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Indian bank efficiency and productivity changes with undesirable outputs: A disaggregated approach

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ABSTRACT

The objective of this study is to examine technical efficiency and productivity growth in the Indian banking sector over the period from 2004 to 2011. We apply an innovative methodological approach introduced by Chen et al. (2011) and Barros et al. (2012), who use a weighted Russell directional distance model to measure technical inefficiency. We further modify and extend that model to measure TFP change with NPLs. We find that the inefficiency levels are significantly different among the three ownership structure of banks in India. Foreign banks have strong market position in India and they pull the production frontier in a more efficient direction. SPBs and domestic private banks show considerably higher inefficiency. We conclude that the restructuring policy applied in the late 1990s and early 2000s by the Indian government has not had a long-lasting effect.

1. Introduction

In the last two decades empirical research on Indian bank efficiency and productivity has attracted a considerable attention among academics and practitioners. Numerous studies have been published on bank performance that include, for example, Casu et al. (2013), Das and Ghosh (2006), Sensarma (2006, 2008), Das and Shanmugam (2004), Kumbhakar and Sarkar (2003), who among others examine bank efficiency and productivity growth of the Indian banking sector, mostly during the 1990s and early 2000s.

Despite extensive and numerous research, we identify a gap in recent academic research on bank efficiency and productivity in India. In particular, there is a lack of recent empirical studies that analyze the changes within the Indian banking sector in the second half of the 2000s, i.e. after the liberalization and consolidation process. In addition, the Indian banking system faces the problem of deteriorating balance sheets because of the growing volume of non-performing loans (NPLs) and the direct impact of NPLs on bank performance has not yet been addressed in recent literature. We also try to provide a deeper and more profound analysis of how individual inputs and outputs affect bank efficiency and productivity. Such an analysis is important for policy-makers, since it can disclose the main shortcomings within the individual banks and the system as a whole. This important issue has been neglected in banking studies, see, for example, Barros et al. (2012) and Assaf et al. (2013). The analysis of NPLs helps to disclose and recognize the problems within the system that could lead to the implementation of an appropriate regulatory framework. These changes could restore sound and efficient functioning of the Indian banking sector.

We examine technical efficiency and productivity growth in the Indian banking sector over the period from 2004 to 2011. In doing so, we apply an innovative methodological approach introduced by Chen et al. (2011) and Barros et al. (2012), who use a weighted Russell directional distance model (WRDDM) to measure the technical inefficiency of Indian banks. We further modify and extend the model by measuring also total factor productivity (TFP) change. The uniqueness and contribution of this approach lies in resolving technical difficulties involved in the empirical analysis of how to disaggregate and quantify the contribution that individual components (outputs/inputs) have on bank efficiency and TFP change. The model is based on directional distance function, which we estimate in linear form. This has the attractive advantage of easy computation and incorporates undesirable outputs into the model.

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Thus, we disaggregate and quantify the impact not only of NPLs but all the individual inputs/outputs on bank efficiency and TFP change. This is a new element in studies on bank efficiency in general, and an important contribution to current research on Indian bank efficiency and productivity in particular. The attempt to examine bank efficiency and productivity growth in this way is reinforced by the rapidly increasing volume of NPLs on Indian bank balance sheets. Furthermore, contemporary research on bank productivity has focused so far on the decomposition of TFP into Technical Change (TECHCH) and Efficiency Change (EFFCH).

We summarize the contribution of this study as follows. First, we examine the nexus between NPLs and bank efficiency that allows us to quantify the impact of NPLs on bank efficiency. Secondly, we provide a comprehensive analysis of the effects of individual bank inputs/outputs on overall banking efficiency and productivity. The decomposition of total technical efficiency and TFP, TECHCH and EFFCH by taking into account the contribution of the individual inputs and outputs is a key contribution to current research on bank efficiency. Third, the empirical analysis is the first of its type applied to the Indian banking sector that examines bank efficiency and productivity changes after the extensive bank consolidation process in the 1990s and early 2000s. We examine the period from 2004 to 2011. Furthermore, we introduce the concept of firm "innovator" (Färe et al., 1994) into our analysis. We quantitatively identify the best practice that move the production frontier upward. The discussion about this concept is in Section 4. Finally, we outline the policy implications of our findings.

The remaining parts of this paper are organized as follows: Section 2 provides an overview of the Indian banking industry, highlighting all the recent trends and challenges. Section 3 provides an overview of the literature, focusing on all the current gaps and reinforcing the contributions of this study. Section 4 describes the model and method of estimation. Section 5 discusses the data set and empirical results. Section 6 summarizes findings and concludes.

2. Indian banking system: an overview

The banking system in India has undergone complex transformation over last five decades. The sector experienced several conflicting development phases. In the 1950s, free and relatively liberal banking was gradually nationalized. This process was started by the transformation of the Imperial Bank of India into the State Bank of India (SBI). SBI's main objective was gradually to take over additional private banks in order to introduce the imposed policy of administratively allocated credits into sectors like agriculture and small businesses. The banking sector has become severely repressed through strict entry controls, interest rate controls and reserve requirements, among others restrictions. Furthermore, the nationalization of the banking sector was extensive. Sixteen commercial banks were nationalized in 1969 and a further six in 1980.

The banks that currently perform business activities in India can be divided into the following groups: public-sector banks, which include also private capital that is, however, rather marginal, purely privately-owned banks and banks with foreign capital. Along with these banks there are also regional rural banks and co-operatives.

Administrative regulation of the Indian banks substantially reduced competitiveness pressures. In terms of total assets, the market share of state-owned banks was more than 90 per cent. Such a deformed market structure marginalized the activities of private and foreign commercial banks. The lack of market pressures and competition led to inefficient credit allocation by state-owned commercial banks. This was later reflected in the deterioration of bank balance sheets. Particularly, there has been an increase in the volume of NPLs, bank profitability dropped and consequently banks became undercapitalized.

In the 1980s, it became evident that the over-regulated and inefficient Indian banking system was not able to respond to the fast growing economy. This fact was recognized by Narasimham Committee reports in 1991 and 1998, see Narasimham (1991, 1998). The Committee addressed the main shortcomings of the Indian banking sector and outlined banking reforms. The Indian banking sector has undergone several important phases of restructuring in last two decades.

In the 1990s, the government recognized that structural, legal and institutional bank reforms were essential for further economic development. The Indian banking system has gradually been deregulated, opened to new domestic and foreign banks and formerly state-owned banks were partially privatized, recapitalized and consolidated. The stability of the state-owned banks has been undermined by an increase in NPLs. These key reforms were aimed at the improvement of bank competitiveness, performance and anchoring stability within the banking system. The changes focused on the deregulation of the banking sector, particularly credit control allocation along with interest rate control on deposit and loans. The banking sector was also gradually opened-up to new entrants – both private and foreign banks. An integral part of this reform was the extensive recapitalization of state-owned banks. Herd et al. (2011) indicate that overall INR 204 billion was spent on banking consolidation during the 1990s, which corresponds to 1.5% of GDP in 2009.

The second stage of reforms reflected the recommendation of the second Narasinham Committee on Financial Sector Reforms in 1998. These changes were intended to restore the stability of the banking system through improved banking regulation, imposing the minimum standards on capital adequacy, increase competitiveness and efficiency. As a consequence of these measures, there has been a wave of mergers and acquisitions among banks. Some of these mergers and acquisitions were conducted on market principles but in many cases the government 'assisted' in this consolidation process.

Herd et al. (2011) argue that the government has to continue the recapitalization of the banking sector and that between 18 and 20 State Public Banks (SPBs) will require further financial assistance. As for the privately-owned banks it is also expected that additional capital is needed to stabilize particularly small-sized private banks. Herd et al. (2011) further show that the government prepared the provision of INR 165 billion for the recapitalization of PSBs in the 2010–2011 Budget. These resources are in addition to INR 31 billion spent in the period 2008–2009.

Although the bulk of poor quality assets on the balance sheets has been written off, new NPLs have been accumulated. This problem was reinforced by the fact that the provisions against NPLs were only 46 per cent in 2010. The regulator responded to the low level of provision by increasing provisioning requirements to 70 per cent by the end of 2010. It is evident that the current level of NPLs could eventually lead to systemic risk in the sector, unless the government does not step in. It is evident that the balance sheets of SPBs have again gradually deteriorated, particularly in terms of outstanding loans.

3. Literature review

In the following Section, we provide a brief overview of empirical studies on the performance of Indian banks. The second part of the review summarizes and outlines the current development of methodological research in estimating efficiency and productivity in general. And we show how our methodology contributes to