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Liquidity shocks and the dollarization of a banking system

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Abstract

This paper shows how uncertainty about liquidity demand can lead to a high degree of dollarization in the banking system. I study a model where the demand for currency in each period is random, and where it is easier for banks to borrow in local currency in times of crisis than in dollars. Banks choose a portfolio composed of local currency, dollars, and real loans. Compared to the anticipated transactions demand for each currency, I show that the bank will hold a relatively large amount of dollars and a relatively small amount of local currency. I also show the existence of a *dollarization multiplier*: as the anticipated transactions demand for dollars increases, the dollarization of the banking sector increases more than proportionately.
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1. Introduction

Much of the recent literature on dollarization has focused on the characteristics of partially dollarized economies, where dollars and local currency each account for a substantial fraction of economic transactions. This literature has identified the degree of

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dollarization of the banking system as being a particularly important variable.[1] The effects of monetary policy, for example, as well as the reaction of the economy to external shocks, appear to depend critically on the degree to which domestic banks choose to denominate their transactions in dollars. This raises the important question of what determines the level of dollarization in the banking system.

Most of the existing explanations focus on ''liability dollarization,'' in which depositors choose to have their deposits denominated in dollars. The literature is therefore concerned largely with explaining why people would choose to open dollar-denominated accounts (see Broda and Levy Yeyati, 2003; Calvo, 1999; Catão and Terrones, 2000; Savastano, 1992; among others).[2] Other explanations have concentrated on network externalities that appear when banks' transactions are made in foreign currency. A lot of work in this area has been done with regard to Bolivia, which is one of the main examples of a partially dollarized economy (see for example Peiers and Wrase, 1997; Reding and Morales, 1999; Cuddington et al., 2002).[3] This work is closely related to the well known phenomenon of ''hysteresis,'' which was first introduced to the study of dollarization issues by Uribe (1997).

In this paper, I concentrate on the other side of a bank's balance sheet. I show that uncertainty about liquidity demand will also tend to push a banking system toward becoming highly dollarized. The model I develop is a generalization of Champ et al. (1996).[4] I transform their one-currency model into a two-currency model, introducing the possibility for banks to hold reserves in either local or foreign currency. Hereafter I will refer to these currencies as pesos and dollars, respectively. In each period, the demand for currency is stochastic. A fraction of the agents who demand currency will need pesos, and the remaining fraction will need dollars.

I make the natural assumption that in times of high liquidity demand, it is easier for a bank to borrow in local currency than in dollars. I show that this assumption implies that, given some anticipated transactions demand for each currency, banks will choose to hold a relatively large amount of dollars reserves and a relatively small amount of reserves in local currency. Uncertainty about liquidity demand therefore leads to a form of ''asset dollarization'' in addition to the liability dollarization studied in other papers.[5]

During a liquidity crisis, a bank will be able to meet the demand for pesos, since it can borrow pesos from the Central Bank. However this will not be true for dollar demand. This asymmetry leads a bank to hold a ''precautionary'' stock of dollars and the model will show how this is done. In fact it will be shown that the demand for dollar reserves is in large part driven by ''rare events'' or ''extreme events''. I concentrate first on the worst-case scenario, where there is no possibility for banks to borrow dollars from the

[1] See, for instance, De Nicoló et al. (2003) who study the benefits and risks associated with a dollarized banking system and Castro et al. (2004) who analyze the financial vulnerability of partially dollarized economies.

[2] For a complete review of the literature see Levy Yeyati and Sturzenegger (2003).

[3] The Bolivian banking system is highly dollarized, 80% of total assets are in dollars and liability dollarization is around 90%.

[4] Antinolfi et al. (2001), Bhattacharya et al. (2005), Haslag and Martin (2003), Schreft and Smith (2002) and Smith (2002) also are interesting generalizations, but for the one-currency model.

[5] Antinolfi et al. (in press) utilize a similar framework with spatial separation and limited communication to study dollarization. In their model, they incorporate the analysis of dollarization into a study of the impact of inflation on financial intermediation and the real activity.

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