



Liquidity risk and bank portfolio management in a financial system without deposit insurance: Empirical evidence from prewar Japan

Michiru Sawada*

Nihon University College of Economics, 1-3-2 Misaki-cho, Chiyoda-ku, Tokyo 101-8360, Japan

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ABSTRACT

Using data from prewar Japan, this paper investigates the impact of a liquidity shock induced by depositors' behavior on bank portfolio management during financial crises in a system lacking deposit insurance. It is found that banks reacted to the liquidity shock sensitively through an increase in their cash holdings not by liquidating bank loans but by selling securities in the financial market. Moreover, banks exposed to local financial contagion adjusted the liquidity of their portfolio mainly by actively selling and buying their securities in the financial market. Finally, there is no evidence to conclude that the existence of the lender of last resort mitigated the liquidity constraints in bank portfolio adjustments.

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1. Introduction

One of the most important roles of banks is to perform the maturity transformation of assets by issuing short-term liabilities and holding long-term assets. Therefore, given a system where depositors are insufficiently protected, banking systems are potentially exposed to the probability of bank runs. In fact, during prewar periods, bank runs occurred frequently in the U.S., Europe, Japan, and contemporary emerging countries where deposit insurance was nonexistent.

Since Diamond and Dybvig (1983), a considerable number of studies have been conducted on bank runs and panics. The majority of these studies have focused on the origin and causes of bank runs, which can be classified into two alternative views. The first is the random withdrawal theory, which considers bank runs as self-fulfilling phenomena (e.g., Chang & Velasco, 2000, 2001; Postlewaite & Vives, 1987; Waldo, 1985). The other is the information based theory, which considers bank runs as phenomena induced by the market discipline of depositors under asymmetric information (e.g., Chari & Jagannathan, 1988; Calomiris & Gorton, 1991; Gorton, 1985). Recently, there has been renewed interest in portfolio management with respect to economies where runs are possible (Cooper & Ross, 1998; Ennis & Keister, 2006; Franck & Krausz, 2007; Peck & Shell, 2003). These studies, further developing Diamond and Dybvig (1983), analyze how banks manage the liquidity of their portfolios, taking into account the strategic behavior of depositors. Cooper and Ross (1998) and Ennis and Keister (2006) examine the relation between the probability of a bank run and the level of liquid assets held by banks. Peck and Shell (2003) investigate how restrictions on the holding of illiquid assets affect the level of liquid assets chosen by banks. Franck and Krausz (2007) analyze the impact of the stock market and the presence of a lender of last resort (LLR) on the portfolio allocations of banks when they are faced with random withdrawals by depositors. Despite such theoretical developments, empirical evidence is lacking on the liquidity management of

* Tel.: +81 03 3219 3399.

E-mail address: sawada.michiru@nihon-u.ac.jp.

banks in a system devoid of deposit insurance—at least, since [Friedman and Schwartz \(1963\)](#). These authors demonstrated that the deposit–reserve ratio is inclined to decrease during periods of banking crisis (as in 1907 and the early 1930s). However, they analyzed the time-series behavior of banks on the basis of aggregate data. Moreover, they did not conduct a detailed statistical analysis. Therefore, few details are available on the behavior of individual banks that are exposed to the liquidity shock induced by depositors' behavior in a system without deposit insurance.

To investigate portfolio management with respect to banks exposed to the liquidity shock induced by depositors' behavior, this study uses micro-level data pertaining to the prewar Japanese banking industry. In prewar Japan, since numerous small banks operated without deposit insurance, the banking sector was subject to liquidity risk due to the frequent occurrence of bank runs. In fact, nationwide bank runs occurred in the late 1920s and early 1930s, which resulted in numerous bank closures. This paper focuses on bank behavior during the banking crisis from 1927 to 1932. To the best of our knowledge, the first time bank-level analysis is used to examine the liquidity management of banks operating without deposit insurance during past periods of financial crises.

This paper examines how banks adjusted the liquidity of their asset portfolios in response to depositors' behavior during periods of banking crises. We specifically analyze the short-term effect of the liquidity shock induced by withdrawals of deposits on the change in the proportions of three assets in its asset portfolio—loans, cash, and securities. Any bank in the economy without deposit insurance is likely to perceive a liquidity shock induced by depositors' behavior, even if it is a small shock, to an increase in its own liquidity risk. Therefore, such banks are expected to immediately raise the cash in hand. In this process, however, the banks will have to choose to liquidate either their loans or securities. In the very short run, it may be difficult to liquidate non-marketable assets such as loans. Furthermore, this paper investigates the impact of financial contagion on bank portfolios. In other words, we examine how banks reacted to the failure of a neighboring bank through portfolio management. Interestingly, this analysis can also be interpreted to capture the effect of a temporary deposit shock on bank portfolio. Finally, this paper examines the influence of the central bank as the lender of last resort (LLR) on the portfolio management of private banks. The existence of the LLR is likely to affect the portfolio management of private banks when the central bank guarantees the supply of loans to them in times of emergency. In prewar Japan, the Bank of Japan (BOJ), which was the central bank of Japan, exercised the role of the LLR by providing loans to private banks during periods of financial crises. Moreover, the BOJ had a well-known tendency to provide LLR loans to banks with which it had an established transactional relationship ([Ishii, 1980](#); [Shiratori, 2003](#); [Okazaki, 2007](#)). The role of the LLR is herein further examined through an analytical comparison of the portfolio management of the BOJ's correspondent banks and non-correspondent banks.

This paper is in line with the recent policy discussions on the need to create financial safety nets. It is generally recognized that deposit insurance suffocates market discipline, although it is effective in preventing self-fulfilling depositor runs that induce bank panic. Many financial economists point out the importance of market discipline and propose various safety net designs to guarantee, among other things, its proper functioning ([Demirguc-Kunt & Huizinga, 2004](#); [Demirguc-Kunt, Kane, & Laeven, 2006](#); [Kane, 2000](#)). However, the cost impact on banks that operate without deposit insurance is not thoroughly understood, particularly in terms of bank behavior.¹ In light of these arguments, this paper will attempt to provide useful evidence.

The remainder of this paper is organized as follows. [Section 2](#) discusses the historical background of the Japanese banking system. [Section 3](#) describes the study's data and methodology. [Section 4](#) presents the study's main results. [Section 5](#) considers the impact of financial contagion on bank portfolios. [Section 6](#) addresses the role of the LLR and the BOJ. [Section 7](#) concludes the study.

2. A historical background

The industrial organization of the prewar Japanese banking sector differed substantially from its postwar counterpart. An interesting feature is that this industry was composed of numerous small banks, which was due to the lax regulations that facilitated entry into the banking industry. Indeed, in the early twentieth century, the number of banks exceeded two thousand.² However, a safety net for depositors was not properly established. That is, since deposit insurance was nonexistent in prewar Japan, it was not rare for depositors to incur losses when banks fell into bankruptcy ([Takahashi & Morigaki, 1968](#); [Imuta, 2002](#)). Therefore, the banking industry was frequently susceptible to a series of runs, which resulted in the closure of many banks, particularly in the 1920s after the collapse of the speculative bubble that followed the economic boom of World War I. [Table 1](#) provides the historical data related to liquidity shocks in the Japanese banking industry from 1922 to 1935. The number of bank closures is particularly high during the late 1920s and early 1930s. This period includes major historic Japanese financial crises, namely, the Showa Financial Crisis of 1927 and the Showa Depression from 1930 to 1931, when nationwide bank runs occurred.³ In addition, it is noteworthy that while the growth rate of the total deposits of all banks was negative from 1927 to 1931 with the exception of 1928, the postal savings continued to grow at more than 10%. These figures are considered to reflect the risk-averse behavior of depositors during banking crises. As such, Japanese banks suffered from a liquidity crisis, particularly in the late 1920s and early 1930s.

¹ For instance, as stated in [Ennis and Keister \(2006\)](#), a bank that is exposed to the possibility of a bank run might hold more reserves, which leads to a decrease in long-term lending and consequently has an effect on economic activities to some degree.

² In 1901, the number of banks peaked at 2334 (1890 ordinary banks and 444 saving banks). Thereafter, the numbers decreased due to the change in government policy. Specifically, in addition to the imposition of strict restrictions on new entrants, the Ministry of Finance promoted bank consolidation efforts. For example, the Bank Law of 1927 obliged an ordinary bank to maintain an amount of capital of not less than one million yen by 1932, and forbade them to increase capital by their own means. Therefore, many banks were forced to choose a merger or dissolution ([Okazaki & Sawada, 2007](#)).

³ For further details on the Showa Financial Crisis and the Showa Depression, see [Hoshi and Kashyap \(2001, p29–31\)](#).

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