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Review paper

Foreign currency debt, risk premia and macroeconomic volatility

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ABSTRACT

This paper studies the relationships between foreign currency debt, macroeconomic volatility, and risk premia in a model of a small open emerging market economy. The external value of the local currency is counter-cyclical, so that foreign currency debt requires larger repayments than local currency debt in bad states of nature. The level of foreign currency-denominated debts, therefore, affects the volatility of aggregate demand and by extension of the exchange rate. Exchange rate volatility is in turn an important determinant of the risk premium on local currency debt. Finally, this risk premium is a major factor in the choice of local versus foreign currency for emerging market borrowers. The mutual endogeneity of foreign currency debt, risk premia, and macroeconomic volatility creates important feedback effects in the economy: small increases in international risk aversion may entail large amplification effects on macroeconomic volatility since domestic borrowers substitute towards cheaper but riskier foreign currency debt finance.

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1. Introduction

The turmoil in international markets in the aftermath of the Great Financial Crisis of 2008 has served as a stark reminder of the dangers of foreign currency-denominated debts. Many emerging economies in Eastern Europe had accumulated large debts in foreign currency during the preceding decade. When boom turned to bust, they experienced severe current account reversals, precipitous declines in economic activity, and strong pressure on their exchange rates.

Foreign currency-denominated debts may amplify the response of an economy to macroeconomic shocks because their value is counter-cyclical to the aggregate state of the economy. However, at the same time, macroeconomic volatility is an important factor in determining the portfolio choice of a country. This implies that it is essential for a comprehensive understanding of the macroeconomic dynamics of emerging market economies to account for the mutual endogeneity of their external debt structure and macroeconomic outcomes such as exchange rate volatility and risk premia.[1] Such an understanding is especially important for policymakers who aim to deepen local currency bond markets in order to make their economies less vulnerable to financial instability (Burger et al., 2009).

This paper develops a simple model of the currency denomination of debts in a small open emerging market economy that takes into account the mutual endogeneity of the country's external debt structure and of macroeconomic outcomes, specifically the volatility of aggregate demand, exchange rates, and the risk premium on local currency debt. We assume the country has access to two internationally traded assets, a bond denominated in foreign currency and a bond

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[1] See, e.g. Devereux and Sutherland (forthcoming) and Tille and van Wincoop (2010), who develop DSGE models that endogenize countries' portfolio choices.

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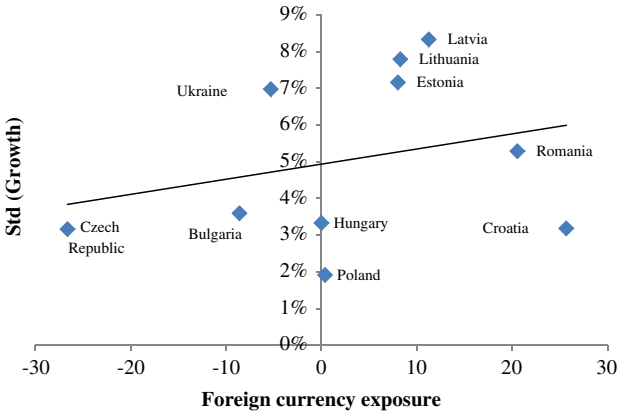

Fig. 1. Foreign currency exposure and macroeconomic volatility.

denominated in local currency, capturing the dominance of debt finance in international capital flows. An integral element of international debt contracts is that one party has to carry exchange rate risk. If the contract is denominated in foreign currency, the emerging market agent carries this risk, which is counter-cyclical and, therefore, aggravates the impact of aggregate shocks on the agent.[2] If the debt contract is denominated in local currency, international lenders carry the risk and demand a risk premium to compensate them. Naturally, this risk premium is endogenous to the level of macroeconomic volatility.

Fig. 1 depicts the average foreign currency exposure of the financial system as well as the standard deviation of output growth for a set of Eastern European countries over the period of 1998–2009.[3] While the figure does not imply causality, it suggests that higher foreign currency exposure in a country is generally associated with greater output volatility.

The setting in which we analyze this problem is a model of a small open emerging market economy with two goods, tradables and non-tradables, the relative price of which represents the real exchange rate. There are two time periods, labeled 0 and 1. In period 0, a representative domestic agent allocates a predetermined level of debt held with large international lenders between local currency (linked to the relative price of non-tradable goods) and foreign currency (linked to the price of tradable goods). In period 1, he receives an endowment of tradable and non-tradable goods. An aggregate shock affects the endowment in the tradable sector, and the exchange rate adjusts in order to equilibrate demand and supply.

In case of a negative shock, for example, tradable goods become relatively scarcer and the relative price of tradables to non-tradables rises, i.e. the real exchange rate depreciates. Hence the repayments on local currency debt fall in parallel with aggregate demand, and this provides insurance against consumption risk. The repayments on foreign currency debt, on the other hand, are fixed in terms of tradable goods, i.e. they rise in terms of the composite consumption good when the exchange rate depreciates. If domestic agents have borrowed in foreign currency and a negative shock hits, the large repayments reduce domestic supply of tradables further, leading to an amplification of the initial shock and a further decline in the exchange rate. In case of a positive shock the opposite results apply. Foreign currency debt, therefore, results in an amplification mechanism that endogenously increases the volatility of domestic consumption and of the real exchange rate in period 1.

Our analysis proceeds by backward induction: First, we analyze the macroeconomic implications of a given debt structure in period 1. Since exchange rates are counter-cyclical, foreign currency-denominated debts entail high repayments in low states when exchange rates depreciate, which aggravates the impact of negative economic shocks, and low repayments in high states when exchange rates appreciate, which amplifies the boom that results from positive economic shocks. In short, the greater the fraction of debt denominated in foreign currency, the higher the impact of a given output shock on aggregate demand and the higher macroeconomic volatility. This in turn raises exchange rate volatility and by extension the risk premium on local currency debt that international lenders charge.

Furthermore, these relationships are convex, i.e. the volatility-enhancing effects of foreign currency debt exhibit increasing returns to scale: each additional unit raises the variance of the payoff of the existing stock of debt plus adds a new unit of foreign currency debt. We also show that there exists a natural foreign currency debt limit: as the amount of foreign currency debt in the country's portfolio approaches that limit, macroeconomic volatility in the economy diverges towards infinity.

[2] Calvo and Reinhart (2002) document that emerging markets exhibit 'fear of floating,' i.e. they attempt to mitigate exchange rate fluctuations so as to reduce the effect of shocks on macroeconomic volatility. However, even if nominal exchange rates are fixed, countries experience fluctuations in their real exchange rates, with important welfare implications. Furthermore, interventions in nominal exchange rates are often subject to limitations in both directions, as e.g. Argentina and China have witnessed over the past decade.

[3] The foreign currency exposure of the financial system measures the unhedged foreign currency exposure of all banks operating in the country (i.e. the sum of foreign currency liabilities and foreign currency lending to unhedged domestic borrowers minus foreign currency assets) as a percentage of total bank assets. The data were obtained from Rancière et al. (2010).

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