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Foreign debt supply in an imperfect international capital market: Theory and evidence

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ABSTRACT

We investigate the determinants of foreign borrowing costs in a stochastically growing economy. We find that these increase with the debt-wealth ratio, depending also upon the volatilities of domestic and foreign origin, and the length of debt contract. In addition, the sensitivity of the short-term debt supply to the debt-wealth ratio exceeds that of long-term debt, and the effects of volatility on the borrowing premium, growth of wealth, and its volatility, depend on the relative size of a direct effect and a secondary portfolio-adjustment effect of the initial shock, as well as the length of the debt contract. Panel regressions suggest that the empirical evidence generally support the theoretical predictions.

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1. Introduction

The basic macrodynamic model of a small open economy typically assumes that the country has unrestricted access to a perfect world capital market, so that it can borrow or lend unlimited amounts at an exogenous constant world interest rate. If, in addition, one invokes the conventional assumption of a fixed constant rate of time preference, these two exogenous constants must in fact be equal in order for an interior equilibrium to prevail. This imposes a stringent "knife-edge" condition on the economy, one that has several important ramifications; see e.g. Turnovsky (2002), Schmitt-Grohé and Uribe (2003). For example, it leads to an extreme form of "consumption-smoothing", and has the further consequence that a temporary structural change or policy shock may have a permanent effect;

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see e.g. Sen and Turnovsky (1989). It also has profound implications for the long-run viability of tax policy; see e.g. Frenkel et al. (1991) and Turnovsky (1997, chapter 6).

Quite apart from the unpalatable practice of imposing equality upon two seemingly unrelated and independent structural parameters, the assumption that a small economy can borrow or lend unlimited amounts indefinitely in international markets at a constant rate is implausible. At some point the economy will cease to be "small" and its decisions will influence the world capital market. Accordingly, beginning with an early paper by Bardhan (1967), economists have periodically imposed a relationship between the rate at which a country can trade financial assets and its net asset position, thereby breaking the knife-edge constraint noted above.[1] The effect of this is to introduce a borrowing premium, which essentially serves as a proxy for the country's default risk. Various specifications of this relationship can be found. Several authors follow Bardhan's original specification and assume that the premium depends upon the *level* of debt; see e.g. Obstfeld (1982), Bhandari et al. (1990), and Fisher (1995). However, as originally argued by Sachs and Cohen (1982) and Sachs (1984), a more appropriate measure reflecting the country's ability to service its debt, is to assess the debt relative to some measure of earning capacity, such as its wealth, capital stock or level of output. Moreover, normalizing in this way becomes necessary if one wishes to incorporate increasing debt costs in an equilibrium of ongoing growth; see e.g. van der Ploeg (1996), Turnovsky (1997), and Turnovsky and Chattopadhyay (2003); see also Mendoza and Uribe (2000), and Sendhadji (2003).

Underlying these specifications is the potential for default risk of highly indebted economies. The issue of sovereign default risk and debt repayment stems from the seminal work of Eaton and Gersovitz (1981, 1989). Emphasizing the difference between sovereign default and bankruptcy of an individual agent, they present a debt repayment function in which lenders establish a credit ceiling that prevents borrowers from repudiating the debt. Similarly, many researchers focus on the sovereign government's trade off between default and lender-enforced penalties, such as a ban from international credit market (Grossman and van Huyck, 1988), seized assets abroad, or future trade barriers (Bulow and Rogoff, 1989).

The upward-sloping supply of debt function has been employed in a variety of contexts. These include: an analysis of the terms of trade shocks (Obstfeld, 1982; Eicher et al., 2008), international term structure of interest rates (Fisher, 1995), economic growth (van der Ploeg, 1996; Turnovsky and Chattopadhyay, 2003) and foreign aid (Chatterjee et al., 2003). The idea of inelastic debt supply curve is also applied in the models of financial crisis episodes in less developed countries. Duffie et al. (2003) model the pricing of sovereign debt focusing on the yield spread. Eicher et al. (2001) show that financial market liberalization alone can generate sharp reversals in foreign capital flows if short-term debt supply is more inelastic than is long-term debt. Rodrik and Velasco (2000) provide a theoretical and empirical analysis of the effects of socially excessive short-term capital flows as a cause of more severe crisis.

While the specification of borrowing costs as an increasing function of the country's net foreign debt position seems plausible, it is nevertheless ad hoc. Beginning with Bardhan (1967) it has been postulated as an equilibrium reduced form relationship, rather than being derived from the underlying behavior of relevant agents. As a consequence, the existing literature simply postulates an arbitrary (usually convex) relationship between debt and borrowing costs, ignoring the dependence of this relationship upon other relevant aspects, such as the degree and nature of the underlying risk in the economy.

This paper has several objectives. First, we wish to derive the equilibrium borrowing premium from the rational behavior of risk-neutral expected profit maximizing international financial intermediaries that allocate funds between borrowers and lenders, while taking account of the potential for default risk. Domestic borrowers are subject to two sources of risk, (i) an internal source, due to domestic production risk, and (ii) an external source, due to the stochastic pricing of foreign bonds, as a result of which they risk defaulting on their loans. We show how this leads to an equilibrium in which the borrowing cost increases with the economy's debt-wealth ratio, with the relationship depending upon the domestic/foreign sources of risk and the length of debt contract.

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[1] There are other ways to break the knife-edge condition, one of which is to endogenize the rate of time preference, by the use of Uzawa (1968) preferences for example. However, as several authors have noted, this requires unsatisfactory restrictions in order for well-behaved dynamics to obtain; see e.g. Blanchard and Fisher (1989).

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