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# Role of off-balance sheet operations on bank scale economies: Evidence from China's banking sector



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## ABSTRACT

This paper investigates product-specific scale economies of banks with respect to off-balance sheet operations. The cost benefits from the non-separability of outputs available to banks that imply the role of OBS activities on bank scale economies are also examined. We further test whether the role of OBS operations on bank scale economies changes across heterogeneous banks. Results suggest that banks can realize more scale economies by increasing OBS operations and that scale economies can be reaped particularly for non-state-owned banks. Therefore, diversification and deregulation should be included in the policy agenda for the subsequent marketization reform of China's banking sector.

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## 1. Introduction

In the last two decades, the product mix of banks worldwide has shifted dramatically from traditional on-balance sheet activities to nontraditional off-balance sheet (OBS) activities (Lozano-Vivas and Pasiouras, 2010). OBS activities, such as loan commitments, securitization, standby letters of credit, and derivative securities, have expanded rapidly and have resulted in substantial rise in the share of fee-based and other non-interest income to total income.

Commercial banks in Europe increased OBS activities from less than 50% of total outstanding loans in the early 1990s to 150% of loans in the early 2000s. A similar change has also occurred among banks in the United States (Bos and Kolari, 2013). In China, the Bank of China started OBS activities (originating from trusts and

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leasing transactions) in October 1979. Since the late 1990s, especially after China's entry into the World Trade Organization (WTO), the OBS activities of China's commercial banks have been expanding dramatically despite the separate-operation regulation of China's banking sector. As of 2013, the risk-weighted assets of OBS activities exceeded seven trillion RMB. Hence, as newly emerging banking activities, OBS operations have reached an important stage in China's banking industry. This development resulted from the banks' pursuit of enhancing the efficiency of using raised funds and the growing demand of the real economy for the non-traditional financial service.

Despite the reforms, opening up of its financial system, and significant achievements since joining the WTO, China's banking sector is still dominated by large state-owned banks, namely, the "Big Four" banks of ICBC, CBC, BOC, and ABC.<sup>1</sup> The dominance of the large state-owned banks implies low competition within the banking sector (Allen et al., 2013). In addition, China's banking sector is under strict government intervention as well as regulations on banking market access and range of products. Consequently, bank profits are due primarily to the net interest margin earning from asset–liability operations rather than the non-interest income from OBS activities. Compared with on-balance sheet business, the scale of OBS activities of Chinese commercial banks is small that, on average, the ratio of OBS business income to bank's total income is no more than 15% over the years, according to the "China Banking Development Report" of the China Banking Association. In light of the different sensitivity of bank activities, such as lending, investment, and OBS operations, to the banks' total costs so that the scale economies of banks will be affected by output mix both in terms of size and composition, fewer OBS activities have resulted in banks not performing in their optimal size.

Studies of economies of scale in banking address the question of whether banks produce the optimal output mix both in size and in composition (Allen and Rai, 1996; Berger and Humphrey, 1997; Cavallo and Rossi, 2001; Goisis et al., 2009; Kim, 1986). Scale economies are measured with respect to costs and refer to how the operation scale, that is size, is related to costs. Although a growing body of research supports the view that significant scale economies are present in banking (Mester, 2010), most studies overlook product-specific scale economies. In particular, empirical evidence, on the product-specific scale economies with respect to OBS items and its impact on the overall scale economies of Chinese commercial banks, remains extremely scarce.

To address the lacuna in recent literature on the scale economies of Chinese commercial banks, we examine the product-specific cost economies of scale with respect to OBS operations and other outputs. The cost benefits from the non-separability of outputs available to banks, which derive the role of OBS activities on bank overall scale economies, are also investigated. Further, we investigate whether the role of OBS operations on bank scale economies changes across heterogeneous banks with low profitability, small size, and non-state-ownership respectively. A Bayesian stochastic cost frontier approach is employed to estimate the empirical models. This method produces more exact small sample estimates, allows for easy incorporation of prior ideas and restrictions, such as regularity conditions, and incorporates formal treatment of parameters as well as model uncertainty. Moreover, policy implications of the empirical results for the diversification and deregulation of China's banking sector are further discussed. Our analysis is important in obtaining new findings concerning the bank scale economies and the effects of OBS operations on bank optimal size in the banking sector of a large emerging market economy.

We conclude that the scale economies for loans are almost constant with the volume of loans. The scale economies for other earning assets decrease with the increase in their sizes. However, the scale economies for OBS increase with the rise of OBS items after a temporary drop. Banks realize more scale economies by increasing OBS operations than by increasing other outputs. Furthermore, in view of the positive complementarities between OBS and other earning assets are greater than the negative complementarities between OBS and loans, increases in OBS operations contribute to overall scale economies for Chinese commercial banks. In addition, banks with low profitability, small size, and non-state-ownership can realize more scale economies by increasing OBS operations than by increasing other outputs. On average, the positive scale economies can be reaped particularly for non-state-owned banks.

This paper continues as follows. Section 2 provides the overview of the relevant literature on OBS activities and bank scale economies. Section 3 describes the OBS activities of Chinese banks. Section 4 presents the

<sup>1</sup> They are Industrial & Commercial Bank of China, Construction Bank of China, Bank of China, and Agricultural Bank of China, respectively.

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