ELSEVIER

Journal of International Money and Finance
21 (2002) 957–980

Journal of International Money and Finance

www.elsevier.com/locate/econbase

Incomplete markets, borrowing constraints, and the foreign exchange risk premium

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Abstract

This paper solves a model consisting of two monetary economies with incomplete markets, in which agents are subject to borrowing constraints. The paper investigates if such a framework is able to account for the volatility and the size of the foreign exchange risk premium. The model succeeds in increasing substantially the volatility of the risk premium to about 30% of that in the data. However, this more volatile risk premium does not translate into sufficiently large predictable excess returns. It thus appears unlikely that excess returns from currency speculation can be uniquely explained by a time-varying risk premium in an incomplete-markets economy with exogenous borrowing constraints.

JEL classification: F31; G12; D52; D58

Keywords: Foreign exchange risk premium; Asset prices; Incomplete markets

1. Introduction

A well-known fact in international economics is that forward exchange rates are biased predictors of expected future spot rates and that there are consequently predictable excess returns from currency speculation. A large body of literature documents that these predictable expected returns, although small, are highly volatile and serially correlated. Two main approaches have been offered to explain this feature of the data, but, to date, no consensus has emerged. The first approach assumes that

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0261-5606/02/$ - see front matter
PII: S0261-5606(02)00016-5

agents are risk-neutral and explains the bias by systematic forecast errors on the part of the traders (Lewis, 1989; Frankel and Froot, 1987; Tornell and Gourinchas, 1996). The second avenue retains the assumption of agents' rationality and explains the expected excess returns by the presence of a time-varying risk premium. This approach has had only limited success. Specifically, Arrow–Debreu economies composed of a moderately risk-averse representative agent with time-separable preferences generate risk premiums that have nearly no variance (see Macklem, 1991; Engel, 1992; Bekaert, 1994).[1] Their failure stems mainly from their inability to generate enough variability in an agent's intertemporal marginal rate of substitution (IMRS). In general, this lack of variability leads the models to fail the test proposed by Hansen and Jagannathan (1991), in which the ratio of the standard deviation of the IMRS to its expected value has to be greater than the estimated Sharpe ratio[2] of any zero net investment portfolio. For instance, Bekaert (1994) shows that a coefficient of relative risk aversion of at least 50 is necessary for his complete-markets framework to pass the Hansen–Jagannathan test.

This paper investigates whether the presence of undiversifiable risks, in a general equilibrium two-country monetary model in which markets are incomplete and agents face borrowing constraints, can generate foreign exchange risk premia that are consistent with the forward discount puzzle. The inability to insure fully against idiosyncratic risk implies that the agent's IMRS becomes more volatile. The model incorporates two endowment economies, composed of a continuum of (types of) infinitely lived agents facing both aggregate uncertainty, in the form of aggregate income and money growth rate shocks, and idiosyncratic income shocks. To provide an upper bound on the potential of the framework to account for the features of excess returns from currency speculation, I study the particular case in which agents cannot borrow to smooth their consumption. The paper shows that introducing uninsurable idiosyncratic risk drastically increases the market price of risk and the standard deviation of the risk premium, the latter to about 30% of that in the data. However, notwithstanding this significant increase in the volatility of the risk premium, the model is unable to account for the predictability of excess returns in the data. The introduction of uninsurable idiosyncratic risk is shown to also increase the covariance between the risk premium and the expected depreciation rate, cancelling out the effects of the higher volatility of the risk premium on the predictability of excess returns.

Recently, other papers have followed different approaches to resolve the puzzle through the presence of a risk premium. Compared with the standard framework, these papers generally have more volatile risk premiums, but they are unable to replicate the volatility that the risk premium shows in the data. This paper reaches

[1] Empirical tests of general equilibrium models with complete markets have also been unsuccessful in uncovering a time-varying risk premium (see Hodrick, 1987; Engel, 1995 for surveys of the literature).

[2] The Sharpe ratio is the ratio of the expected return to the standard deviation of the return, $\frac{E(r)}{\sigma(r)}$. The ratio of the standard deviation of the IMRS to its expected value, $\frac{\sigma(\text{IMRS})}{E(\text{IMRS})}$, is also called the market price of risk.