

ECONOMICS SERIES

SWP 2008/25

**A Comparative Study of Banking in China and India,
Nonperforming Loans and the Level Playing Field**

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Abstract

This paper compares the operative performances of the banking institutions in China and India, taking into account the contentious issue of institutional differences in banking sectors in these two economies, reflected in the generation of non-performing loans. The study also examines the issue of the use of banks to provide countervailable subsidies to exporting organizations. Our results show that the efficiency differences between banks in these two countries can be directly related to their institutional differences.

Key terms: Technical efficiency; Non-performing loans; Subsidies.

JEL Classification: G 21.

1. Introduction

Rapid economic growth of India and China and their significant contribution to international economy, has made comparative analyses of these two countries quite common these days (Farrell, Khanna, Sinha, Woetzel 2004; Ernst and Young, 2006;

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Bussière and Mehl, 2008; Bosworth and Collins 2007, Roland 2007; Aziz, 2008). Using a growth accounting framework, Bosworth and Collins (2007) compared economic performances of India and China by examining contribution of inputs and productivity growth for the aggregate economies as well as for agriculture, industry and services over the period 1978-2004. Aziz (2008) using growth model compared the real and financial sector linkages in China and India and concluded that for evaluating China's and India's economic performance, an understanding of financial institutions is crucial. Similarly, Gamble (2005) tried to compare China's Construction Bank and India's ICICI Bank (formerly Industrial Credit and Investment Corporation of India). However, all these studies ignore the institutional differences between these two countries and tend to compare these two countries as if they are similar in all respects concerning their institutional and regulatory set up and their developments.

Banking institutions are critical financial intermediaries for economic growth. At times, and especially in developing economies, banks are also prone to legal and political interventions leading to distortion in international economy. Access to finance is the most critical component of any firm's operations and a lopsided access has a potential to distort the level playing field of industries operating in international business (Helleiner, 1992). The Basel I Accord (the Accord on the International Convergence of Capital Measures and Capital Standards) requiring reserve capital of at least eight percent or more of the risk-weighted assets of a bank followed by Basel II (the New Basel Capital Accord) requiring internal ratings-based (IRB) capital (Claessens, Underhill and Zhang, 2008; Jokivuolle and Vesala, 2007) are the two international attempts to introduce such level playing field (Basel Committee on Banking Supervision 2006; Chakraborty and Linda, 2007).

While the Indian banks are mainly profit oriented, the Chinese banks are operationally closely related to the Chinese government's budgeting operation (Bonin and Huang, 2001; Chiu and Lewis, 2006). Thus the banking practices in these two countries are quite different. While the Chinese commercial banks have mainly extended loans to the Chinese State owned enterprises (SOEs) (Lardy, 1999), the Indian banks are more commercial in nature although there are governmental stipulations for priority sector advances. Similarly, the way the non-performing loans (NPLs) have been dealt with in these two countries are also quite different due to the differences in governmental, economical and legal institutional set ups existing in these two countries.

Banking institutions can also act as significant facilitators of exports and thus banking practices occupy a very important place in the Agreement on Subsidies and Countervailing Duties (ASCD) because of their sensitivity in providing direct financial subsidies. In every action taken by or against Members of the World Trade Organization (WTO) such as the USA, the EU, Japan, India etc. involving countervailing duties, benefits provided by banks through favourable loans have been the most contentious issue (WTO 2005, 2007). In recent years, the most important example of banks providing subsidies is in the case of Dynamic Random Access Memories (DRAMS) manufactured by Hynix from Korea where the USA, the EU and Japan all imposed countervailing duties on imports of DRAMS from Korea exclusively on the basis of Korean banks alleged favourable treatment to Hynix through loan waivers, loan postponement or even changes in the interest rates of such loans. Korea took each and every decision of these governments before the WTO's Dispute Settlement Body (WTO 2005, 2007).

Although NPLs connote a financial asset of a bank, assets which have stopped earning expected returns, they also reflect adversely on the productivity of the banks, the corresponding industry and the nation harbouring such assets. Viewed from this perspective, the NPLs are the products of the social, economic, financial and legal institutions of a country. The NPLs are generated because of infirmities in the debt recovery process, inadequate legal provisions for bankruptcy, judicial limitations in getting court orders and in the execution of court decrees (Bhide, Prasad and Ghosh, 2001). A precise quantification of NPLs is difficult because of the tendency of banks to hide their weaknesses (Chipalkani and Rishi, 2007).¹ One of the reasons for this confusion is the non-uniformity in the classification and the consequent definition of NPLs. According to the International Monetary Fund, "A loan is nonperforming when payments of interest and principal are past due by 90 days or more, or at least 90 days of interest payments have been capitalized, refinanced or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons – such as a debtor filing for bankruptcy - to doubt that payments will be made in full."² However, those loans which are not returned or are allowed to be recycled provide the banks not only with extra assets on their balance sheet but also with extra profits on their profit and

¹ Chu's (2008) report on China's financial system put the total amount of troubled debt at roughly US\$700 billion which is more than four times the official figure of US\$ 164 billion. Fitch's figures include 'special mention' loans and other problem loans which are not officially classified as "nonperforming."

² In Bloem and Freeman (2005), p. 2

loss account (Xu 2005; Chiu and Lewis 2006; Aziz 2008). Such non-returned loans can also help firms, having such access to fund, an extra advantage particularly in the international market where they can act as direct export subsidies (Dwight 2004; Aziz 2008).³ Scholars even discussed subsidy provided to the bank deposit insurance in the case of the Chinese banking as having moral hazard effects (Ketcha, 1999).

In this article, we have examined the operative performances of the banks in China and India taking into accounts the generation and disposals of their NPLs to reflect the institutional differences in these two economies. Using a non-parametric technique, the efficiencies of the banks have been assessed from 2002 to 2005, which was the period when the banks were undergoing major reorganizations in both countries. So far, most of the studies comparing India and China (Farrell et al 2004, 2006; Saez, 2004; Bosworth and Collins, 2007; Roland, 2007; Tseng & Cowen, 2007; Bussière and Mehl, 2008), did not take into account the related institutional developments in these two countries. This study contributes to the literature by comparing efficiencies of the banking sector of India and China taking into account the institutional aspects of their development. This study is expected to lead to a significant insight not only into the comparative efficiencies of the banks, but also into other factors affecting vital financial intermediation. Results suggest that Chinese restructured banks recorded continuing decline in their efficiencies over the study period. Two Indian banks, State Bank of India and ICICI have shown consistent performance as the most efficient banks.

The remainder of the article is arranged as follows. The section 2 provides an overview of the NPLs and restructuring processes in Indian and Chinese banking sectors. Section 3 discusses the analytical models used for efficiency estimates of the banks and the data used for the study. Section 4 discusses the empirical evidence on efficiency of the banks, with special reference to their NPL adjusted operative performances. Section 5 concludes.

2. Overview of Banks and their NPLs in China and India

³ It is not possible to quantify NPLs in the circumstances such as those prevailing in China and India. Particularly in the case of China, the nonperforming loans data were not released for quite a long time and are not available consistently (Bonin and Huang, 2001). First official report of NPLs in China was issued only in 2003 by People's Bank of China.

2.1 NPLs in Chinese Banks and Infusion of funds by the Chinese Government⁴

China has four major banks, of which three have become public limited banks with the issue of shares. These three are Industrial and Commercial Banks of China (ICBC), China Construction Bank Corporation (CCBC), and Bank of China (BOC), whereas Agricultural Bank of China (ABC) still stays at its old format. A number of foreign banks entered into the Chinese recapitalization process through the purchase of privately placed shares. Other Chinese government owned banks such as China Communications Bank, China Merchant Bank (CMB) and China Citic Bank (CCB) have also raised funds from the Hong Kong and Shanghai Stock Markets in recent times. Apart from these banks, China has 12 Joint Stock Commercial Banks (JSCB), more than 100 city commercial banks, a number of rural cooperative banks, rural commercial banks, and foreign banks. China also has three policy banks and a large number of urban and rural credit cooperatives (Okazaki, 2007).

China's six major banks have raised more than US\$ 50 billion through international public offerings since mid-2005 (Reuters, 2007). The Chinese loans have grown at a compound annual growth rate of 15.6 per cent and the deposit at the rate of 18.1 percent in the last five years (CITIC, 2007). In China, banks and the stock markets provide limited finance at present and the percentage of self-raised funds comprises a very significant proportion of the investment. Despite this, the banking practices in China may have provided Chinese industries and Chinese banks with unusual advantages (Allen et al 2007, Aziz, 2008).

In its attempt to modernize its financial institutions, the Chinese government started the process of restructuring of its banks. Table 1 outlines a list of these policies. The process of restructuring started with the issue of RMB 270 billion in Special Government Bonds in August 1998 (Table 1). The banks could buy the bonds after the Chinese government reduced statutory reserve requirement from 13 to 8 percent (Xie, 1999). The government then injected all the bond proceeds in their four major banks thereby virtually doubling their capital base. These bonds have left scholars perplexed as till now there is no sign of payment of any interest on these bonds. This was followed in 1999 by the establishment of the four Asset Management Companies (AMCs) to which NPLs worth RMB 1.4

⁴ Figures pertaining to China have been given in RMB with 8 RMB= 1 US dollar. Figures pertaining to India have been given in Rupees with 40 Rupees = 1 US dollar. (Rupees One crore = 10 million).

trillion (US\$173 billion) or 20 percent of the total loan balance at that time were transferred at par value (Ma, 2006). These NPL transfers in 1999 were claimed to be restricted to those loans incurred before the end of 1995 (Ma and Fung, 2002). To complete this transaction, AMC's issued bonds to the four banks. Although the rate of interest is mentioned in the corresponding documents, but so far, it appears that no interest has been paid at all. Moreover, the 20 percent cash recovery rate claimed by the AMC's would not be able to cover the interest payment on these bonds and PBC loans assumed by the AMC's (Ma, 2006, p. 23; Li 2008).

TABLE 1: POLICY SCHEDULE FOR CHINESE BANKS

| | |
|------|---|
| 1998 | <i>RMB 270 billion (US\$33 billion at 1998 exchange rates) injected in equity capital in 1998. This equity was raised by the government by selling bonds to the banks and payment for such buying came when the Chinese government lowered the capital adequacy ratio to 8 percent from 13 percent.</i> |
| 1999 | RMB 1400 billion (us\$ 169 billion at 1999 exchange rates) were transferred to AMC's. This constituted roughly 20 percent of the total loans at that time. AMC's also assumed the banks' liabilities to the People's Bank of China. Early recovery rates on the bad loans were 30 percent which later fell to 15 to 20 percent. |
| 2003 | US\$ 45 billion of the People's Bank of China were endorsed to China Construction Bank and the Bank of China to increase their formal capital in 2003. |
| 2004 | The PBOC bought RMB 320 billion (US\$ 39 billion) of NPLs from China Construction Bank and Bank of China at half their book value. The Chinese Ministry of Finance wrote off RMB 320 billion of its equity stake in these two banks. |
| 2005 | US\$ 15 billion in foreign currency was transferred to ICBC as capital through Huijin (April 2005). The Chinese Finance Ministry wrote down RMB 170 billion (US\$ 20 billion) amounting to one third of its existing equity in ICBC and injected another RMB 124 billion (US\$ 30 billion) in new capital. The PBOC also bought RMB 460 billion (US\$ 56 billion) in NPLs at par. In addition, RMB 246 billion (US\$ 30 billion) were put in a joint MOF/ICBC special purpose receivable account. The aggregate allowance for impairment loss of RMB 567 billion was reversed and credited to the capital reserve as a contribution of capital. |
| 2007 | China Everbright Bank received RMB 20 billion (US\$ 2.7 billion) capital injection in 2007 from Huijin which has become a subsidiary of the China Investment Corporation (Martin, 2008) |
| 2008 | Central Huijin again injected RMB 130 billion in Agricultural Bank of China in 2008 (Yuzhe and Xiu, 2008). |

Source: Ma (2006); Setser (2007), Martin (2008), Prospectuses and annual reports of ICBC, CCBC and BOC.

The transfer to the AMC's was followed by the endorsement of US\$ 60 billion of Chinese government's reserve invested in the USA to China CCBC (US\$22.5 billion), BOC (US\$ 22.5 billion) and to ICBC (US\$ 15 billion). In 2004, another RMB 780 billion (US\$ 96 billion) worth NPLs were transferred by CCB, BOC and ICBC to AMC's through a

number of transactions involving the People's Bank of China (PBC). First RMB 320 billion in NPAs was bought by PBC from CCBC and BOC at half of their book value and then transferred to the AMCs for 30-40 cents to a dollar (Table 1). In 2005, PBC bought another RMB 460 billion from ICBC at par value and then transferred to the AMCs for an average of 26 cents for a dollar. The PBC has apparently made a loss of RMB 400 billion (US\$ 50 billion) or as Ma (2006) puts it, some 20 times more than its own capital.

There appears to be certain discrepancies regarding the quantity of NPLs in Chinese banks. As per the China Banking Regulatory Commission (CBRC, 2008), the percentage of NPLs in Chinese banks is around 6.17 per cent. Ernst and Young's study on May 2, 2006 claimed that the NPL percentage in the contemporary Chinese loans would be more than 32 percent of total loans (Ernst and Young, 2006). Pei and Shirai (2004) have done their own calculations. Other scholars such as Setser (2006) have also provided estimates ranging from 37 percent in 2002 to 24 percent in 2005, provided there is no fresh addition to NPLs.

According to Ma (2006), the cost of restructuring of the Chinese banks assuming that there are no further problems with these banks would come to staggering 30 percent of the China's GDP. While discussing bailout policy of Chinese banks, Mundaca and Quifeng (2005) critically observed that "What is then at risk is the insolvency of virtually the entire banking system. Risk, return, effort and capital adequacy have meant nothing for Chinese banking industry." (Mundaca and Quifeng, 2005, p. 2).

2.2 NPLs in India and Infusion of Funds by the Indian Government

The Indian banking industry comprises nationalised banks, old private banks, new private banks and foreign banks (Banerjee *et al*, 2005). The importance of public sector banks has been coming down in recent years but they still command major share of banking activities. The Reserve Bank of India (RBI) is the central bank responsible for the control and operations of others banks, including managing the money supply. The Bank Nationalisation Act of 1980 named as the Banking Companies (Acquisition and Transfer of Undertaking) Act, 1980, stipulates that the Indian government's equity in nationalized banks cannot fall below 51 percent. This act also restricted the holding of foreign financial institutions at 24 percent in Indian banks. This governmental control apparently brought the banks under constant vigilance scrutiny and led to a high degree of underlending (Chakrabarti, 2005).

The percentage of bank loans to GDP in India is less than 50 percent and suggests low credit penetration (Nitsure, 2007). The credit deposit ratio is hovering around 50 percent whereas it should have been around 70 percent (Naik, 2002). The underlending is also evidenced by the Indian banks' investment in government securities, which was more than Rs. 1,000 billion (or approximately US Dollar 25 billion) in the year 2000 (Naik, 2002). Loans of the Indian banking sector have grown seven times between 1995 and 2007 (from Rs. 5984 billion to Rs. 45,372 billion). Unsecured consumer loans, capital market exposure and real estate lending comprise less than 10 percent of total loans (Nitsure, 2007). Banks in India are required to lend at least 40 percent of their loans to the designated priority sector such as agriculture and small scale industries (SSI) at an interest rate no more than 4 percentage points above their prime lending rates.

Amounts of NPLs seem to be also understated in India (Topalova, 2004). The Tarapore Committee report suggests an acceptable figure of around 13.7 percent in 1997 which was recommended to be brought down to 5 percent by the year 2000. The Narasimhan Committee (RBI, 1998) suggested transfer of NPAs to Asset Reconstruction Company (ARCs) on the realizable value of NPLs and issue of "NPA Swap Bonds" (Bhaumik and Piess, 2004). The government was supposed to guarantee these bonds issued by the ARCs. Another committee was formed to suggest how to improve weak public sector banks called Verma Committee which prepared guidelines for restructuring of ARCs (RBI, 1999). Unlike China, Indian NPLs have not been generated through extending loans to state-owned enterprises (Muniappan, 2002; RBI, 2007).⁵ The involvement in share market speculation by Indian banks also led to the generation of NPLs. The disposal of these NPLs also took an entirely different route.

The Indian government has always been supportive of banks possibly to enhance the depositors' confidence in banks and has been injecting funds to support the system. These infusions are mostly merger of failed banks with larger banks although there have been certain liquidations since 1969. Banerjee *et al* (2005) identified 21 cases of such bank failure. In recent years, India has established one ARC (India) Limited (ARCIL) to deal with NPLs of Indian banks. In addition, the RBI has granted registration to six more ARCs (PriceWaterhouseCooper, 2008). This was facilitated by the enactment of the

⁵ According to Muniappan (2002) until March 2001, the NPLs attributed to the Indian state owned enterprises was less than 2.5per cent of total NPLs, whereas RBI (2007) calculated this ratio to be less than 1.3 percent in 2006.

Securitisation and Reconstruction of financial Assets and Enforcement of Security Interest (SARFAESI) Act (Chakrabarti, 2005). The Indian banks are, also, approaching the market directly with their NPL portfolios without going through ARCs (PriceWaterhouseCooper, 2008). The NPLs are transferred to ARCs for disposal purposes and banks receive only security receipts (pass-through instruments) from ARCs till the disposal of their NPLs.

TABLE 2: POLICY SCHEDULE FOR INDIAN BANKS

| | |
|------|---|
| 1993 | <i>Rs. 64000 million infused in 1993-94 to attain capital adequacy ration of 8 percent by 31 March 1996</i> |
| 1995 | Rs. 43620 million infused in 1994-95 to attain capital adequacy ratio |
| 1998 | US\$ 150 million borrowed from the World Bank infused in six public sector banks by way of subordinated debts. Rs. 21000 million infused in United Bank of India (UBI), Union Bank of India (UOI) and Indian Bank in 1997-98 |
| 1999 | Rs. 4000 million infused in 1998-99 in these banks. |
| 2004 | Total of Rs. 204460 million infused by 1999 on recapitalisation of the nationalised banks which increased to Rs. 225160 million by 2004. |

Source: Various annual reports of RBI.

To improve the performance of public sector banks, the Indian government wanted to go for gradual privatization of these banks which needed improvement in the balance sheet of these banks, primarily through capital infusion. The Indian government had already provided Rs. 40 billion for recapitalization of 19 nationalized banks from 1991-92 to 1992-93. The capital injection was made through the issue of bonds directly to recapitalized banks, with fixed coupon rates of 7.7 per cent and 10 per cent per annum, in subsequent issues. Certain performance obligations were introduced on these banks including deposit mobilization, improvement of investment yield, expansion and diversification of credit, reduction of NPLs, cost reduction, voluntary retirement etc. Over the period 1993-2004, the Indian government infused around Rs. 225.16 billion for strengthening the capital base of nationalised banks (RBI, 2007). It is worth noting that, out of the total infused fund of Rs. 225.16 billion, a high proportion (Rs. 221.16 billion) was infused over 1993-1998. Table 2 describes the schedule of most of these funds infused within the period. As a part of the recapitalisation, the Indian government is also investing Rs. 100 billion (US\$2.5 billion) in SBI keeping its 59.73 percent of original stake (David, 2007). SBI has also raised about Rs. 160 billion (US\$ 4 billion) from investors by March 2008. Some of the Indian banks have returned capital to the government to the total amount of Rs.13.03 billion by March 2004 although most of these banks are still paying interest on their recapitalised fund (RBI, 2007).

3. Methodology

The preceding discussions clearly show the differences in characteristics and patterns in Indian and Chinese banking sectors, despite similarities in terms of high growth of banks in these two economies. It would be of interest to evaluate the banks operative performance taking into consideration the institutional differences reflected by the generation of NPLs. This needs an analytical framework to compare the operative efficiencies of these banks.

Although at the individual country level, there has been a plethora of studies relating to efficiency measurement of banks in China and India (Berger et al., 2008; Fu and Heffernan, 2007; Chen et al., 2005; Kumbhakar and Sarkar, 2003; Sathye, 2003), only a limited number of comparative studies is available such as Saez (2004) and Roland (2007). For estimating efficiencies of firms or decision making units (DMUs), Data Envelopment Analysis (DEA) has been a popular non-parametric methods used in recent literature. DEA is specially suited for multi product processes such as the ones seen in service sector firms including banks.

3.1 DEA: Theoretical Underpinnings

Farrell (1957) proposed that the productive efficiency of any firm consists of two components, technical efficiency (TE) and allocative efficiency. Using an input (output) oriented framework, Farrell (1957) defined TE as the ability of the firm to minimise (maximise) inputs (outputs) with a given set of outputs (inputs). Farrell (1957) explained allocative efficiency as the ability of a firm to use the inputs in optimal proportions, given their respective prices and production technology (Coelli et al, 2005).

Drawing on Farrell's (1957) proposition, Charnes, Cooper and Rhodes (1978) first suggested DEA methodology to empirically estimate frontier over data points, assuming constant returns to scale (CRS) technology. A more generalised methodology was proposed by Banker, Charnes and Cooper (1984), assuming variable returns to scale (VRS) technology, allowing decomposition of TE into pure technical efficiency (PTE) and scale efficiency (SE). The DEA models with the assumption of CRS are restrictive in the sense that such models are only appropriate when all DMUs are operating at an optimal scale, which could be unlikely for Chinese and Indian banks (Chen et al, 2005). The study does not examine allocative efficiency due to difficulties associated with

obtaining comparable input costs in Chinese and Indian banks. However, the study provides useful insights into the banks' operative performance given the wide implications of technical efficiencies in terms of technical knowledge and skills and since TE changes serve as a key source of productivity growth.

The following paragraphs briefly explore the standard linear programming involved in DEA methodology. Let there be N firms and let x_i represents the input matrix of the i th firm and y_i represents the output matrix of the same firm. Let X represents $K \times N$ input matrix and Y represent $M \times N$ output matrix for all firms.

Using input orientated approach, the relative efficiency of each bank is specified as

$$\begin{aligned}
 & \max_{u,v} (u' y_i / v' x_i) \\
 & s.t. \\
 & u' y_j / v' x_j \leq 1 \quad j = 1, 2, \dots, I \\
 & u, v \geq 0
 \end{aligned} \tag{1}$$

where y_i is the vector of output produced by the i th bank, and x_i is the vector of inputs used by the i th bank, u and v are $M \times 1$ and $K \times 1$ vectors of output and input weights (the prime denotes a transposed vector). The first condition ensures that efficiency scores for all banks cannot score more than one and the second condition ensures that weights are non-negative. The above mathematical problem (1) requires estimation of the values for u and v ensuring that when applied to every producer's inputs and outputs, the weighted output-to-input ratio would be maximised for the producer being evaluated and no firm in the sample has a ratio of more than unity.

The DEA searches for the ratio of all weighted outputs over all weighted inputs. The weights are selected from the dual of the original linear programming and are specified as

$$\begin{aligned}
 & \min_{\theta, \lambda} \theta \\
 & s.t. \\
 & -y_i + Y\lambda \geq 0 \\
 & \theta x_i - X\lambda \geq 0 \\
 & \lambda \geq 0
 \end{aligned} \tag{2}$$

Where λ is an $N \times 1$ vector of constants, θ is a scalar and denotes efficiency score for the i th firm such that $\theta \leq 1$, with a value of one indicating that the DMU lies on the frontier and hence, is technically efficient.

Following Banker et al (1984), the linear programming problem given by (2) above is modified to account for VRS, by adding convexity constraints $N1'\lambda = 1$, where $N1$ is an $N \times 1$ vector of ones. The next step is to solve the following linear program which includes the convexity constraints:

$$\begin{aligned} & \min_{\theta, \lambda} \theta \\ & s.t. \\ & -y_i + Y\lambda \geq 0 \\ & \theta x_i - X\lambda \geq 0 \\ & N1'\lambda = 1 \\ & \lambda \geq 0 \end{aligned}$$

The convexity constraint given by $N1'\lambda = 1$, implies that an inefficient bank would be compared or benchmarked against banks of similar size.

3.2 Data

The data used in this study have been mainly obtained from databases such as *Bankscope* and *Osiris*, and from Annual Reports of various banks, the RBI, and from prospectuses of Chinese banks used for raising funds on Hong Kong Stock Exchange. Our sample consists of 13 Chinese banks and 19 Indian banks.⁶ These banks comprise nearly 80 per cent of the banking operation in both the countries.

Adopting an intermediation approach, we assumed banks as multi output DMUs producing total loans and non-interest income; with inputs such as total deposits and non-interest expenses. To incorporate the role of the NPLs in the efficiency calculations, we have used the pooled data with loans as one of the outputs reduced by certain percentages to reflect the presence of the NPLs. NPLs are essentially total loss for the bank except for the recovery of certain percentages by banks and the AMCs. The data of percentage recovery from the disposal of the NPLs in China is not clear as it also involves a large

⁶ We have not used policy banks in our sample.

TABLE 3: DESCRIPTIVE STATISTICS OF THE DATA

| | | Variables | | | | Variables | | | |
|----------|----------|---------------|---------|-----------|----------|-----------|---------|-----------|----------|
| | | Y1 | Y2 | X1 | X2 | Y1 | Y2 | X1 | X2 |
| | | 2005 | | | | 2004 | | | |
| Combined | Mean | 736994.5 | 8952.8 | 1033011.5 | 18703.9 | 614858.1 | 6833.1 | 907301.3 | 15643.3 |
| | St. Dev. | 1074847.9 | 16566.8 | 1631400.0 | 29093.5 | 926290.3 | 11675.6 | 1433514.4 | 24215.0 |
| | Max. | 4364515.0 | 66580.3 | 5736866.0 | 133739.7 | 3232585.3 | 53425.6 | 5176282.0 | 116060.7 |
| | Min. | 107.6 | 37.2 | 26659.0 | 0.7 | 100.9 | 41.7 | 23440.0 | 3.6 |
| Chinese | Mean | 890778.7 | 7861.3 | 1540740.3 | 18260.8 | 828091.6 | 6452.9 | 1382439.2 | 15755.6 |
| | St. Dev. | 1226316.9 | 12631.4 | 2147591.2 | 27045.4 | 1163825.9 | 10155.5 | 1890200.9 | 23048.2 |
| | Max. | 3205861.0 | 44171.3 | 5736866.0 | 81585.0 | 3109191.0 | 35441.1 | 5176282.0 | 62639.0 |
| | Min. | 107.6 | 37.2 | 26659.0 | 0.7 | 100.9 | 41.7 | 23440.0 | 3.6 |
| Indian | Mean | 631773.8 | 9699.6 | 685618.0 | 19007.0 | 468961.5 | 7093.2 | 582206.9 | 15566.5 |
| | St. Dev. | 978950.8 | 19101.4 | 1093299.3 | 31142.8 | 720686.9 | 12877.9 | 939464.6 | 25606.5 |
| | Max. | 4364515.0 | 66580.3 | 5061052.9 | 133739.7 | 3232585.3 | 53425.6 | 4354333.4 | 116060.7 |
| | Min. | 22822.3 | 196.3 | 27492.3 | 699.8 | 18846.4 | 136.3 | 24715.3 | 601.3 |
| | | 2003 | | | | 2002 | | | |
| Combined | Mean | 524999.9 | 4886.5 | 734487.5 | 13638.7 | 370300.0 | 4211.4 | 606623.8 | 8672.1 |
| | St. Dev. | 809231.3 | 8692.9 | 1222743.1 | 21840.9 | 596189.7 | 8000.6 | 1014354.8 | 16063.6 |
| | Max. | 2766055.0 | 44736.9 | 4706861.0 | 100053.6 | 2252529.8 | 41720.5 | 4100517.0 | 91767.3 |
| | Min. | 92.0 | 33.5 | 20814.0 | 5.8 | 68.9 | 24.9 | 14245.0 | 0.7 |
| Chinese | Mean | 729855.7 | 3961.3 | 1075947.5 | 14405.1 | 450152.1 | 2959.1 | 848073.3 | 4575.7 |
| | St. Dev. | 1039396.8 | 5620.9 | 1603146.1 | 22773.4 | 721356.5 | 4806.5 | 1296107.6 | 6226.7 |
| | Max. | 2766055.0 | 18237.7 | 4706861.0 | 62777.0 | 1912960.0 | 16991.6 | 4100517.0 | 20266.0 |
| | Min. | 92.0 | 33.5 | 20814.0 | 5.8 | 68.9 | 24.9 | 14245.0 | 0.7 |
| Indian | Mean | 384835.4 | 5519.5 | 500856.9 | 13114.4 | 315664.5 | 5068.2 | 441421.5 | 11474.8 |
| | St. Dev. | 597101.1 | 10394.1 | 848344.2 | 21796.2 | 507435.6 | 9640.0 | 762351.4 | 19953.5 |
| | Max. | 2656918.1 | 44736.9 | 3919261.9 | 100053.6 | 2252529.8 | 41720.5 | 3514224.0 | 91767.3 |
| | Min. | 14712.0 | 112.8 | 21491.0 | 470.8 | 10973.8 | 109.0 | 18232.6 | 454.1 |
| | | Pooled Series | | | | | | | |
| Combined | Mean | 561788.2 | 6220.9 | 820356.0 | 14164.5 | | | | |
| | St. Dev. | 869523.4 | 11737.9 | 1339410.5 | 23293.3 | | | | |
| | Max. | 4364515.0 | 66580.3 | 5736866.0 | 133739.7 | | | | |
| | Min. | 68.9 | 24.9 | 14245.0 | 0.7 | | | | |
| Chinese | Mean | 724719.5 | 5308.6 | 1211800.1 | 13249.3 | | | | |
| | St. Dev. | 1038346.3 | 8862.5 | 1731851.0 | 21348.8 | | | | |
| | Max. | 3205861.0 | 44171.3 | 5736866.0 | 81585.0 | | | | |
| | Min. | 68.9 | 24.9 | 14245.0 | 0.7 | | | | |
| Indian | Mean | 450308.8 | 6845.2 | 552525.8 | 14790.7 | | | | |
| | St. Dev. | 718422.0 | 13376.3 | 905216.9 | 24654.8 | | | | |
| | Max. | 4364515.0 | 66580.3 | 5061052.9 | 133739.7 | | | | |
| | Min. | 10973.8 | 109.0 | 18232.6 | 454.1 | | | | |

Note: Y1=Total Loans; Y2=Non-interest Income; X1= Total deposits; X2= Non-interest Expenses.

All values are in million units of national currencies.

Source: Estimated by the authors.

amount of debt-equity swap. To account for NPLs in Chinese banks, total loans of these banks have been discounted by 20 per cent, 25 per cent and 30 per cent. For Indian Banks, we have used NPL of 13 percent and 3 percent for output adjustments (RBI, 2007).

Table 3 presents descriptive statistics of the data, in chronological order, for all banks combined as well as for Indian and Chinese banks, separately. The mean and standard deviations of all the four variables viz., total loans (Y1), non-interest income (Y2), total deposits (X1) and non-interest expenses (X2) increased over time, for Indian, Chinese and combined banks (Table 3). As revealed by the maximum values, some of Chinese and Indian banks seem to have higher deposits and non-interest expenses, respectively. In contrast, the minimum figures indicate very low amount of total loans and non-interest income for some Chinese banks. These characteristics have been further summarised for the pooled series provided at the bottom of the table.

4. Empirical Evidence

4.1 Result Analysis

Table 4 reports the NPL adjusted and unadjusted scores of PTE of the Chinese and Indian banks. It is important to see how the TE changes over time as well as whether banks' efficiencies have been affected by the discounting of their loans to reflect their NPLs. Because of the brevity of space, we have reported two out of six combinations of discounted ratios, viz., 30 percent for Chinese banks with 3 and 13 per cent for Indian banks.

Three Chinese banks (ABC, CCG and DCCB) and two Indian banks (ICIC and SBI) appear to be on operating on the frontier being fully efficient over period of the study (Table 4). The most surprising result has come from the Chinese banks where the major Chinese banks such as CCBC, ICBC and BOC which have undergone extensive restructurings along with significant infusion of funds in the last few years are showing increasing loss in their efficiencies (Table 4). The reduction in inefficiencies of major

Table 4: NPL ADJUSTED AND NPL UNADJUSTED PURE TECHNICAL EFFICIENCY IN CHINESE AND INDIAN BANKS, 2002-2005

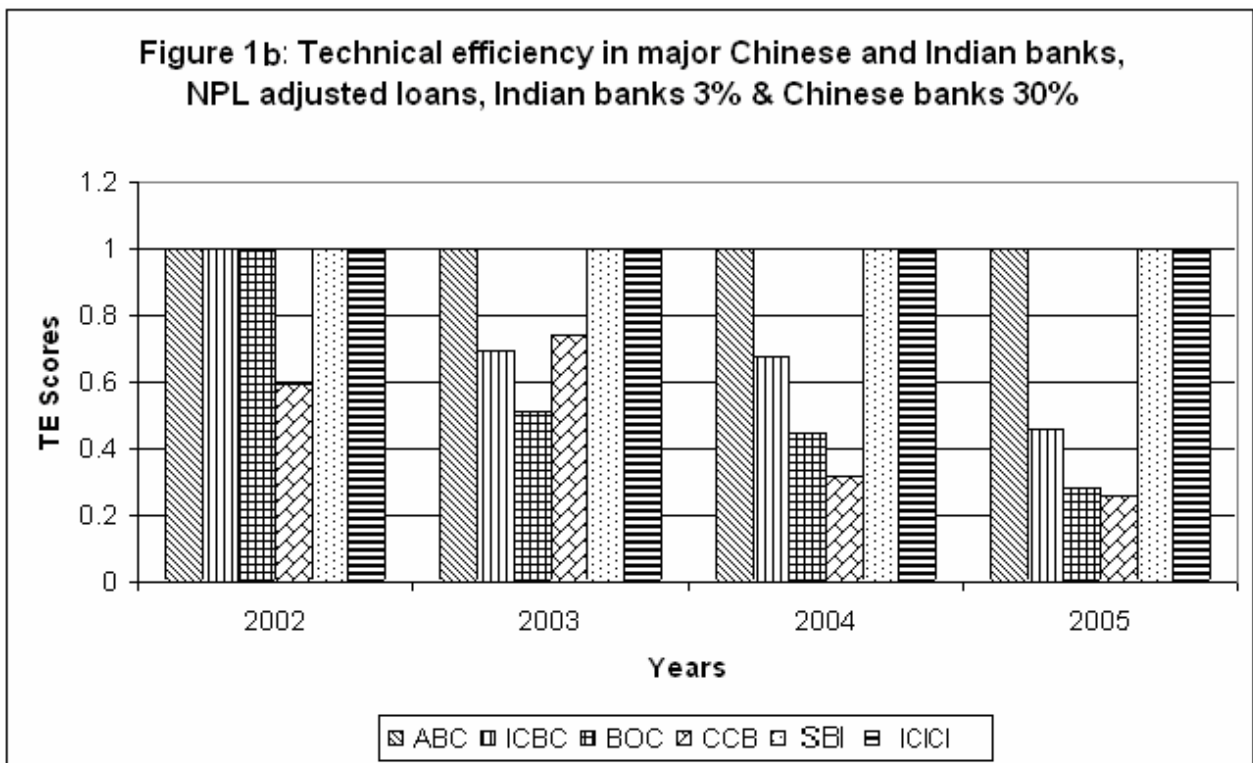
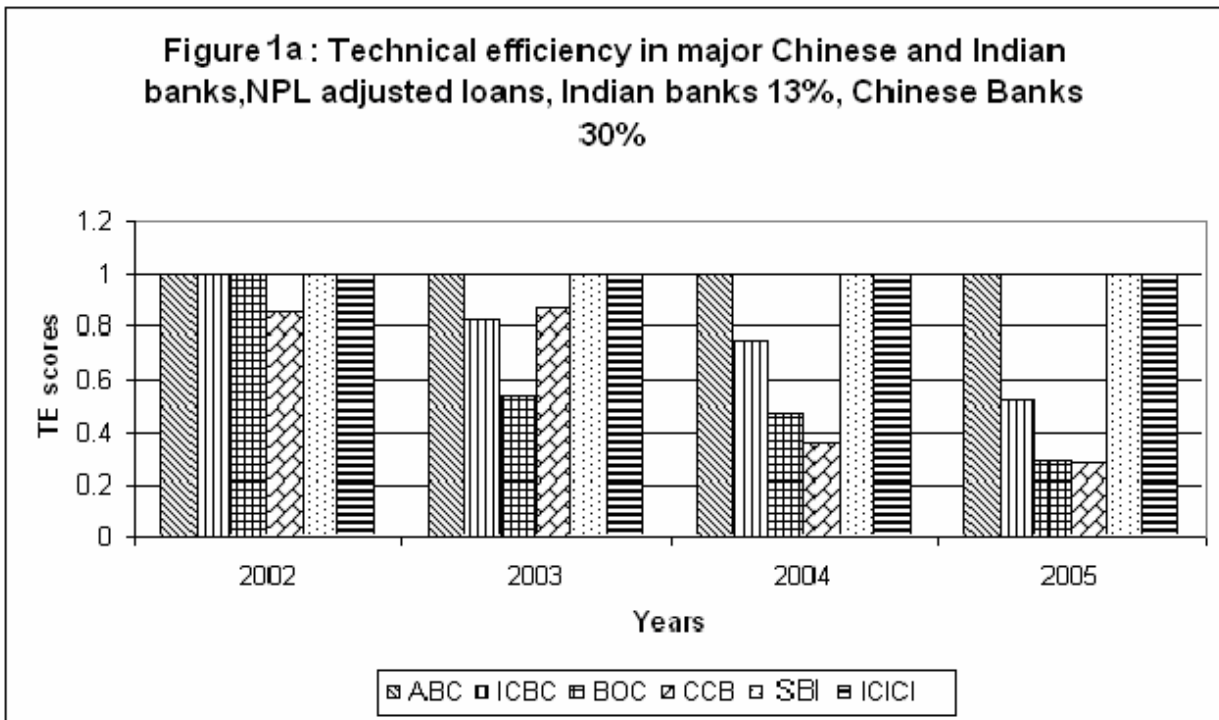
| Names of Banks | 2005 | | | 2004 | | | 2003 | | | 2002 | | |
|---|-------------|------------------------------|-------------------------------|-------------|------------------------------|-------------------------------|-------------|------------------------------|-------------------------------|-------------|------------------------------|-------------------------------|
| | NPL Unadj'd | NPL adj'd Ind. 3%, Chin. 30% | NPL adj'd Ind. 13%, Chin. 30% | NPL Unadj'd | NPL adj'd Ind. 3%, Chin. 30% | NPL adj'd Ind. 13%, Chin. 30% | NPL Unadj'd | NPL adj'd Ind. 3%, Chin. 30% | NPL adj'd Ind. 13%, Chin. 30% | NPL Unadj'd | NPL adj'd Ind. 3%, Chin. 30% | NPL adj'd Ind. 13%, Chin. 30% |
| Chinese Banks | | | | | | | | | | | | |
| Agr. Bank of China (ABC) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Bank of Beijing Corp. Ltd. (BBC) | 0.17 | 0.17 | 0.17 | 0.18 | 0.18 | 0.18 | 0.19 | 0.19 | 0.19 | 0.18 | 0.18 | 0.18 |
| Bank of China (BOC) | 0.32 | 0.28 | 0.29 | 0.52 | 0.45 | 0.47 | 0.59 | 0.51 | 0.54 | 1.00 | 1.00 | 1.00 |
| Bank of Shanghai (BOS) | 0.29 | 0.29 | 0.29 | 0.28 | 0.28 | 0.28 | 0.24 | 0.24 | 0.24 | 0.14 | 0.14 | 0.14 |
| China Merchandise Bank (CMB) | 0.33 | 0.33 | 0.33 | 0.27 | 0.27 | 0.27 | 0.30 | 0.30 | 0.30 | 0.19 | 0.19 | 0.19 |
| China Citic Bank (CCB) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| China Construction Bank Corp. (CCBC) | 0.32 | 0.26 | 0.28 | 0.46 | 0.32 | 0.36 | 1.00 | 0.74 | 0.87 | 1.00 | 0.59 | 0.86 |
| China Minsheng Bank Corp (CMBC) | 1.00 | 0.99 | 0.99 | 0.13 | 0.13 | 0.13 | 0.14 | 0.14 | 0.14 | 0.13 | 0.13 | 0.13 |
| Dongguan City Com. Bank Ltd. (DCCB) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Industrial & Com. Bank of China (ICBC) | 0.66 | 0.46 | 0.52 | 1.00 | 0.68 | 0.75 | 1.00 | 0.69 | 0.83 | 1.00 | 1.00 | 1.00 |
| Ningbo Commercial Bank (NCB) | 0.90 | 0.90 | 0.90 | 0.98 | 0.98 | 0.98 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Shanghai Pudong Dev. Bank (SPDB) | 0.21 | 0.21 | 0.21 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.16 | 0.16 | 0.16 |
| Shenzhen Commercial Bank (SCB) | 0.55 | 0.54 | 0.55 | 0.53 | 0.52 | 0.53 | 0.57 | 0.57 | 0.57 | 0.53 | 0.53 | 0.53 |
| Indian Banks | | | | | | | | | | | | |
| Andhra Bank | 0.31 | 0.32 | 0.32 | 0.31 | 0.32 | 0.31 | 0.33 | 0.33 | 0.33 | 0.34 | 0.35 | 0.35 |
| Bharat Overseas | 1.00 | 1.00 | 1.00 | 0.99 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.83 | 0.83 | 0.83 |
| Bank of Baroda (BOB) | 0.24 | 0.25 | 0.24 | 0.25 | 0.26 | 0.26 | 0.35 | 0.36 | 0.35 | 0.70 | 0.70 | 0.70 |
| Canara Bank | 0.31 | 0.32 | 0.32 | 0.32 | 0.33 | 0.32 | 0.42 | 0.42 | 0.42 | 0.82 | 0.82 | 0.82 |
| Central bank of India (CBI) | 0.15 | 0.16 | 0.16 | 0.17 | 0.18 | 0.17 | 0.20 | 0.21 | 0.20 | 0.20 | 0.21 | 0.21 |
| Housing Dev. Fin. Corp. (HDFC) | 0.47 | 0.48 | 0.48 | 0.39 | 0.40 | 0.40 | 0.58 | 0.59 | 0.58 | 0.50 | 0.51 | 0.51 |
| Ind., Credit & Inv. Corp of India (ICICI) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.51 | 1.00 | 1.00 |
| Indian Overseas Bank (IOB) | 0.23 | 0.24 | 0.24 | 0.21 | 0.22 | 0.21 | 0.26 | 0.26 | 0.26 | 0.25 | 0.26 | 0.25 |
| Oriental Bank of Commerce (OBC) | 0.22 | 0.24 | 0.23 | 0.20 | 0.21 | 0.21 | 0.25 | 0.26 | 0.26 | 0.28 | 0.30 | 0.29 |
| Punjab and Sind Bank (PSB) | 0.26 | 0.28 | 0.27 | 0.25 | 0.26 | 0.26 | 0.25 | 0.26 | 0.25 | 0.20 | 0.21 | 0.21 |
| State Bank of India (SBI) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| State Bank of Bikaner (SBB) | 0.36 | 0.37 | 0.37 | 0.37 | 0.37 | 0.37 | 0.45 | 0.45 | 0.45 | 0.71 | 0.72 | 0.72 |
| State bank of Hyderabad (SBH) | 0.34 | 0.35 | 0.35 | 0.35 | 0.36 | 0.35 | 0.47 | 0.47 | 0.47 | 0.51 | 0.52 | 0.52 |
| State Bank of Patiala (SBP) | 0.56 | 0.58 | 0.58 | 1.00 | 1.00 | 1.00 | 0.55 | 0.55 | 0.55 | 0.38 | 0.39 | 0.38 |
| State Bank of Travancore (SBT) | 0.30 | 0.31 | 0.31 | 0.27 | 0.28 | 0.28 | 0.38 | 0.38 | 0.38 | 0.36 | 0.37 | 0.37 |
| Syndicate Bank | 0.19 | 0.20 | 0.20 | 0.16 | 0.17 | 0.16 | 0.18 | 0.19 | 0.19 | 0.17 | 0.18 | 0.18 |
| United Com. Bank (UCOB) | 0.21 | 0.22 | 0.22 | 0.19 | 0.20 | 0.20 | 0.17 | 0.18 | 0.17 | 0.16 | 0.16 | 0.16 |
| Union Bank of India | 0.22 | 0.24 | 0.23 | 0.20 | 0.20 | 0.20 | 0.25 | 0.26 | 0.26 | 0.24 | 0.24 | 0.24 |
| United Bank of India | 0.21 | 0.22 | 0.22 | 0.18 | 0.19 | 0.19 | 0.19 | 0.19 | 0.19 | 0.15 | 0.15 | 0.15 |

Source: Calculated by the authors.

Chinese banks becomes more pronounced when the loans have been discounted in the combined data to reflect presence of NPLs. However, major Indian banks such as United Bank of India and Union Bank of India which had received infusion of funds from the Government of India have either not shown any change or shown slight increase in their comparative efficiencies. Most of the Indian banks operating below the frontier possess low levels of efficiency, ranging mostly from 15 to 59 per cent. However, in contrast to some Chinese banks, none of these banks slipped from being fully efficient in 2002 to being inefficient in the later years (Table 4). Four banks, viz. SBB, SBH, BOB and Canara Bank recorded reduced efficiency from 2002 to 2005 while the other banks, *albeit* at low levels, recorded consistent scores throughout. Note that the relative efficiencies of the Indian banks do not change significantly due to adjustments for NPL (Table 4). For some Chinese banks (ICBC, CCBC and BOC), TE fell significantly once their NPLs were compensated for. CMBC recorded a remarkable efficiency improvement in 2005, rising from about 13 per cent in the earlier years. Efficiencies of the other banks seem to remain somewhat low and steady of over the period (Table 4).

In Figure 1a and 1b, we have plotted NPL adjusted PTE scores of selected banks. These are major banks such as CCBC, ICBC, BOC and ABC from China; and SBI and ICICI from India. They all confirm that the efficiencies of restructured Chinese banks have gone down continuously from the year 2002 to 2005. ABC has shown highest efficiency even when its loan output was discounted by 30 percent over the period of our study. ABC is regarded as one with the maximum amount of NPLs (about 21 percent as per its annual report 2007). Chinese Government has just infused US\$ 19 billion in ABC but it has not been restructured unlike other three major Chinese banks. The results suggest that whereas major structured Chinese banks have been restrained from extending loans (output in our study), Agricultural Bank of China is still extending loans without any constraint and the loan amount is so high that even a reduction of 30 percent of its loans has not altered its position in efficiency dispersion.

The major Indian bank, SBI shows highest efficiency for every year of our study and for all the NPL adjusted estimates (Figure 1a and Figure 1b). Other Indian banks have not shown much change with the exception of BOB and Canara Bank which have recorded decline in their efficiencies from the year 2002 to 2005. ICICI has shown improvement in efficiency from 2002 when loans were unadjusted and has stayed at the top with other major banks for every year of our study.



4.2 Discussions

Major economies in the world such as the USA and EU treat China as a non-market economy i.e. the economy where price at which the goods are sold is not determined by the costs incurred in

producing those goods because of the extensive governmental intervention in running of the economy (Commission of the European Communities, 2008). However, at the same time these countries do not apply countervailing duties against the goods coming from China on the pretext that they are not able to calculate the amount of subsidy extended by the Chinese government (Shanker, 2001).⁷ On and off, the USDOC developed different ways to deal with imports from China under “bubbles of capitalism test” (Meszaros, 1996), but the goods from China were exempted from countervailing duty actions till the end of 2007 when, the USDOC changed its position under the pressure of American Congress, its industries and trade unions (Jones, 2007). It is true that the Chinese banks provide less than 20 percent of funds raised for investment in China and the majority of investment in China comes from self-raised funds, the source of which is difficult to identify (USDOC 2007, p. 43; Allen et al, 2007).

An important feature of the Basel I and Basel II is to improve transparency and the level playing field by international banks. By keeping the Capital Asset Ratio (CAR) at a comparatively low percentage, banks in Japan could improve their international market share significantly (Helleiner, 1992). If banks can extend credit either at a concessionary rate of interest or without insisting on the return of the credit, the practice would amount to providing a direct subsidy to the corporations. In China the extent of subsidy provided by the Chinese government to its exporting firms is difficult to estimate. However, non-returned loans or their conversion into shares and other banking related facilities can be easily determined.

This study suggests that the process of generation of NPLs in China and India are quite different and so are their resolutions. In China, such loans have mostly been generated by the State Owned Enterprises and lack of a culture of market economy whereas in India such NPLs have been generated through businesses and sometimes priority sectors who fail to generate sufficient returns on their investment. The exposure of Indian banks to SOEs is quite limited. The process of resolution of such NPLs in India is entirely different and it is nearly impossible for market economies to follow the example of Chinese banking reforms.

⁷ Before the US Court of International Trade and the Court of Appeals for Federal Circuit, the US Department of Commerce opposed the imposition of countervailing duty on the plea that since subsidy can be applied only when there is a market distortion and in the case of non-market economies such as that of old Czechoslovakia and China, there could not be any distortion of market since there was no market. *Continental Steel Corp. v. United States*, US Court of International Trade, 614 F. Supp. 548 reversed by the Court of Appeals for Federal Circuit in *Georgetown Steel Corp. v. United States*, 801 F.2d 1317.

The results from the DEA analysis suggests that the Chinese restructured and recapitalized banks such as CCBC, BOC, and ICBC which have raised billions of dollars worth investments on the Hong Kong and Shanghai share market, are showing loss in their efficiencies because of greater oversight on these restructured banks in extending credits. Having raised investment from the market, these restructured banks are operating under market discipline whereas the Chinese banks which are still to be recapitalized and restructured are merely going ahead with the distribution of loans. The Indian banks have shown two trends. One is that the state owned banks such as State Bank of India have maintained high rate of loan advancement. The other is that private banks in India such as ICICI have improved dramatically in recent times.

It is difficult to introduce a level playing field between a non-market economy such as China and other market economies because of an entirely different mode of financing. It is doubtful that six times the value of the Chinese GDP has been raised by SOEs, local bodies and private citizens without any accounting as self raised funds (Allen et al, 2007). This points to the difficulty in estimating the amount of subsidy extended to goods exported from China but permitting such export from China and restricting them from other market economies may amount to giving undue advantage to Chinese exporters. The NPLs may act as a form of direct cash subsidy in the export oriented economy of China but it has not attracted any countervailing duty action either by the USA or by the EU because of their treatment of China as a non-market economy.

5. Conclusions

The comparative analysis of Indian and Chinese banking sectors conducted in this study has resulted in some interesting observations. It is found that the major Chinese restructured banks such as BOC, ICBC and CCBC have been showing consistent decline in their efficiencies from the year 2002 to 2005. We attribute this decline in efficiency to the constraint imposed on the restructured Chinese banks when they have gone to the market to raise funds through the issue of IPOs. The Chinese bank showing maximum efficiency is ABC which so far has not transferred its NPLs to any AMCs and has infusion of funds from the Chinese government only in the year 2008 (Jun, 2008). Two Indian banks, SBI and ICICI have shown consistent performance as the most efficient banks.

There is the related issue that loans which are not returned or are not expected to be returned in the future are a type of subsidies provided to export oriented industries of China. Transparency is the integral part of the level playing field and unrestricted growth of NPLs can alter international

business scenario through extending export subsidy. The major economies in the world such as USA and the EU do not consider such subsidies as actionable for China whereas any minor infringements by other countries such as India or South Korea immediately invite punitive action. This practice apparently distorts the level playing field and has restricted market access for goods coming from open economies. An avenue for future research would be to identify the actual movement of non-returned bank loans in export oriented corporate houses.

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