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Bank diversification and liquidity creation: Panel Granger-causality evidence from China

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ABSTRACT

This paper applies the empirical methodology of panel Granger-causality tests to test the relationship between bank diversification and liquidity creation, employing the panel vector autoregression models in a generalized method of moments framework. We find that an increase in the degree of bank diversification between traditional bank activities generating net interest income and non-traditional bank activities generating non-interest income reduces bank liquidity creation. However, an increase in the degree of bank diversification within non-traditional bank activities leads to an increase in bank liquidity creation. In the context of China's banking sector, the positive and negative aspects of bank diversification coexist. In addition, we do not find evidence of reverse causality between banks' diversification and liquidity creation. Furthermore, we examine whether the investigated empirical relationship will change for heterogeneous banks and find that the relationship between bank diversification and liquidity creation exhibits heterogeneity for banks with various characteristics.

1. Introduction

"Liquidity creation" occurs when banks provide illiquid loans to borrowers while giving depositors the ability to withdraw funds at par value at a moment's notice (Diamond and Dybvig, 1983). Commercial banks also provide borrowers liquidity off the balance sheet through loan commitments and similar claims to liquid funds (Holmstrom and Tirole, 1998; Kashyap et al., 2002; Thakor, 2005). Banks function as key liquidity creators by financing relatively illiquid assets with relatively liquid liabilities. Bank liquidity creation is important for the macro-economy and the financial system, and it becomes even more prominent during financial crises (Bryant, 1980; Bernanke, 1983; Boot et al., 1993; Acharya et al., 2009).

Diversification in banking is also well studied. A vast body of literature has emerged on the relationship between bank diversification and risk-taking, the business model, or financial performance (Stiroh, 2004; Berger et al., 2010; Li and Zhang, 2013; Meslier et al., 2014). Stiroh (2015) reviews a large body of research regarding the reasons about why banks diversify. These studies suggest that bank revenue diversification may be efficient and desirable, as it can reduce idiosyncratic risk and total risk. Diversification across products may improve the risk-return frontier by expanding the investment opportunity set. Nevertheless, many studies have identified negative aspects associated with bank diversification (Berger et al., 1999; Milbourn et al., 1999; Bliss and Rosen, 2001; Aggarwal and Samwick, 2003). In certain circumstances, bank diversification may disperse managerial resources and operating stability.

There is abundant empirical research that examines the impacts of bank diversification on bank financial characteristics and the determinants of bank liquidity creation. However, empirical evidence on the potentially reciprocal relationship between bank diversification and liquidity creation, especially in the context of a large emerging economy such as China, remains extremely scarce. In the context of China, the banking industry occupies a dominant position in China's financial system and provides the primary liquidity for the macro-economy and the financial system. Although remarkable progress has characterized the reform and opening up of China's banking industry, reforms in the banking sector have lagged behind those in other economic sectors (Allen et al., 2008).

China's banking sector is still under strict government supervision as well as regulations regarding market access and the range of products. Bank profits primarily come from the net interest margin earning from traditional asset-liability operations rather than the non-interest income from non-traditional bank activities. Therefore, non-marketable risks proposed by Froot and Stein (1998) are particularly relevant for Chinese

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commercial banks. The bank function of liquidity creation is also partly constrained under the current banking regulatory system. Accompanied by more challenges on the traditional banking business activities and regulatory system, bank revenue diversification is supposed to expand at a rapid pace in China's banking sector.

Conversely, the lack of managerial expertise and the ineffective incentive schemes for managers to maximize stakeholders' wealth and provide their clients with outstanding financial services are characterized as the common weaknesses of Chinese commercial banks (Allen et al., 2013). The impacts and potential determinants of bank diversification are still open to debate. A bank that can create more liquidity may have management teams with more abundant managerial expertise and a stronger incentive mechanism for managers to meet the diversified demand of financial services for their customers. Consequently, the relationship between bank diversification and liquidity creation in a large emerging economy such as China is worthy of deep investigation.

Our aim in this paper is to investigate both the effect of bank diversification on liquidity creation and the effect of liquidity creation on bank diversification. Therefore, this paper will apply the empirical methodology of panel Granger-causality tests to test the relationship between bank diversification and liquidity creation by employing panel vector autoregression (VAR) models in a generalized method of moments (GMM) framework. Our study broadens the understanding of the determinants of bank liquidity creation and deepens the study of the relationship between bank diversification and liquidity creation.

We find that an increase in the degree of bank diversification between traditional bank activities and non-traditional bank activities reduces bank liquidity creation. However, an increase in the degree of bank diversification within non-traditional bank activities leads to an increase in bank liquidity creation. In addition, we do not find evidence of reverse causality between banks' diversification and liquidity creation for our full sample. Moreover, we find that the relationship between bank diversification and liquidity creation exhibits heterogeneity for banks with various characteristics.

The paper is organized as follows. Section 2 reviews the literature. Section 3 provides the relevant background of China's banking industry. Section 4 introduces the data, variable definitions, and methods used in the estimations. Section 5 presents the results of our causality analysis and robustness checks. Section 6 concludes the paper.

2. Literature review

There is now an emerging body of literature on the empirical measurement and determinant analysis for bank liquidity creation (Berger and Bouwman, 2009, 2015; Horváth et al., 2014; García-Posada and Marchetti, 2016; Berger and Bouwman, 2017). It is worth mentioning that Berger and Bouwman (2009, 2015, 2017) propose the first comprehensive measure of bank liquidity creation and further dig its relation with other financial instruments and phenomena such as monetary policy and financial crises. Horváth, Seidler, and Weill (2016) evaluate the effect of bank competition on liquidity creation by banks. They find that enhanced competition reduces liquidity creation. Li, Xiong, Chen, and Wang (2017) examine money creation process of the banking system when it is complying with the Liquidity Coverage Ratio (LCR). They conclude that there may be a credit contraction and even a significant reduction in money multiplier when the bank is regulated by the LCR.

Diversification in banking is also well studied.[1] A vast body of literature has emerged on the relation between bank diversification and risk-taking, business model, or financial performance (Stiroh, 2004; Berger et al., 2010; Li and Zhang, 2013; Meslier et al., 2014; Ahamed, 2017). Most empirical studies have focused on the relationship between bank diversification and risk-taking. Portfolio theory shows that diversification, which is the expansion of investments into activities that are not perfectly correlated, can decrease the risk of a portfolio. With respect to commercial banks, diversification is a portfolio concept, thus banks can be imagined as a portfolio of loans and we treat improved opportunities to diversify as an upward shift in the risk-return tradeoff facing a bank (Meslier et al., 2016). Importantly, managers can diversify by offering new products via nontraditional banking activities. This should reduce the risk that is specific to each activity and leave only risk that is common to all activities. Stiroh (2015) reviews a large body of research on the reasons why banks diversify. Taken together, these studies suggest that bank revenue diversification may be efficient and desirable, as it can reduce idiosyncratic risk and total risk. Diversification across products may improve the risk-return frontier by expanding the investment opportunity set.

Additionally, Froot and Stein (1998) argue that some risks are not marketable; risk associated with this type of illiquid asset is particularly relevant for financial firms. Santomero and Eckles (2000) suggest that the rationale for bank diversification in the financial services industry is to grow and realize efficiency gains via economies of scale and scope. Hughes and Mester (2002) argue that bank managers may prefer to diversify and reduce total volatility even if it is not in the best interest of shareholders. Sanya and Wolfe (2011) investigate the effect of revenue diversification on bank performance and risk. Their core finding is that diversification across and within both interest and non-interest income-generating activities decreases insolvency risk and enhances profitability. Shim (2013) finds that banks with high revenue diversity achieve capital savings. Meslier, Tacneng, and Tarazi (2014) find that a shift toward bank diversification increases bank profits and risk-adjusted profits in an emerging economy. In sum, bank revenue diversification may facilitate risk absorption, economies of scale and scope, a reduction in total volatility, capital savings, and increased bank profits, which may give rise to more bank liquidity creation, assuming bank risk is given via providing stronger financial foundations to meet depositors' demand of withdrawing funds at par value at a moment's notice and providing borrowers liquidity off the balance sheet.

On the other hand, many studies have identified the negative effects of bank diversification. Berger, Demsetz, and Strahan (1999), Milbourn et al. (1999), Bliss and Rosen (2001), and Aggarwal and Samwick (2003) discuss managers' diversification incentives related to empire building, corporate control problems, managerial hubris and self-interest. All of these incentives could lead to inefficient diversification, and the growing reliance on non-interest income may not be associated with reduced volatility in earnings (Stiroh, 2015). Furthermore, Berger et al. (2010) note that the existence of bank diversification discounts at least partially comes from the lack of managerial expertise of management and the ineffective incentive schemes for managers to maximize stakeholders' wealth. Therefore, in certain circumstances, bank diversification may disperse managerial resources and operating stability, which will lead to a failure to meet the liquidity demand of bank clients and damage bank liquidity creation. In general, whatever that is, the positive side or the negative side, we expect a significant impact of bank diversification on liquidity creation.

Reciprocally, the benefit of diversification is the motive of bank diversification strategy. Berger, Hasan, and Zhou (2010) argue that the benefit of bank diversification comes from abundant managerial expertise of top management teams and the effective incentive schemes for managers to maximize stakeholders' wealth. A bank that can create more liquidity may have management teams with more abundant managerial expertise and a stronger incentive mechanism for managers to meet the demand of depositors for liquidity and the demand of other customers for financial services. Therefore, more liquidity created by a bank may be accompanied by a higher benefit of bank diversification. Banks'

[1] Bank diversification mainly consists of revenue diversification and geographic diversification. In this study, we focus only on bank revenue diversification, which is defined in detail in the following section of this study, because of the absence of detailed local bank data with respect to product market diversification and liquidity creation. In addition, a locational factor is not the subject investigated in this paper.