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Liquidity risk and bank portfolio allocation

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Abstract

The joint existence of a lender of last resort and of a stock market is usually considered the sign of a developed financial infrastructure. This paper analyzes whether a securities market may play a role similar to that of a lender of last resort by being of assistance to a bank, which faces possible liquidity shortages. We examine which of these two institutions best prevents a bank's liquidity shortages while allowing the optimal allocation of the bank's resources. Our results suggest that securities markets matter more for the liquidity of banks than a lender of last resort.

JEL classification: G21; O16
Keywords: Financial markets; Lender of last resort; Liquidity risk

1. Introduction

The joint existence of a lender of last resort (LLR) and of a stock market is usually considered the sign of a developed financial infrastructure.[1] A LLR provides solvent banks with a means to overcome temporary liquidity shortages while ensuring the stability of the banking system.[2] Stock markets provide

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[1] On this, see for instance Levine and Zervos (1998) and Arestis, Demetriades, and Luintel (2001).

[2] The doctrine of the LLR was elaborated by Thornton (1802) and Bagehot (1873). They considered that the Central Bank may be allowed to lend under conditions to illiquid but solvent banks. Bordo (1990), Kaufman (1991), and Schwartz (1998) consider that the LLR theory of Bagehot (1873) and Thornton (1802) is irrelevant nowadays since efficient interbank markets prevent solvent banks from being illiquid. This view is contested by Rochet and Vives (2002).

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liquidity to investors whose risk and costs are therefore reduced. Furthermore, by vying for investors' capital, stock markets increase competition for banks. However, stock markets and banks may also complement each other. For instance, the former benefits from the underwriting services provided by the latter to issuers of stocks.

In this paper, we consider that a securities market may play a role similar to that of a LLR by being of assistance to a bank, which faces possible liquidity shortages. We examine which of these two institutions best prevents a bank's liquidity shortages while allowing the optimal allocation of the bank's resources. Indeed, although the bank is able to avoid liquidity shortages by keeping a high proportion of cash in its balance sheet, such an asset allocation also entails a waste of resources. The latter reduces the bank's profits by diminishing the number of loans the bank grants. Since loans are meant to finance profitable investment projects and are thus likely to generate economic growth, avoiding liquidity shortages by keeping a high proportion of cash may ultimately impair economic development.

We draw on the literature that relates to the impact of institutions and regulations on banks' asset allocation as surveyed by Dewatripont and Tirole (1994) and Freixas and Rochet (1997). We suggest a model relating changes in commercial banks' asset allocation to changes in the financial institutional structure. These include the existence of a market for short-term assets and a lender of last resort. Our framework builds upon elements of two strands of research in banking. The first one, characterized by Kareken and Wallace (1978), Koehn and Santomero (1980), Kim and Santomero (1988), and Rochet (1992) amongst others, focuses on the changes in commercial banks' portfolio choices as a result of regulation. The second one stems from the analysis of bank runs in line with Diamond and Dybvig (1983), and whose most recent extensions include Green and Lin (2003), Peck and Shell (2003), and Samartin (2003). In their seminal paper, Diamond and Dybvig (1983) provide a rationale for the existence of banks by showing that they improve the risk sharing of simple competitive markets by transforming illiquid assets. However, because of asymmetric information and a sequential service constraint a la Wallace (1988), banks are vulnerable to runs since they do not know the consumption timing of their depositors.

In our model, the bank is a mutually owned profit-maximizing risk-neutral institution, which operates in an environment a la Diamond and Dybvig (1983) with three assets: loans, securities and cash. Loans and securities are long-term technologies, which represent different levels of liquidity, while cash is a storage technology.

The bank faces stochastic early withdrawals but does not face bank runs. Because depositors may withdraw early, the bank is compelled to keep some of its deposits in the form of interest-free liquid reserves. It is even possible that, at a given point in time, the bank's reserves do not cover the depositors' desired withdrawals. Under such circumstances, the bank has to liquidate part or all of its securities at a cost. Depending on the existence of institutions like a securities market and/or a lender of last resort (LLR), the bank may find it less costly not to invest a certain part of its deposits and keep them liquid.

We show that a LLR and a securities market can improve the bank's asset allocation in the sense that fewer resources are held in cash and more loans are supplied by the bank. The improvement in asset allocation requires that returns on assets and the LLR borrowing rate fulfill certain conditions. Moreover, there is a need for a minimal degree of liquidity in the securities market. We also show the conditions under which the joint existence of a securities market and a LLR leads to the best asset allocation. A securities market is found to reduce cash holdings but an increase in loans can be achieved only when a LLR also exists.