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Assessing the strategic fit of potential M&As in Chinese banking: A novel Bayesian stochastic frontier approach☆

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ABSTRACT

Banking in China is well-known for being extremely fragmented, thus making the analysis of the sector not a straightforward task. This study aims to explore the strategic fit of potential mergers and acquisitions in the Chinese banking industry. When the operations of two banks are jointly analyzed this means that the inputs and the outputs of these two individual banks are somehow combined in an attempt to better understand the sector as a whole. A novel SFA model with Bayesian inference on input/output prices is proposed to assess the impact of business-related variables on efficiency levels. The results not only reveal that bank size, type, and origin present a significant impact on individual technical efficiency levels, but also exert a significant impact on the efficiency frontier of the industry. The strategic fit of M&As in the Chinese banking industry strongly relies on opportunities derived from banking automation that may arise from acquiring technologically obsolete small banks. Big and foreign banks also exert a positive impact on the technological catch-up of Chinese banks, which may suggest opportunities for sector deregulation.

1. Introduction

The term mergers and acquisitions (M&A) refers to the process of merging or acquiring all or part of another company's property rights. An M&A is carried out under certain conditions to obtain controlling rights. A merger or acquisition is an important strategic move made by a company to improve its enterprise performance management. Successful mergers can produce many gains such as cost savings, increased profits, upscaling, and freeing up abundant resources (Fried et al., 1999; Johnes and Yu, 2008; Halkos and Tzeremes, 2013; Peyrache, 2013). In the banking sector, for example, Chase Manhattan Bank and Hurray Bank merged in 1995 with the purpose of cutting operational cost as the two banks were near in geography and similar in operating business. After the merger, the merged bank saved US$1.5 billion in expenses, as a result of shutting down overlapped branches and laying off staff among other factors. Afterwards, Chase Manhattan acquired Hambrecht & Quist in 1999, and Robert Fleming and Beacom in 2000 for the same input-saving purpose.

As a matter of fact, banks are seeking optimal positioning of their activities in the market for converging to an optimal size. This explains their recourse to M&As to converge to that size. In this context, Halkos and Tzeremes (2013) noted that M&As enable banks to reduce their costs and improve their efficiency at the allocative and productive levels. Indeed, according to the industrial economy theory, it is often assumed that size is strongly linked to economies of scale. Actually, a size increase involves a lower unit cost due to the decrease in the mean fixed cost. In fact, according to Sassenou (1992), Halkos and Tzeremes (2013) and Halkos et al. (2016), there exists only one critical size that can minimize the unit production costs.

Another aspect that has an impact on the optimal size of the banking industry is related to the emergence of increased banking automation as a consequence of the IT revolution. Cost savings derived from large scale IT adoption in banking operations has positively contributed to the profitability of this industry by means of services scalability (Ho and Mallick, 2010). The effects of the IT revolution on the banking activity in terms of services scalability and, therefore, on the optimal scale size, had a clear

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implication on diminishing the competitive power of technologically obsolete small banks. This opened room for diverse forms of restructuration of the banking industry, which may range from network collaboration and joint ventures (Ho and Mallick, 2010) to M&As.

Specifically, with respect to M&As, there has been a growing number of studies examining the potential gains to be made from mergers in the bank sector based on the strategic fit of two banks (Halkos and Tzeremes, 2013; Gattoufi et al., 2014; Halkos et al., 2016; Shi et al., 2017). The underlying idea is that, in order to decrease the high failure rate of M&A activities, a bidder bank should try to identify suitable target banks prior to an M&A is to determine whether the prospective partner can offer synergies and the necessary relevant attributes to complement their operations (Wanke et al., 2016, 2017). The need to predict M&A outcomes has drawn the attention of many researchers (Gale and Shapley, 1962; Dietrich and Sorensen, 1984; Powell, 2001; Pasiouras and Gaganis, 2007), including those focused on efficiency measurement (Halkos and Tzeremes, 2013; Halkos et al., 2016; Shi et al., 2017). As regards efficiency measurement, this is often done by assessing the impact of contextual, business-related, variables of the bidder and target banks in terms of the individual efficiency levels of the potential merged banks and their impacts upon the efficiency frontier (Wanke et al., 2016, 2017).

Comparing to the previous research using the Data Envelopment Analysis (DEA) model (Halkos and Tzeremes, 2013; Shi et al., 2017), this research focuses on the strategic fit of potential M&As involving Chinese banks, taken two-by-two, by using a novel stochastic frontier model capable of simultaneously controlling the impact of contextual variables - of bidder and target banks - on the resultant technical change of the sector (frontier shift effect), productive change of the sector (catch-up effect), and on individual efficiency levels of the potentially merged banks. In other words, it is designed to pre-estimate the short-run efficiency gains of potential M&As.

Moreover, as a distinctive feature of the proposed stochastic frontier model is the use of a Bayesian approach for inferring how input and output capital and labor prices may vary after merging two individual banks. Most previous SFA (Stochastic Frontier Analysis) studies in banking have not only neglected the analysis of the impact of potential mergers on this sector (Kraft and Tırtıroğlu, 1998; Kohers et al., 2000; Okeahalam, 2006; Sun and Chang, 2011; Tabak et al., 2013; Mamatzakis et al., 2015), but also failed short in a more systematic research approach to M&As in China (Fu and Heffernan, 2007; Berger et al., 2009; Fungáčová et al., 2013; Jiang et al., 2009; Sun et al., 2013; Dong et al., 2014; Hsiao et al., 2015; Silva et al., 2017; Chen et al., 2018). These two aspects suggest a literature gap to be filled.

The relevance of this study also relies on the uniqueness of the Chinese banking industry, which is singular for several reasons. First, it is one of the largest and most sophisticated in Asia. More and more, Chinese banks rank in the Top 1000 world banks in the list of *The Banker*. According to the statistics of *Financial Times*, the total assets of the Chinese banking industry, excluding the shadow banks, has amounted to US$ 33 trillion by the end of 2016. Meanwhile, commercial banks have played a much more important role in the financial system of China, similar to the case in Japan and Germany. Second, Chinese commercial banks have continually experienced different waves of reforms when the economy of China began to implement the “open-up and reform” policy since 1978. More importantly, during the recent turn of reform after 2001 when China became part of the World Trade Organization (WTO), M&As have been one of most significant aspects when these banks started to improve the governance and enhance their competitiveness through joint-stock reform (Barros et al., 2011; Pessarossi and Weill, 2015). Lastly, to our best knowledge, in the expected future, M&As will still be one of development themes for the banking system as dozens of banks have been established in recent decades (Fernández-Arias et al., 2017). The outbreak of a global financial crisis and the flourishing of internet Finance have also driven some banks to the edge of bankruptcy. This research and its policy implication will help the future reform to further improve the development of Chinese banks.

Therefore, the motivations for the present research are as follows. Firstly, although the last wave of financial reform has given rise to M&A events in the banking industry of China, there is nearly no research that has paid attention to this issue. This paper intends to examine the potential efficiency gains from M&As for the Chinese banking industry. It provides a useful strategic tool for policy-makers to pre-evaluate possible M&A decisions based on performance criteria that are measured in terms of efficiency gains (Halkos et al., 2016). To the best of our knowledge, it is also the first work that analyzes the potential M&As in the case of China. Secondly, most of the studies on banking M&As have used the “efficiency hypothesis”, which is based on the realization of economies of scale and other efficiency gains in the merged bank (Craig and Dinger, 2009; Halkos and Tzeremes, 2013; Du and Sim, 2016). However, some other researchers provide exactly opposite results for some other countries (DeLong and DeYoung, 2007; Du and Sim, 2016). It is worth examining China's specific situation. Meanwhile, in contrast to these conventional studies that comparing pre- and post-merger bank performances, this paper employs the potential M&As to display the scenarios of the gains from an ex ante perspective.

This paper is structured beginning with this introduction and then presents the contextual setting, which includes a description of the Chinese banks. The literature survey is then presented followed by the methodology section in which the novel SFA model is presented. Section 5 presents the data and discusses the results. Conclusions are given in Sections 6.

2. Contextual setting

With the rapid development of Chinese banks, M&As have always dominated the reform and structure change. Before 1978, the People's Bank of China (PBC),[1] which was set up by merging existing banks in 1949, functioned as a central bank as well as a commercial bank. In other words, it was characterized as a mono-bank (Barros et al., 2011). Later when China switched from a central-planned economy to a market-oriented economy, the government authorities decided to reestablish or establish four specialized banks (SBs), which are the Agricultural Bank of China (ABC), the Bank of China (BOC), the China Construction Bank (CCB)[2] and the Industrial and Commercial Bank of China (ICBC). All these banks came out of the PBC except for the CCB, which came from the Ministry of Finance, and operated respectively in the agricultural area, the foreign exchange area, the fixed assets investment area, and the industrial and commercial area.

With the reform accelerated, the government started another wave of restructuring. For example, in 1994, the government founded three policy banks[3] to take over the policy-related business from the four SBs in order to transform the latter into commercial banks, which are characterized as market-functioning modern companies for profit (Barros et al., 2011; Pessarossi and Weill, 2015). After the Asian Crisis, four asset management companies (AMC) were established by the government to strip off many bad loans from the four SBs. Since 1986, the authorities have successively approved the founding of several joint-equity commercial banks, including national joint-equity commercial banks as well as regional commercial banks,[4] so as to decrease the monopoly power of the four SBs in the financial market.

In the last two stages of the reform, the M&As and restructuring were controlled and manipulated by the government. When the Chinese

[1] The PBC was not separated from the Ministry of Finance of China until 1978.

[2] The Bank of China was originally set up in 1905, the Agricultural Bank of China in 1951, and the China Construction Bank in 1954.

[3] I.e., the China Development Bank, the Export-Import Bank of China, and the Agricultural Development Bank of China.

[4] According to statistics from the China Banking Regulatory Commission (CBRC), there were 5 state-owned commercial banks, 12 joint-equity commercial banks, and 133 city commercial banks by the end of 2015.