Interdependent bank runs under a collapsing fixed exchange rate regime

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ARTICLE INFO

ABSTRACT

Nakata, Takeshi—Interdependent bank runs under a collapsing fixed exchange rate regime

This paper provides a framework for simultaneous multiple bank runs in a country experiencing a currency crisis. The correlation of bank runs increases as the proportion of debts from foreign creditors (indexed to the dollar) to domestic creditors (indexed to the domestic currency) increases. Moreover, when the share of dollar debt is sufficiently high, this interlinkage is perfect; that is, runs occur in all banks or not at all. Consequently, a situation exists where even a solvent bank cannot borrow in the interbank market. These findings imply that as the domestic banking sector becomes increasingly dependent on dollar debt, there is a heightened requirement for dollar reserves and a lender-of-last-resort facility. *J. Japanese Int. Economies* **24** (4) (2010) 603–623. Niigata University, Department of Economics, 8050 Ikarashi 2-no-cho, Nishi-ku, Niigata-shi 950-2181, Japan.

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1. Introduction

At the end of the last century, it was commonly held that *widespread* bank runs accompanied currency crises. For example, Kaminsky and Reinhart (1999) provide empirical evidence of financial crises in several countries since 1980 including both banking and currency crises, commonly referred to as twin crises. Moreover, bank runs, especially in East Asia and Latin America, took the form of simultaneous runs on many banks at this time. For instance, the International Monetary Fund (IMF) reported on Indonesia from 1997 through 1998 as follows: "Several banks were insolvent, or at least suffered

Table 1
Number of banks and market concentration in selected emerging market banking systems in 1994.[1]
Source: IMF staff estimates based on data from Fitch IBCA's Bankscope and official data.

Country	Number of banks[2]	Share of total deposits (%)		HH Index
		Three largest banks	10 Largest banks	
Republic of Korea[3]	30	52.8	86.9	1263.6
Malaysia	25	44.7	78.3	918.9
Philippines	41	39.0	80.3	819.7
Thailand	15	47.5	83.5	1031.7
Argentina	206	39.1	73.1	756.9
Brazil	245	49.9	78.8	1220.9
Chile	37	39.5	79.1	830.4
Mexico	36	48.3	80.8	1005.4
Venezuela	43	43.9	78.6	979.2

[1] Analysis is based on data available as at the end of 2000 for the 30 largest banks in a specific country, including merger and acquisitions: data on deposits are at end of 1999 or most recent available in Fitch IBCA's Bankscope.
[2] The number of banks is based on official data provided by country authorities, the OECD, or IBCA. In Asia, the total number of banks in a specific country includes only domestic commercial banks.
[3] Includes the mergers between the Kookmin and Housing and commercial banks and the Shinhan and Cheju Banks.

from serious weakness, well before the crises; the banks' difficulties were compounded by the losses incurred when the rupiah began to depreciate. The closure of some banks, together with the absence of coherent strategy for dealing with the others (including the scope of guarantees for depositors), was followed by widespread bank runs that led to calls for massive liquidity support from Bank Indonesia." (IMF Occasional Paper 178, p. 38.) Arena (2008) showed that in East Asia and Latin America, systemic macroeconomic and liquidity shocks that triggered the crises destabilized not only weak banks but also strong banks. To prevent widespread bank failure, large amounts of public funds were then injected into the banking sectors in these regions.[1] When discussing these crises, a common criticism is that local banks borrowed from foreign creditors not in their domestic currency but in dollars. Moreover, each bank lent this money to domestic firms and repaid in the domestic currency. Therefore, when each country's currency drastically depreciated against the dollar, many banks went into default because the amount repayable in dollars had significantly decreased (a currency mismatch problem).

The purpose of this paper is to construct a model where bank runs occur interdependently among a number of banks under twin crises and to analyze how the share of dollar debt in domestic debt affects this interdependency. More specifically, when the domestic currency depreciates, banks may not be repaid if they delay because of the reduction in the possible amount repayable in dollars. Therefore, foreign creditors withdraw their claims before maturity. Each bank that cannot prepare dollars for responding to these withdrawals then exchanges domestic currency for dollars with the monetary authority. If these banks exchange too large an amount, the dollar reserves that the monetary authority holds are exhausted; the fixed exchange rate system then collapses, and the domestic currency depreciates. Consequently, when creditors in one bank withdraw claims denominated in dollars early, the prospect of a domestic currency depreciation increases, and thus creditors in other banks in the same country may also withdraw their dollar claims while they still can.

As shown in Table 1, a distinctive feature of the banking sector in Asian and Latin American countries that experienced currency crises is that the share of large bank deposits is high. In this situation, creditors are more concerned with the actions of creditors in other banks than would be the case if deposits were dispersed across several banks. Namely, they decide strategically whether to withdraw early or to wait in anticipation of the currency depreciation. We describe the actions of depositors here as a noncooperative game. Moreover, we show that strategic complementarities exist between

[1] According to Caprio (2003), during 1997 and 1999, these fiscal costs comprised some 50–55% of GDP in Indonesia, 26.5% in Korea, 20.5% in Malaysia, 6.7% in Philippines, and 32.8% in Thailand. In the case of Latin America, costs in Argentina were estimated to be 55.3% of GDP through 1980–1982 and 1.6% in 1995. Moreover, in Brazil, 13.2% of GDP was injected during 1994–1996 and 41.2% in Chile over 1981–1983.