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Double bank runs and liquidity risk management☆

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ABSTRACT

By providing liquidity to depositors and credit-line borrowers, banks can be exposed to double-runs on assets and liabilities. For identification, we exploit the 2007 freeze of the European interbank market and the Italian Credit Register. After the shock, there are sizeable, aggregate double-runs. In the cross-section, credit-line drawdowns are not larger for banks more exposed to the interbank market; however, they are larger when we condition on the same firms with multiple credit lines. We show that, ex-ante, more exposed banks actively manage their liquidity risk by granting fewer credit lines to firms that run more during crises.

1. Introduction

The financial crisis that started in 2007 was centered on wholesale liquidity problems at financial institutions. This was in stark contrast with previous financial crises in history, where bank runs were mainly coming from retail depositors (Cornett, McNutt, Strahan, and Tehranian, 2011; Gorton and Metrick, 2012; European Central Bank, 2012; Freixas, Laeven, and Peydró, 2015). The financial crisis hit European markets on August 9, 2007 when the interbank market dried up. Banks that relied more on interbank funding suffered a severe liquidity shock to the liability-side of their balance sheet. Moreover, there is some evidence that firms increased the drawdown on available credit lines after the failure of Lehman Brothers in September 2008 (Ivashina and Scharfstein, 2010), which implies a liquidity shock on the asset side of banks. In this paper we ask to what extent the drawdowns on credit lines are more intense for banks more exposed to the wholesale

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(interbank) funding liquidity shock, thereby leading to an asset and liability—double—bank run, and whether banks do ex ante liquidity risk management to minimize this risk of double runs.

The provision of liquidity to both firms and depositors is at the heart of banking. Diamond and Dybvig (1983), among others, identify the existence of synergies between bank assets and liabilities. This explains why banks pair illiquid assets (loans), with liquid liabilities (retail and wholesale deposits) that are subject to runs. Kashyap, Rajan, and Stein (2002) emphasize the parallel between deposits and credit lines as both are subject to runs. They argue that, as long as deposit withdrawals and credit-line drawdowns are imperfectly correlated, offering both products allows them to economize on costly liquidity buffers. Moreover, Hanson, Shleifer, Stein, and Vishny (2015) argue that financial institutions with more fragile sources of funding (uninsured wholesale finance) should hold assets with lower liquidity risk, such as credit lines.[4] On the other hand, the opinion of many commentators and the implications of several theoretical models indicate that, in the presence of moral hazard, weaker banks with less stable funding are prone to excessive risk-taking, e.g., by minimizing liquidity risk management (Freixas and Rochet, 2008). This debate highlights the importance of an empirical analysis of correlated (double) asset-liability bank runs as a test of the existing theory, as well as for the design of prudential policy and for a better understanding of financial crises.

In this paper we examine the following specific questions. Do banks suffer double runs? Do firms run on the credit lines granted by banks that are hit by a funding liquidity shock on their liabilities? And, before a liquidity shock, is there evidence of liquidity risk management by banks with more fragile liabilities in their granting of credit lines?

The empirical analysis of these questions presents serious challenges for a researcher. Identification requires the following three ingredients: (a) a shock to bank funding liquidity that is exogenous and offers cross-sectional heterogeneity; (b) a sample of firms with multiple simultaneous credit lines held at different banks, to isolate which bank a firm chooses to run on; (c) an exhaustive credit register with the credit lines extended by banks, inclusive of relevant loan and firm variables (e.g., loan price and loan applications; firm leverage and size).

Our empirical strategy relies on the above three ingredients, each of which is critical for the identification of the effects that we investigate. As a shock to bank funding, we exploit the dry-up of the European interbank market in August 2007. This shock was exogenous to the Italian banking system and heterogeneous across banks, because banks differed significantly in their pre-shock interbank funding.[5] As for data on credit lines, we have access to the comprehensive Italian Credit Register held at the Bank of Italy, which allows for a match between banks and firms at the level of each credit relationship. The depth and breadth of the database allows us to focus on firms with multiple credit lines simultaneously held at different banks. For these firms we can test whether a firm draws preferentially on the credit lines provided by banks that are affected more by the interbank shock. Although most firms have credit lines with more than one bank, for additional tests we also consider the broader spectrum of firms with a credit line from only one bank.

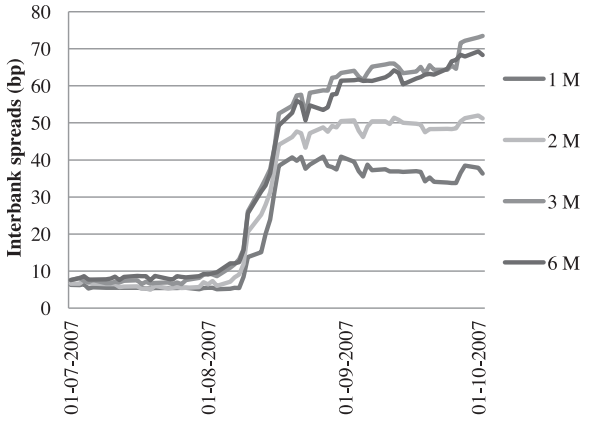

Fig. 1. Interbank spreads on euro market (Euribor – Eurepo). The figure shows the series of spreads between the Euribor (Euribor is the average interest rate for unsecured Euro term deposits, the reference rate in the short-term unsecured interbank market) for three different maturities and the corresponding Eurepo (the average interest rate for secured money market transactions in the euro area). Values are reported in basis points (bp). Source: Thomson Datastream.

Before August 2007, spreads on unsecured interbank lending had remained stable at very low levels for several years. In August 2007, interbank spreads and volatility increased significantly, as shown in Fig. 1. The interbank market dried up on August 9, which led the European Central Bank (ECB) to inject almost 100 billion euros in liquidity into the system on that day. However, in 2007, the ECB did not provide full liquidity allotment (ECB, 2012), which only became available after the collapse of Lehman Brothers in September 2008. The 2007 crisis originated in the U.S. and was triggered by the exposure of investors to subprime-related securities. The crisis spread to the European markets when this subprime exposure led BNP Paribas to suspend redemptions from three of its investment funds (Brunnermeier, 2009). This event caused a shock to the European interbank market. Notably, while in some European countries there were credit and housing price bubbles somewhat similar to the US ones, this was

[4] Other theory papers also examine the synergies between bank assets and liabilities. Diamond and Rajan (2001) show that the fragility of bank deposits disciplines bank management, enhancing the value of illiquid bank loans. Rochet and Vives (2004) also show that interbank runs can discipline banks in their choice of investments. Gennaioli, Shleifer, and Vishny (2013) emphasize asset-side diversification and tranching to back safe liabilities. Other papers highlight only one aspect of banks: (i) lending to opaque firms thanks to a bank's ability in monitoring and screening (e.g., Diamond, 1984; Dell'Ariccia and Marquez, 2006); or (ii) the creation of bank deposits that are used as inside money (e.g., Gorton and Pennacchi, 1990; Stein, 2012).

[5] Bank liquidity and fundamentals interact in bank runs (see Goldstein and Pauzner, 2005). Accordingly, in the analysis we use a pre-crisis measure of interbank funding, as change in interbank volume or pricing at the bank level after the shock may also be due to bank fundamentals.

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