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A twin crisis model with incomplete information

Fumiko Takeda

Faculty of Economics and Business Administration, Yokohama City University, Yokohama, 236-0027, Japan

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This paper presents a model that highlights the connection between domestic bank runs and currency crises in a framework in which small depositors and a large trader engage in a simultaneous game. A long-term return on domestic technology affects the prospects of the bank and those of the domestic currency in the same direction. The presence of a large trader makes small depositors more likely to withdraw their money from the bank. The large trader's influence on the small traders is much larger, when he has more precise information than the small depositors. *J. Japanese Int. Economies* **18** (1) (2004) 38–56. Faculty of Economics and Business Administration, Yokohama City University, Yokohama, 236-0027, Japan.

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1. Introduction

A common view of many recent international financial crises is the simultaneous occurrence of a domestic bank run and a currency crisis. This so-called "twin crisis" phenomenon was notable especially in the crises in Chile (1982), Mexico (1994), and East Asia (1997). Kaminsky and Reinhart (1999) first provide empirical findings of this "twin crisis" phenomenon. Using a large data set, they find that domestic banking crises are accompanied by massive devaluations.

Several factors drew researchers' attention as causes of the twin crisis. In particular, the following three factors are examined with considerable efforts and supported by the previous empirical papers. First, the mismatches in the maturity and the currency denomination of assets and liabilities are associated with the occurrence of currency crises.

E-mail address: ftakeda@yokohama-cu.ac.jp.

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Such mismatches rendered the countries vulnerable to the change in the international financial markets and subsequently the self-fulfilling crisis.[1] Second, several empirical papers find the connection between the outbreak of the crisis and economic fundamentals, such as low growth rates and high interest rates.[2] These negative factors for the economic fundamentals make investors more pessimistic about the country, and withdraw their money from the country or attack its currency.

Third, several academic researchers and policymakers support the view that large traders in the currency market can be a source of market panic and short-terminism.[3] For example, the financier George Soros was accused of causing the Asian crisis by Dr. Mahathir, the prime minister of Malaysia. Such accusation is still controversial, however, because the estimated size of large traders is too small, compared to the entire forex market and the amount of international reserves available to the monetary authority, to cause a currency crisis.[4] But if there is information asymmetry, that is, markets believe that large traders have more precise information, even modest short positions by large traders may generate herd-like behavior of other traders.[5]

The model presented in this paper provides theoretical underpinnings for these features of the twin crisis phenomenon. In the model small depositors and a large trader engage in

[1] Analyzing the period immediately after the Mexican peso crisis in December 1994, Sachs et al. (1996) find that the maturity mismatch between the country's assets and liabilities is an important determinant of the crisis, though their data were not random both in time and sample countries (see Eichengreen et al., 1996). Radelet and Sachs (2000) also argue that such a maturity mismatch was seen in East Asian crisis.

[2] Eichengreen and Rose (2001) find that an increase in foreign interest rates, in particular industrial countries' interest rates, and low GDP growth rates are important sources of banking crises. Demirguc-Kunt and Detragiache (1997) show that the low GDP growth rates and high domestic interest rates have significant effects in determining the occurrence of banking crises.

[3] Corsetti et al. (in press) present a comprehensive discussion about the role of large traders in the currency crises.

[4] Brown, Goetzmann, and Park (2000) estimate the net position of hedge funds and find that there is no unusual short-position during the crisis.

[5] Financial Stability Forum (2000) suggests that some macro hedge funds obtained very high reputation about their access to precise information and ability to analyze macro developments. Furthermore, many financial institutions provided credit to hedge funds willingly. Information about the behavior and strategy of hedge funds was considered seriously among a wide range of investors.

The results of empirical studies about herding and positive feedback trading (buying winners and selling losers) are mixed, however.

Frankel and Schmukler (1997) examine the role of domestic investors relative to international investors in the Mexican crisis by using closed end fund data. They find that domestic residents played the leading role in portfolio movement and capital outflows.

Lee et al. (1999) study trading patterns of three types of investors: large individual investors, institutional investors, and small individual investors. They show that small investors appear to herd, while large individual investors are the most influential in the market.

Choe et al. (1999) examine the impact of foreign investors on Korea's stock returns during 1996–1997. They find evidence of positive feedback trading and herding by foreign investors before the crisis. However, the evidence becomes weaker during the crisis and positive feedback disappears.

Kim and Wei (2002) compare the trading behavior of different categories of foreign portfolio investors in Korea. They find that individual investors herd significantly more than institutional investors, and that non-resident investors herd significantly more than their counterparts.

For more comprehensive discussions, see Corsetti et al. (in press).