

Rebuilding the Indonesian Banking Sector -Economic Analysis of Bank Consolidation and Efficiency-

Kimie Harada*

Takatoshi Ito**

Abstract

This paper examines the soundness of the Indonesian banking sector by describing its transition and current status. In particular, we focus on the government-led bank consolidation after the Asian currency crisis and provide a qualitative prospect of the role of the consolidation in bank restructuring. On that basis, we estimate a nonparametric frontier function that does not specify any functional form, and analyze efficiency with a quantitative measure.

The conclusion of the paper is summarized as follows. First, performance of the Indonesian banking sector has seen gradual recovery, in real terms. Second, privatization of state banks (sales of government-owned shares to the private sector) has not always brought subsequent improved business performances and market valuations. Third, given the estimation result of DEA with measures the level of inefficiency and total factor productivity, the Indonesian banking sector is confirmed to be on a recovery trend.

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Introduction

Indonesia suffered the most economic damage during the Asian currency crisis of 1997-1998. The country, which experienced a sharper drop of the currency than any other country involved in the crisis, injected a huge amount of capital into its banks. Political and economic shocks, including the sharp drop in the currency, bank runs, and the collapse of the Suharto regime inspired by the political instability, deteriorated the balance sheets of leading banks. Capital injections conducted in 1999 to re-establish banks employed an extremely generous set of capital adequacy ratio criteria; 4% or higher for healthy banks, - 25% to 4% for banks that required capital injections, and - 25% or lower for banks that were to be immediately shut down. The banking sector had deteriorated that far.

However, the subsequent effort by the Indonesian government and rearrangement of the banking supervision structure enabled Indonesia eventually to exit the IMF program and the Indonesian Banking Restructuring Agency (IBRA) was dissolved after completing its task. In 2004, President Yudhoyono, who won Indonesia's first direct presidential election, took office. From the political and economic point of view, Indonesia seems to have overcome the damage from the Asian currency crisis to set out on another path of growth.

Indeed, the Indonesian banking sector or the general macro economy has restored its confidence rapidly. As far as published data shows, macro data on recent bank performance, the financial data of individual banks, and individual bank's stock prices, suggest recovery of the management of banks.

Although the banking sector apparently has regained its stability, concerns still remain. For

* Associate Professor, Graduate School of International Accounting, Chuo University

** Professor, Graduate School of Economics, The University of Tokyo

instance, a final disposal (privatization) of banks that were put under state control during the Asian currency crisis has not been completed yet. Among state banks, Bank Mandiri is recognized as being in an extremely poor financial condition, which does not appear on its balance sheet or income statement (based on a survey by the authors). Following the IBRA's dissolution, the Financial Supervisory Agency, which was scheduled to be established by 2002, has not yet been set up. In fact, the country is returning to the pre-crisis situation that the central bank supervises banks. In addition, Indonesia suffers from macro economic issues such as relatively high inflation rates compared with those of other Asian countries.

In this paper, we examine the soundness of the Indonesian banking sector by describing its transition and current status. In particular, we focus on the government-led bank consolidation after the Asian currency crisis and provide a qualitative prospect of the role of consolidation in bank restructuring. Regarding recovery of the banking sector, macro performance has apparently recovered its stability in nominal terms. We, however, intend to confirm whether the situation is robust against adjusting for inflation-usually in real terms-or whether it is merely a false recovery. We also estimate nonparametric frontier function that does not specify any functional form and analyze efficiency with a quantitative measure.

The conclusion of the paper is summarized as follows. First, performance of the Indonesian banking

sector has seen gradual recovery in real terms. Second, privatization of state-controlled banks (sales of government-owned shares to the private sector) has not always brought subsequent improved performances and market valuations. Third, given the estimation results of DEA, which measures the level of inefficiency and total factor productivity, the Indonesian banking sector is confirmed to be on a recovery trend.

The overall structure of the paper is as follows. In Chapter 1, we review aspects of the banking sector during the period of the Asian currency crisis in 1997, based on macro data and institutional framework. We provide an outline of the characteristics of the banking supervision structure before the crisis, the IMF/IBRA structure immediately after the crisis, and the recent transition into the central bank structure. In Chapter 2, we focus on individual banks and summarize its restructuring. In Chapter 3, we evaluate the efficiency of management of banks by the envelope analysis.

Chapter 1: Overall view of the Indonesian banking sector¹

1. Structural change

Table 1 shows the number of banks which reached 239 in pre-crisis 1996, came down to 151 in 2000 and even to 138 at the end of 2003, after the end of the crisis. There has been a slight change in the number of state banks, regional development banks, foreign banks, and joint venture banks, but the number of

Table 1 Transition of the number of banks and branches

	1996	1998	2000	2001	2002	2003
State banks	7	7	5	5	5	5
Number of branches	1,379	1,602	1,506	1,807	1,885	2,072
Regional development banks	27	27	26	26	26	26
Number of branches	490	555	550	857	909	1,003
Domestic private banks*	164	130	81	80	76	76
Number of branches	3,964	3,976	3,228	6,765	7,001	7,730
Foreign banks/Joint venture banks	41	44	39	34	34	31
Number of branches	86	121	95	113	114	126
Total number of banks	239	208	151	145	141	138
Number of branches	5,919	6,254	5,379	6,765	7,001	7,730

* Domestic private banks include Private National Forex Banks and Private National Non-Forex Banks.

Source : Bank Indonesia, Annual Report 1998, 2000, 2003

¹ The macro-based transition of the Indonesian banking sector is detailed in Bank Indonesia (2004a, 2004b), Indonesian Chamber of Commerce (2005), Nasution, and Santoso (2005) and Sato (2004).

Figure 1. Macro indicators of the banking sector in nominal terms

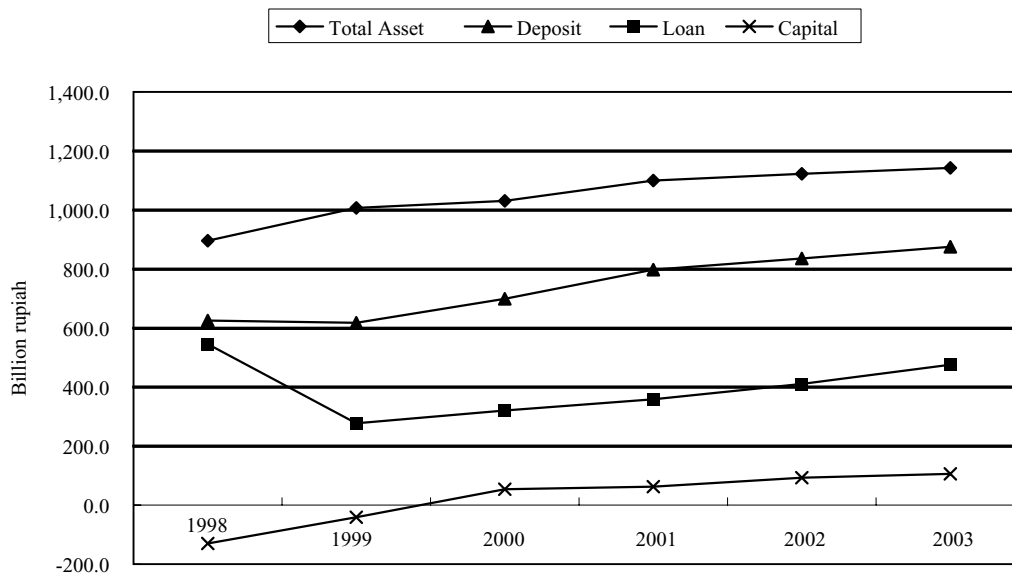
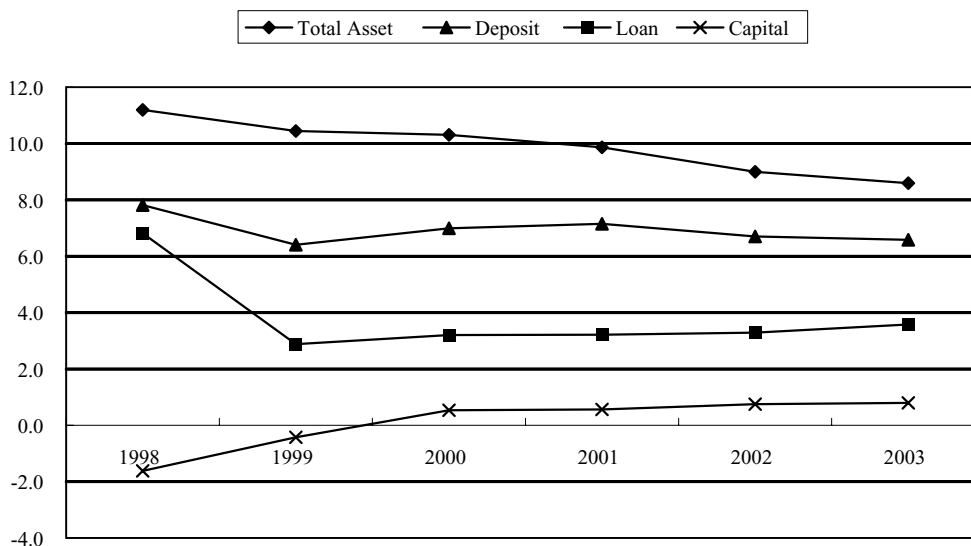


Figure 2. Macro indicators of the banking sector in real terms



domestic private banks has decreased by nearly 54% to 76 (in 2003) from 161 (in 1998).

On the other hand, the total number of branches has increased to 7,730 in 2003 from 5,919 in 1996. All state banks, regional development banks, foreign banks, and joint venture banks, have added to the number of their branches.

However, in the Indonesian banking sector, the top 5 banks represent 61% of the total assets of the banking sector as a whole, and the rate reaches 90% of the total assets when it comes to the top 23 banks

(Indonesian Chamber of Commerce (2005)). In addition, the Indonesian government promoted consolidation and restructuring by closing relatively small banks and injecting capital into large banks after the Asian currency crisis. Taking these factors into account, changes in the number of banks and branches merely provide a clue toward our judgment and analysis.

Therefore, we use macro data, such as total assets, deposits, loans, and capital, as management indicators of the banking sector as a whole (Figure

Table 2 Macro Indicators

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Monetary base	34,405	46,085.9	75,120.3	101,790	125,615	127,796	138,250	166,474	199,446
Monetary base real growth rate	—	23.2%	2.9%	11.7%	17.4%	-9.2%	-3.4%	12.2%	12.0%
M1	64,089	78,343	101,197	124,633	162,186	177,731	191,939	223,799	253,818
M1 real growth rate	—	14.0%	-20.4%	2.2%	22.7%	-1.7%	-3.5%	9.0%	6.5%
M2	288,632	355,643	577,381	646,205	747,028	844,053	883,908	955,692	1,033,530
M2 real growth rate	—	14.8%	2.5%	-7.4%	10.8%	1.3%	-6.6%	1.4%	1.8%
Consumer price index	47.6	50.5	80.0	96.4	100.0	111.5	124.7	133.0	141.3
Price growth rate	—	6.04%	45.99%	18.64%	3.65%	10.89%	11.22%	6.38%	6.06%

Source : International Monetary Fund, International Financial Statistics

1/Figure 2). Figure 1 shows the nominal transition of each indicator, and Figure 2 shows the real figure of each indicator that is calculated by dividing the nominal figure by the consumer price index. On the basis of nominal figures, lending is the only loser after the currency crisis, while total assets, capital, and deposits, enjoy an upward trend in the sector as a whole. A glance at Figure 1 provides the fact that total assets and capital are increasing and the number of banks has decreased significantly.

With relatively high inflation rates in Indonesia, we have observed the following facts from the transition of real figures that deduce price growth rates. First, total assets have been decreasing as a whole. Considering the large number of banks overall, or overbanking, in Indonesia, decline in the real total assets could be a good sign. The drastic decline in real loans in 1999 does not ensure an outbreak of credit crunch because of the succeeding marginal rise in following years. Considering a slight increase in real capital, we can observe stabilizing performances of the banking sector as a whole, even based on real figures.

Indonesia's price growth rate, which remained high at 45.99% (in 1998) and 18.64% (in 1999) immediately after the currency crisis, has stabilized at a relatively high level within the 6% range at 6.38% in 2003 and 6.06% in 2004, compared to other Asian developing countries that have eased the Asian currency crisis confusion (Table 2).

2. Banking supervision structure

The banking sector played a major role in the currency crisis encountered by Indonesia. This is a commonly accepted theory in written reports on the Asian currency crisis (Cf. Enoch et al. (2001)). It is also true that the banking crisis, which was provoked

by the currency crisis, further escalated the currency crisis to bring the "twin crises" to Indonesia.

The banking sector had already been facing problems even before the currency crisis. It was highly vulnerable to any shock due to its low business transparency caused by incomplete financial disclosure and by inadequate distance from group companies, for which banks act as financing agencies. Management inefficiency had been another problem for large state banks. Since the mid-1980s, the government, which had control over state banks, had endeavored to develop the banking business with a focus on private banks through deregulation and liberalization of activities. Coexistence of state banks and private banks suggests that banking supervision was not the only task of the government.

In addition, various sectors including the banking sector had retained the inherent problems such as corruption, which were prevalent throughout the industrial, political and financial landscape. After the currency crisis, KKN (corruption, accretion and favorable treatment of blood relatives) issues, which came under closer scrutiny, may have delayed the crisis settlement. However, nobody pointed out that these issues had adversely affected economic growth before the crisis.

The early liberalization of capital accounts in Indonesia has enabled not only banks but also general companies in the country to conduct free overseas loans and foreign currency transfers to foreign banks. Economic development theory and IMF guidelines suggest that liberalization of capital accounts establishes strong financial systems.

Considering the fact that most developing countries share the problems of a fragile banking system, state banks, and currency risks, Indonesia's banking sector may not be remarkably weak. Bank

Indonesia (the central bank of Indonesia) even realized risks on a net open position of foreign currencies and concentrated loans to certain corporate groups. However, the country, where regulations are not fully complied with, encountered the currency crisis with vulnerability still remaining. When the currency crisis struck, the banking sector contributed to the escalation of economic difficulty by creating the “twin crises” alongside the currency crisis.

(1) Break of the crisis

In the context of the first IMF program agreed at the end of October 1997, decisions were made to close 16 fragile banks immediately and to give no protection to amounts that exceeded the designated upper limit (20 million rupiah) for deposit payback. At the end of October there was no serious foreign reserve shortage, though the currency has dropped (no large-scale intervention of buying rupiah and selling US dollars to make the transition to floating exchange rates). The closure of banks was intended to prevent capital outflow and currency depreciation and to restore confidence in announcements by the government and the IMF of serious measures towards repairing the long-standing structural problem. The government, which was forced to make a politically difficult decision, chose closure of banks. Ironically, these closures resulted in acceleration of the banking crisis.

The IMF program at the end of October addressed the following problems. First, depositors had become suspicious of the possibility of other fragile banks to be closed following the closure of 16 banks. Closure of the 16 banks had left the impression of over-hastiness because it was done without due diligence and disclosure of bank balance sheets and a restructuring of the banking sector. Secondly, a lack of full protection of all deposits created the growing fear that (a part of) deposits might be lost. Frequent runs on deposits further diffused the bank crisis. In January 1998, the government was forced to come out with full guaranty of bank deposits.

Those who consider the IMF’s involvement to be a failure think that the closure of 16 banks without sufficient preparation had caused the problem

between the IMF and the Indonesian Soeharto government. On the other hand, those who support the IMF claim that the closure of 16 banks was part of a well-prepared plan, of which the Indonesian government approved. However, the fact that one of the banks was owned by the president’s son and survived by changing its name through acquisition of another bank, sparked distrust. The defenders accuse Indonesia of activities that raised questions about implementation of the agreed program, scaring away investors.

The Indonesian rupiah, which was worth 2,500 to the US dollar just before the Thai baht crash in 1997, had depreciated to 14,000 rupiah against the dollar, a sixth of its original value, in January 1998. Under these circumstances, the economic crisis had escalated to where the majority of companies fell into negative net worth. Non-performing loans as a percentage of total loans surged sharply to 50%. The currency crisis, which had triggered the economic and banking crisis, raised Indonesia’s country risks and provoked depreciation of the currency, had spread synergistically

In the early part of 1998, the Indonesian government and the IMF took some measures. They agreed on 15 January to revise the program to raise the structural issues again, and the Indonesian government agreed to implement a revolutionary list that included as many as 50 items. The IMF Managing Director, Michel Camdessus, went all the way to Jakarta to attend the signing ceremony. However, after the notorious picture of Camdessus looking down at President Suharto signing the contract appeared in the media, the Indonesian rebellion against the IMF strengthened while President Suharto lost his support.

Based on the IMF program, the government instituted blanket protection of all deposits with the aim of calming a run of withdrawals, and set up IBRA to manage the restructure of the banking system. The IBRA introduced more rigid classification of non-performing loans, a temporary moratorium on capital adequacy rules, a moratorium on foreign debts (and negotiation with debtors), and a mechanism to promote restructuring of the system that created the bank crisis (Jakarta Initiative).

All deposits (and loans) in 212 banks that

existed at the end of January were fully protected in whatever currency. However, the banking sector is thought to have already withdrawn more than half of its deposits before then. This situation might persuade the IMF to change its strategy of introducing blanket protection of all deposits.

The IBRA, which was established on 27 January 1998, set out to build a bank restructuring mechanism.

(2) IBRA structure

Immediately after its establishment, the IBRA introduced restructuring measures such as successive takeovers of ill-performing banks and gaining full control over banks by changing management.² On the other hand, it supplied liquidity to prospective banks and promoted business restructuring.

As there was no sign of settlement of the crisis, even by 14 February when 54 banks (including 4 state banks) were placed under IBRA control, it is said that mutual suspicion among the IMF, the Indonesian government and Bank Indonesia and President Suharto deepened. After the president dismissed the Bank Indonesia governor, Djwandono, on 23 February, the first chairman of the IBRA was dismissed at the end of the month.

Following the release on 27 February of new classification criteria for non-performing loans, 7 heavily supported banks (which accounted for 16% of the banking sector assets and 75% of injected liquidity to the banking sector) came under IBRA control in April 1998. These banks' shareholders' rights were suspended and management was reshuffled, but they still stayed in business. In addition, 7 other small banks (with a capital adequacy ratio of 5% or lower and a received liquidity of 2 trillion rupiah or more, which represents 75% of the total assets) were closed. The restructuring based on these clear criteria was generally favorably received. The IBRA closed these 7 banks to place them under its control. However, 3 out of the 7 banks closed later, in August.

President Suharto, who was re-elected on 11 March under the deepening political crisis during

January-April 1998, resigned in May due to his failure to restore political stability. To that end, a massive amount of deposits ran out of Bank Central Asia, in which Suharto's family had a major stake. The bank, which had received liquidity from Bank Indonesia and state banks, was placed under the authority of the IBRA where it suffered suspension of shareholders' rights and a management reshuffle.

In June, a group of international creditors and Indonesian companies agreed on a policy for how to treat corporate debts.

Three of the 7 banks over which the IBRA gained full control were closed on 21 August, and the state bank *Expor Impor Indonesia* (Indonesia Export and Import Bank) was merged with other state banks. Of the remaining 3 banks, 2 were merged with Bank Danamon, which had received an injection of public funds. Since then, Bank Danamon, though its financial condition has deteriorated, has acted as a bridge bank that incorporates small banks with relatively healthy assets.

The IBRA, which was established as an integrated agency to tackle the bank restructuring, could not be empowered for legal authority and endowed with enough budget. Under IMF guidance, the IBRA created a bank restructuring mechanism independent of the government and Bank Indonesia, but it failed to get full cooperation from the government and resulted in undermining its authority. There may have been concern about scrutiny of the balance sheets of banks and their corporate borrowers, and the dismissal of the first chairman a month after his accession to office provides support for that view.

Under the October 1988 revision of the Banking Law, in February 1999 the IBRA (which was initially unable to conduct sufficient reorganizational activities due to its limited budget) gained full access to all assets of banks that were under its control (the rupiah eventually recovered to 7,000 from 11,000 rupiah against the dollar in this period).

In March, a banking system restructuring program was revealed which classified banks into 3 categories based on their capital adequacy ratio; A

2 The description of the bank restructuring and IBRA following this chapter referred to Takayasu (2003), Enoch et al. (2001) and IMF (2003).

(4% or higher), B (-25% to 4%) and C (-25% or lower). The 72 banks that fell into category A were recognized as healthy banks and were allowed to stay in business without any intervention by the government. Any bank that fell into criteria B was obliged to submit a business plan, and the owner shareholders and government were to jointly set up a scheme to boost the bank's capital adequacy ratio after the business plan was approved. Nine such banks obtained approval for their business plans and 7 out of those 9 were successful in raising new capital by the deadline of 20 April, at the same time receiving shareholders' equity from the government as promised. Two banks (Bank Bali and Bank Niaga), which failed to raise new capital, were put under state control by the IBRA. Of category B banks that failed to access the recapitalization program, 7 large banks were put under state control while 21 small banks were closed. 17 category C banks were also closed (38 banks were closed on 13 March). However, 7 state banks which fell into category C escaped closure and made a fresh start, as did Bank Mandiri upon the merger of 4 banks in August.

The Indonesian government has raised new capital for banks by granting government bonds totaling 430 trillion rupiah (43 billion dollars when calculated on 10,000 rupiah = 1 US dollar or 4.3 trillion yen). This was done 12 times in total, starting with Bank Central Asia on May 1999 and ending with Bank Tanbungan Negara in November 2000. This huge capital injection represented approximately 30% of the Indonesian GDP in 2000. In this way, non-performing loans of the banking sector were turned into government finances.

Between the instigation of the program at the end of October 1997 and the banking restructurings and consolidations during 1999, both the Indonesian government and the IMF constantly reviewed their strategy in accordance with the transition of economic conditions and of the banking sector. This may also be attributable to the unpredictable financial status at the initial stage and deterioration of the banks' financial state over the period. Closure of 16 banks in October 1997 without any financial scrutiny was a policy failure, but after a process of crisis management, a long-term strategy was set up in March 1999 to cope with the crisis.

Category B covered a wide range of banks with a capital adequacy ratio of -25% to 4%. The situation was unusual. As the IMF's position is to close banks having negative net worth, the application of this "generous" standard was itself a great surprise. However, the financial system could have collapsed under a situation in which no large bank would have survived if all banks with a negative capital adequacy ratio were closed. We may presume that these criteria were applied in recognition of the extremely poor economic conditions in Indonesia at the time.

There were radical changes in the position of the IMF and the government on the injection of public funds. At first, the Indonesian government is said to have shown little appetite for the use of public funds, which involves an added fiscal burden. In fact, this policy was abandoned when it became apparent that most banks might collapse due to negative net worth unless they were to receive such funds. The government accordingly decided to inject a large amount of capital in line with the IMF proposal.

State banks have been privileged in the context of the restructuring. The government, which strongly resisted any closure of state banks, insisted on consolidating such banks without modification. The current biggest state bank in terms of asset size is Bank Mandiri, which was established through the merger of several other state banks. According to the authors' survey in Jakarta, many people are suspicious of financial figures published by Bank Mandiri.

As of end of 2000, most of the shares of 4 state banks and 7 re-capitalized banks were under the control of the IBRA. During 2001, the main emphasis shifted to sales to the private sector of bank assets controlled by the IBRA. Full-scale sales of the IBRA-owned shares and assets started in 2002. The IBRA's asset management department was also responsible for administration and sale of the (non-performing and healthy) loans of closed banks, the irrecoverable loans of recapitalized banks, state banks, and nationalized banks. The total amount of assets placed under the authority was 275 trillion rupiah. As non-performing loans may be sold under large discounts, there were guidelines to avoid their sale to the original business owner. However, as assets were rapidly sold during 2003, it was difficult to scrutinize

full details of the sales. In February 2004, the IBRA was dissolved after completing the sale of its assets. Unsold assets are placed under the authority of the Ministry of Finance.

(3) Banking supervision structure in peacetime

Bank Indonesia made two financial reforms in the 1980s, including open-market operations through the market mechanism and liberalization of interest rates. In the 1990s, the bank aimed for enhanced financial health by adopting the Basel (BIS) standard as its capital adequacy rule, and set a target for individual banks to achieve this standard by the end of 1993. For international or off-shore borrowings, the bank also stipulated regulations to make transactions subject to a certain equity capital ratio.

Under the Suharto administration (1968-1998), individual banks were guided or supervised by Bank Indonesia, while banking business licenses were issued or revoked by the Ministry of Finance and the Currency Committee's Secretariat Division. Regardless of these regulations and supervision, the liberalization of interest rates boosted the number of banks (private banks increased sharply to 164 in 1996 from 66 in 1988) and the amount of loans. Whereas risks were on a steadily rising trend, there still remained 7 poorly business restructured state banks and private banks that had failed to meet the Basel standard (22 out of 240 banks as of the end of 1995). In 1996, 52 out of 239 banks violated the upper lending limit because loans to a given company group exceeded 20%.

As already mentioned in the preceding two subsections, the IBRA, which took over authority for supervision and reconstruction of banks, was the key agency for banking sector reform during the currency crisis.

In 2003, the Indonesian government made a political decision to terminate policy management based on loans and advice from the IMF. Exit from the IMF program meant receiving no further loans from the fund. Thereafter, the government became

responsible for implementing economic policy without any input from the IMF. While the IMF's guidance is still partly effective under Article IV, consultation with the IMF (surveillance) and post-program monitoring, the government restored its autonomy in establishing economic policy.

With the dissolution of the IBRA in February 2004, the Indonesian banking sector may be back to normal. Since the dissolution of the IBRA, Bank Indonesia has supervised banks. Although the new Central Banking Law (2004) stipulates detachment of banking supervision authority from Bank Indonesia and the setting up of an independent banking supervising agency, opposition from the central bank has prevented its implementation.

In general terms, there is no standard answer to which is more suitable to supervise banks - an independent banking supervision agency or the central bank. Every country has a different situation. In Indonesia, the concerns are to what extent an independent banking supervision agency can keep its independence, and whether the central bank, if it supervises other banks, can separate the supervision arm and the financial policy arm. Whatever the ideal structure, it is undeniable that a banking supervision structure able to provide guidance in preventing the banking sector from becoming fragile will be required to prevent another currency or banking crisis.

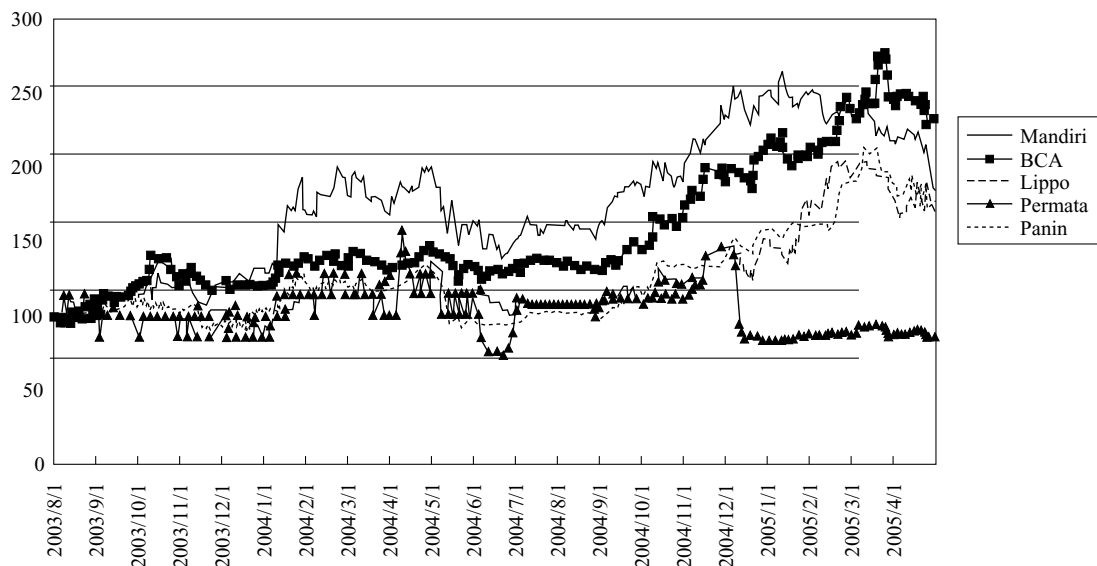
Chapter 2: Transition of the banking sector^{3 4}

1. Overview of consolidations

In 1999, banks were classified into 3 categories in order to inject public funds and rehabilitate them. The 3 categories are healthy banks in category A (capital adequacy ratio of 4% or higher), banks requiring capital injection in category B (capital adequacy ratio of -25% to 4%) and banks subject to closure in category C (capital adequacy ratio of -25% or lower) for restructuring.⁵

3 The financial sector experienced deregulation a few years before the Asian currency crisis. The related law revisions include the Banking Law revision. This law revision is translated into Japanese by the Indonesian Economic Act Report as the "Banking Law 1992 Act No. 7" (published on 25 March 1992).

4 The banking sector restructuring policy published in 1998 revealed a public fund injection program to the banking sector. Usui (2001) details the mechanism of the issuance of government bonds by the Indonesian government to inject funds into banks.

Figure 3. Stock prices since August 2003

Not only category C banks but also 21 of the 37 category B banks were closed. While most category A banks were medium- and small-sized banks, exclusion of the closed 21 category B banks made the number of surviving banks 16. Seven of these 16 banks, which were relatively small, were put under state control (6 of the 7 banks merged to form Bank Danamon, and the only remaining bank merged with Bank Central Asia). The remaining 9 banks out of the 16, which were entitled to receive 80% of funds from the government if 20% could be self-financed, extracted a promise regarding eligibility to stay in business with management rights remaining. Of these 9 banks, Bank Bali (currently Bank Permata) and Bank Niaga, which failed to raise the 20% capital, came under control of the IBRA.

Briefly, category A banks got back on their feet by themselves. On the other hand, category B banks split into four: closed banks, banks merged after being put under state control, banks successful in raising capital to receive support from the government but not giving up management control, and banks that failed to raise capital and came under the control of the IBRA.

Not all category C banks, which were subject to

closure, were actually closed. All 7 large state banks fell into category C. The government may have been of the opinion that they were “too big to fail”, since it saved large state banks and chose to inject more capital for their restructuring. These include 4 banks, which later merged to become Bank Mandiri.

Therefore, the top 10 banks in terms of asset size include 2 types of banks; state banks that received public funds (banks originally classified as category C banks) and private banks that got back on their feet through the government’s support (category B banks, which could be sub-classified further by with or without management rights). In other words, to varied degrees the top banks could not revitalize without the government’s support.

In this paper, we trace the transition of 11 individual banks including 9 of the 10 top banks in terms of asset size (due to unavailability of financial statements of the ninth) and 2 semi-large banks that did not receive support from the government. On this occasion, we classify banks into 4 prominent categories. Group A consists of state banks that received public funds and still have a high percentage of share ownership by the government. This group includes 3 banks: Bank Mandiri, Bank Negara

5 Bank consolidations in Indonesia after the Asian currency Crisis are examined in Bank Indonesia (2000, 2004a), Daiwa Institute of Research Singapore (1998), Komatsu (2001), Takayasu (2003) and others. Other related documents are Daiwa Bank Research Institute (1998a, 1998b, 1998c).

Indonesia, and Bank Rakyat Indonesia. Group B includes private banks that received public funds. Based on management rights, we classify this group further into 2 sub-groups; group B2 that gave up management rights and group B1 that still holds management rights. 4 banks: Bank Central Asia, Bank Danamon, Lippo Bank, and Bank International Indonesia belong to group B1, and 2 banks: Bank Permata and Bank Niaga are in group B2. 2 banks, Bank NISP and Bank Pan Indonesia, fall into group C, a group of healthy banks that did not receive public funds.

Figure 3 shows selected stock prices from the 4 groups within the limited period since summer 2003. Due to different stock price levels, we put the closing price as of 1 August 2003 as 100 in order to make a successive comparison of stock price trends. We confirmed that all stocks except for one in group B2 (Bank Permata) are on an upward trend (please refer to the box in the Appendix for the stock price trend that also covers the period around the Asian currency crisis). Market valuations have also provided evidence of the banking sector's recovery.

Next, we compared profitability indicators based

Table 3 Personnel expenses (labor cost/total expense)

Name of bank	1996	1997	1998	1999	2000	2001	2002	2003	2004
BANK MANDIRI TBK	—	—	—	0.027	0.225	0.373	0.310	0.307	n.a.
BANK CENTRAL ASIA TBK	0.422	0.343	0.027	0.309	0.443	0.465	0.482	0.479	0.559
BANK NEGARA INDONESIA TBK	0.398	0.344	0.020	0.420	0.446	0.448	0.436	0.415	n.a.
BANK RAKYAT INDONESIA TBK	—	—	—	1.027	0.642	0.578	0.677	0.651	n.a.
BANK DANAMON TBK	0.264	0.186	0.011	0.119	0.263	0.284	0.344	0.404	0.406
BANK INTERNATIONAL INDONESIA TBK	0.291	0.169	0.015	0.138	0.275	0.213	0.254	0.326	0.349
BANK PERMATA TBK	—	—	—	—	—	0.383	0.248	0.442	n.a.
BANK LIPPO TBK	0.297	0.273	0.019	0.268	0.387	0.369	0.338	0.323	0.357
BANK NIAGA TBK	0.361	0.279	0.041	0.026	0.234	0.298	0.283	0.390	0.364
BANK PANIN TBK	0.280	0.144	0.087	0.098	0.286	0.265	0.254	0.218	0.209
BANK NISP TBK	0.480	0.302	0.193	0.251	0.387	0.346	0.481	0.367	0.441

Source : Financial statements of the banks

Table 4 Loan-deposit ratio

Name of bank	1996	1997	1998	1999	2000	2001	2002	2003	2004
BANK MANDIRI TBK	—	—	—	14.64	18.36	21.69	29.58	36.48	n.a.
BANK CENTRAL ASIA TBK	73.13	89.36	69.15	4.31	9.00	15.32	19.95	24.10	26.37
BANK NEGARA INDONESIA TBK	91.38	99.72	41.47	26.38	30.51	30.04	37.05	41.47	n.a.
BANK RAKYAT INDONESIA TBK	—	—	—	52.14	48.49	50.55	50.92	56.68	n.a.
BANK DANAMON TBK	95.83	171.42	97.07	12.34	16.57	24.60	47.58	45.55	56.16
BANK INTERNATIONAL INDONESIA TBK	83.42	106.19	34.13	35.69	57.37	18.33	17.50	32.99	39.56
BANK PERMATA TBK	—	—	—	—	—	38.03	33.00	36.37	n.a.
BANK LIPPO TBK	85.45	90.83	24.34	16.70	18.29	17.97	19.55	16.93	17.32
BANK NIAGA TBK	105.00	120.00	92.00	30.00	36.50	42.45	62.14	70.78	76.19
BANK PANIN TBK	102.43	99.76	71.57	49.43	110.31	46.66	80.63	66.01	62.08
BANK NISP TBK	93.98	126.73	52.57	46.49	26.38	30.51	30.04	37.05	41.47

Source : Financial statements of the banks

Table 5 ROA

Name of bank	1996	1997	1998	1999	2000	2001	2002	2003	2004
BANK MANDIRI TBK	—	—	—	(11.92)	9.70	1.00	1.44	1.31	n.a.
BANK CENTRAL ASIA TBK	0.68	0.43	(43.83)	0.24	1.45	3.03	2.17	1.80	1.06
BANK NEGARA INDONESIA TBK	1.34	0.82	(82.38)	(12.73)	0.14	1.26	2.00	0.32	n.a.
BANK RAKYAT INDONESIA TBK	—	—	—	(5.48)	0.52	1.41	1.77	2.64	n.a.
BANK DANAMON TBK	1.27	0.12	(122.54)	(13.12)	0.54	1.37	2.02	2.90	1.81
BANK INTERNATIONAL INDONESIA TBK	2.16	1.54	(37.78)	(5.73)	0.73	(13.56)	0.37	0.89	1.05
BANK PERMATA TBK	—	—	—	—	—	0.50	(3.25)	1.93	n.a.
BANK LIPPO TBK	1.58	1.32	(57.95)	(7.69)	1.08	1.14	(2.01)	(1.95)	0.37
BANK NIAGA TBK	2.00	1.00	(32.00)	(85.00)	0.35	(0.20)	1.50	1.72	1.20
BANK PANIN TBK	20.14	14.20	0.42	1.31	0.07	0.01	0.63	2.22	1.21
BANK NISP TBK	2.15	1.99	1.31	0.62	(12.73)	0.14	1.26	2.00	0.32

Source : Financial statements of the banks

Table 6 Capital adequacy ratio

Unit : %

Name of bank	1996	1997	1998	1999	2000	2001	2002	2003	2004
BANK MANDIRI TBK	—	—	—	15.93	31.29	26.44	23.39	27.72	n.a.
BANK CENTRAL ASIA TBK	—	—	—	—	33.84	32.64	32.19	27.95	28.65
BANK NEGARA INDONESIA TBK	—	—	—	(10.28)	13.31	14.20	15.94	18.16	n.a.
BANK RAKYAT INDONESIA TBK	—	—	—	31.30	14.35	13.32	12.62	20.87	n.a.
BANK DANAMON TBK	—	—	—	—	57.97	35.49	25.33	26.84	33.27
BANK INTERNATIONAL INDONESIA TBK	—	—	—	—	7.57	(47.41)	33.21	22.02	21.97
BANK PERMATA TBK	—	—	—	—	—	—	10.40	10.80	n.a.
BANK LIPPO TBK	—	—	—	—	21.08	23.70	26.15	17.86	18.26
BANK NIAGA TBK	—	—	—	—	21.34	20.33	18.24	11.58	11.61
BANK PANIN TBK	—	—	—	—	45.13	36.07	32.91	42.35	40.26
BANK NISP TBK	—	—	—	—	(10.28)	13.31	14.20	15.94	18.16

Source : Financial statements of the banks

Table 7 Liquidity (loan/asset)

Name of bank	1996	1997	1998	1999	2000	2001	2002	2003	2004
BANK MANDIRI TBK	—	—	—	9.61	44.97	15.75	21.82	26.14	n.a.
BANK CENTRAL ASIA TBK	64.21	74.31	58.81	3.89	8.08	13.46	17.66	21.39	23.00
BANK NEGARA INDONESIA TBK	65.71	68.85	51.69	20.38	22.95	23.46	28.63	33.15	n.a.
BANK RAKYAT INDONESIA TBK	—	—	—	70.29	36.29	38.52	41.06	45.62	n.a.
BANK DANAMON TBK	76.48	86.23	54.44	12.08	8.17	18.59	35.38	34.33	38.76
BANK INTERNATIONAL INDONESIA TBK	64.34	65.72	29.46	24.02	44.82	15.02	14.12	27.26	30.11
BANK PERMATA TBK	—	—	—	—	—	—	32.18	25.86	29.54
BANK LIPPO TBK	73.24	78.60	31.32	12.70	14.96	15.10	17.12	15.22	15.45
BANK NIAGA TBK	75.88	83.38	77.92	56.76	27.92	32.11	48.97	57.98	62.77
BANK PANIN TBK	58.53	52.49	43.65	28.66	71.67	34.54	55.64	40.63	41.24
BANK NISP TBK	72.30	67.66	33.61	31.51	20.38	22.95	23.46	28.63	33.15

Source : Financial statements of the banks

on financial statements. Table 3 shows the percentage of labor costs in other operating expenses, Table 4 the percentage of loans in deposits, Table 5 the ROA (return on assets), Table 6 capital adequacy ratios, and Table 7 the percentage of loans in the total assets (liquidity).

First, ROA, which represents the percentage of profits in assets, is an indicator by which to measure the efficiency of assets or financial soundness. For example, banks with low ROA present low ratios of lending to deposits, or low liquidity as banks tend to restrict lending under poor financial conditions (credit contraction/credit squeeze). This shows high correlations of the 2 indicators. All banks except for 2 in group C had negative ROA during the post Asian currency crisis period in 1998 and 1999, followed by a recovery to positive ROA (Table 5). Judging from

the result that 3 banks: Bank Mandiri, Bank NISP and Bank Panin, presented a relatively strong correlation between ROA and liquidity (Table 8 and Figure 4), it is difficult to evidence Indonesian banks' reluctance to lend new money.

Public funds, which were injected to banks in the form of recap bonds, are listed as assets in balance sheets. For this reason, Indonesian banks post extremely high capital adequacy ratios compared to those of other countries, as shown in Table 6.⁶ Labor costs remain relatively stable with the exception of Bank Rakyat (Table 3).

2. Individual bank's consolidation ⁷

We provide the history and current state of restructuring by focusing on individual banks. Almost all the large Indonesian banks which received

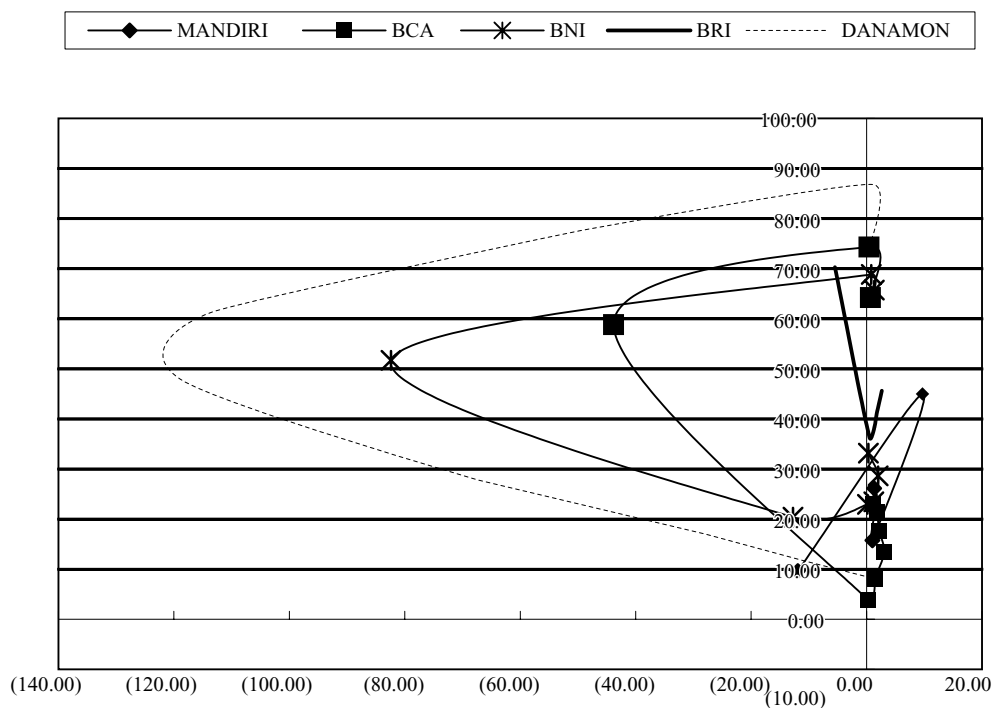
6 Among public funds injected in 1998 and 1999 in Japan, funds issued as preferred stocks are included in capital (capital or excess capital) and those issued as subordinated bonds in liabilities (corporate bonds in corporate liabilities) in the balance sheet. That is to say, public funds are not recognized as assets.

7 We referred to documents from P.T. Nomura Indonesia, documents from the Bank of Tokyo-Mitsubishi Jakarta Branch, Fitch (2004, 2005), Bank Indonesia (2004a, 2004b) and Takayasu (2003) for the history and current state of restructuring of individual banks.

Table 8. Correlation between ROA and Liquidity

Name of bank	Correlation
BANK MANDIRI TBK	0.87944
BANK CENTRAL ASIA TBK	-0.40649
BANK NEGARA INDONESIA TBK	-0.18790
BANK RAKYAT INDONESIA TBK	-0.88362
BANK DANAMON TBK	-0.15201
BANK INTERNATIONAL INDONESIA TBK	0.31722
BANK LIPPO TBK	0.05685
BANK NIAGA TBK	-0.10097
BANK PANIN TBK	0.32077
BANK NISP TBK	0.41854

Figure 4. ROA and Liquidity



capital injections were temporarily placed under the control of the government. Therefore, we also clarify the changes in individual banks and the involvement of the Indonesian government, privatization through the sales of government-owned shares, and the percentage of private capital. We make a comparison of whether large banks that received capital injections had improved their corporate earnings until they were sold. We also compare whether banks with a higher percentage of share ownership by private or foreign investors enjoy higher market valuations.

The following are data on the top 9 banks in terms of asset size in the middle of June 2004, and on another 2 semi-large banks (all figures are as of the end of 2003 except for the asset size). As mentioned,

we added 2 banks as an example of non-government capital recipients because all the top 9 banks received capital injection from the government. (We excluded a ninth because its financial data was unavailable.)

We identify state banks and private banks by the “type”. We classify banks with majority shareholdings by private investors as private banks, and those that still have a majority share ownership by the government as state banks. The forms of the banks during three different periods is abbreviated in brackets; at or before March 1999 (state or private), when the banking system restructuring program was implemented in March 1999 (state or private), and as of the end of 2003 (state or private). The “listing code” represents the security code at the Jakarta

Stock Exchange.

We provided “transition”, “basic financial figures” (based on financial statements of the banks), and “stock price” charts (based on the daily closing price at the stock exchange) separately in the Appendix as detailed in Chapter 2, 2. (Please refer to each box in the Appendix).

Bank Mandiri (First in asset size)
 Assets: 234,686 (billion rupiah)
 Number of branches: 683 (domestic) 3 (overseas)
 Number of employees: 17,735
 Type: State bank(State→state→state)The Indonesian government is the majority shareholder, private investors hold a 30% stake.
 Listing code: BMRI

Of state banks in operation as of March 1999, 4 large-scale category C banks merged to create Bank Mandiri in August 1999. The merger of 4 negative net worth banks created a banking giant that enjoys the premier position in terms of asset size through a huge amount of capital injection.

The number of employees has been cut drastically to 18,000 from 26,000, the ROA and the capital adequacy ratio (CAR) have seen year-on-year recovery, and the percentage of loans in deposits has been on an upward trend. However, as the capital adequacy ratio of Bank Mandiri covers substantial government bonds, it is hard to sum up its strong earnings recovery.

As a whole, the stock has been on an upward trend since its listing in April 2003, though it is sometimes volatile.

Bank Central Asia (BCA) (Second in asset size)
 Assets: 141,738 (billion rupiah)
 Number of branches: 778 (domestic), 2 (overseas)
 Number of employees: 21,358
 Type: Private bank(Private→state→private)
 Listing code: BBCA

Since the government sold its Bank Central Asia (hereafter BCA) shares to Farallon Capital Management, which centered on US hedge funds in 2002, Farallon Capital Management has been the majority shareholder.

BCA was the first bank to be covered by the recapitalization program in 1999 and its government-owned stocks were the first to be sold after nationalization.

Djarum Group, the third tobacco company in

Indonesia, holds 10% of the private capital and participates in BCA management as a major shareholder.

From an improvement in ROA since its nationalization in 2000, we may say that the IBRA contributed to adding more equity capital and further removing non-performing loans. The bank has increased lending after the nationalization through adjustment of the loan-to-deposit rate and further removal of non-performing loans. The stock price strongly rebounded to 3,125 rupiah at the end of April 2005 from 350 rupiah at the end of May 2000.

Bank Negara Indonesia (BNI) (Third in asset size)
 Assets: 128,618 (billion rupiah)
 Number of branches: 685 (domestic), 6 (overseas)
 Number of employees: 13,483
 Type: State bank(State→state→state)
 Listing code: BBNI

Bank Negara Indonesia (hereafter BNI) is a state bank that received public funds in 2000. Following a management reshuffle at the time of the public funds injection, there was another entire reshuffle due to the scandal uncovered in 2003.

While the stocks are scheduled to be sold to private investors in 2005, the stock price has been suffering from a persistent slump since its collapse in the latter half of 1997. In the period around the currency crisis, the stock price hit a 26,625 rupiah high on 13 February 1997 and fell to a 975 rupiah low on 26 April 2001. Closing price on 28 April 2005 was 1,610 rupiah.

After the injection of public funds, ROA and the capital adequacy ratio have been recovering in tandem with the state banks without any significant improvement in valuation in the stock market.

Bank Rakyat Indonesia (BRI) (Fourth in asset size)
 Assets: 99,287 (billion rupiah)
 Number of branches: 324 (domestic), 2 (overseas)
 Number of employees: 34,719
 Type: State bank(State→state→state)
 Listing code: BBRI

Bank Rakyat Indonesia (hereafter BRI), which is a state bank, got back on its feet by accepting public funds in 2000, as did other large state banks.

BRI is characterized by its strong regional network. Besides 324 main branches, the bank owns 148 small branches and 3,900 subordinate

organizations (hereafter BRI Unit). Another feature is its immunity to urban competition due to a community- and regional-oriented customer base. However, cost issues such as those of labor still remain in a bank with as many as 35,000 employees.

Upon its listing on the Jakarta Stock Exchange in October 2003, 40% of the government-owned stocks were sold to private investors. Currently the stocks are on an upward trend. The stock hit a 3,275 rupiah high in 2005 (3 days, including 28 February, 8 March and 16 March), up from 975 rupiah on 10 November 2003 (although listing was in October, stock prices before that date are unavailable).

The bank's ROA has rebounded sharply since becoming positive after the public funds injection in 2000. The ROA hit 2.64% in 2003, which is the highest figure among those of state banks. There has been a slight upturn in lending after a contraction caused by the public funds injection and bad loan disposals in 2000. However, it has still not regained its level of late 1990.

<p>Bank Danamon (Fifth in asset size) Assets: 53,149 (billion rupiah) Number of branches: 479 Number of employees: 13,203 Type: Private bank (Private→state→private) Listing code: BDMN</p>

Bank Danamon is one of 4 banks that were placed under the authority of the IBRA in April 1998. The IBRA utilized the bank as a bridging bank after injecting public funds, and merged it with PDFCI Bank upon its acquisition in December 1999. This was followed by the acquisition and consolidation of 8 banks (Bank Duta, Bank Tamara, Bank Tiara Asia, Bank Nusa National, Bank Rama, Bank Pos Nusantara, Bank Jaya International and Bank Risyad Salim International) in May 2000.

After sale of the government-owned shares to private investors in June 2003, Asia Financial Indonesia holds more than 60% of the shares. Asia Financial Indonesia is an investment company in which Temasek, a Singaporean government-affiliated investment company, has an 85% stake and Deutsche Bank has a 15% stake.

The stock price is apparently sluggish. After it hit a 147,500 rupiah high on 13 February 1997 before the Asian currency crisis, it went down to 800 rupiah

on 31 January 2003. However, observing stock prices since the sale of shares to private investors on 16 June 2003 (please refer to the box in the Appendix), we see a decent level of subsequent performance. The stock is on an upward trend, closing at 1,600 rupiah on 16 June 2003 after the sale of shares to private investors, and at 4,650 rupiah on 28 April 2005. The stock market put confidence in Danamon Bank getting back on its feet, while the ROA provides evidence of the same kind. Its ROA is the highest among those of top-ranked banks (2.90% in 2003 and 1.81% in 2004). The loan-to-deposit ratio has also improved since 2000.

<p>Bank International Indonesia (Sixth in asset size) Assets: 35,085 (billion rupiah) Number of branches: 250 (domestic) Number of employees: 7,562 Type: Private bank (Private→state→private) Listing code: BNII</p>

Bank International Indonesia (hereafter BII), which was classified as a category B bank in March 1999, is a recapitalized bank that raised its own new capital. Since the recapitalization in 1999, its shareholder structure has changed dramatically.

Currently, Sorak Financial Holding Company is the majority shareholder. Sorak Financial Holding Company is an investment company in which Temasek has a 50% stake, Korean Kookmin Bank a 25% stake, Barclays Bank a 20% stake and ICB Financial Holdings the remaining 5%. Fifty-one percent of voting rights in Sorak Financial Holding Company is held by Kookmin Bank, which has a 25% stake (Fitch (2005)).

BII falls behind the above-mentioned Bank Danamon, whose shares are also held by Temasek, in terms of the stock price and the capital adequacy ratio. The stock hit an 18,125 rupiah high on 16 June 1997 and then fell to a 30 rupiah low on 6 May 1999. It closed at 180 rupiah on 28 April 2005.

<p>Bank Permata (Seventh in asset size) Assets: 30,456 (billion rupiah) Number of branches: 306 (domestic) Number of employees: 6,222 Type: Private bank (Private→state→private) Listing code: BNLI</p>

Bank Permata was established by consolidation of Bank Bali, which was established in 1954, and

other banks. Bank Bali, which was classified as a category B bank in March 1999, was not only placed under authority of the IBRA but also lost its management rights to the agency due to failure to recapitalize. It asked Standard Chartered Bank (SCB) for an injection of new equity capital, but failed to achieve this because a scandal between the central bank and Bank Bali was uncovered (Takayasu (2003)). In 2002, 4 private banks that had received capital injections consolidated with Bank Bali to create Bank Permata.

In the current capital structure of Bank Permata, the equally-owned joint venture between SCB and PT Astra International (the biggest automobile manufacturer in Indonesia) has a majority stake.

The bank had negative ROA in 2002 when it merged with other 4 banks, but saw a recovery to 1.93% in 2003. The capital adequacy ratio has remained low by comparison with other banks.

The stock, which hit a 31,953 rupiah high on 24 July 1997, has fallen sharply to 3000 rupiah. It recovered to 20,949 rupiah (14 July) in 1999, remained sluggish even under the IBRA (750 rupiah on 30 September 2002) and despite sales of shares to private investors (1,000 rupiah on 11 November 2004).

<p>Bank Lippo (Eighth in asset size) Assets: 27,272 (billion rupiah) Number of branches: 359 (domestic) Number of employees: 6,236 Type: Private bank (Private→state→private) Listing code: LPBN</p>
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Bank Lippo, which was fully owned by the Muchtar Riady family before the Asian Currency Crisis, was classified as category B due to faltering business. The bank, which succeeded in recapitalization through co-funding with the government, became a private bank whose shares were sold to private investors after the nationalization.

Currently, Swissasia Global is the majority shareholder. Swissasia Global is a joint venture established by Swiss and Austrian small banks.

ROA had remained negative until government-held stocks were sold to private investors, while the loan-to-deposit ratio is lower than that of other banks. The stock price level is also low. Although the stock

is rising, at 625 rupiah on 25 February 2004 and 940 rupiah on 28 April 2005, there is no significant correlation between sales of shares to private investors and the stock price.

<p>Bank Niaga (Tenth in asset size) Asset: 25,377 (billion rupiah) Number of branches: 52 (domestic) Number of employees: 4,115 Type: Private bank (Private→state→private) Listing code: BNGA</p>

Bank Niaga, which was classified as category B together with Bali Bank in March 1999, failed in raising new capital and was placed under the supervision of the IBRA.

Since November 2002, CAHB (Commerce Asset Holding Berhad Malaysia), a Malaysian holding company, has held a majority of shares. CAHB is a business unit, in which Bumiputra Commerce Bank, the second largest bank in Malaysia, has a 99% stake. Bank Niaga is one of the few “non-overseas Chinese” banks among leading banks.

The stock price has hovered sluggishly within the range of 300 to 500 rupiah, even after 2002 when the shares were sold to private investors.

Chapter 3: Analysis of efficiency

1. The analysis method

In this chapter, we outline methods for analysis of the efficiency of bank management and the consolidation effect. There are a number of methods to verify whether there is any improvement in a bank’s financial condition, any enhancement to management efficiency, and any consolidation effect.

The main analysis examined consolidation effectiveness including event studies of stock price responses and performance analysis using financial statements. The event study, which identifies the consolidation announcement date as an event, monitors the trend of the prices during two periods before and after the announcement. Considering government-led bank consolidation, this analysis does not suit Indonesia, where a number of events include announcement dates on policy or capital-raising plans and other public funds-related events other than the consolidation announcement date.

Case studies (case study analysis method), which examine the background of the progress to consolidation, is an analysis method that uses financial statements. However, this method also does not suit Indonesia, where banks were consolidated involuntarily.

There is an analysis method to estimate the cost function for the purpose of establishing economies of scale or economies of scope in a bank consolidation.⁸ However, the Indonesian government, which had consolidated insolvent state banks, may have been more concerned with “too big to fail”.

Given this factor, we make an analysis based on the idea of inefficiency that is defined by deviation from the production frontier.

2 .Estimation model ⁹

(1) Efficiency measurement concept and DEA

Data Envelope Analysis (hereafter referred to as DEA) is widely used in the empirical estimation of financial institution efficiency. There are two types of approaches for estimating frontier function: a parametric approach and a nonparametric approach. DEA, initially an idea from Farrell (1957), is a nonparametric approach. As DEA can avoid technical problems that occur when estimating a parametric approach, Berger and Humphrey (1997) point out that more studies use DEA to estimate inefficiency.

DEA is a nonparametric approach to solve linear programming problems (hereafter LP) to find a set of best-practice frontier observations. DEA defines efficiency as 1 when on the frontier and measures the level of inefficiency by the distance from the frontier. It is difficult to parametrically specify and estimate a production function for the banking business because deregulation and advances in technology have brought many outputs other than loans. DEA requires no explicit specification of functional form. Another advantage is its capability to derive explicit efficiency for an individual bank.¹⁰

A bank is efficiency consists of 2 components:

technical efficiency and allocative inefficiency. Technical efficiency refers to the ability of a bank to obtain maximal output from a given set of inputs, while allocative efficiency represents the ability of a bank to use the inputs in optimal proportions, given their respective prices. These two measures of efficiency are combined and described as overall efficiency.

Two axes in Figure 5 show two inputs (X1 and X2), an output (Y), production frontier or isoquant (UU') and the input price ratio (PP'). This isoquant is estimated from observations and a point on the isoquant is 1 when the production function is homogeneous.

When a production activity is performed at point A, this point is not only technically efficient but also allocatively efficient. As all points on the line that connects the original point and point A represents an identical combination of inputs, it is possible to produce output B where requires fewer inputs without changing the input mix. This distance AB represents additional cost attributing to overspent inputs, or the technical inefficiency. Producing outputs at point B can reduce the cost at a rate of OB/OA.

Even in the case of production on the production frontier through dissolution of technical inefficiency, a bank can shift production activities to point C by modifying the input mix of (slope of) OC. Point C is the most effective production activity point in terms of technical efficiency and allocative efficiency. This suggests that we can produce outputs with the same cost injected to inputs shown at point D. Producing outputs at point C can reduce the cost at a rate of OD/OB.

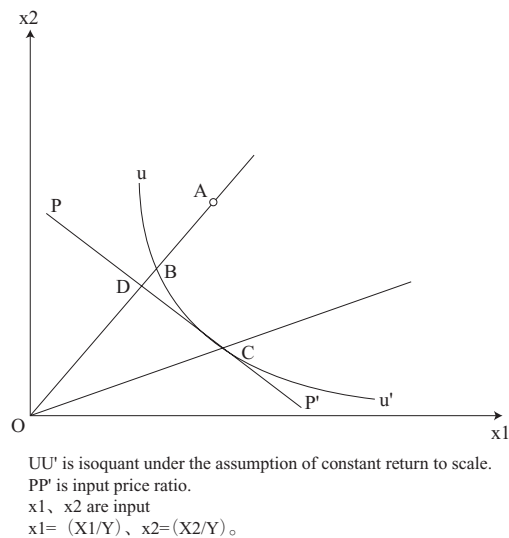
A combination of technical inefficiency, which is represented by BA/OA, and allocative inefficiency (DB/OA) makes $DA/OA = (BA/OA + DB/OA)$. Multiplication of respective inefficiency scale (reducible costs), $OD/OA = (OB/OA \times OD/OB)$, is interpreted as inefficiency of production volume.

8 Okuda (1999) estimates the log-liner cost function through the use of the financial data of 54 Indonesian local banks.

9 Introduction of models in this chapter is based on Harada (2004).

10 DEA estimation, which has no estimated error on deviation from the frontier, can be fully explained by inefficiency. A criticism of DEA is its lack of assumption of estimated error and its assumption of residual error against the frontier as zero. Advantages and disadvantages related to each frontier function are detailed in Greene (1997), Torii (2001), Hori (1998) and others.

Figure 5.



(2) DEA Model

Assumption of constant return to scale (hereafter CRS) gives the following linear programming (binary) problem of the DEA model;

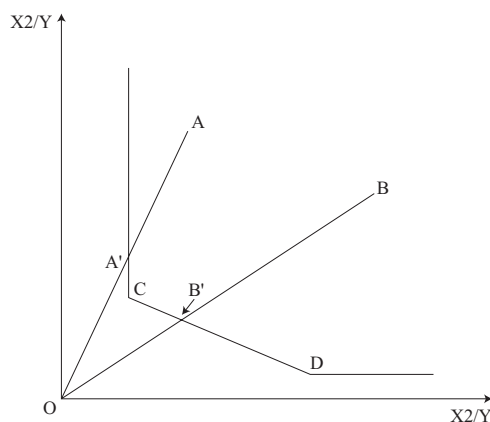
$$\begin{aligned}
 & \min_{\lambda, \theta} \theta \\
 \text{s.t.} \quad & -y_i + Y \lambda \geq 0, \\
 & \theta x_i + X \lambda \geq 0, \\
 & \lambda \geq 0,
 \end{aligned}
 \tag{1}$$

θ stands for a scalar that represents technical inefficiency, which satisfies $\theta \leq 1$. In the case of $\theta = 1$, outputs are produced on the production frontier. X stands for the vector of input Y for the vector of output, y_i for the production volume of i bank and λ for a $N \times 1$ column vector. This linear programming must be solved successively for each bank and θ , the efficiency score of each bank is obtained.

Efficiency measures by this DEA model assume that there is a production function of the fully efficient firm (Farrell (1957)). In empirical estimation, partially linear LP faces a problem as the efficient isoquant must be estimated from the sample data (Coelli et al. (1996)). Figure 6, which assumes the same framework as Figure 5, shows an estimated production function.

Based on the idea in the preceding paragraphs, points A and B are inefficient production points whereas A' and B' do not always provide efficient production points. This is because reduction of a product by CA' at point A' enables production at point C. CA' represents a status that enables more cutback of 2 items, i.e. slacks. DEA tends to recognize inefficiency caused by slacks as allocative inefficiency (Koopmans (1951)). A product that contains slacks does not contain technical efficiency

Figure 6.



level in the sense that no higher efficiency is attainable without changing any technology. Therefore, more strict efficient points are estimated by multistage DEA where a sequence of LP problem is conducted to eliminate slacks and a more accurate result is obtained (Coelli et al. (1996)).

DEA with variable returns to scale (hereafter VRS, which means increasing or decreasing return) is given in a similar form to that of constant returns. The constant returns to scale linear programming problem is easily modified by adding a constraint: the total sum of each factor of λ as 1.

$$\begin{aligned}
 & \min_{\lambda, \theta} \theta \\
 \text{s.t.} \quad & -y_i + Y\lambda \geq 0, \\
 & \theta x_i + X\lambda \geq 0, \\
 & N1' \lambda = 0, \\
 & \lambda \geq 0,
 \end{aligned} \tag{2}$$

This method solves the slacks problem. Technical inefficiency deduced from VRS, which is a purely technical inefficiency, is identical or closer to 1 relative to technical inefficiency deduced from the DEA of the CRS model. Dividing the technical inefficiency of VRS by those of CRS produces technical inefficiency that excludes the part affected by allocative inefficiency. When this figure comes out as 1, the bank is considered to be conducting optimal production.

3. The data and period^{11 12}

Our analysis covers 5 years of the post Asian currency crisis period of 1999-2003. Non-consolidated financial figures are used for the nonparametric frontier approach explained in the previous section. We did not include the period

around the Asian currency crisis when bank consolidation was going on.

The selection of appropriate inputs and outputs is the most important in using the DEA, and flow figures are preferable to stock variables. For example, outstanding loans, which is a stock variable, may include non-performing loans. This point should be taken care of when analyzing the period after the currency crisis where disposals of bad loans took place. Berger and Humphrey (1997) recommend the Intermediation Approach (IA) to measure management efficiency on an entire bank level. The IA is an approach that uses labor, capital, interest payments, and other expenses as inputs and interest income and non-interest income as banks' outputs.

In this paper, supposing that banks produce outputs by the input of labor and funds, personnel expenses (a proxy variable of the number of employees), general and administrative expenses, and interest payments (total interest expenses) are chosen as inputs.¹³ We took interest income (total interest income) and commission income as outputs.¹⁴

4. Estimation results

Table 9 and 10 show the results calculated by inserting the data of 10 Indonesian banks into the equations (1) and (2). The 10 banks include the top 8 banks in terms of asset size, excluding the seventh-ranked Bank Permata and the ninth-ranked Bank Tabungan Negara, and 2 banks that did not receive public funds: Bank Panin and Bank Nisp. Bank Permata, a new bank established by Bank Bali's merger with other 4 medium-sized banks, was left out of our list as the bank is new and its financial data is

11 When obtaining financial data, Mr. Peter Chandra of P.T. Nomura Indonesia helped us and provided the data. We gratefully acknowledge his contribution.

12 Due to limited use of financial data, we have to say that analysis in this paper is still in a period of transition. First, there are still no data available for the ninth bank in terms of asset size. Second, we found an error in the financial statements data provided (part of financial figures in different banks was the same). We may later make minor adjustments due to data problems.

13 Financial data released by the Indonesian government are, unlike Japanese banking financial data, limited in number of items. Due to lack of data on personal expenses and real estate related funds, inputs and capital-related factors were excluded.

14 There are two prominent types of outputs; interest income and non-interest income (total other operating income). While banks in developed countries including Japan have a high percentage of commission income in total non-interest income, we observed that Indonesian banks have a higher percent of "other income" than commission income. Income from foreign exchange trading is under another detailed item. The "other income" whose details are unknown at this time might include interest payments on the bonds injected by the government. As these are not outputs of banks, we adopt interest income as income from lending operations and commission income as income from non-lending operations.

insufficient. Financial data from Bank Tabungan Negara were unavailable.

Table 9 and 10 show the result of the DEA panel data analysis 5-year panel data for 10 banks covering 1999-2003. The estimated DEA is in line with the definition in T. Fare et al. (1994).

Fare et al. (1994) calculate the technical efficiency distance between terms $t-1$ and $t+1$ to measure total factor productivity of company i at term t whereas Table 9 carries only the values of efficiency at period t . Table 10 shows TFP (Total Factor Productivity). TFP is an indicator of the relationship between outputs and the aggregated volume of all inputs. Subtracting weighted-average input growth from output volume growth gives TFP growth. Table 9 and 10 show the result of the DEA panel data analysis using 5-year panel data for 10 banks covering 1999-2003. The estimated DEA results are in line with the definition in T. Fare et al. (1994).

Namely TFP growth is productivity growth that is not explained by increases in factor (capital and labor) inputs. In the short term, we can construe that it represents improved operation rates of fixed equipment and the technical level of laborers. TFP growth is measured as a difference from TFP in term $t-1$ to TFP in term t . Table 10 shows results of total factor productivity (TFP) as an overall efficiency figure (other items such as technological change or change in scale economy are not shown in the paper).¹⁵

First, Table 9 gives an overview on pure efficiency movements throughout 5 years.¹⁶ As an overall feature, the banking sector is on a recovery trend as shown by the average efficiency scores, which have been recovering since it bottomed out at an average of 0.80 in 1999, remaining at an average of more than 0.9 since 2000.¹⁷ The transition of TFP average in Table 10 also provides similar evidence.

We observe constant yearly recovery of productivity, which rose by 1.289 on a year-on-year basis in 2000 against 1999 and showed successive year-on-year rises of 1.08, 1.061, 1.019 and 1.108.

Regarding individual banks, Table 9 shows that Bank Panin and Bank Nisp, which belong to group C of non-recipients of public funds, had retained an efficiency of 1.00 throughout almost the whole period. In this context, we can conclude that banks that had not received public funds ran their business efficiently. (The efficiency of Bank Niaga slightly slowed during 2000-2002).¹⁸ Secondly, Bank Mandiri, Bank Negara Indonesia, and Bank Rakyat Indonesia, which had received a huge amount of public funds, saw a significant deterioration in efficiency in 1999 compared to other banks (0.55, 0.58 and 0.84 respectively). These banks have recovered their performance to bring the efficiency up to approximately 1.00. From this perspective, we can conclude that the state banks in group A have become efficient. Private banks that did not receive public funds enjoy rising stock prices, but this is not necessarily the case for state banks. That is to say, analysis results with the use of financial data do not accord with the valuation in the stock market of state banks. This issue remains to be resolved.

Performance of each bank in group B1 is varied. Although Bank Danamon's efficiency figures have recovered sharply to 0.88, 0.90 and 1.00 after bottoming out at 0.55 in 1999, the figure of Bank International Indonesia deteriorated from 1.00 in 1999 to 0.68 in 2003. Bank Niaga, the only bank in group B2, turned out to be on average the most inefficient of the banks analyzed, with efficiency indicators of 0.51, 0.60, 0.72, 0.75 and 0.92 in 1999 - 2003.

Table 10 shows almost the same results. Year-on-year efficiency, which remained just above 1.00, and the result of DEA, confirmed positive recovery

15 The methodology of Fare et al. (1994) is not explained in this paper.

16 It was found that banks with large assets had relatively large interest income and commission income when 2 outputs were plotted. Therefore, constant returns to scale (CRS) technique are assumed as a functional form in this paper.

17 We use panel data in the paper to estimate DEA scores. The advantage of panel analysis is the availability of yearly comparison. A yearly-based DEA analysis gives only relative positions during the year and relative comparison in a year might cause misleading of results because a bank might happen to perform well in a particular year, and it could downgrade the efficiencies of other banks. This paper has avoided this kind of problem.

18 Bank Panin was named in 2005 as the healthiest bank that did not receive public funds (category: the best non-recap bank with assets under Rp 10 to Rp 50 trillion).

Table 9 Result of DEA panel analysis (CRS technical efficiency)

	1999	2000	2001	2002	2003
BANK MANDIRI TBK	0.55	0.86	0.90	0.96	1.00
BANK CENTRAL ASIA TBK	1.00	1.00	1.00	1.00	1.00
BANK NEGARA INDONESIA TBK	0.58	1.00	0.82	0.88	0.87
BANK RAKYAT INDONESIA TBK	0.84	1.00	1.00	1.00	0.96
BANK DANAMON TBK	0.55	0.88	0.90	1.00	1.00
BANK INTERNATIONAL INDONESIA TBK	1.00	1.00	0.66	0.61	0.68
BANK LIPPO TBK	1.00	1.00	1.00	1.00	1.00
BANK NIAGA TBK	0.51	0.60	0.72	0.75	0.92
BANK PANIN TBK	1.00	1.00	1.00	1.00	1.00
BANK NISP TBK	1.00	0.96	0.92	0.98	1.00
Average	0.80	0.93	0.89	0.92	0.94

Table 10 TFP transactions over the previous year

	2000	2001	2002	2003	Average
BANK MANDIRI TBK	1.60	1.18	1.01	0.83	1.12
BANK CENTRAL ASIA TBK	0.91	1.27	0.97	0.97	1.02
BANK NEGARA INDONESIA TBK	2.13	1.00	1.05	0.98	1.22
BANK RAKYAT INDONESIA TBK	1.38	1.16	1.01	1.14	1.16
BANK DANAMON TBK	1.71	1.02	1.31	0.96	1.22
BANK INTERNATIONAL INDONESIA TBK	1.00	0.75	0.97	1.22	0.97
BANK LIPPO TBK	1.41	1.14	1.25	1.39	1.30
BANK NIAGA TBK	1.18	1.17	1.10	1.17	1.15
BANK PANIN TBK	0.97	1.26	0.96	0.84	1.00
BANK NISP TBK	1.08	0.98	1.04	0.85	0.98
Average	1.289	1.08	1.061	1.019	1.108

trend of the Indonesian banking sector.

Conclusion

In this paper, we analyzed whether capital injection to rebuild the Indonesian banking sector, and the government-led bank consolidation, contributed to improving the management efficiency of banks. Referring to the banking supervision structure and macro environments, we made a quantitative review by clarifying the backgrounds to the consolidation of individual banks and their current state. We estimated production frontier functions with using DEA, a non-parametric analysis measure that has never before, as far as the authors know, been used in analyzing the Indonesian banking business.

The results of the analysis made clear that the efficiency of the banking sector has on average been on a recovery trend since the public funds injection of 1999. Above all, we concluded that the efficiency of private banks that had not received public funds after the Asian currency crisis performed well throughout the period analyzed. The result shows that performance of the state banks had recovered. However, the stock prices had remained sluggish. Efficiency scores were mixed across private banks

taken under state control temporarily. Our estimation results confirmed the Indonesian banking sector's rebound.

Additionally, we found that the Indonesian banking sector has been recovering slowly but steadily in real terms and that privatization of state banks (sales of government-owned shares to the private sector) has not always brought improved business performances and market valuations.

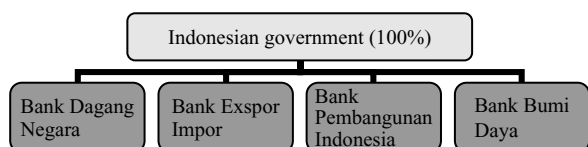
As shown by some analysis results in this paper, the Indonesian banking sector is proven to be on a recovery trend. However, outstanding environment issues still remain; the bank supervision structure is still weak due to the continuing absence of the Financial Supervising Agency, and inflation rates remain relatively high compared with those of other Asian countries. Sales of state banks to private investors are another outstanding issue. In order to maintain and further enhance the health of the banking sector, macro economic issues and institutional issues such as that of the banking supervising structure require early solution. We eagerly await the country's future financial system reforms.

Appendix table 1 Bank Mandiri (1st in asset size)

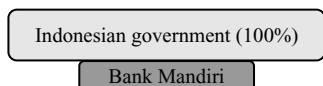
Number of branches: 683 (domestic), 3 (overseas),
 Number of employees: 17,735
 Type : State (State→State→State)
 Listing code : BMRI
 Established on 2 October 1998 through a merger of 4 state banks

Transition of bank ownership structure

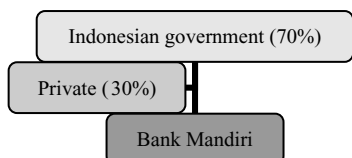
Before 2 October 1998



Since 2 October 1998

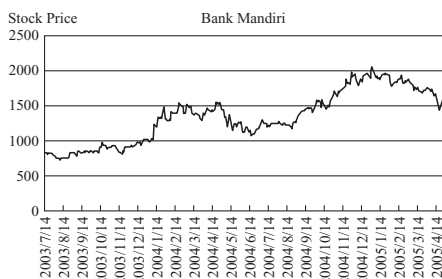


Since 14 July 2003 (As of end 2003)



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	(11.92)	9.70	1.00	1.44	1.31	n.a.
CAR	15.93	31.29	26.44	23.39	27.72	n.a.
Loan/deposit	9.61	44.97	15.75	21.82	26.14	n.a.

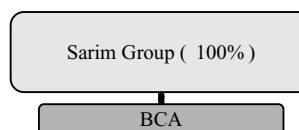


Appendix table 2 Bank Central Asia (BCA)(2nd in asset size)

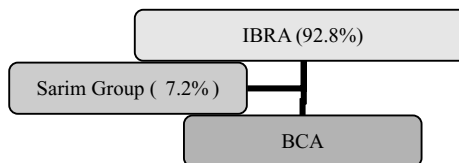
Number of branches: 778 (domestic), 2 (overseas)
 Number of employees: 21,358
 Type : Private (Private→State→Private)
 Listing code : BBCA
 Established on 10 August 1955 through a merger of 4 state banks

Transition of bank ownership structure

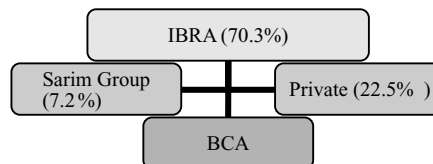
Before 27 April 1999



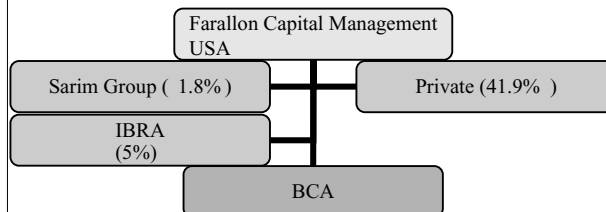
Since 27 October 1999



Since May 2000



Since March 2002



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	0.24	1.45	3.03	2.17	1.80	1.06
CAR	—	33.84	32.64	32.19	27.95	28.65
Loan/deposit	3.89	8.08	13.46	17.66	21.39	23.00



**Appendix table 3 Bank Negara Indonesia (BNI)
(3rd in asset size)**

Number of branches: 685 (domestic), 6 (overseas),
Number of employees: 13,483
Type : State (State→State→State)
Listing code : BBNi
Established on 5 July 1946 through a merger of 4
state banks

Transition of bank ownership structure

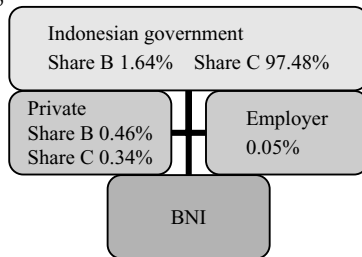
Before 25 November 1996



Since 25 November 1996



As of December 2003



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	(12.73)	0.14	1.26	2.00	0.32	n.a.
CAR	(10.28)	13.31	14.20	15.94	18.16	n.a.
Loan/deposit	20.38	22.95	23.46	28.63	33.15	n.a.



**Appendix table 4 Bank Rakyat Indonesia (BRI)
(4th in asset size)**

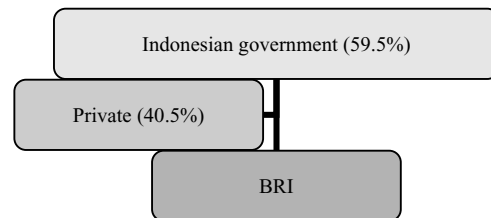
Number of branches: 324 (domestic), 2 (overseas),
Number of employees: 34,719
Type : State (State→State→State)
Listing code : BBRI
Established on 16 December 1895 through a merger
of 4 state banks

Transition of bank ownership structure

Before 16 October 2003



As of December 2003



Basic financial statement

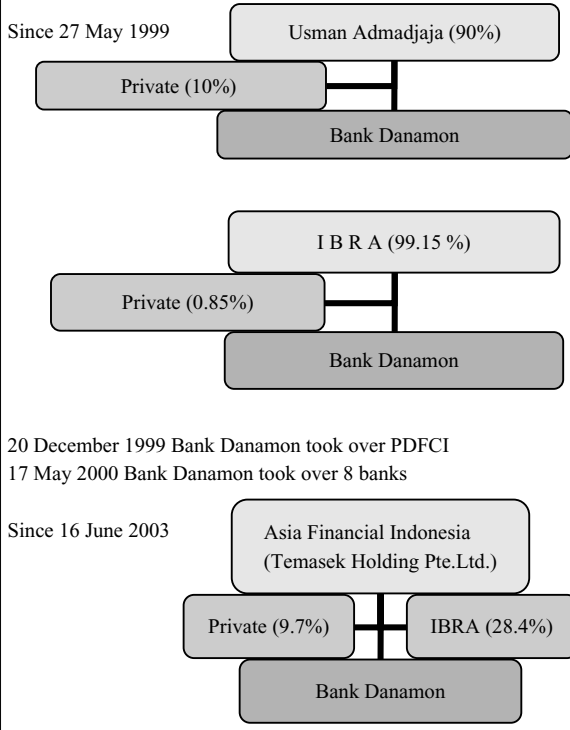
	1999	2000	2001	2002	2003	2004
ROA	(5.48)	0.52	1.41	1.77	2.64	n.a.
CAR	31.30	14.35	13.32	12.62	20.87	n.a.
Loan/deposit	70.29	36.29	38.52	41.06	45.62	n.a.



Appendix table 5 Bank Danamon (5th in asset size)

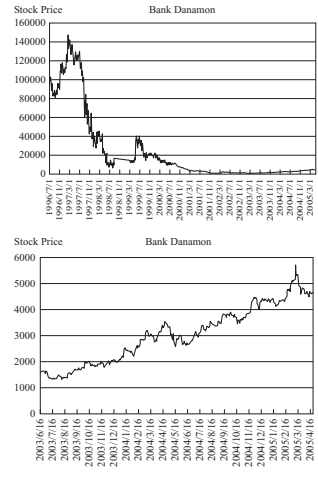
Number of branches: 479 (domestic)
 Number of employees: 13,203
 Type : Private (Private→State→Private)
 Listing code : BDMN
 Established on 16 June 1956 through a merger of 4 state banks

Transition of bank ownership structure



Basic financial statement

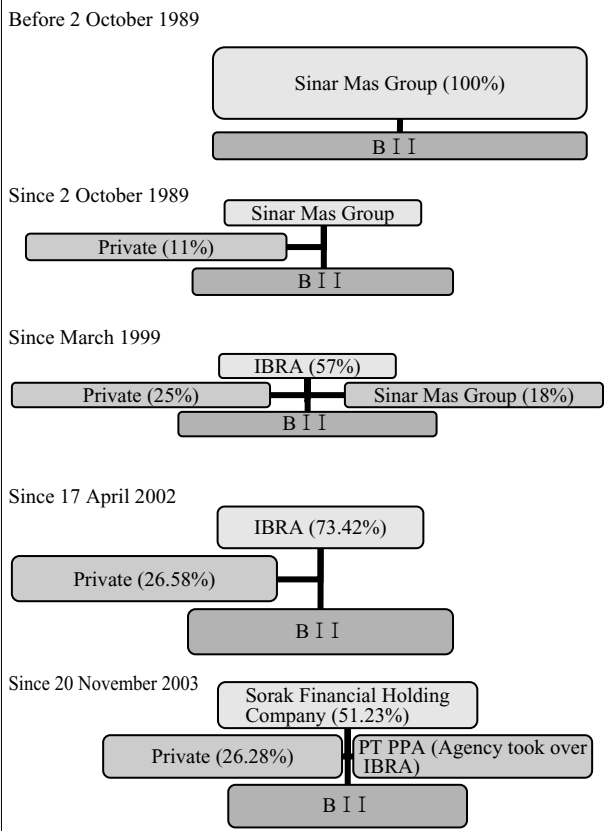
	1999	2000	2001	2002	2003	2004
ROA	(13.12)	0.54	1.37	2.02	2.90	1.81
CAR	—	57.97	35.49	25.33	26.84	33.27
Loan/deposit	12.08	8.17	18.59	35.38	34.33	38.76



Appendix table 6 Bank International Indonesia (BII) (6th in asset size)

Number of branches: 250 (domestic)
 Number of employees: 7,562
 Type : Private (Private→State→Private)
 Listing code : BNII
 Established on 15 May 1959 through a merger of 4 state banks

Transition of bank ownership structure



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	(5.73)	0.73	(13.56)	0.37	0.89	1.05
CAR	—	7.57	(47.41)	33.21	22.02	21.97
Loan/deposit	24.02	44.82	15.02	14.12	27.26	30.11

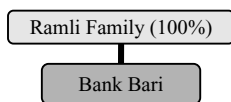


Appendix table 7 Bank Permata (7th in asset size)

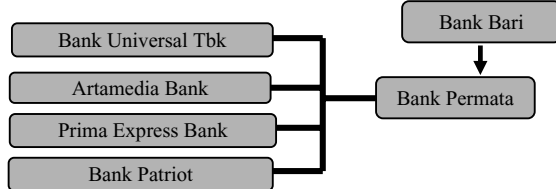
Number of branches: 306 (domestic), 2 (overseas),
 Number of employees: 6.222
 Type : Private (Private→State→Private)
 Listing code : BNLI
 Established on 15 January 1954 through a merger of 4 state banks

Transition of bank ownership structure

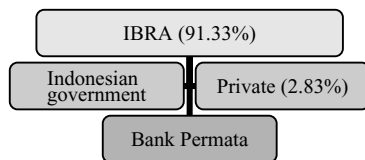
Bank Bari period



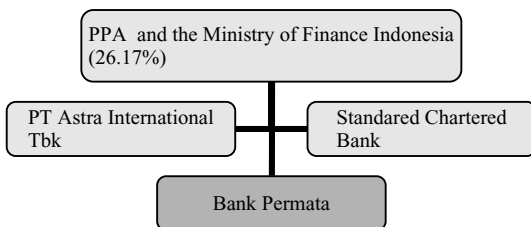
On 30 September 2002, 4 banks merged with Bank Bari to establish Permata Bank



Since 14 July 2003 (As of end of 2003)

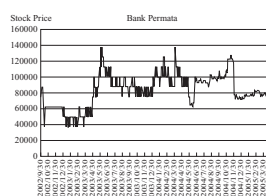
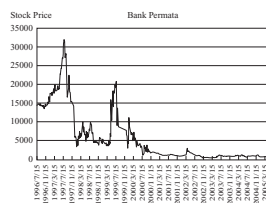


Since 11 November 2004



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	—	—	0.50	(3.25)	1.93	n.a.
CAR	—	—	—	10.40	10.80	n.a.
Loan/deposit	—	—	—	32.18	25.86	29.54

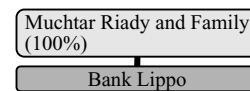


Appendix table 8 Bank Lippo (8th in asset size)

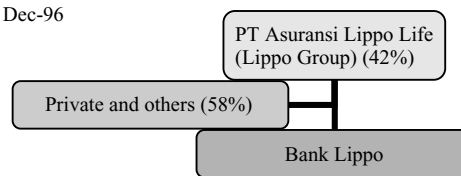
Number of branches: 359 (domestic)
 Number of employees: 6,236
 Type : Private (Private→State→Private)
 Listing code : LPBN
 Established on 11 March 1948 through a merger of 4 state banks

Transition of bank ownership structure

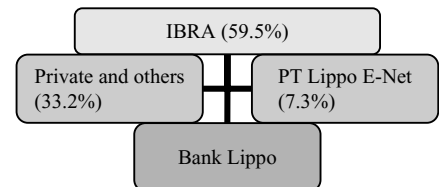
Before 10 November 1989



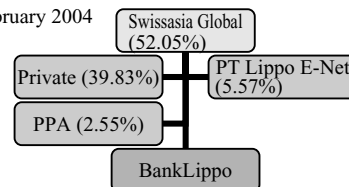
Dec-96



Since 14 July 1999

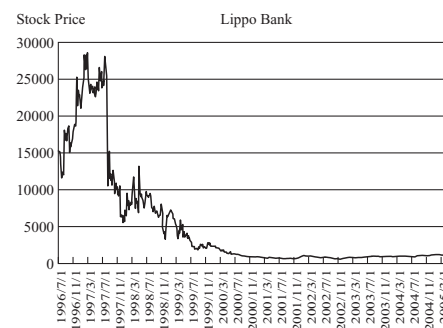


Since 25 February 2004



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	(7.69)	1.08	1.14	(2.01)	(1.95)	0.37
CAR	—	21.08	23.70	26.15	17.86	18.26
Loan/deposit	12.70	14.96	15.10	17.12	15.22	15.45

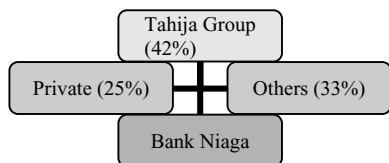


Appendix table 9 Bank Niaga (10th in asset size)

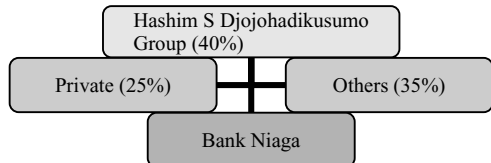
Number of branches: 52 (domestic)
 Number of employees: 4,115
 Type : Private (Private→State→Private)
 Listing code : BNGA
 Established on 1 March 1955 through a merger of 4 state banks

Transition of bank ownership structure

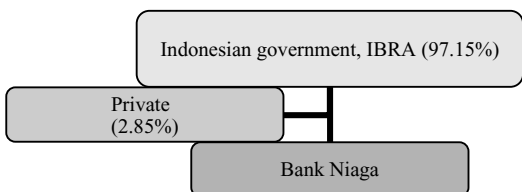
As of 1996



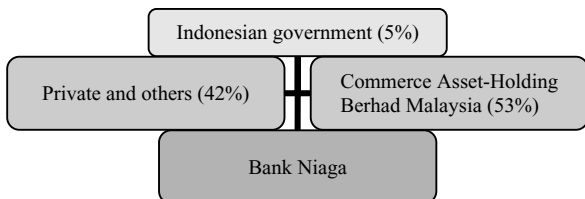
Since 27 July 1997



Since July 1999

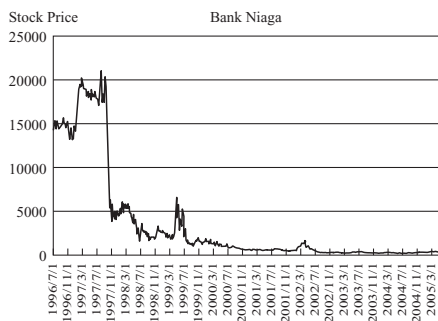


Since 22 November 2002



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	(85.00)	0.35	(0.20)	1.50	1.72	1.20
CAR	—	21.34	20.33	18.24	11.58	11.61
Loan/deposit	56.76	27.92	32.11	48.97	57.98	62.77

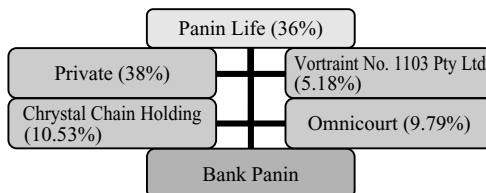


**Appendix table 10 Bank Pan Indonesia (Bank Panin)
 (Asset size un-known)**

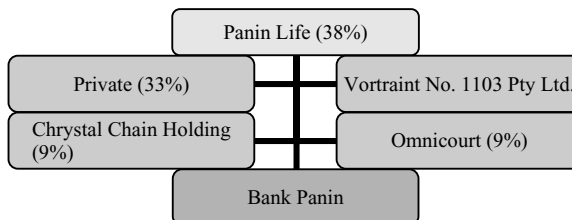
Number of branches: 125 (domestic)
 Number of employees: 2527
 Type : Private (Private→Private→Private)
 Listing code : PNBN
 Established on 17 August 1971 through a merger of 4 state banks

Transition of bank ownership structure

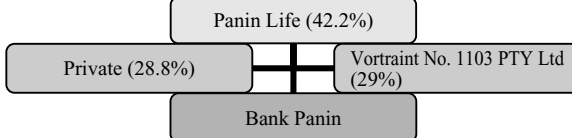
December 1999



Since December 2002



Since June 2004



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	1.31	0.07	0.01	0.63	2.22	1.21
CAR	—	45.13	36.07	32.91	42.35	40.26
Loan/deposit	28.66	71.67	34.54	55.64	40.63	41.24



Appendix table 11 Bank NISP (Asset size un-known)

Number of branches: 119 (domestic)

Number of employees: 2,901

Type : Private (Private→Private→Private)

Listing code : NISP

Established on 2 October 1998 through a merger of 4 state banks

Transition of bank ownership structure

Since 20 October 1994

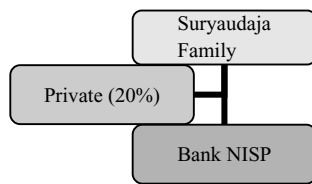
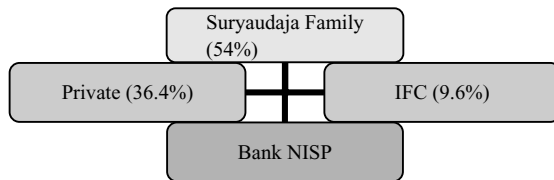
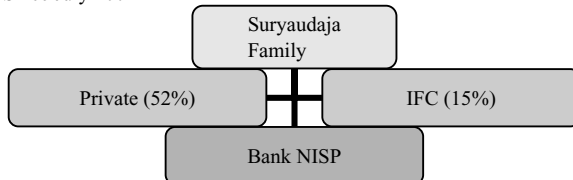


Table 10 TFP transactions over the previous year

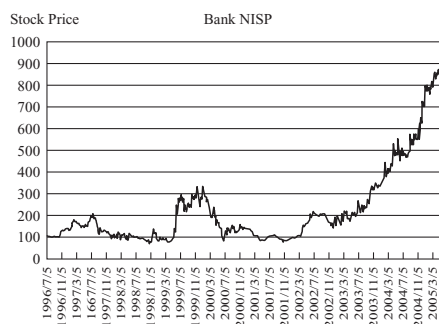


Since July 2002



Basic financial statement

	1999	2000	2001	2002	2003	2004
ROA	0.62	(12.73)	0.14	1.26	2.00	0.32
CAR	—	(10.28)	13.31	14.20	15.94	18.16
Loan/deposit	31.51	20.38	22.95	23.46	28.63	33.15



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