the prediction of traditional Keynesian models.

JEL classification: F30; F31; F32; F41

Keywords: Real exchange rate; Stock markets; Risky assets; Risk-sharing; Balassa–Samuelson effect

1. Introduction

Given the extraordinary developments in financial markets in recent years, one would expect the stock market to play a role in the determination of the real exchange rate (RER). Yet there are surprisingly few models in the literature that deal with this issue.[1] The goal of this paper is to contribute to filling this gap.

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[1] To the author's knowledge, there exists no N-country-model with incomplete markets and endogenous risky asset prices that offers a closed-form solution for the real exchange rate.

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We construct a model with stock markets, and we derive a closed-form solution for the real exchange rate. We use the framework developed by Davis and Willen (2000) and Davis et al. (2000). It allows for a given number of risky assets, which form an incomplete market. Risky asset prices and their allocations across countries are determined endogenously. The RER of a country relative to another country is defined as the relative price of their nontraded goods. The price of nontraded goods in a country increases when the country's marginal utility for traded goods decreases. Therefore, anything which increases a country's consumption in tradables increases its RER. What affects a country's consumption in tradables? In our model, several things do.

First, countries with higher current or future outputs in tradables consume more tradables. They therefore have an appreciated RER. We discuss this prediction of the model, and we show that it is similar to a dynamic version of a Balassa–Samuelson effect.

Second, a country's financial structure affects its consumption of tradables and therefore its RER. We show that countries whose financial assets provide more risk-hedging benefits to the world have an appreciated RER. Also, the more risk-hedging benefits a country can derive from international financial markets, the higher its RER.

Finally, larger income on a country's net foreign position increases its consumption in tradables, and therefore its RER. We contrast this prediction to that of traditional Keynesian models.

We also analyze RER volatility. We find that asymmetries in the financial structures of two countries increase the volatility of their RER.

The remainder of the paper is organized as follows: Section 2 presents the model; Section 3 gives the solution for the RER; Section 4 discusses the determinants of the RER; Section 5 analyzes the volatility of the RER; and Section 6 concludes.

2. The model

The model is a stock-market-augmented version of a consumption-smoothing story. We use the framework developed in a different context by Davis and Willen (2000), and Davis et al. (2000).[2] A country's representative agent (RA) receives two stochastic endowments at each period: one in tradable goods (T), and one in nontradables (NT). The agent uses all financial instruments at her disposal to maximize her expected intertemporal utility. These financial instruments include an arbitrary number of risky assets, as well as a risk-free bond.

Using the tradable good as numéraire, and writing δ as the rate of time preference, the program of the agent is the following:

$$\underset{\left\{c_{\mathrm{T},t};c_{\mathrm{NT},t};\omega_{0,t};\omega_t\right\}_{t=0}^{+\infty}}{\mathrm{Max}} U(C)=E_0\left\{\sum_{t=0}^{+\infty}\delta^t\left[u(c_{\mathrm{T},t})+v(c_{\mathrm{NT},t})\right]\right\},$$

under the budget constraints : (1)

$$c_{\mathrm{T},t}+p_{\mathrm{NT},t}c_{\mathrm{NT},t}+\omega_{0,t}+\sum_{j=1}^{J}\omega_{j,t}=y_{\mathrm{T},t}+p_{\mathrm{NT},t}y_{\mathrm{NT},t}+R_0\omega_{0,t-1}+\sum_{j=1}^{J}R_{j,t}\omega_{j,t-1}$$

(we have the initial conditions: $\omega_{0,-1}=\omega_{j,-1}=0$).

[2] Willen (2005) also develops a two-period version of the model.