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THE IMPACT OF MONETARY POLICY ON BANK CREDIT DURING ECONOMIC CRISIS: INDONESIA'S EXPERIENCE

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Abstract: *The monetary policy mechanism by which monetary policy was transmitted to the real economy had emerged as the pivotal discussion topic recently. This paper tried to discuss the impact of Bank Indonesia's monetary policy on loan bank. By using simple loan bank framework we concluded that monetary policies were able to influence loan bank. The monetary variables such as discount rate policy, base money and exchange rate policy were very important in determining the banking credit. As the credit was very important to influences the economic activitiy, the result provided evidence that monetary policy was important as a tool to control economic activity via credit channel. The validity of this study challenged the hypotheses that monetary policy was death. However, monetary policy maker should carefully consider the soundness of the banking industry because it was a strategic partner for monetary authority to control the economic activities.*

Keywords: *monetary policy, credit crunch, bank lending*

The monetary policy mechanism by which monetary policy is transmitted to the real economy has emerged as the pivotal discussion topic recently because the reality that monetary policy has become the only game can be played by the central bank. Many economists, even, believe that monetary policy is not important anymore. However, as the economic situation among countries are dispersed, the empirical investigation resulted from various studies are also, in some cases, contradictionary and confusing. That is why it is a debatable topic in macroeconomics in general and monetary study especially.

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For Indonesia, the understanding and ability of Indonesia Monetary Authority how monetary policy works is necessary mandate of the new Central Bank Act of 1999 especially to help the economic recovery. The understanding how monetary policy works requires enhancements both the capacity and institutional buildings for better monetary policy making process and implementation. As enacted in 1999, the new Central Bank Act provides a clear mandate for Bank Indonesia in conducting its monetary policy to maintain the value of Rupiah both in domestic and international term.

The Act No. 23 of 1999 on Bank Indonesia that amend the previous Act No.13 of 1968 states that the single objective of Bank Indonesia (BI) as a

central bank is to achieve and to maintain the stability of the value of Rupiah. To achieve this objective, BI has a role in formulating and implementing the monetary policy, regulating and safeguarding the smoothness of the payment system, and also regulating and supervising banks before the new authority established.. Refer to the Act, BI gets its independency. It means other party shall not intervene BI in performing its tasks. The act also bring substantial change because the role of BI as an agent of development is deleted. The direct operation in the credit market is not possible then.

Unfortunately, the loss of public confidence in effectiveness monetary policy that target price stability or the exchange rate has forced central banks to look for a more credible nominal anchor. Indonesia recently adopted explicit inflation targeting as their monetary policy regime although the base money is still the main target.

Broadly speaking, price stability defined as the *price level* remains constant, that is, that the inflation rate is zero. But this is not what economists and central bankers usually mean but mostly follow Fischer (1996) that argues the government should pursue an average rate of annual inflation centered at 2 percent, with a tolerance interval of plus or minus 1 percent.

Currently, the main investigation efforts are directed to study on the role played by banking industry in the transmission of monetary policy. The aim is to uncover a credit channel of monetary policy. As the credit channel operates through shifts in loan-supply schedules, uncovering the credit channel in monetary policy means nothing but to looking on the impact of monetary policy instrument to banking industry.

Warjio and Agung (2002) mentioned the reasons why Indonesian monetary authority is eager to study monetary policy channel because the understanding the movements of financial and economic aggregates as result of monetary policy would improve the understanding the link between the financial and the real sectors of the economy. Second, a better understanding of the transmission mechanism would help monetary authorities and analysts to interpret movements in financial aggregates. Finally, more information about the transmission mechanism might lead to a better choice of intermediate monetary targets. As concluded by Aghion, Bacchetta and Banerjetta (2000) the interest rate shock may be necessary to prevent crisis economy from further recession when the responses of such policy by credit supply not so strongly.

Instrument
OMO
Reserve Requirement
Discount Rate
Moral Suasion

Immediate Target
Base Money
Bank Reserve
Interest Rate

Intermediate
Target
Money in Circulation

Ultimate Target
Economic Growth
Inflation
Employment
External Balance
Budget

Figure 1
Framework of Monetary Policy In Indonesia

Bassically, the framework of monetary policy in Indonesia can be explained here. Open market operation (OMO), Reserve requirement, dicount rate and moral suasion are still the main policies. These policie are aimed to influence monetary

aggregate such as base money, lending capacity of banking system and off course, interest rate. However, the ultimate target of monetary policy is to achive stabil economic growth, price stability, emplayoment and external balance. In Indonesia, monetary policy in term of interest rate policy is also aimed to reduce budget deficit due to most of governement bonds are price using central bank discount rate as anchor rate.

In the country experiencing multi crisis, banking, exchange rate and political crises, Indonesian monetary authority worked hard to make the credit channel work. The monetary policy currently is in questionable stage as Indonesia curretly lack of supported institution and condition for succesful monetary policy, such bank capital constraint (CAR), exchange rate instability and firm restructuring process. All these lessen the effectiveness of monetary policy. Under dis-intermediation in the banking industry, indicated by Loan to deposit ratio (LDR) currently at only 34%, the validity of the monetary policy is on attack. The attacks based on the assumption that the work of credit channel depends on the extent to which banks rely on deposit financing and adjust their loan supply schedules following changes in bank reserves as responses to monetary policy action.

The economic crisis that began in the mid-1997 completely changed monetary and banking landscape in Indonesia. After nearly ten years of rapid expansion, Indonesia's banking system is crippled, with the vast majority of dominant local banks now technically bankrupt without government supports. It then means that when banks strive to survive, no actions will be done to responses the monetary policy action but only responding to prevent from the death. However, the study is not based on that presumption. We still believe that the roles of monetary variables are still important to influences the bank managers to change their loan or balance sheet position.

THEORITICAL BACKGROUND

The debate on the monetarty policy via bank lending channel and balance sheet chanel emerged from the existence of assymentric information problem between lender and borrowers. Bank lending channel focuses on the assumption that bank loan is very important for successful monetary policy. In the monetary policy channel via the "bank lending "(Bernanke and Blinder,1988), monetary transmission mechanism was delivered by banks upon changing their assets as well as their liabilities**.**

Arestis and Sawyer (2002) identify six possible channels of monetary policy can be. There are to begin with, the channels traditionally identified in the literature: the interest rate channel; the wealth effect channel; the exchange rate channel. These are what has been termed the monetarist channel. Two further channels have been identified more recently: these two are essentially a credit channel normally discussed as comprising two channels: the narrow credit channel (sometimes referred to as the balance sheet channel), and the broad credit channel.

Banking industry has special role. Himmelberg and Morgan (1995) suggest that lenders attempt to control agency problems by imposing restrictive covenants in lending contracts. These covenants require firms to maintain minimum levels of net worth and working capital to prevent become the "zombie company". That is the reason of monitoring. Diamond (1984) suggests that the bank as the delegated monitor of depositors. Himmelberg and Morgan (1995) argue that intermediaries are more efficient at monitoring financial contracts because reusability of information dan ability to force debtors more efficient.

During a monetary contraction situation, banks will decrease their reserves and reduce their deposits and the the loan. In a monetary expansion, banks increase the loan. If the decrease in deposits

is not offset by other funds which are not subject to reserve requirements,or by a decrease in securities,this will result in a decrease in bank loans.If bank loans fall and bank dependent borrowers are dominant in the economy,real investment expenditure will fall. Since bank loans in Indonesia remain the main source of external finance for business enterprises,a disrupting of bank loan supply can reduce the economic activity.

Kim (1999), using Korean cases, found that bank credit channel is significant after the crisis. The sharp drops in credit supply in line to the eastern asia crisis reduced credit supply provided evidence that constractive monetary policy was responded. There is strong evidence that a substantial excess demand for bank loans becuause of a dramatic decrease in loan supply as impact of banking crisis.

Previously, Kasyap and Stein (1997) found supportive evidences that credit channel is as monetary policy channel. The study was using USA bank panel data during 1976-1993. The study found evidences the impact of monetary policy that affected bank's propensity to lend, especially among illiquid banks.,For Indonesian cases, Agung (1998), using sample data from 1985-1995, proved that a monetary policy was able to influence the bank supply of credit, in particular small banks, not large banks which were able to shield their bank loan supply by finding the cheaper source of funds from overseas. Further investigation using aggregate data during episode of crisis, Warjio and Agung (2002) conclude that monetary policy is still effective to affect bank lending. However different type of bank has different elasticity.

DeBondt (2000) finds evidence for the reaction of bank lending to monetary policy mainly depends on bank size. On the other hand, Favero et al. (1999) do not find such evidence using the same database in a cross-sectional analysis. Worms (2001), Quoted from Kakes and Strum, (2002) – study using the Bundesbank´s bank balance sheet statistics covering all German banks– conclude that we cannot reject the hypothesis that the reaction of a bank´s lending to monetary policy depends on its size, although this effect does not seem to be of macroeconomic importance.

The finding support Kashyap and Stein (1995) that as long as the banks do not face a perfectly elastic demand for their managed liabilities, a bank lending channel will operate. However, some argue that the regulatory action of central banks can also significantly influence bank loan supply. For example, the regulation on loan classification and capital adequacy ratio (CAR). Interested paper on this issue is the work of Peek and Rosengren (1995), The capital Crunch : Neither a borrower nor lender be, Journal of Credit Money and Banking, 27, p 149-213

Altunbas, Fazylop and Molyneux (2002) add more confusions on the role of bank channel in the monetary policy. By using bank specific data for European case, they found that smaller and undercapitalized banks were more responsive to monetary policy. Small banks which have relatively limited access to non-deposit funds such as securities issues or foreign borrowings are expected to be more affected by the monetary shock and to tend to cut their loan supplies immediately following the shock. However, across European countries resulted in inconsistent results and suggest further verification and examinations. Their findings are in line to Ehrmann et al. (2001) that testing for a differential reaction of bank loans to monetary policy across banks for France, Germany, Italy, Spain and the euro-area as a whole and conclude no evidence for a bank lending channel using bank size as the discriminating variable. They also show that the data summarized by BankScope is not necessarily a useful database for exercises of this kind.

These inconsistent results may arise as the impact of the banking industrial strucutre of Europe as mentioned by Lensink and Sterken (2002). Both suggest to view credit market within industrial organisation of banking sector, considering structural factor in the economy, business cycle and institutional factors among nations. However, using

individual firm data, Nilsen (1999) concludes the bank lending channel become less important to transfer the effect of monetary policy because small firms still can increase their demand on loan by shifting from investment loan to trade credit.

The importance of banking in the economy especially to the behavior of output that driven by aggregate bank credit will be necessary condition for prompt economic recovery. During the crisis, banks were forced to cut lending, and this resulting "credit crunch" . This is, then believed as the propagation and deepening the crisis. So then restoring the flow of credit should be a priority for policy-makers in the immediate aftermath of banking crises. Bernanke (1983) argued that the contraction in credit inhibited by the banking crisis was instrumental in the propagation of the Great Depression in the U.S. Recent attempt to test for a credit crunch effect in Indonesia was done by Hariadi (2002) and found the evidences of credit crunch during the crisis.

The study on the monetary policy strategy in Indonesia during the banking crisis has been investigated extensively especially by Fane (2000). The strategy was mainly controlling the growth of M0. In sum, achieving a modest target for domestic inflation would not have been very different in practice from setting tight limits on the growth of M0.

METHODOLOGY

The Framework of The Study.

The point of departure of the study is based on assumptiona adopted from Luísa Farinha and Carlos Robalo Marques , *The Bank Lending Channel Of Monetary Policy: Identification And Estimation Using Portuguese Micro Bank Data*, ECB Working Paper 102, December 2001 which states that the monetary policy works by affecting bank assets (loans) and banks' liabilities (deposits). The key point is that monetary policy besides shifting the supply of deposits also shifting the supply of bank loans. In this context, the crucial response of banks to monetary policy is their lending response and not their role as deposit creators. The two key necessary conditions that must be satisfied for a lending channel to operate are: (a) banks cannot shield their loan portfolios from changes in monetary policy; and (b) borrowers cannot fully insulate their real spending from changes in the availability of bank credit.

The first condition assumes that banks are not able to completely offset the decrease in deposits brought about by monetary policy shocks, by resorting to alternative sources of funds (at least not without incurring in increasing costs). Because of the extra premium that banks have to pay to bring in alternative external funds, banks will make fewer loans after the fall in reserves brought about by monetary policy. Of course, it is expected that banks hedge against changes in monetary policy, by holding securities as a buffer against a reserve outflow. But such buffer is not expected to fully offset the effects of a monetary policy contraction, as buffer stocks are costly for banks (in terms of interest foregone).

The second condition assumes that some spending, which is financed with bank loans, will not occur if banks cut the loans, else the real consequences of the credit channel will be null. In summary, while the traditional theory emphasizes the households' preferences between money and other liquid assets (bonds) the credit view argues that the banking behavior is also very important to the transmission of monetary policy .

According to Warjio and Agung (2002) there are two necessary conditions for the validity of the bank lending channel; bank loans and securities must be imperfect substitutes for some borrowers, or some borrowers are bank dependent, second the central bank must be able to constrain the supply of bank loans using all available instruments. It seems these conditions are valid in Indonesia Case especially if we refer to Agung (1998).

Data

The data used in this study are aggregate data and collected mainly from Asia Recovery Information Center (ARIC) database, Asia Development Bank. The data is monthly and totally we got 131 observation from Januari 1991 to June 2002. We treated all data to fullfil stationarity using Augmented Dickey-Fuller test. When the data is stasionair at the level, no further treatments were conducted. If not the data is then differentiated. We assume the period of the banking and exchange rate crisis are started in July 1997.

Variables

Variables employed in this study are discount rate (SBI), Index of banking sector deposits (INADEPIDX) , the growth of base money (INAGM0), the exchange rate movement index (DINAKURS) (July 1997 as 100), dummy variable for crisis (CRISIS) and for dependent variables the change in bank credit growth (INARBC).

Model of Analysis

To estimate the impact of monetary policy variables to the bank lending, the model of analysis used in this study is linear regression using the change in total banking system credit as dependent variable. The model is formulated below:

$$DINARBC = \alpha 1\ SBI + \alpha 2\ INADEPIDX + \alpha 3\ INAGMO + \alpha 4\ DINAKURS + \alpha 5\ CRISIS + å$$

Definition:

DINARBC = The Changes in Total Banking System Credit
SBI = Discount Rate of Central Bank
INADEPIDX = Index of Deposits Change
INAGMO = Growth of Base Money (M0)
DINAKURS = Change in Exchange Rate Index (July 1997 as Baseline)
CRISIS = Dummy for Crisis (July 1997 and Aftermath as 1, previous is 0)

Estimation is carried out using Eview Statistical Packard Programme using ARCH model, order 1 both for ARCH and GARCH and no error term is selected.

The hipotheses we are to tested is on the work of monetary aggregate such as discount rate, base money and exchange rate, as monetary policy variable to influence bank lending. In the light of economic crisis, we also test the impact of this situation on the bank lending channel of monetary policy. We expect that the economic crisis lower the ability of monetary policy to influence the bank lending. As the crisis created volatility on all aggregates data, we expect that volatility will increase compared to the previous period. We modelled the news about volatility using the lag of the squared residual from the mean equation (the ARCH term). Consequence of such a condition is the last period's forecast variance (the GARCH term) which will increase and be significant.

RESULTS

Table 1 presents the descriptives statistic of the data used in the study. Two variables, DINARBC and DINAKURS, own negative mean. The coefficient of variation, measure by dividing standard deviation with its mean value, shows very interesting results. For the DINARBC, the coeficient variation is more than 45 so the variation is high or more than 45 time of its mean. The coefficient variation for DINAKURS is 4.6 meaning the variation is 4.6 time of its mean. For the SBI, INADEPIDX, and INAGMO the coefficient are less than one. It means the variations are quite low. However, similar to time series data, all variables are are not normally distributed.

Table 1. Descriptive Statisitics of The Data Used.

	DINARBC	SBI	INADEPIDX	INAGMO	DINAKURS	CRISIS
Mean	-252.8767	18.12609	112.1156	19.91170	-0.729071	0.434783
Median	1235.065	14.14000	81.21174	18.76434	-0.367495	0.000000
Maximum	92401.36	70.81000	244.7974	60.31731	6.260430	1.000000
Minimum	-74961.37	7.450000	26.74673	-3.211550	-24.86328	0.000000
Std. Dev.	15318.06	12.07641	73.24712	11.74330	3.398923	0.497534
Skewness	-0.164680	2.894416	0.479992	1.398442	-4.398113	0.263117
Kurtosis	19.59510	11.29209	1.630116	5.614703	28.88497	1.069231
Jarque-Bera	1584.158	588.0491	16.08937	84.29056	4297.580	23.02756
Probability	0.000000	0.000000	0.000321	0.000000	0.000000	0.000010
Observations	140	140	140	140	140	140

Table 2 presents the estimation result of the role of banking credit as monetary policy transmitter. The R-squared is 40% and the adjusted R-Squared is only 37%. The null hypothesis stating the model can not be used as a tool to analyse the impact of monetary policy is rejected. The F statisitic is 11.17. If we look at the table, we will see the F-table is 3,12. Further more, if we look at Probabaility of F-statisitics, it is significiant at 1%. It means the model is plausible to be used as tool of analysis.

Table 2. The Estimation Results

Dependent Variable: DINARBC
Method: ML – ARCH
Date: 07/07/04 Time: 13:06
Sample (adjusted): 1991:01 2002:09
Included observations: 140 after adjusting endpoints
Convergence achieved after 45 iterations

Variable	Coefficient	Std. Error	z-Statistic	Prob.
SBI	-406.7667	83.45679	-4.873980	0.0000
INADEPIDX	104.5336	32.17334	3.249075	0.0012
INAGMO	183.3257	82.50008	2.222128	0.0263
DINAKURS	-2132.700	212.1771	-10.05151	0.0000
CRISIS	-18213.36	3986.228	-4.569070	0.0000
C	-2147.124	2743.143	-0.782724	0.4338
	Variance Equation			
C	87778343	17746997	4.946096	0.0000
ARCH(1)	0.567345	0.219076	2.589716	0.0096
GARCH(1)	-0.102664	0.045630	-2.249936	0.0245
R-squared	0.409264	Mean dependent var		-252.8767
Adjusted R-squared	0.372629	S.D. dependent var		15318.06
S.E. of regression	12132.93	Akaike info criterion		21.04826
Sum squared resid	1.90E+10	Schwarz criterion		21.23916
Log likelihood	-1443.330	F-statistic		11.17146
Durbin-Watson stat	2.290139	Prob(F-statistic)		0.000000

However, the ARCH and GARCH effect existed in capturing time varying condition. That is why we use ARCH (1) and GARCH (1) method for estimation process and found both ARCH and GARCH are significant. Off course, this estimation's method made the serial correlation disapeared from the model. Fortunately, the coefficient of the ARCH (1) term is less than one meaning that the bank lending channel directs to stable condition. In term of GARCH (1) term the estimation found that it is negative and very low. Adding ARCH (1) coefficient , 0.567 and GARCH (1), - 0.1, we get 0,467 or less than 0,5. It means the volatility is decreasing. Both results confirmed us that monetary policy via bank lending are getting better and may indicating the crisis is closing to end. Monetary authority must use this evidence as information that the convergence to stability must be maintained and policy must carefully be formulated

The expected result for SBI is negative to indicate the existance of competing return between investing fund in central bank instrument than in the lending. The coefficient of Variable SBI is –406.77 . The z-statitics is -4.87 and significant at 1%. It means when other thing is assumed unchanged, an increase by 1% in discount rate will reduce the credit disbursement by 400 billion rupiah. The high coefficient of SBI provide evidence the role of discount rate policy as monetary policy variable. This information is very usefull and it can be used by central bank to manage credit market and thus real sector as well. As the direction of Indonesian monetary policy can be investigated through the central bank discount rate policy, the evidence provides supports to continue the use this policy variable carefully. Indonesian central bank mainly uses the discount rate policy as a mean of reducing inflation . However this evidence strongly advises that it may endanger the credit market hence the real sector.

The expected result for depsosit is positive because the deposits is supply of funds for loan making. The variable INADEPIDX is to measure the movement of banking system deposits. The coefficient is 104.53 and the z-statitistics is significant at 1%. This variable is control variable and should have positive value because any increase in deposits should be followed by making more loan. However, in line to the crisis, it seems the central bank will be more dificult to force bank that is preferer not producing loan but using the funds to buy central bank securities (Bank Indonesia Certificate). At this time almost 20% of bank productive asset is on Bank Indonesia Certificate. However, evidence that the amount of loans channeled is determined by total deposits collected is unchallenged.

The base money is expectd to give positive sign. Variable INAGMO is used to measured the change in base money circulated (M0). The coefficient is 183 and the z-statisitics is 2.22 so it is significant at 3%. The ceofficient is positive so it provide the information content that central bank effort to increase the M0 will increase loan disbursed by the banks.

Exchange rate is expected to give negative sign as the depreciation of IDR (RP) will send negative sign to lenders as well as borrower that the prosepect of econmy is downward. Variable DINAKURS is used to investigate the impact of exchange rate policy to the banking credit. The coefficient is negative so any depreciation in rupiah will hurt the effort to increase the credit. The coefficient is –2132 meaning this variable is a very shocking variable because every one poin index increase in the exchange rate index will reduce 2.13 billions rupiah credit. That is why the effort by central bank to retain and make Rupiah stronger should be supported. International cooperation among Asian countrie to set up the Asian Currency Swap Arrangement is necessary to prevent rupiah from speculative attacks. However, as the total external debt of Indonesia currently reaching USD 150 billions or almost 172% of GDP, it makes impossible for the central bank to manage the exchange rate problem freely. Current total foreign exchange reserved held by the central bank is only USD 29 Billions.

Indonesia has experienced economic crisis since the mid of 1997. This crisis brought a substantial impact to the whole economy. The variable CRISIS is dummy variable to cope with this crisis. The coefficient is – 18213 and the z-statisitics is -4.57 so it is significant at 1%. The result provides evidence that the banking industry faces very difficult time during the crisis. Due to their huge foreign exchange open posisition as result big borrowing in USD, most of big banks economically bankrupt because they lent it in Rupiah denominated loans. The crisis also increase NPL reaching 70%. In general, the crisis has negative impact to the banking industry and reduce the capacity of credit demand. This finding support Hariadi (2002).

The actual, and fitted figure are very closed before the year 1998. It provides information how this model can capture the impact of the crisis. After the year 2000, the actual and fitted value were very closed almost reaching the situation before the crisis again. However when we looked at figure 3, we see how the residual of this model behaved, it can be easily identified that the residual is not normaly distributed because the Jarque-Bera staitisics is 385.

CONCLUSION

From the discusion above we could conclude that the role of the bank credit as monetary policy channel in Indonesia is unchallenged. The monetary variables such as discount rate policy, base money and exchange rate policy are very important in determining the banking credit. As the credit is very important to influences the economic activitiy, the result provide firmed evidence that monetary policy is important as a tool to control economic activity via credit channel. The ability of credit channel as monetary policy channel place the banking industry as a strategic partner for monetary authority to control the economic activities. It also provided support that monetary authority action increased discount rate until 70% during the crisis was necessary although it was not sufficient.

During the time of crisis, monetary policy via bank credit is less effective. Very high coefficient of crisis dummy variables indicated that during that periode any action to control credit by increasing the discount rate produced contraproductive result. Other measure such as moral suation and temporary credit control can be supplemented policies.

As financial institutions play a crucial role in channeling funds from those who save to those who invest. Academic research has therefore given much attention to studying the terms under which such institutions both borrow and lend to fulfill this role as intermediary. However, for micro analysis, the difficulty in studying banks' lending come from the complicated nature of financial contracts such as collateral requirements, flexible payment schedules, commitments, and other non-price terms. Even monetary stability is not enough. This study is very broad so can not provide explanation why the lending getting decrease while the situation is more favorable. However this study provide strong evidences that monetary is still useful and necessary as a tool to influence bank lending.

The result from ARCH and GARCH model found that the volatility are decreasing and nearly toward stable situation. However, as this study contain some limitation especially on the level of data used. Future study to investigate how credit market working by using monthly bank level data during the crisis time. Therefore, it can provide basis for correct policy action in the future.

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