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The information content of Basel III liquidity risk measures☆,☆☆

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ABSTRACT

We present a comprehensive analysis to calculate the Basel III liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR) of U.S. commercial banks using Call Report data over the period 2001–2011, and provide indirect empirical evidence on net cash outflow rates of certain liability categories. In addition, we examine potential links between Basel III liquidity risk measures and bank failures using a model that differentiates between idiosyncratic and systemic liquidity risks. We find that while both the NSFR and the LCR have limited effects on bank failures, the systemic liquidity risk is a major contributor to bank failures in 2009 and 2010. This finding suggests that an effective framework of liquidity risk management needs to target liquidity risk at both the individual level and the system level.

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1. Introduction

The length and severity of the liquidity disruption during the financial crisis of 2007–2009 has prompted regulators to emphasize the importance of sound liquidity risk management. In December 2010, the Basel Committee on Banking Supervision (BCBS) (2010a) proposed two standards for liquidity risk management and supervision. The first is the liquidity coverage ratio (LCR) standard, which requires banks to have sufficient high-quality liquid assets to survive a significant stress scenario over one month. More specifically, the LCR (a measure of asset liquidity) is defined as the ratio of the stock of high-quality liquid assets to the total net cash outflows over the next 30 calendar days under a significantly severe liquidity stress condition. The second standard is the net stable funding ratio (NSFR) standard, which aims to induce banks to fund their activities with more stable sources of funding. As a measure of funding stability, the NSFR is defined as the ratio of available stable funding (ASF) to required stable funding (RSF). Overall, the objectives of the LCR and NSFR standards are to increase individual banks' liquidity buffers and to enhance their funding stability.

In this study, we conduct a comprehensive analysis to calculate the LCR and NSFR of U.S. commercial banks using Call Report data over the period 2001–2011, and examine the links between the calculated liquidity risk measures and bank failures. The new liquidity standards depend on certain assumptions that have been largely untested. For instance, a crucial component of the LCR standard

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is its assumptions on the rates of cash outflows and inflows of different liability categories under stressed conditions. Therefore, empirical studies of the new liquidity standards using historical data can shed light on these underlying assumptions and have potential and important policy implications. Calculating the LCR and NSFR is a critical step in such a study. However, few empirical studies have attempted to calculate the LCR and NSFR because of the gap between historical data and the information required for calculating the LCR and NSFR under Basel III. Our study takes an important first step in this direction.

We also calculate alternative measures of LCR using the 90th, 95th, and 99th percentiles of net cash outflow rates of different funding categories derived from U.S. bank Call Report data. This allows us to compare these alternative measures with the measure of LCR based on cash outflow rates prescribed in the Basel III LCR standard. Our calculations represent an initial attempt to establish empirical evidence on the rates of net cash outflows of different liability categories under stressed conditions.

By examining the effectiveness of the new liquidity standards in reducing bank failures, this paper contributes broadly to understanding the question of whether the new liquidity standards will achieve their intended goal of promoting financial stability. While not necessarily the sole purpose of the new liquidity standards of Basel III, bank failure reduction is likely one of the main objectives given the timing of the new liquidity standards. Therefore, examining potential links between the new liquidity risk measures and bank failure is crucial in understanding their overall effectiveness in the presence of purposeful behavior by regulators and policy makers.

While the new liquidity standards aim at strengthening individual banks' liquidity buffers and lowering their maturity mismatches, it remains to be seen whether idiosyncratic liquidity risk was a major contributor to bank failures during the 2007–2009 financial crisis. The seminal work of Diamond and Dybvig (1983) on liquidity risk and bank runs has inspired a growing body of theoretical literature that has underscored the systemic nature of liquidity risk and the important role of contagion in financial crisis (Allen and Gale, 2000; Diamond and Rajan, 2005). For this reason, the International Monetary Fund (IMF) expressed concerns that the new liquidity standards can only play a limited role in managing systemic liquidity risk (International Monetary Fund, 2010, 2011).

Moreover, different economic forces can affect the relationship between individual liquidity risk measures and bank failures. First, banks may increase their liquidity buffers because of deteriorating economic conditions, commonly known as liquidity hoarding. Gârleanu and Pedersen (2007) pointed out that liquidity hoarding of individual banks can have negative externality effects, leading to market illiquidity at the aggregate level. If the negative externality effects outweigh the beneficial effect of liquidity buffer, we may observe a positive relationship between liquidity buffer and bank failure. Second, banks may increase their liquidity buffers because they anticipate financial distress (reverse causality).[3] Additionally, banks with high insolvency risk may choose to hold high liquidity buffers (self-selection problems). Therefore, an additional goal of this paper is to empirically examine the effects of different economic mechanisms.

In addition, while recent studies have identified systemic liquidity disruptions in multiple short-term funding markets,[4] few empirical studies have directly linked bank failures to both systemic and idiosyncratic liquidity risks. One obvious reason for the lack of empirical studies is that bank failures are rare in the United States between 1995 and 2007. The massive number of bank failures during the recent financial crisis post 2007 offers a valuable opportunity to improve our understanding of bank failures and liquidity risk.

We employ a model that links bank failure to insolvency and liquidity risks. We postulate that liquidity risk affects banks through both idiosyncratic and systemic channels, which can have varied impacts on bank failures. Our empirical approach is consistent with the theoretical model of Allen et al. (2009), who divide liquidity risk into idiosyncratic and aggregate risks. Since the new liquidity ratios target an individual bank's liquidity risk management, their effects are largely contained in the idiosyncratic channel. By comparing the contributions of idiosyncratic and systemic liquidity risks, we can assess the effectiveness of the new liquidity risk standards in reducing bank failures.

Bank failure is a complicated process in which competing factors, such as regulatory forbearance, government intervention, and other political considerations, can play important roles. However, the focus of this paper is the links between liquidity risk and bank failures. We follow the literature and include a list of control variables for observed heterogeneity among banks. The variables included in our models have strong influence in the decision-making process of regulators and policy makers who are expected to act purposefully. As in any specification of the empirical model, other possible unobserved factors that affect bank failure are captured by the error term of the econometric model.

The remainder of this paper is organized as follows. Section 2 provides background information about the new liquidity standards and reviews the related literature on bank failures and liquidity risk. Section 3 calculates the approximate measures of the Basel III LCR and NSFR and provides empirical evidence on the rates of net cash outflows of different liability categories. Section 4 examines the links between the new liquidity risk measures and bank failures. Section 5 concludes.

2. Background and literature review

2.1. Definitions of Basel III liquidity risk measures

The Basel III LCR standard is designed to ensure that a bank maintains an adequate level of unencumbered, high-quality liquid assets that can be converted into cash to meet its liquidity needs for 30 days under a significantly severe liquidity stress scenario. The LCR is defined as the ratio of the stock of high-quality liquid assets to the total net cash outflows over the next 30 calendar days under a significantly severe liquidity stress condition:

$$\text{LCR} = \frac{\text{Stock of high-quality liquid assets}}{\text{Total net cash outflows over the next 30 days}}. \quad (1)$$

This ratio is required to be above 100%. The calculation of LCR depends on assumptions in the calculations of the stock of high-quality liquid assets and the total net cash outflows. These assumptions include the classification of "Level 1" and "Level 2" assets, the weights assigned to these asset categories, the classification of different liability categories, and the rates of cash outflow and inflow for different liability categories.

The NSFR standard was developed to promote medium and long-term funding stability. The NSFR is the ratio of available stable funding (ASF) to required stable funding (RSF):

$$\text{NSFR} = \frac{\text{Available stable funding}}{\text{Required stable funding}}. \quad (2)$$

[3] We are grateful to a referee for suggesting this.

[4] These disruptions include the collapse of the asset-backed commercial paper (ABCP) market in 2007 (Covitz et al., 2013), the run on the repurchase agreement market (the repo market) (Gorton and Metrick, 2012), and the strains in the interbank market (International Monetary Fund, 2010).