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Banks, debt maturity and financial crises

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Abstract

We develop a model in which the maturity of external debt of banks, their level of international reserves, and the term structure of interest rates are jointly determined. Self-fulfilling runs may occur, and banks take this possibility into account when choosing the structure of their assets and liabilities. If the probability of a run is sufficiently small, banks will deliberately choose an illiquid asset-liability position and expose themselves to a run. In that case, short term debt will be cheaper than long term debt, and the maturity structure of foreign debt will depend on attitudes towards risk.

Keywords: Bank runs; Financial crises; Foreign debt

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1. Introduction

Fractional reserve banking systems are often fragile, but in recent financial crises their potential fragility was exacerbated by the presence of a very large stock of short-term foreign debt. This is illustrated by Table 1, taken from Chang and Velasco (1998a), which shows the ratio of short term debt to international

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Table 1
Short term debt as a ratio of international reserves

	Indonesia	Korea	Malaysia	Philippines	Thailand	Asean-5
June 94	1.73	1.61	0.25	0.40	0.99	0.92
June 97	1.70	2.06	0.61	0.85	1.45	1.43

reserves for each of the so called Asean-5 countries.[1] A ratio higher than one implies that international reserves would have not been sufficient to repay maturing debt; in that case, a refusal by external creditors to roll over the debt (which, as documented by Radelet and Sachs (1998), actually occurred in the second half of 1997) would have placed the country in an extremely difficult liquidity situation, triggering a crisis. The table shows that, as of June 1997, Indonesia, Korea, and Thailand had ratios well above one and hence were vulnerable. Malaysia and the Philippines had ratios below one, but their ratios had more than doubled in three years. Accordingly, Chang and Velasco (1998a) and Radelet and Sachs (1998) have argued that the root cause of the recent Asian crisis was a situation of *international illiquidity*, in which the potential short term hard currency obligations of a financial system exceeded the liquidation value of its assets.

These observations raise a number of theoretical questions. Bryant (1980), Diamond and Dybvig (1983), and others have developed useful models of how the liquidity position of a bank vis à vis domestic depositors is determined. But we have little theoretical guidance in predicting how a bank should optimally arrange the maturity of its foreign liabilities. While the presumption exists, and Table 1 suggests, that Korean or Thai banks recently took on "too much" short-term debt abroad, what is "too much" or "too little"?

This issue is related to how the term structure of international interest rates is determined. Indeed, the idea that banks or governments in emerging markets tend to borrow short-term "because it is cheaper than long term debt" seems eminently sensible. But presumably the term structure of interest rates is itself determined by the riskiness of different debt maturities. Borrowers that abuse short-term credit are more likely to find themselves in a liquidity pinch, and in equilibrium this should affect the cost of credit. This means that *debt maturity* and the *term structure* are determined simultaneously, and taking into account that a financial crisis may be possible. This fact is yet to be captured in existing models.

In previous work, particularly Chang and Velasco (1998b), we have embedded Bryant–Diamond–Dybvig banks into a small open economy, allowing them to

[1]The data are taken from the BIS and the IMF; a country's short term debt is measured by its short term liabilities to BIS reporting banks. The bulk of the borrowing was done by local banks, except for Indonesia where corporations tended to borrow overseas directly. See Chang and Velasco (1998a) for further detail and a discussion of data limitations.