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Banking Disintermediation and Its Implication for Monetary Policy: The Case of Indonesia

Halim Alamsyah, Doddy Zulverdi, Iman Gunadi, Rendra Z. Idris, Bambang Pramono[1]

Abstraksi

Paper ini berupaya menganalisa implikasi perilaku bank dalam menentukan portofolio terhadap tingkat efektivitas kebijakan moneter. Dengan kerangka analisa comparative static, paper ini mengetengahkan model industri perbankan yang bersifat monopolis dimana pemilik bank memaksimalkan profit dengan kendala tertentu baik yang berasal dari kesanggupan modal maupun kendala akibat regulasi.

Kalibrasi model pada kondisi optimal, mengindikasikan bahwa penurunan fungsi disintermediasi bank yang didominasi oleh faktor asymmetric information, akan berakibat pada menurunnya efektifitas kebijakan moneter.

Kesimpulan ini berimplikasi pada (i) perlunya Biro Kredit dan rating agencies untuk menyempurnakan informasi, (ii) perlunya investasi yang lebih besar oleh perbankan atas kapasitas riset dan sistem monitoring, (iii) perlunya mempertimbangkan skema garansi kredit, (iv) perlunya koordinasi yang lebih baik antara kebijakan mikro dan makro demi kestabilan makro yang akan meningkatkan keyakinan publik dan terakhir, (v) perlunya mempromosikan perkembangan lembaga keuangan non-bank, untuk mengurangi ketergantungan pembiayaan atas lembaga perbankan.

JEL: E52, E58, G21

Keyword: Disintermediation, monetary policy, banking sector, interest rate.

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I. BACKGROUND

It is widely known that banks play a determinant role in financing economic development. Stiglitz and Greenwald (2003) argued that this is so because banks are superior to other financial institutions in coping with asymmetric information and high cost operations in financial intermediary activities. By their nature, banks are capable of dealing with different types of borrowers, and with an appropriate regulatory framework and institutional set up, banks are better equipped to deal with asymmetric information problems.

In emerging countries or economies like Indonesia the role of banks is even more critical. Banks are not only the major source of funding to small, medium as well as large corporations, they also determine the business cycle of the economy as a whole. For example, in Indonesia during 2001 – 2004, the flows of credit from the banking sector contributed on average about 77% of total financing from major financial institutions (banks, bond markets, and stock markets). As a result, the rise and fall of banks has strong correlation with economic booms and busts in Indonesia. This phenomenon can also be observed in many emerging countries. However, escaping this phenomenon is not easy in most emerging countries as the development of non-bank financial institutions is usually constrained by inadequate institutional capacity and infrastructure as well as weak legal foundation.

Looking at the micro level, a bank's behavior in selecting their portfolio composition also plays an important role in explaining monetary policy transmission (see e.g. Silber [1969] & Beckhart [1940]). Within a bank's portfolio, special attention is given to credit because this type of asset is most dominant in a normal and well functioning bank. The growing awareness of the importance of credit in the monetary policy transmission process is driven, among others, by concerns over the impact of financial sector weaknesses, bank failures, non-performing loans (NPLs), and credit rationing on the effectiveness of the transmission process (see e.g. Blinder [1987], Bernanke and Blinder [1988], Brunner and Metzler [1988]). In the past, monetary literature has paid little attention to the role of credit due to the emergence of monetarist thinking and the overriding influence of Keynesian thought on "Liquidity Preference" that stresses the importance of money rather than credit (Gertler [1988]). As proposed by Stiglitz and Greenwald, a new monetary policy paradigm should really be re-focusing its attention toward the importance of supply and demand for credits in the economy.

Within this context, this paper tries to analyze the implication of banks' behavior in selecting their portfolio choices on the effectiveness of monetary policy. A very simple model has been designed and the analysis will compare banks' behavior and their impact on the effectiveness of monetary policy before and during the post-crisis period. We begin with a historical overview of the development of the banking sector and monetary policy in Indonesia.

We then proceed with a brief explanation of the model being used in analyzing banks' behavior. Based on this framework, an empirical simulation on the impact of banking disintermediation on policy transmission in Indonesia was conducted. Lastly, we conclude with how changes in banks' internal and external conditions can alter the efficacy of monetary policy and provide some note worthy recommendations.

II. THE DEVELOPMENT OF THE BANKING SECTOR AND MONETARY POLICY IN INDONESIA

II.1 Pre-Crisis Period: 1960s - Mid 1997

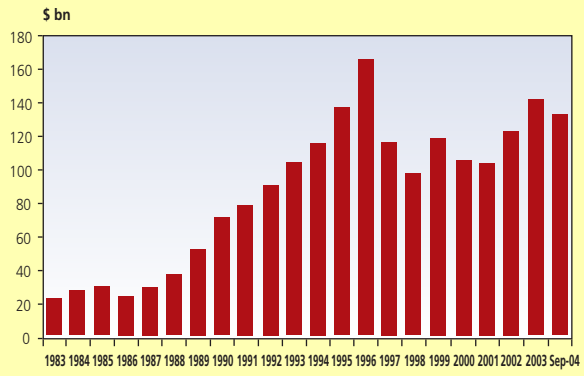
Prior to a series of financial deregulations in the 1980s, state-owned banks dominated the banking sector, holding 80% of total bank assets. State-owned banks acted almost as the sole credit provider to the real sector and played as agents of development by channeling significant amounts of government subsidized loans. These banks were heavily regulated, to such an extent that interest rate determination was controlled, by the government, to an artificially low level, hence discouraging efficient fund mobilization and stifling competition.

Under such conditions, monetary policy is conducted through the use of direct control instruments. Following a successful macro economic stabilization program in the second half of the 1960s, the Central Bank employed direct monetary instruments such as imposing a ceiling on lending rates and the volume of loans, injecting subsidized credits, and endorsing selective foreign exchange controls, whereas the exchange rate regime was relatively fixed. Supported by windfall profits from the oil boom, this was marked as the era of government-led growth lasting through the 70s and 80s with an average annual economic growth rate of 7.5%.

The world recession and the dramatic oil price drop in the early 1980s prompted the government to change its development strategy. As the current account deficit widened, thus threatening the external positions of the country, and GDP growth dropped to 2.3% in 1982, the government took sweeping adjustment measures. As an initial step, the government devalued the Rupiah by 38% to correct the external imbalance by stimulating non-oil exports. In addition, the government postponed some large government projects, amounting to around US$10 billion of public expenditure. Furthermore, the government realized that it could no longer act as the main engine of growth as fiscal sustainability was under pressure. Consequently, the government gradually shifted its dominant role as development agent to the private sector by encouraging the promotion of the banking sector and the financial sector as a whole in order to tap private savings and channel them into private investments expeditiously. This was done through a number of deregulation policy packages in the financial sector.

The first financial deregulation was introduced in June 1983, known as PAKJUN 83, involving three aspects, namely, (1) abolishing the credit ceiling that had been used as a means of monetary control and introducing indirect monetary instruments, (2) reducing the injection of liquidity credit provided by Bank Indonesia, and (3) granting freedom to state-owned banks to set their own interest rates and allowing more opportunities to all banks to mobilize deposits from the public. Consequently, the share of private banks in lending increased rapidly, funded by deposit mobilization, inter-bank borrowing from state banks, and offshore borrowing.

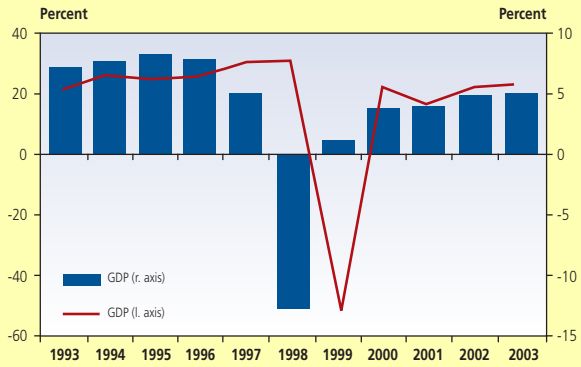
To expedite the mobilization of funds, another policy package was issued in October 1988, known as PAKTO 1988, aimed at promoting non-oil exports, enhancing banks' and non-banks' efficiency, improving the efficacy of monetary policy, and creating a conducive climate for capital market development. These measures effectively marked the new and liberalized financial environment era, abandoning the financially repressive regime. On the banking front, this deregulation package facilitated easier openings of new banks and their branches. Within two years, licenses to open 73 new commercial banks and 301 branches were issued. Since then, banking activities have increased substantially in terms of assets and the number of banks (Graph II.1). The other important aspects of this package included the permission of state-owned and local government enterprises to deposit up to 50% of their funds in private banks and the possibility for banks to merge along with efforts to reduce credit risks.



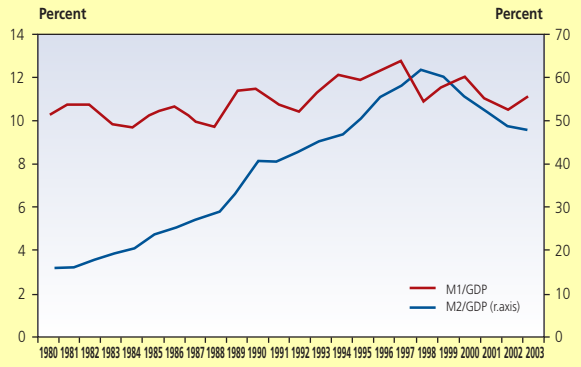
Graph II.1 Banks' Assets

This "big bang" approach in financial deregulation, complemented by several deregulation packages, did not only affect the banking sector but also the development of non-bank financial institutions and capital markets. Capital markets developed rapidly as reflected by the growing number of firms listed in the Jakarta Stock Exchange, expanding volume of shares traded, and

increasing market capitalization. Non-bank financial institutions and capital markets emerged as alternative sources of firms' financing. In spite of this, the dominance of the banking sector remained. The increasing role of banks in Indonesia prior to the crisis period was verified by the rapid growth of credit (Graph II.2) and higher monetization. The ratio of M1 and M2 over GDP steadily increased, as demand for money rose, in conformity with growing economic activities (Graph II.3).



Graph II.2 Growth of Credit and GDP



Graph II.3 Ratio of money Supply to GDP

The deregulation measures had remarkable impacts on the development of the banking industry. Not only the number of banks soared, but also the network of banking services widened, banking activities and the variety of banking products offered expanded; and instruments used

in the money market diversified. It also gave the opportunity for the Central Bank to launch more market-based indirect monetary policy instruments. During 1983 - 1984, the minimum reserve requirement was reduced from 15% to 2% and open market operation mechanisms were improved through the auctions of two monetary instruments, namely the central bank certificates (SBI) and money market securities (SBPU).

In response to the rapid changes in the banking sector, the authorities strengthened prudential regulations with the objectives of creating a sound and more efficient banking system to safeguard the interest of the general public and contribute to Indonesian economic development. Recognizing the possibility of banks taking on excessive risks due to promising economic growth, each bank was required to maintain capital at a minimum of 8% of its risk-weighted assets, in line with the standard set by the Bank for International Settlements (BIS). Bank Indonesia also set regulations on legal lending limits, preventing a concentration of bank credit to certain debtors. Considering that the soundness of a bank does not depend only on the quality of its investments but also on its capability to anticipate possible losses in the investments, adequate provisioning for risk assets was made mandatory.

The prudential regulations also covered other supporting factors for improving banking operations such as a reporting system and various management aspects, including human resource development. For instance, each bank was required to allocate at least 5% of its budget for human resources aimed at improving the quality of bank personnel which, in turn, would sustain the development of banking activities.

In February 1991 more comprehensive prudential banking principles were endorsed and banks were urged to merge or consolidate. Unfortunately, expected widespread banking consolidation never took place due to a lack of commitment by bank owners. Meanwhile, banks kept on pumping credit supply to the economy excessively.

To prevent the economy from overheating, in January 1991 a tight monetary policy was introduced. The government ordered major state-owned enterprises to switch their deposits into SBI, the central bank certificates, and banks' access to offshore borrowing was constrained. In addition, the exchange rate band was widened, hindering negative impacts of short-term capital flows and lessening the dependency of banks on foreign exchange transactions with Bank Indonesia. These policies brought the inflation rate under control to 4.9%, but at the expense of a soaring interest rate.

A few years later, however, the financial sector returned to its high speed growth. Over the period of 1993 - 1997, the average annual growth of credit reached 22.6%. Banks' lending capacity (measured as total assets minus cash in vault, paid-in capital, and reserve

requirement) grew 22% fueled by the rapid growth of private deposits. The Loan to Deposit Ratio (LDR) reached an average of 80.5%. The capital market was bullish, actively acting as another source of financing. The market capitalization of the Jakarta Stock Exchange reached 29.7% of GDP. The economy was overheating and asset price bubbles emerged. The economy and the banking sector were prone to shocks.

The major factor contributing to the vulnerability of the banking sector was the inherent weaknesses prevailing in the national banking industry. Firstly, the implicit guarantee from the central bank that banks should not be allowed to fail -so as to prevent systemic risk to the banking system- had led to moral hazards and adverse selection problems on the part of bank owners and management. In addition, the implicit guarantee induced banks' leverage to extent imprudent bank credit with less caution to high risk sectors. As a result, commercial bank risk was shifted to the central bank while systemic risk in the banking system mounted.

Secondly, supervision by the central bank was less than fully effective as the central bank was unable to keep up with the rapid progress and increasing complexity of bank operations. Consequently, banks were lured to overlook prudential principles governing their operations. Although Indonesia had adopted international standards for prudential regulations, the existing weaknesses in law enforcement and lack of central bank independence resulted in ineffective supervision and inadequate corrective measures.

Thirdly, sizable connected lending (either directly or indirectly to individuals or business groups), raised commercial banks' exposure to the risk of non-performing loans. While various disciplinary measures entailing strong sanctions had been introduced to prevent unsound lending practices, violations persisted due mainly to the structure of private national banks' ownership, which tended to be concentrated on few groups or individuals.

Fourthly, the relatively low managerial skills in banking led to a weakening productive asset quality and rising risk exposure. This was aggravated by the existing weaknesses in internal supervision and the information system which resulted in a failure to monitor, detect, and solve non-performing loans and excessive risk exposure. These weaknesses further limited banks' ability to anticipate and overcome the emergence of financial crisis.

Finally, a lack of transparent information on bank conditions undermined not only the accuracy of the analysis of banks' financial positions but also inhibited efforts to introduce social control and market discipline. This factor contributed to an erosion of confidence in the banking sector, which raised the systemic risk in the banking industry.

II.2 Crisis Period: Mid 1997 - Mid 1999

In July 1997, following a contagion effect from Thailand and South Korea, the Rupiah exchange rate came under severe attack. Given the existing various fundamental weaknesses in the domestic economy, the exchange rate shock developed rapidly into severe economic and financial crises. On the external sector, the exchange rate crisis drove substantial private capital outflows, bringing about a deficit in the balance of payments for the first time since 1989/90. Furthermore, outstanding debt and amortization of principal soared, especially in Rupiah terms, which caused the default of many firms in their external obligation.

The exchange rate crisis, followed by a crisis of confidence caused banks to incur losses and experience severe liquidity problems, making them dependent on the central bank's liquidity support. Concerns over the possibility of another round of bank closures, following the government's decision to close 16 banks in November 1997, and the absence of a guarantee program on deposits spread panic among depositors for the safety of their deposits with commercial banks.[2] This led to bank runs and a flight from unsound to sound banks which drained banks' liquidity. The massive liquidity support extended by the central bank, in turn, prompted the rapid expansion of money supply, which gave further rise to the prevailing high level of inflation (77% in 1998) as a consequence of the pass through effect of the sharp Rupiah depreciation.

The crisis put banking performance at its nadir. Intricate with increasing firms bankruptcies, non-performing loans (NPLs) rose significantly. Market correction to asset price bubbles and worsened balance-sheets of both firms and banks caused credit to shrink. LDR dropped to 26%. Supply of loans fell off significantly in response to the banking crisis. Zulverdi *et al* (2004a) found a strong indication that from August 1997 through December 1998, there was a credit crunch phenomenon in Indonesia. The findings on the credit crunch in the early stage of the crisis are consistent with Agung *et al* (2001) and Ghosh and Ghosh (1999), and differ only in their predictions of when the phenomenon was at end.

To cope with the crisis, the Government introduced various measures. In the implementation, however, the Government was confronted with a dilemma. In the monetary and banking sector, the efforts to stabilize the exchange rate through raising interest rates and tightening monetary stance increased the vulnerability of the banking industry and the business sectors.[3] The central bank therefore, was confronted with dilemma between maintaining

2 Later on, to prevent another cycle of bank rush, the government introduced a blanket guarantee scheme which effectively guaranteed the payment of all types of bank liabilities.

3 To cope with the battered Rupiah, the Government initially relied more on the monetary policy with the hindsight that the pressure was transitory in nature. At the beginning of the crisis, Bank Indonesia widened the intervention band from 8% to 12%, combined

monetary stability and rescuing the banking industry and the business sectors. In the fiscal area, the efforts to control domestic demand through government spending had been less effective due to lack of transparency and weaknesses in the supervision of government expenditure, including public enterprises. In the industry and trade sectors, efforts to strengthen efficiency and sound competition have been impeded by the oligopolistic and monopolistic market and distorted incentive system. These factors reflect the onerous pressure that rendering partial solutions to the problem could not adequately solve during the ongoing crisis. Therefore, in addition to restoring economic stability, the government was determined to launch reforms across the board.

II.3 Post-Crisis Period: Mid 1999 - Present

The government's decision to launch a blanket guarantee scheme (1998) and a bank recapitalization program (1999 - 2000) successfully restored public confidence in the banking system. Base money steadily declined, public funds flew back into the banking system, and banks' lending capacity improved (Table II.1).

Table II.1. Banking Indicators

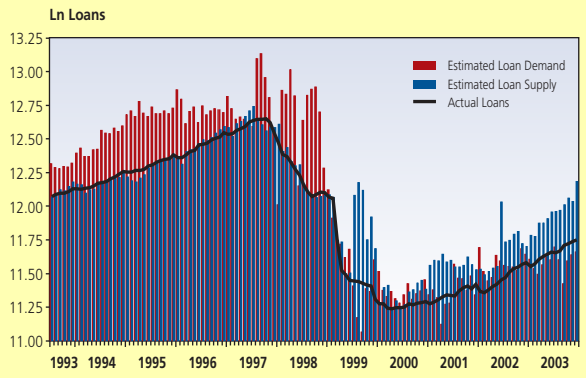
Indicators	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004*
Total Asset (Trilions ofRp)	291,271	333,708	413,800	506,869	715,205	895,487	1,006,656	1,048,208	1,099,699	1,109,130	1,163,758	1,179,431
Credit (Trilions of Rp)	150,271	188,880	234,611	292,921	378,134	487,426	225,133	269,000	307,594	365,410	437,942	471,064
CAR (%)	9.9	12.5	11.9	11.8	9.2	-15.7	-8.1	2.3	19.3	23.1	19.3	22.8
LDR (%)	78.5	81.2	81.	178.3	82.6	72.4	26.0	33.7	33.1	38.4	43.2	43.7
ROA (%)	1.0	0.6	1.1	1.2	1.4	-18.8	-6.1	1.0	1.4	2.0	2.5	2.7
ROE (%)	9.3	3.0	16.1	16.4	19.1	-437.2	-110.8	9.7	13.6	15.0	21.6	6.7
NIM (%)	9.9	12.5	11.9	11.8	15.8	-61.2	-38.6	22.8	37.8	32.1	42.7	56.6
NPL (%)	16.4	13.6	11.1	9.5	8.1	53.8	36.9	19.4	11.7	7.6	6.8	6.3

* Mei

These improved conditions, however, did not guarantee the return of banking intermediation to normality. The completion of the first phase of the bank recapitalization program in mid 1999 brought immediate improvements to banks' balance sheets and expanded their capacity to offer loans. Nonetheless, loan demand plunged dramatically from early 1999.

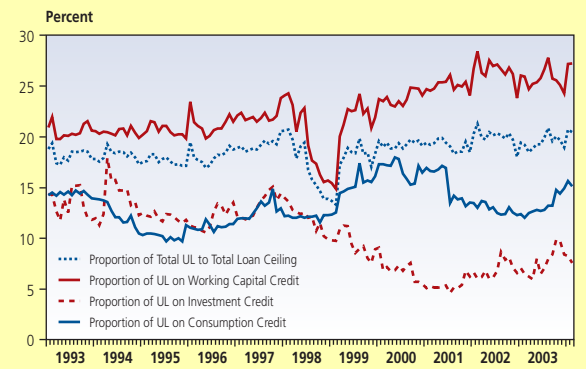
with intervention both in the forward and spot markets. In view of the stronger pressure on the rupiah, on 14th August 1997 Bank Indonesia decided to abandon the managed floating exchange rate system and adopt the free floating system. To mop up the excess liquidity, the discount rate on SBI was raised, and public enterprises' deposits with state and private banks were shifted into SBIs.

Consequently, there is an indication of a reversed situation from a long period of excess demand for loans during the pre-crisis period and a short period of credit crunch during the peak of the crisis to a period of excess loan supply since 2001 (Graph II.4).[4]



Graph II.4 Estimation of Loan Supply and Demand

The indication of excess loan supply was more pronounced among existing (good) borrowers. As banks compete with each other to keep their good borrowers, they increase the supply of loan commitment to them. However, the borrowers' capacities to absorb new



Graph II.5 Ratio of Undisbursed Loan to Loan Ceiling by Purpose of Use (%)

4 For a detailed explanation of the specification and the estimation results of the model that was used to get this indication, please refer to Zulverdi *et al* (2004a)

loans are limited (due to unfavorable business prospects and/or high leverage ratio) and some large-middle sized borrowers are able to tap into the capital market with a lower cost of borrowing. Coupled with persistently high loan interest rates (though this has been declining slowly) and a low commitment fee, this situation has induced an increasing trend of undisbursed loans (Graph II.5).

The study on this phenomenon (Zulverdi *et al*, 2004 a) has shown that the rise in loan supply during the post-crisis period was driven by:

(i) Steady improvement in bank capital during the post-bank restructuring program, enabling banks to book significant profits in the past two years. The bank CAR is in much stronger shape, well above the minimum required 8%, thus banks have considerable headroom for loan expansion.

(ii) Improved structure in bank assets following the introduction of trading in government bonds. The last two years have seen rapid growth in government bonds registered in trading portfolios, up from 14.9% of total recapitalization bond portfolios at the end of 2001 to 47% at the end of 2003. The expansion in trading portfolios has given banks added liquidity and expanded capacity to lend.

(iii) Improved non-performing loans (NPLs) ratio. The improvement in the NPLs ratio also provides banks with more headroom to expand loan supply. NPLs (gross) have improved significantly, easing from 11.65% at the end of 2001 to 6.77% at the end of 2003.

(iv) Persistently high lending rates in relation to interest rates on other earning assets, such as SBIs and government bonds, and a declining cost of funds have improved the banks' appetite to expand lending.[5]

Triggering factors constraining loan demand are:

(i) Lack of investment demand due to a non-conducive climate (political and legal uncertainties). This is consistent with findings that economic growth was essentially consumption driven.

(ii) Banks tendency toward a more risk averse attitude and the problem of asymmetric information have resulted in downward rigidity of the loan interest rate. The widened spread between the loan and deposit rates has stirred the expectation among debtors of future easing in loan interest rates in line with the declining cost of funds. Thus, debtors are holding back from applying to banks for new loans or are delaying their draw down on agreed loan commitments.

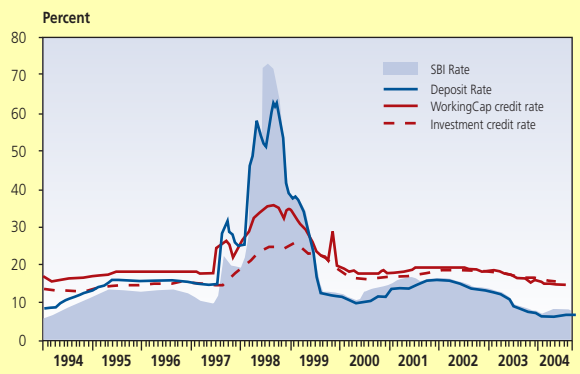
(iii) High loan interest rates have prompted some eligible companies to seek alternative financing sources, for example, by issuing bonds with a lower yield. This is evident in the volume of

5 Interest rates on monetary instruments, including SBI, declined substantialy during the period, reflecting the ease monetary policy conducted by the Central Bank.

private sector bond issues that reached Rp25.6 trillion in 2003, as compare to Rp6.5 and Rp2.3 trillion in 2002 and 2001, respectively.

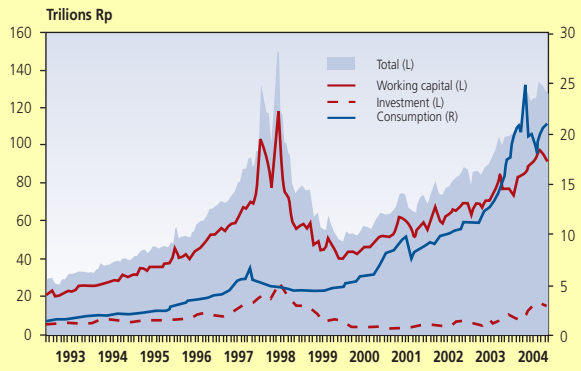
(iv) Asymmetric information has resulted in banks focusing their lending only to a particular group of preferred debtors or debtors with known track records. Consequently, new debtors are excluded from access to bank credits.

During this period, theory would predict that monetary policy should be more effective since it is conducted in a flexible exchange rate regime, while the Central Bank has been granted full independence. However, the effectiveness of monetary policy transmission has not improved as reflected in the slow response of loan rates to reduction in SBI rates and the widening spread between loan and deposit rates (Graph II.6). A survey conducted by Bank Indonesia suggests that although borrowers were willing to pay a high interest rate and provide more collateral, banks were not willing to approve the loans.



Graph II.6 Interest Rate Development

There was also a change in banks' preferences in their investment portfolios, where banks had a tendency to hold more liquid and less-risky assets. Consequently, the impact of easing monetary policy is largely reflected in the increase of short-term consumption oriented credit rather than investment credit (Graph II.7). Loan to deposit ratio was still low.



Graph II.7 Credit Development

III. THE ANALYTICAL FRAMEWORK OF BANKS' BEHAVIOR

III.1 The Model

Based on work by Zulverdi *et al* (2004b), we developed a static partial equilibrium model as an analytical framework to understand how banks' portfolio behavior in maximizing their profit links to the efficacy of monetary policy. Simplifying the model, we assume that the Indonesian banking sector behaves like a monopoly and has the following balance sheet structure:

Table II.2. Balance Sheet of Commercial Banks

Assets	Liabilities
Excess Reserve (incl. cash in vault)	Saving and Demand Deposits
Reserve Requirement	Time Deposits
Loans	Capital
Government Bonds	
SBI and Fasbi (central bank instruments)	
Inter-bank Money Market	

As intermediary institutions, banks collect funds from surplus spending units with a certain cost and distribute it to deficit spending units by imposing a certain interest rate as banks' earning. Aside from deposit interest cost, banks also face contemporaneous transaction (management) costs in the form of quadratic functions on both the assets and liabilities side.[6]

6 We use the quadratic cost function to fulfill the usual convexity and regularity assumptions.

Banks' objective function is to maximize its profit as follows:

$$Max \sum_{i}^{I} \sum_{t=0}^{\infty} \beta^{t+1} \pi_{t+1}^{i} \qquad \text{(II.1)}$$

where profit function is defined as

$$\pi_{t+1}^{i} = \sum_{n}^{N} (r_{Lt}^{in} L_t^{in})(1-\eta_t^{in}) + r_{Pt}^{i} P_t^{i} + \sum_{o}^{O} r_{St}^{io} S_t^{io} + \sum_{m}^{M} r_{Bt}^{im} B_t^{im} + r_{Ft}^{i} F_t^{i} \quad \rightarrow \text{Interest revenues}$$

$$- \sum_{q}^{Q} r_{Dt}^{iq} D_t^{iq} - r_{Tt}^{i} T_t^{i} \quad \rightarrow \text{Interest Expenses}$$

$$- \left\{ \begin{array}{l} \sum_{n}^{N} \frac{\alpha_L^{in}}{2} (L_t^{in})^2 + \frac{\alpha_P^{i}}{2} (P_t^{i})^2 + \sum_{o}^{O} \frac{\alpha_S^{io}}{2} (S_t^{io})^2 + \sum_{m}^{M} \frac{\alpha_B^{im}}{2} (B_t^{im})^2 \\ + \frac{\alpha_F^{i}}{2} (F_t^{i})^2 + \sum_{q}^{Q} \frac{\alpha_D^{iq}}{2} (D_t^{iq})^2 + \frac{\alpha_T^{i}}{2} (T_t^{i})^2 + \frac{\alpha_x^{i}}{2} (X_t^{i})^2 \end{array} \right\} \quad \rightarrow \text{Marginal costs of holding assets \& liabilities}$$

Note: List of variables is presented in the appendix

In maximizing their profits, banks are subject to the following constraints:

- Bank assets should be equal to their liabilities at all times (equation II.2).

$$\sum L_t^{in} + P_t^{i} + \sum S_t^{io} + \sum B_t^{im} + F_t^{i} + X_t^{i} - \sum D_t^{iq}(1-\rho_D) - T_t^{i}(1-\rho_T) - K_t^{i} = 0 \qquad \text{(II.2)}$$

- Demand for loans is a linear function with a negative relationship to the loan interest rate (equation II.3).

$$L_t^{in} = e_t - f_t r_{Lt}^{in} \qquad \text{(II.3)}$$

- Supply of time deposit and saving deposit are both linear functions with a positive relationship to time deposit rates and saving deposit rates respectively (equation II.4 and II.5).

$$D_t^{iq} = a_t + b_t r_{dt}^{iq} \qquad \text{(II.4)}$$

$$T_t^{i} = c_t + d_t r_t^{i} \qquad \text{(II.5)}$$

- Banks always maintain a certain level of excess reserve (in cash and in accounts at the Central Bank) as a proportion of deposits (equation II.6).

$$X_t^{i} = \rho_X^{i} \left(\sum D_t^{iq} + T_t^{i} \right) \qquad \text{(II.6)}$$

- The capital adequacy ratio (CAR) imposed by Bank Indonesia limits banks' behavior in maximizing their profit. As risk averse investors, banks can calculate risk-weighted asset (RWA) on loans higher than that imposed by the central bank. (equation II.7)

$$\left(\frac{K_t^i}{\gamma_1 \sum L_t^{in} + \gamma_2 P_t^i + \gamma_3 \sum S_t^{io} + \gamma_4 \sum B_t^{im} + \gamma_5 F_t^i} \right) \geq \Omega \qquad \text{(II.7)}$$

Interest rate on monetary instruments, SBI and FASBI are exogenous and set up by Bank Indonesia. Interest rates of government bonds are also exogenous.

Solving this optimization problem will give some clues about how changes in monetary policy affect a bank's portfolio, and furthermore, explain how monetary policy is transmitted via banks. Following are some important findings that relate banks' responses to changes in policy rate (SBI).

Impacts of a Change in Policy Rates on Loan Volume

$$\frac{\partial L}{\partial r_S} = -\left(\frac{f}{(1-\eta) + \alpha_L f} \right) \left(\frac{1 - \Omega\gamma_1}{1 - \Omega\gamma_3} \right) < 0 \qquad \text{(II.8)}$$

- As the theory predicts, the volume of loans (L) has a negative relationship with policy rates (r_s). A reduction of policy rates, for example, will shift the allocation of funds from central bank certificates (SBI) into loans. Equation II.8 indicates that monetary policy transmission will be less effective (as reflected in lower sensitivity of loan volume to changes in policy rates) if borrowers are less sensitive to interest rates (f is lower), CAR (Ω) is high, banks' perception on default risks is high as reflected in high risk weighted assets on loans (γ_1)[7], marginal cost of managing loans (α_L) are high, and non-performing loans ratio (η) is low.
- As long as banks continue to perceive high loan risks (γ_1) in contrast to low risk on holding SBIs (γ_3), banks would consequently reluctant to expand loans, particularly to new debtors. Therefore, lowering loan risk perception would be expected to encourage banks to expand lending and discourage them from dominant holding of SBIs.

Impacts of a Change in Policy Rates on Loan Rates

$$\frac{\partial r_L}{\partial r_S} = \frac{1}{2(1-\eta) + \alpha_L f} \frac{1 - \Omega\gamma_1}{1 - \Omega\gamma_3} > 0 \qquad \text{(II.9)}$$

7 It should be noted that banks' risk perception can be also endogenous with respect to changes in policy rates. However, it is easy to present cases where banks may have formed their risk perception based on the instability and uncertainty of social and political situation (e.g. in a country like Indonesia), independently on the changes in policy rates by the central bank.

- Loan rates (r_L) have a positive relationship with policy rates (equation II.9). Monetary policy transmission will be less effective (as reflected in lower sensitivity of loan rates to changes in policy rates) when banks' perception on default risk is high, CAR is high, and marginal costs of managing loan are high.
- The negative impact of higher default risks on the effectiveness of monetary policy transmission is consistent with the phenomenon of asymmetric effects of monetary policy. In the recession (economic crisis) when default risk tends to be high, a loose monetary policy would not be optimally followed by a decrease in loan rates (an increase in loan volume). In contrast, during an expansion period in which default risk is relatively lower, a tight monetary policy would be effectively followed by an increase in loan rates (a decrease in loan volume). In this environment, a tight monetary policy may be more effective than more lax monetary policy.[8]

Impacts of a Change in Policy Rates on Spread between Loan Rates and Time Deposit Rates

$$\frac{\partial(r_L - r_D)}{\partial r_S} = \frac{\eta + (1-\eta)(\rho_D + \rho_X) - \Omega\gamma_1}{(1-\eta)(1-\Omega\gamma_3)} \qquad \text{(II.10)}$$

- Equation II.10 indicates that when banks' perception on default risks (γ_1) and CAR ratio (Ω) are substantially high relative to the non-performing loan ratio (η), reserve requirement ratio (ρ_D), and excess reserve ratio (ρ_X), the policy rate will have a negative impact on the spread between loan rates and deposit rates. Therefore, in an easing monetary condition, for example, a decline in policy rates would widen the spread.
- This negative relationship reflects a situation when bank perceives that the costs of credit defaults are larger than the opportunity cost of holding non-productive funds (NPLs + reserve requirement + excess reserve). In this situation, bank tends to move loan rates slower than deposit rates.

III.2 Empirical Analysis

Based on the above analytical results, we have run an empirical analysis for Indonesia's case by calibrating some of the parameters of the model. We divide the simulation into three periods: 1) pre-crisis (1996.01 - 1997.06), 2) crisis (1997.07 - 1999.06), and (3) post-crisis (1999.07 - 2004.03). The followings are some important findings (Table II.2).

8 Kato et al (1999), for example, has proved empirically the existence of this phenomenon in Japan.

Table II.3. Simulation Results

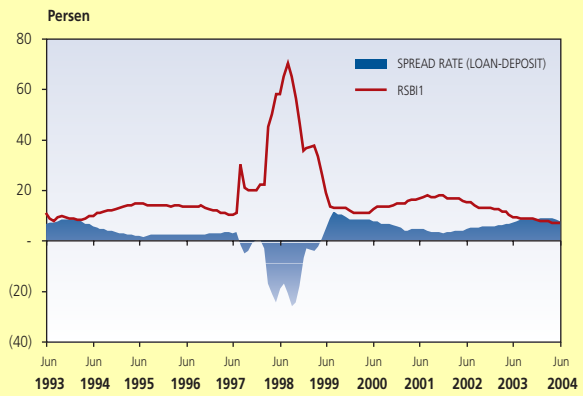
	Pre-Crisis 1996.01 - 1997.06	Crisis 1997.07 - 1999.06	Post-Crisis 1999.07 - 2004.03
A. Indicators of Effectiveness of Monetary Transmission via Banks:			
dL/drS	-7725	-8332	-7635
drL/drS	0.423	0.396	0.410
d(rL - rD)/drS	-0.005	-0.006	-0.005
B. Banks' Internal Conditions:			
Default Risks (γ^1)	1.451	7.80	1.85
CAR (Ω)	0.11	0.02	0.14
NPL (η)	0.11	0.30	0.19
C. Demand for Loan Conditions:			
Constant (e)	395000	630660	402116
Slope (f)	-10050	-11983	-10325
D. Supply of Time Deposit Conditions:			
Constant (a)	-337500	-426342	-332003
Slope (b)	30500	14077	31071
E. Monetary Policy Conditions:			
Policy Rates (rS)	0.13	0.38	0.13
Reserve Requirements (ρD)	0.03	0.05	0.05

Monetary Transmission via the Banking Channel during the Peak of the Crisis Period

- There are strong indications that the effectiveness of monetary policy transmission via banking channels was significantly lower during the peak of the crisis period. There is evidence of less sensitivity of loan rates to changes in SBI rates ($\partial r_L / \partial r_S$) during the crisis as compared to the pre-crisis period. According to the simulation results, two major factors may be responsible for this condition. First, the economic crisis and its impact on mounting NPLs had increased banks' perception of default risks very significantly. This factor reduced banks' willingness to increase loan rates as a response to higher policy rates as it would worsen its NPLs. Second, as most borrowers experienced huge solvability problems, they became more sensitive to loan rate changes (the slope of loan demand, f, increased). This factor reduced banks' ability to increase loan rates without losing their good customers. Both factors were so dominant that they overshadowed the incentive to increase loan interest revenues to cover the losses from higher NPLs.
- As borrowers were more sensitive to loan rate changes and banks suffered huge losses from

higher NPLs, the negative impact of higher policy rates on loan volume ($\partial L / \partial r_S$) were larger during crisis.

- As default risks were substantially high, the perceived costs of credit defaults were higher than the opportunity cost of holding idle funds (funds "trapped" in bad debts, reserve requirement, and excess reserves). This made loan rates less sensitive to policy rates relative to deposit rates. Consequently, the rise in SBI rates increased deposit rates much faster than the climb in loan rates $\left[\frac{\partial\,[r_L - r_D]}{\partial r_S} < 0\right]$, creating a negative interest margin (Graph II.8).



Graph II.8 SBI Rate and the Spread between Loan and Deposit Rates

Monetary Policy Transmission during the Post Crisis Period

- The improvement of monetary policy transmission has been very slow during the post-crisis period. The sensitivity of loan rates to policy rate changes ($\partial r_L / \partial r_S$) increased only slightly, and is still smaller than the sensitivity during the pre-crisis period. Although banks' perception of default risk has improved significantly, banks are still very cautious as evidenced by a higher CAR ratio than the level required by regulation. The positive income effect of smaller NPLs has also reduced the incentive for banks to fully respond to any changes in policy rates. Both factors have resulted in slower decline of loan rates than the decrease of SBI rates during the period. (See graph II.6)
- The sensitivity of loan volume to policy rate changes ($\partial L / \partial r_S$) has been declining during the post-crisis period. It is even lower than the sensitivity during the pre-crisis period. Banks are still very cautious in extending credit as evidenced by a higher CAR ratio. In addition, the smaller NPLs ratio has reduced banks' loses significantly. This situation has reduced the need

for banks to increase loan supply to cover losses from NPLs. On the other hand, as borrowers are not suffering from solvability problems as heavily as during the peak of the crisis, their demand for loans is less sensitive to interest rate changes. Consequently, as monetary authorities reduced the policy rates to boost aggregate demand, the increase in loan volume was relatively slower than if the same policy was conducted during the pre-crisis period.

- As banks are still maintaining higher CAR, the perceived costs of credit defaults are still higher than the opportunity cost of holding idle funds (which is declining as NPLs are smaller). This keeps loan rates less sensitive to policy rates relative to deposit rates. Consequently, lower SBI rates reduce deposit rates faster than loan rates (the positive spread between both rates widens) (see graph II.8).

IV. CONCLUSION AND POLICY IMPLICATIONS

There are indications that bank disintermediation reduced the effectiveness of monetary policy during the crisis and post-crisis period. Structural changes in banks and borrowers have altered the smoothness and effectiveness of monetary policy. As banks are still the major source of financing in Indonesia, this situation contributes to a slower pace of economic recovery compared to other countries that experienced a similar crisis.

From the analysis above, it is shown that one of the serious problems facing the banking community in Indonesia is asymmetric information. This problem has kept banks' risk perception at a relatively high level, even though it has been declining, which may have led them to be (overly) cautious. To overcome this problem, there is an apparent need to initiate efforts that can provide more information regarding the credit-worthiness of the borrowers while at the same time trying to continue boosting the real side of the economy.

This conclusion thus leads to the following policy implications:

- The establishment of the planned Credit Bureau and rating agencies is critical as it will improve transparency and availability of debtor information, thus reducing asymmetric information problems. It may also reduce the cost of monitoring by banks and thus reducing further the current abnormally high spread between loan and deposits rates.
- To improve their knowledge in assessing risks, banks should invest more in research capacity and credit monitoring system. The authorities could help by providing more information regarding potential economic sectors and clear policy directions.
- Considering the pervasive asymmetric information in the credit market for small and medium enterprises, the introduction of a credit guarantee scheme can also be considered, with minimum moral hazard.

- More importantly, the maintenance of macroeconomic stability needs to be continued in order to enhance public confidence. In turn, with positive perception, default risk could be lessened. As both monetary policy and banking regulations gain more positive impacts on loan performance, the need for better coordination and harmonization between macro and micro policies becomes greater.
- Increasing the role of non-bank financial markets and increased competition in financial markets should be promoted to reduce over dependence on banks, thereby gradually promoting sound and efficient non-bank financing and thus reducing downward rigidity in bank lending rates.

APPENDIX

π^{i}_{t+1} = Profit for bank i at time t + 1,

β = Discount value

L^{in}_{t} = Loan outstanding of type n loan for bank i at time t

r^{in}_{Lt} = Loan interest rate of type n loan for banks i at time t

P^{i}_{t} = Oustanding of interbank money market placement for bank i at time t

r^{i}_{Pt} = Interest rate of interbank placement for bank i at time t

S^{io}_{t} = Oustanding of o - month maturity of Bank Indonesia Certificate (SBI) for bank i at time t

r^{io}_{St} = Interest rate of o - month maturity of Bank Indonesia Certificate (SBI) for bank i at time t

B^{im}_{t} = Oustanding of m - year maturity of Government Bonds for bank i at time t

r^{im}_{Bt} = Interest rate of m - year maturity m of Government Bonds for bank i at time t

F^{i}_{t} = Oustanding of Bank Indonesia Facility (FASBI) for bank i at time t

r^{i}_{Ft} = Interest rate of Bank Indonesia Facility (FASBI) for bank i at time t

D^{iq}_{t} = Outstanding of q - month maturity of time deposit for bank i at time t

r^{i}_{Ft} = Interest rate of q - month maturity of time deposit for bank i at time t

T^{i}_{t} = Outstanding of saving deposit for bank i at time t

r^{i}_{Ft} = Interest rate of saving deposit for bank i at time t

K^{i}_{t} = Capital of bank i at time t

X^{i}_{t} = Excess reserves of bank i at time t

Ω^{i}_{t} = Capital adequacy ratio of bank i at time t

ρ_{D} = Reserve requirement of time deposit for bank i at time t

ρ_{T} = Reserve requirement of saving deposit for bank i at time t

ρ_{X} = Ratio of excess reserve to total deposits

$\alpha_{L}, \alpha_{P}, \alpha_{S}, \alpha_{B}, \alpha_{F}, \alpha_{D}, \alpha_{T}$ = Marginal cost of each items of balance sheets

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