# Determinants of Bank's Net Interest Margin in Indonesia

Ascarya Ascarya, Central Bank of Indonasia Diana Yumanita, Central Bank of Indonasia

## Abstract

Indonesia has adopted dual banking system since 1998, when conventional bank operate side by side with Islamic bank. One measure of bank's performance as intermediary institution to stimulate economic growth is net interest margin (NIM) in conventional bank or net profit-andloss sharing/PLS margin (NPM) in Islamic bank. This study analyses the determinants of NIM and NPM in Indonesia using multivariate analysis and dynamic panel data to see the persistence of large NIM and NPM in the recent past, although policy rate has been decreasing significantly.

JEL Codes:: E52, G18, G28

## 1 Introduction

#### 1.1 Background

Indonesia's financial system has long been dominated by banking sector. Meanwhile, Indonesia has adopted dual banking system since 1998, when conventional bank operates side by side with Islamic bank. As intermediary, banking sector plays dominant role in productive activities and economic development. Research by Levin (1996) showed that the effectivity of banking intermediary can affect economic growth. One of the indicators is net interest margin (NIM) in conventional bank or net profit-and-loss sharing/PLS margin (NPM) in Islamic bank.

Islamic banks are expected to encourage the growth in real sector as business partner and contribute positively in the realization of sustainable development. By emphasizing the investment paradigm, the main role of Islamic bank is distributing funds to productive financing based on profit-and-loss sharing (PLS) mode of finance.

One indicator of effective banking intermediation is loan to deposit Ratio (LDR) in conventional bank or financing to deposit ratio (FDR) in Islamic bank, which reached 73% and 90%, respectively, at the end of December 2009. Another indicator is loan / financing to GDP ratio. Based on Bank Indonesia data as of December 2009, loan to GDP and financing to GDP ratios have shown an increasing trend. However, Indonesia's total loan+financing to GDP ratio is much lower than other Asian countries, such as Philipine and Thailand that reached 297% and 309%, respectively.

Distribution of conventional loan and Islamic financing in real sector can be optimized, if the pricing set by the bank is in accordance to market price or market return. This normal pricing will provide reasonable profit for entrepreneurs who obtain loan from conventional bank or financing from Islamic bank for their businesses. Unreasonable pricing (too high) will distort the market, reduce business interest, and will also reduce the effectiveness of intermediation function of bank. High loan/financing price will make the attempt to encourage the activities in real sector becomes counterproductive.

The pricing of loan/financing in conventional/Islamic banks are determined by their constituent elements, which are cost of fund and spread. Cost of fund is determined by the composite level of return on deposits (demand deposit, saving, and time-deposit), while the spread is determined by interest to cover required reserves, loan loss provisions / loans, operating costs / loans, and pretax profit. Bank loan/financing pricing is influenced by microeconomic factors (internally) and macroeconomic factors (externally). Microeconomic factors include bank size, equity, overhead cost, foreign ownership, competition, reserve

requirement, and deposit rate (Gelos, 2006), while macroeconomic factors include GDP, inflation, volatility and country risk. Other influencing factors are information, tax, and legal environment.

Up until today, pricing in Islamic bank, either from supply side, which includes PLS *nisbah*, *murabahah* margin, *ijarah* fee, and fee based income rates, or from demand side, which includes demand deposit, saving deposits and time deposits, are still be benchmarked to conventional interest rate prevailed as reference rate in the market. The pricing technique of Islamic bank is also copied from that of conventional bank. However, the movement of PLS return in Islamic bank does not always follow the movement of interest rate in conventional bank.

The margin or spread between PLS funding and financing in Islamic bank is relatively similar to the margin or spread between interest funding and loan in conventional bank. From January – November 2009, Islamic bank PLS margin reached an average of 6.1%, while conventional interest margin reached an average of 6.3% (see figure 1.3). High and persistent margin between funding and financing does not only happen in Indonesia. Research conducted by Gelos (2006) and Afanasieff and Lhacer (2006) showed a high and persistent margin in Latin America, resulting in low distribution of banking credit. In Brazil, the margin between lending and deposit rates was as high as 38.7% in 2000. Cihak and Podpiera (2005) showed that high margin (13% average) also occured in Africa in 2002.

Based on the above mentioned problem of high and persistent interest/PLS margin in Indonesia's conventional/Islamic bank, it is very important to understand the determinants of interest/PLS margin of bank, so that the root cause of the problem can be pin pointed and policy recommendations to solve the problem can be formulated.

#### 1.2 Objectives

In detail, this study/research has some objectives to answer the research questions, as follows.

- 1. To identify the determinants of net interest margin (NIM) of conventional bank, as well as net PLS margin (NPM) of Islamic bank.
- 2. To identify the causes of persistent high NIM and NPM in conventional bank and Islamic bank, respectively.

## 2 Methodology

The definition of net interest margin in this research refers to the definition suggested by Maudos (2009), financial income and financial expenses to total asset. The observation period in this research is from first quarter 2006 – First quarter 2009 (quarterly). Total banks are 80 commercial banks. Banks in this research cover more than 80% of share asset to total banking asset, in both conventional and Islamic banking as a whole.

## 2.1 Determinants of Net Interest Margin

To answer the research question about determinant factors that influence net interest margin of bank following bank spread, is by using two step regression approach by Ho and Saunders (1981), Alfanasief (2002), Brock and Suarez (2000), Maudos (2004, 2009). In this approach, bank is assumed to be risk adverse and acted as dealer or intermediary between creditor and debitor. The model considers the credit risks with a process that does not require big expenses. In its operational activities, bank tends to hold non-liquid assets and by then it always manages unbalanced portfolio, due to excess credit demand or insufficient credit supply. Bank determines the deposit's and credit's rate to maximize the profit at the end of period.

Assumption used is that creditor and debitors meet randomly by Poisson process. Ho and Saunders assumed that the functions of credit and deposit rate have specifications of linear symmetric as the equation below:

$$\lambda_L = \alpha - \beta b, \qquad \lambda_D = \alpha + \beta a$$
 (1)

Where a and b are the fees charged by credit and deposit.

The equilibrium of spread can be written down as follow:

$$s = a + b = \frac{\alpha}{\beta} + \frac{1}{2} R \sigma_1^2 Q$$
<sup>(2)</sup>

Where bank spread consists of two parts, first is  $(\alpha/\beta)$ , which measures the 'risk neutral spread'. This indicator reflects bank spread when bank faces neutral risks. Risk neutral spread is the ratio of intercept ( $\alpha$ ) against the slope ( $\beta$ ) from the symmetric functions of credits and deposits. Ho and Saunders interpreted that the first part is the measurement of market power, as long as bank faces an inelastic demand relative to supply function in market, so that the market power is reflected by giving out a bigger spread.

The second part is to measure the risk premium. It reflects the composition of three components, which are absolute coefficient of risk aversion (R), variation of interest rate on net credit inventories ( $\sigma_1^2$ ) and transaction size between deposits and credit.

In this case, Ho and Saunders (1981) and Alfanasief (2006) built two-step regression to determine the variables that influence bank spread.

#### 2.2 Econometric Model

In this section, we describe the empirical approximation of the determinants of net interest margin in the Indonesian conventional banking system. We estimate a regression model of the net interest margin (NIM) (calculated as the difference between financial income and financial costs divided by total asset) as a function of pure spread (PS), bank specific variables (BS) and Macroeconomic Variables.

The model to b estimated is as follows:

$$NIM_{it} = \alpha_i + \sum_{j=1}^{J} \beta^j P S_{it}^{j} + \sum_{k=1}^{K} \chi^k B S_{it}^{k} + \sum_{l=1}^{L} \delta^l M E_l + \varepsilon_{it}$$
(3)

For t=1,...,I, where T is the number of periods observed and i=1,...,I, and I is the total number of banks. Therefore, subscripts I and t refer to bank I at time t, respectively. Pure spreads are the variables that theoretically determine the margin.

### 2.3 Operational Variables

The variables are proxied empirically as follows:

Variables	Description	Source	Expected Sign			
Net Interest Margin	Calculated as the difference between	Bank's Monthly				
	financial income and financial costs	Financial Report				
	divided by total asset					
	I. Pure Spread	l				
Market Power	Proxy of Concentration Degree	Developed	Positive/Negative			
	(Herfindhal Index)					
Risk Aversion	Ratio of Equity to total assets	Balance Sheet	Positive			
Size	Logarithm of loans	Balance Sheet	A priori			
Market Rate	Market rate standard deviation	Bank Indonesia	Positive			
Volatility						
II. Microeconomic Variables						
Operating Cost	Ratio of administrative to total asset	Income Statement	Positive			

Table 3.1 Variable Descriptions and data used

#### SESSION 4A: Finance

Default Risk	Ratio of credit to total asset	Balance Sheet	Positive			
Liquidity Risk	Ratio of liquid asset to liquid liability	Balance Sheet	Negative			
implicit return	Ratio biaya non dana to rata-rata aktiva produktif	Income Statement Balance Sheer	Positive			
Opportunity cost of bank reserves	Ratio of liquid reserves (proxied by cash variable) to total asset	Balance Sheet	Positive			
Quality of Management (efficiency)	Ratio of operational cost to operational revenue	Income Statement	Negative			
Operational Policy	Ratio of deposit to difference of total asset and fixed asset	Balance Sheet	Positive			
Implicit Cost	Difference between noninterest expense and other operating income in term of total assets	Income Statement Balance Sheet	Positive			
Interaction between credit and market risk	Ratio product of nonperforming loans to loans and market risk	Income Statement	Positive			
Income from trading	Difference of non interest income and fee	Income Statement	Negative			
Strategy cost subsidy	Ratio of other operation revenue- operational cost to total asset	Income Statement	Negative			
Ratio of Deposit	Specialization variables	Balance Sheet				
Non Performing Loan	Bad debt (collective 4 and 5)	Income Statement	Positive			
	III. Macroeconomic Va	riables				
Inflation	Growth rate of the consumer price index	Indonesia Bureau of Statistics	Positive			
PUAB	Daily PUAB	Bank Indonesia	Positive			
GDP Growth	Output Growth in constant 2002	Indonesia Bureau of Statistics	Positive/Negative			

Note: \*) Less concentrated and more competitive banks will adjust their credit rate quicker

\*\*) Operational costs considered in MFR, consist of labour cost, education and training cost, research and development cost, rental cost, promotion cost, and maintenance and repair costs.

## 3 Result

The sample used is form by a balanced panel of data from quarterly observations, corresponding to 80 commercial banks for the period between first quarter 2006 and 2009, which represent an average of 80% of the Indonesian commercial bank. The data obtained from financial report of Bank Indonesia. Table 1 shows the descriptive statistics of the net interest margin and their determinants, as well as the number observations in each year.

The model was estimated with fixed effects in order to capture the influence of specific variables of each bank. The results are presented in table 2.

Almost the sign of variables are significant with the expected sign.

Table 1. Sam	ole Descri	ptive	Statistic
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Year	Banks	Statistics	NIM	Market Power (Herfindahl Index-Loan)	Risk Aversion	Operating Cost	Default Risk	Liquidity Risk	implicit return	Opprotunity cost of bank reserves	Opportunity Cost	Management Quality	Operational Policy	Implicit Interest	Income from trading	Strategy cost subsidy	Ratio of Deposit	Non Performing Loan
2006_1	80	Mean	5.88	5.92	13.45	6.20	54.56	38.62	42.94	3.95	19.49	432.52	78.27	9.31	61.12	2.79	75.49	4.12
		Standard Deviation	2.33		11.92	0.84	18.21	26.59	25.41	1.78	13.39	346.29	15.69	3.76	145.47	2.09	14.78	3.79
2006_2	80	Mean	5.70	5.84	13.82	6.23	54.44	39.31	44.20	3.88	22.68	438.29	78.38	9.17	53.12	2.80	75.64	4.17
		Standard Deviation	2.13		10.13	0.84	18.26	25.71	25.65	1.77	15.81	341.30	16.05	3.68	123.73	2.01	15.20	3.67
2006_3	80	Mean	5.68	6.14	14.21	6.25	54.70	39.92	44.59	3.88	23.15	442.41	78.03	9.11	55.80	2.82	75.29	4.16
		Standard Deviation	2.08		10.38	0.82	17.74	25.68	27.40	1.79	15.97	339.00	15.89	3.56	130.94	1.97	14.97	3.85
2006_4	80	Mean	5.42	6.12	13.73	6.28	53.59	40.44	44.45	3.82	23.29	453.20	77.46	8.62	55.11	2.80	74.89	3.69
		Standard Deviation	2.05		9.92	0.82	17.90	23.14	29.34	1.87	13.38	332.94	15.73	3.44	129.79	1.99	14.86	3.18
2007_1	80	Mean	5.67	5.59	14.13	6.29	53.15	46.15	45.02	3.85	27.50	428.59	77.71	8.10	57.71	2.72	75.02	3.88
		Standard Deviation	2.17		10.95	0.82	17.69	39.18	27.97	1.97	16.21	314.34	16.02	3.09	133.63	1.93	14.98	3.20
2007_2	80	Mean	5.64	5.53	14.20	6.31	54.30	42.56	44.42	3.86	24.64	408.78	77.55	7.86	55.37	2.70	74.90	3.93
		Standard Deviation	2.01		11.13	0.82	17.58	32.34	30.08	1.92	15.08	301.83	14.73	3.13	122.39	2.05	13.81	3.29
2007_3	80	Mean	5.42	5.45	14.35	6.33	53.72	45.19	44.28	3.78	26.20	414.17	77.91	7.61	52.12	2.73	75.27	3.66
		Standard Deviation	1.82		10.77	0.84	17.08	33.78	36.61	1.87	16.00	306.77	14.75	2.95	115.14	1.84	13.64	2.91
2007_4	80	Mean	5.16	5.59	14.37	6.36	54.00	53.53	47.50	3.64	27.19	428.11	76.52	7.19	52.60	2.66	74.11	3.01
		Standard Deviation	1.91		12.25	0.85	17.04	113.79	50.11	1.47	16.86	306.25	15.90	2.49	115.31	1.37	14.80	2.51
2008_1	80	Mean	5.50	5.38	14.73	6.39	57.05	52.58	47.75	3.79	24.04	426.24	76.28	7.42	60.66	2.87	73.70	3.17
		Standard Deviation	2.04		12.55	0.85	17.94	135.08	56.30	1.53	16.68	305.21	16.45	2.61	135.84	1.49	15.31	3.10
2008_2	80	Mean	5.46	5.46	15.88	6.42	59.29	56.19	48.49	3.82	20.58	426.91	75.85	7.27	55.65	2.87	73.40	3.03
		Standard Deviation	1.92		13.99	0.87	17.82	198.40	65.79	1.47	16.01	294.61	16.40	2.70	130.70	1.42	15.70	2.98
2008_3	80	Mean	5.40	5.53	16.24	6.45	60.53	39.85	54.45	3.85	17.83	433.96	74.82	7.26	58.20	2.91	72.45	2.93
		Standard Deviation	1.79		14.01	0.89	18.62	75.15	121.99	1.48	14.16	299.19	16.07	2.79	135.95	1.45	15.49	3.18
2008_4	80	Mean	5.39	5.84	16.10	6.48	59.84	57.88	59.60	4.11	18.38	424.50	74.44	7.68	60.15	3.06	72.05	2.97
		Standard Deviation	2.20		14.18	0.87	17.33	213.11	124.22	2.19	14.28	289.44	17.16	3.49	145.36	2.14	16.63	4.53
2009_1	80	Mean	5.49	6.50	15.47	6.48	56.65	71.57	61.72	3.90	21.64	406.85	74.97	8.10	66.62	2.83	72.82	3.32
		Standard Deviation	1.95		17.36	0.88	16.42	224.93	143.95	2.01	14.11	346.81	18.40	3.85	147.23	2.20	16.99	4.62

Source: Author Calculation based on data from Commercial Bank Financial Report, collected by Bank Indonesia

Dependent Variable: Net Interest Margin							
Variable	Coefficient	P-Value					
NIM (01)	0.4706	0.000					
Default Risk	0.0502	0.000					
Liquidity Risk	0.0009	0.000					
Implicit Return	0.0000	0.929					
Operational Cost	0.0097	0.000					
Efficiency	0.0000	0.000					
Operational Policy	0.0451	0.001					
Opportunity Cost of Bank Reserves	0.2859	0.000					
Risk Aversion	-0.0017	0.569					
Implicit Cost	-0.0239	0.035					
Size	-0.9821	0.000					
Strategy of Cross Subsidy	0.1286	0.000					
Income from Trading	-0.0002	0.000					
Ratio of deposit	-0.0609	0.000					
Market Structure (HHI-Loan)	0.2370	0.000					
Non Performing Loan	-0.0812	0.000					
Inflation	-0.0014	0.604					
Market Rate (PUAB)	-0.0310	0.000					
Interest Market Volatility	0.0002	0.000					
Growth of GDP	0.0309	0.000					
_cons	4.9005	0.000					
Result	Fixed Effect Model						
	No Biased						
	Order 1 = Autocorrelation						
	Order 2 = No Autocorrelation						
	Over identifying restrictions are valid						

Table 2. Determinants of the Net Interest Margin

The result indicates that not all variables that are pure bank spread is statistically significant. The result of market structure is statistically significant, indicating that commercial bank market tends to be concentrated into several big banks. The more concentrated banking in Indonesia, the higher the NIM, where large banks tend to set product prices both funding and lending products.

In general, the coefficients of the independent variables are consistent and statistically significant with that predicted by theoretical models, except for degree of risk aversion. According to the theoretical model degree of risk aversion is one of the variables included in the variables that determine the NIM of banking pure spread, but the estimation shows that the results were not significant. Proxy for this variable is the ratio of capital to total assets.

The estimation of bank-specific variables is also statistically significant with the expected sign, except for the variable liquidity risk, implicit cost, and non performing loan. Liquidity risk was calculated as ratio of liquid assets and liquid liability. Meanwhile, the results of the estimation shows that the more illiquid assets held by banks compared with their obligations, the higher of NIM. The reason behind this result is the market structure of commercial banking in Indonesia. As we mentioned before that the market structure of Indonesian banking tend to be concentrated into several banks mostly five banks. It means that more liquid will push net interest margin.

Variable opportunity cost of bank reserves, which were calculated based on the ratio between the liquid reserve approach with the total assets held by banks have a significant effect on the movement of NIM. Overall, estimation results show that NIM banking in Indonesia is determined by market structure or market power, the variable cost opportunity of reserve bank, and cross subsidy strategy. Meanwhile, the economic conditions, such as inflation, growth of GDP, and market rate have statistically significant.

# 4 Conclusion

In Indonesian commercial banking system, market structure, cost opportunity of reserve bank and cross subsidy strategy are the main factors in determining the net interest margin. Meanwhile, the macroeconomic variables have also a contribution in determining net interest margin in commercial banking in Indonesia. The policy implication from the research, that our regulatory should make the commercial banking to become a perfect competition.

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