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# Market structure, risk taking, and the efficiency of Chinese commercial banks

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### ABSTRACT

We investigate the impacts of market structure and bank risk taking on the efficiency of Chinese commercial banks, employing a two-stage semi-parametric data envelopment analysis model. Our empirical results show that the intense market competition compels Chinese commercial banks to develop advanced technical experience and skills, thus improving their technical efficiency. Besides, the technical efficiency is positive associated with the risk taking. Since more risk taking implies a credit expansion of Chinese commercial banks based on the soft risk constraint, the improvement of technical efficiency may accompany an accumulation of banking risks in the current financial system of China.

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## 1. Introduction

Remarkable progress has characterized the reform and opening up of China's banking sector to foreign competition following the country's entry into the World Trade Organization (WTO) in 2001. However, reforms in the banking sector have lagged behind those in other economic sectors. In particular, Chinese commercial banks have faced numerous challenges in their attempt to realize stable development.

China's banking industry opened its doors to the world with the implementation of the Regulations of the People's Republic of China on Administration of Foreign-funded Banks on 11 December 2006. This move resulted in the emergence of more challenges, further stimulating the intense competition in the

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entire banking industry. In addition, since the end of 2007, the global financial crisis has disrupted the stability of the world financial markets, but China's banking sector has apparently experienced limited impact. Nevertheless, the business model of Chinese commercial banks is being questioned now more than ever, especially in terms of their main profit sources (i.e., interest margin and arbitrary charges for ordinary customer services).

Therefore, the ability of Chinese commercial banks to perform efficiently needs to be improved, especially under the influence of double shocks caused by increasing competition in the global banking industry and the global financial crisis in recent years. [Naceur and Omran \(2011\)](#) already investigate the impacts of bank concentration and regulation on commercial banks' efficiency across a broad selection of Middle East and North Africa countries. [Pessarossi and Weill \(2013\)](#) had begun to be concerned about the effect of capital risk on Chinese banks' efficiency, while [Fungacova et al. \(2013\)](#) find that no significant relation between competition and efficiency for a sample of Chinese banks, which differs from the results generally observed for other countries. Although a number of studies have concerned the determinants of Chinese bank efficiency, the effects of market structure and risk taking, including capital risk, credit risk, and liquidity risk, on the bank efficiency still remain an important, yet largely unexplored, financial issue, which motivates our study in this paper.

[Allen et al. \(2007\)](#) provide a comprehensive examination on all aspects of China's financial system. They principally conclude that China's financial system is dominated by a large, inefficient banking sector. Despite the entry and growth of many domestic and foreign banks in recent years, China's banking sector is still mainly controlled by large state-owned banks. In addition, continuing efforts to control the risks of the major banks within normal levels, thereby avoiding a banking crisis, are the most important aspect of reforming the country's banking system. Hence, against this background, we investigate the impact of market structure and risk taking on the efficiency of Chinese commercial banks.

Market structure is one of the factors that may explain some of the efficiency differences that remain after controlling for the efficiency concept and measurement method ([Berger and Mester, 1997](#)). Especially in China, banking sector reform as part of the reform of the entire financial system is carried out predominantly by the Chinese government, indicating that the change in market structure in China's banking industry is almost entirely exogenous. Therefore, there is a good opportunity to investigate the effect of the change in market structure on the efficiency of Chinese commercial banks.

Commercial banks can solve the potential moral hazards and adverse selection problems caused by the imperfect information between borrowers and lenders. These banks assess and manage risks, write contracts, and monitor contractual performance. The ability of banks to efficiently perform also depends in part on their amount of risk taking ([Hughes and Mester, 2010](#)). Moreover, the amount of risk taking reveals their strategic niche, which is one of the important potential correlates of bank efficiency ([Berger and Mester, 1997](#)). In recent years, the regulatory authorities have increasingly focused on the risk management of Chinese commercial banks, but the bank risk constraint is still soft derived from underlying credit guarantees by the government. Thus, another motivation of the current study is to examine the impact of risk taking on the bank efficiency.

Aside from these studies on the banks in developed countries, efficiency research on commercial banks in China has become increasingly popular in recent years. The two most frequently used approaches are stochastic frontier analysis (SFA) and data envelopment analysis (DEA) methods. The SFA approach requires a specific functional form, which may be unsuitable for the data during the industry transition period ([Yao et al., 2008](#)). Although the banking industry in China has undergone dramatic changes, many papers have used the DEA approach to estimate technical efficiency, and sometimes examine the impacts of some environmental variables on the efficiency estimates ([Luo et al., 2011](#); [Sufian and Habibullah, 2011](#); [Yao et al., 2008](#); [Ye et al., 2012](#)).

However, [Simar and Wilson \(2007, 2011\)](#) argue that the conventional two-stage DEA approach to inference employed in these papers is invalid due to complicated, unknown serial correlations among the estimated efficiencies. To obtain a valid statistical inference, they propose a two-stage, semi-parametric model in which second-stage regressions are well-defined and meaningful, such that the form of the second-stage regression equation is determined by the structure of the model in the first stage where the initial DEA estimates are obtained. Empirical studies examining the determinants of the efficiency are abundant. Nevertheless, to our knowledge, papers that use a two-stage, semi-parametric model to investigate the impacts of market structure and risk taking on the technical efficiency of Chinese commercial banks have

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