Journal of Economics and Development, Vol.17, No.2, August 2015, pp. 69-82 ISSN 1859 0020 | DOI: 10.33301/2015.17.02.04

Determinants of Net Interest Margin of Commercial Banks in Vietnam

Hoang Trung Khanh
Albert-Ludwigs-Universität Freiburg, Germany
Email: khanhhoangtrung@gmail.com

Vu Thi Dan Tra
Foreign Trade University, Vietnam
Email: vuthidantra.cs2@ftu.edu.vn

Received: 25 September 2014 | Revised: 07 December 2014 | Accepted: 18 April 2015

Abstract

T*his study provides an insight into the determinants of net interest margin (NIM) of commercial banks in Vietnam during the recession period. We employ secondary data collected from published audited consolidated financial reports of Vietnamese commercial banks from 2008, the year marking the outbreak of the global financial crisis, to the end of 2012. Altogether, the data constitute 175 panel-data observations. The regression using the ordinary least squares method yields the result that operating expense, management quality, risk aversion, and inflation rate have a positive effect on NIM, while the banking sector's market concentration affects NIM negatively. Afterwards, some policy implications are derived from those findings to mitigate and put NIM under control, so that the efficiency of the financial intermediary system can be developed.*

Keywords: Determinants; net interest margin; commercial banks.

1. Introduction

Amid Vietnam's recent efforts of recovering and stabilizing the economy, more and more businesses are in great need of external financing, mainly in the form of loans from commercial banks. A survey conducted by the Monetary Forecast and Statistics Department, State Bank of Vietnam showed that the average credit growth of the banking industry is expected to rise to 16.93% in 2015 compared to a result of 14.57% in December 2014. However, as the Vietnam Chamber of Commerce and Industry pointed out in its data, only one third of businesses are accessible to commercial loans in reality. As a result, research about how to allocate capital resources effectively becomes an urgent and important mission.When it comes to this issue, net interest margin (NIM) is of special concern. NIM is calculated by the difference between total loan interests and total deposit interests in proportion to total interest-generating assets of one individual bank (Dumičić and Ridzak, 2012). This is also the definition used in other research about NIM (Claeys and Vander Vennet, 2007; Kalluci, 2012; Tarus et al., 2012).

Normally, a higher average NIM among the banking industry indicates signs of an inefficient system of financial intermediary (Sensarma and Ghosh, 2004). Higher NIM directly translates into a lower deposit interest rate, which intimidates people from making deposits, as well as a higher loan interest rate, which makes credits less accessible to businesses in need (Zuzana and Tigran, 2008). Therefore, in order to benefit businesses and the overall economy, banks' NIM should be put under control at a low level, which means that the capital is transferred across the financial intermediaries at a slight expense. On the other hand, a too low NIM causes damage to banks' profitability (Zuzana and Tigran, 2008). Here exists a conflict of interest between policymakers, whose objective is to optimize the society's benefit, and bankers, who aim at maximizing profits. Because of this dilemma, there have been plenty of studies on NIM and its determinants around the world in the last three decades, for example Demirgüç-Kunt and Huizinga (1999), Maudos and Fernández de Guevara (2004), Zuzana and Tigram (2008) to name a few. However, such research is still unavailable in Vietnam, and both the government and the banking system are uninformed about specific factors to control NIM as they wish. To fill in this gap is the motivation behind our study.

Within the scope of this paper, we discuss the determinants of NIM using Vietnamese banks' data during the 5-year-period 2008-2012. They are divided into three sub-categories: bank-specific factors, industry-specific factor, and macroeconomic factors. After setting up the model, estimating the coefficients, and observing the causal effects these factors cast on NIM, we point out how significant these effects are and in which directions NIM are affected by them, as well as show economic implications from the result.

2. Literature review

One of the pillars that support contemporary theories about NIM is Ho and Saunders' "dealership model" presented in their 1981 work. According to this model, banks' operating activities of taking in deposits and lending out loans are treated the same as the mechanism of dealership's "bid-ask" in the security market.

That is, banks play both roles of the demander for and the supplier of funds. Their demand is paired with some people's needs of depositing, while their supply meets others' yearning for borrowing. Because this operation is associated with credit risks, banks ask for a risk premium equal to the difference between interest earned from loans (ask) and interest paid for deposits (bid).

Using this model, Ho and Saunders (1981) identified two determinants of NIM: banking industry competitiveness and interest risk. In the following years, other factors have been claimed by other researchers to be determinants of NIM. Allen (1988) suggested credit risk, Demirgüç-Kunt and Huizinga (1999) suggested financial leverage, owner's equity, and taxes. Saunders and Schumacher (2000) found out regulations, market structure, and risk premium, and Maudos and Fernández de Guevara (2004) added operating expense. Within the scope of this paper, we consider the following factors: bank-specific factors including operating expense, credit risk, management quality, risk aversion; macroeconomic factors including inflation rate and economic growth; and an industry-specific factor, which is market concentration.

The model employed in this paper is the regression model developed by Demirgüç-Kunt and Huizinga (1999), Abreu and Mendes (2003), and Tarus et al. (2012) and the approach of estimating coefficients involves using the ordinary least square method.

The model has the form as following:

$$\prod it = c + \sum_{j=1}^{J} \beta_j X_{it}^j + \sum_{l=1}^{L} \beta_l X_{it}^l + \sum_{m=1}^{M} \beta_m X_{it}^m + \varepsilon_{it}$$

in which Πit is the dependent variable NIM of bank i at time t (t = 2008, 2009, 2010, 2011, 2012), c is constant, X_{it} with subscripts j, l, m are independent variables representing bank-specific, industry-specific, and macroeconomic factors, respectively, β with subscripts j, l, m are parameter estimates of respective factors, and ε_{it} is error term. The independent variables are ultimately chosen on the basis of common utilization and high level of significance found in preceding studies.

2.1. Bank-specific factors

Operating expense

Operating expense (OpEx) is defined as costs that arise from a bank's operating activities. This, according to Vietnamese accounting standards, includes fees, taxes, employee expenses (salaries, infringements, and compulsory labor insurance), depreciation costs, deposits insurance, and managerial overheads. OpEx is measured by the ratio of the operating expenses item in the income statement to the value of total assets at the time of observation (Tarus et al., 2012). The purpose is to eliminate the effect of an individual bank's scale and size of operation. Research using data from different economies shows that a certain bank's operating expense poses a positive effect on its NIM. Specifically, Abreu and Mendes (2003) with data from France, Germany, Portugal, and Spain, Gelos (2006) with research on the Latin American market, Carbo and Rodriguez (2007) with data from seven European Union members, Ahmet and Hakan (2010) with data from Turkey, and Maria and Agoraki (2010) with data from Eastern and Southern Europe, all state that when operating expense increases, the bank's NIM would also increase and vice versa.

This causal relationship is explained by the fact that when facing a higher operating expense, banks would try to pass this increasing expense on their customers in the form of higher loan interest rates and lower deposit interest rates (Maudos and Fernández de Guevara, 2004). Consequently, this raises the interest profit of the banks and followed is their NIM. Thus, we expect a similar relationship for Vietnamese banks.

Credit risk

Credit risk (CR) is the probability that a debtor would fail to execute his or her financial obligations; hence the creditor would face the risk of losing partly or wholly his or her loaned money. Credit risk is represented by the ratio of loan loss provision to total loans (Tarus et al., 2012). Earlier research calculated credit risk by the ratio of total debts to total assets. Based on this measurement, Angbazo (1997), Demirgüç-Kunt and Huizinga (1999), Abreu and Mendes (2003), and Carbo and Rodriguez (2007) all conclude that the higher credit risk a bank is exposed to, the higher its NIM. Even when Taurus et al. (2012) use a different proxy of credit risk, which equals to the ratio of loan loss provisions to total loans, they also reach the same conclusion.

The reason for the positive correlation between credit risk and net interest margin is that, as the bank makes more risky loans, it perceives the credit risk more carefully, sets out more money for the loan loss provision, and thus requires a higher risk premium, which in turn is passed on to the bank's borrowers in the form of higher lending rates of loans (Maudos and Fernández de Guevara, 2004). This increases the interest income and, eventually, the net interest margin as well. This is also our expectation for the Vietnamese banking industry.

Management quality

Management quality (MQ) refers to the efficiency of a bank's operation at the managerial level to generate income at the lowest cost possible. Management quality is measured by the ratio of operating expenses to gross operating income (Kalluci, 2010). This variable demonstrates how much expense is needed for operation activities in order to yield one unit of income. Research points out that when a commercial bank enhances its management quality, hence making profit at a lower expense, its NIM would also increase. Angbazo (1997), Maudos and Fernández de Guevara (2004), and Kalluci (2010) all prove a positive causal relationship between management quality and NIM.

This phenomenon can be explained: as a bank's management quality improves, the bank would be more likely to pick up better assets, which have a high return rate but low risk, to make more secured loans, and to avoid high interest payment (Angbazo, 1997; Maudos and Fernández de Guevara, 2004). Therefore, the interest income would increase, while the interest expense would decrease simultaneously. This leads to a larger net interest margin for the bank. We expect that the same logic applies for Vietnamese banks. We should also keep in mind that, because management quality is calculated as the ratio of operating expense to gross operating income, better quality means a lower rate. Thus, an expectedly positive relation of this variable with NIM would be accompanied by a negative sign of estimated coefficient in regression.

Risk aversion

Risk aversion (RA) is defined as the degree to which a bank is reluctant to take more risk for a same amount of return. If the risk aversion is high, the bank is said to be risk averse; on the other hand, if the risk aversion is low, the bank is said to be risk loving. Risk aversion is represented by the ratio of total equity to total assets (McShane and Sharpe, 1985). It is suggested in earlier research that there is a positive relationship between a bank's risk aversion degree and its net interest margin. This point of view is supported by the approach of McShane and Sharpe (1985), and more recently by Maudos and Fernández de Guevara (2004). The more risk averse a bank, the greater its net interest margin is expected to be.

Given the same legislative requirements and conditions for commercial banks' minimum equity throughout Vietnam, if a bank is more risk averse, it will be more likely to prefer equity financing to debt financing, and, thus, require a higher margin as compensation for higher costs arising from equity financing in comparison with external financing (Maudos and Fernández de Guevara, 2004). This explains why risk aversion and net interest margin move in the same direction. This is also our expectation.

2.2. Macroeconomic factors

Inflation rate

Inflation rate (IF) means the rate at which the price level of a same general basket of goods and services increases over a period of time. Because inflation rate directly affects the nominal interest rates used in borrowing and depositing activities, which in turn alternates the demand and supply of bank services, it also has an effect over net interest margin. As the change in price over time of the aforementioned basket of goods is reflected by CPI, it is reasonable to proxy the Vietnamese inflation rate during the period 2008-2012 by the annual CPI growth rate over the same period. Recently, the debate on which direction inflation rate affects the net interest margin of banks in the regarded economy is heated by several studies. Demirgüç-Kunt and Huizinga (1999) argue that inflation rate positively affects net interest margin. This conclusion is shared by Claessens et al. (2001) and Drakos (2002). On the other hand, many other researchers state the opposite. Abreu and Mendes (2003), Samy (2003), Martinez and Mody (2004), and Maria and Agoraki (2010) all agree that inflation rate has a negative relationship with NIM.

In this paper, increasing the inflation rate is expected to increase the net interest margin of Vietnamese banks and vice versa. This is because generally, an increase in inflation would also make interest rates for loans rise, and that eventually would lead to an increase in the interest margin (Tarus et al., 2012). Even if banks do not anticipate inflation correctly, in the long term, interest rates would be adjusted to reflect the inflation premium, which would also increase the interest margin.

Economic growth

Economic growth (GR) is the value increase in an economy's capacity to produce goods and services over a certain period of time. This increase implies an expansion in business activities, an upgrade in the living standard of the people, and more favorable market conditions. Consequently, economic growth also increases the public demand for bank services, including loans and deposits, which are directly related to net interest margin. Economic growth is simu-

lated by Vietnam's GDP growth over the period 2008-2012. Different studies lead to unsettled opinions about the direction and magnitude of this relationship. Claessens et al. (2001) argue that economic growth is positively correlated with net interest margin, while in their empirical studies of European countries, Abreu and Mendes (2003) and Maria and Agoraki (2010) do not determine any correlation between the two variables. On the other hand, Demirgüç-Kunt and Huizinga (1999), Demirgüç-Kunt et al. (2004), and Carbo and Rodriguez (2007) claim that they detect a negative effect of economic growth to net interest margin.

In this paper, economic growth is expected to have a negative relationship with the net interest margin of commercial banks within the regarded economy. As discussed earlier, an increase in economic growth can be translated to better market conditions, more positive business activities, and improvement in business performance. This would help mitigate the risk that businesses cannot fulfill their financial obligations to banks-their creditors. Thus, risk premiums would reduce, and banks would tend to lower their interest margins (Maria and Agoraki, 2010). In contrast, bad economic growth would increase the credit risk banks face from making loans to businesses, which in turn would increase the risk premium and banks' required interest margins.

2.3. Industry-specific factor

Market concentration (MC) is the degree to which a minority of firms within the same industry possess a considerably large amount of the market share. This variable is used to measure the competition within an industry, and is proxy by a 3-firm-ratio, the ratio of the three largest banks' total assets in the market to total assets of the whole industry combined altogether during one specific year. If market concentration is high, a few firms account for the majority of the market share, and the market is said to be uncompetitive. In contrast, if market concentration is low, the market power is distributed equally between the industry's members, and the market is deemed as competitive. There are debates over the direction of the relationship between the market concentration of the banking industry and the net interest margin of banks. Samy (2003) and De Haan and Poghosyan (2012) claim that in a highly concentrated market, banks would be monitored more easily than in a less concentrated one, due to the convenience and consistency in adoption of regulations and controlling methods over the whole system. Therefore, the overall net interest margin would be more likely to fall in such concentrated markets because of governmental control. However, there are many scholars who hold different perspectives as well as contradicted empirical evidence. Porter (1979), Demirgüç-Kunt and Huizinga (1999), and Naceur (2003) find high market concentration to be positively correlated with the net interest margin of banks within the regarded market. On the other hand, in their recent researches, Carbo and Rodriguez (2007) and Maria and Agoraki (2010) can determine no significant relationship between these two variables.

Within the scope of this paper, high market concentration is expected to lead to a widened interest margin. As the market power in the banking industry stays only in the hands of some individual banks, those banks would tend to behave in an oligopolistic manner: they

Table 1: List of independent variables with their literature sources, measurement, and expected parameters' signs

Independent variables	Source	Measurement	Expected sign
Operating expense	Tarus et al. (2012)	$\frac{\text{Operating expense}}{\text{Total assets}}$	+
Credit risk	Athanasoglou et al. (2005)	$\frac{\text{Loan loss provisions}}{\text{Total assets}}$	+
Management quality	Kalluci (2010)	$\frac{\text{Operating expense}}{\text{Gross operating income}}$	-
Risk aversion	Maudos and Fernández de Guevara (2004)	$\frac{\text{Total equity}}{\text{Total assets}}$	+
Economic growth	Maria and Agoraki (2010)	Annual GDP growth	-
Inflation rate	Demirgüç-Kunt and Huizinga (1999)	Annual CPI growth	+
Market concentration	Demirgüç-Kunt and Huizinga (1999)	3-firm concentration ratio	+

would end up asserting their pricing power by imposing higher interest rates for loans and lower interest rates for deposits (Tarus et al., 2012). Since they own a large market shares, these rate settings would not harm their competitiveness compared to other smaller banks. The increasing gap between interest income and interest expense would help increase the net interest margin of those banks.

The measurement of all seven factors is given in Table 1.

3. Methodology

3.1. Data

The data is collected from annual financial reports of commercial banks in Vietnam over the period 2008-2012. During this period, some banks merged with or were acquired by others, thus the number of banks saw changes from year to year: 36 in 2008, 37 in 2009 and 2010, 34 in 2011, and 35 in 2012, which altogether make up 175 observations. After being collected, the data is organized into the panel form, with each observation identified by both year and name of bank and containing values of NIM and seven factors respectively.

Table 2 demonstrates an overview of descriptive statistics for every variable taken from the sampled observations. Overall, the volatility within each variable is quite moderate, except for management quality which has a significant gap between maximum (18.336) and minimum (0.0776) and a relatively high standard deviation (1.7102) compared to others. This is due to the maximum value, which turns out to be an outlier. In order to deal with this problem, we can modify the regression model by replacing the MQ variable by its natural logarithm variable LMQ, with descriptive statistics also demonstrated in Table 2. The volatility is greatly reduced.

3.2. Model assumptions

We analyze the determining effect of 7 in-

Table 2: Descriptive statistics of all variables

Variables	Mean	Max	Min	Median	Standard deviation
NIM	0.0355	0.0985	-0.0061	0.0339	0.0158
OpEx	0.0154	0.0498	0.0043	0.0146	0.0059
CR	0.0121	0.0428	0.0005	0.0104	0.0066
MQ	1.2671	18.336	0.0776	0.7797	1.7102
RA	0.1327	0.4638	0.0291	0.1049	0.0861
IF	13%	19.9%	6.52%	12%	0.0557
GR	6%	6.78%	5.03%	6%	0.0064
MC	0.4159	0.4917	0.3724	0.4039	0.0437
LMQ	-0.0901	2.9088	-2.5555	0.77971	0.7094

Note: total observations: 175
Source: compiled with STATA

dependent variables above (MQ substituted with LMQ) on NIM by the establishment of a linear regression model. The employment of the ordinary least square approach in estimating the model coefficients is built upon five Gauss-Markov assumptions: linearity in parameters, random sampling, no perfect collinearity, zero conditional mean, and homoskedasticity. The first two assumptions are straight-forwardly satisfied by the regression model, whereas collinearity is examined in the correlation table (Table 3), and the other two can be tested easily using the residual analysis after we run the regression of NIM on all seven independent variables' observation from the sample.

From Table 3, it is obvious that the highest correlation among all 7 independent variables occurs between inflation rate and economic growth (0.5915), which is still far away from perfect collinearity. Therefore, our model fulfills the third assumption.

To test the zero conditional mean assumption, we run the regression of NIM on all 7 independent variables, save the residuals and analyze them from two aspects: (1) t-test to see if the mean of residuals is equal to zero and, (2) check if the covariance of all explanatory variables and residuals are all equal to zero. In fact, both tests show that the mean of residuals is not significantly different from 0 at the level of 1% and all 7 explanatory variables share no correlation with the residuals. Therefore, the fourth assumption is satisfied.

Finally, to test homoskedasticity, we use the Breusch-Pagan test with the null hypothesis being constant variance of the error term regardless of independent variables and get a result with a p-value equal to 0.2933, which means that we cannot reject the null, and our model meets the fifth assumption at the level of significance of 10%.

In summary, all five satisfied Gauss-Markov assumptions contribute to a firm base for our model and validate that the ordinary least square approach would actually yield the best linear unbiased estimation (BLUE). The re-

Table 3: Correlation between independent variables

	OpEx	CR	LMQ	RA	IF	GR	MC
OpEx	1						
CR	0.0414	1					
LMQ	0.3404	-0.0631	1				
RA	0.3400	-0.2846	-0.1454	1			
IF	-0.0156	-0.0735	0.0263	0.0969	1		
GR	-0.2719	-0.1073	-0.1394	0.0381	0.5915	1	
MC	0.0456	-0.2593	0.0719	0.2168	0.2841	-0.0062	1

Source: compiled with STATA

gression result in Table 4 is, therefore, well supported and reliable.

4. Results and discussion

The regression results are shown in Table 4. We use different combinations of independent variables in order to objectively and accurately evaluate the effect of each factor on NIM. We start with the full model as in other research introduced earlier, and then start omitting insignificant or too highly correlated variables until we achieve a reliable and optimal modified model. The criterion for omitting variables lies in the significance of estimated parameter coefficients, and the iteration stops when all coefficients are significant at the level 10%.

Model 1 is the regression of NIM on all 7 explanatory variables, which yields conventionally significant estimates (i.e. at the level of 10%) for all but credit risk (CR) and economic growth (GR). Since the t-statistics of credit risk coefficient estimate is lower than that of economic growth, we should focus on this variable first. We omit this variable in model 2. The new regression result shows that without the presence of CR in the model, the t-statistics of the GR coefficient estimate improves but is still insignificant at a 10% level. We move on to omit GR from model 2 and get model 3. Since all estimates in model 3 are significant at least at the 10% level, model 3 is the optimal estimated model with the studied sample. We conclude that NIM of Vietnamese commercial banks is determined by five factors: operating expense, management quality, risk aversion, inflation rate, and market concentration.

It is notable that even though there exist correlations among some explanatory variables, the multicollinearity test in Table 5 using variance inflation factor (VIF) shows that all 7 variables have the corresponding VIF smaller than 5, which indicates that there is no multicollinearity between them, and the estimates yielded from running regression are reliable.

As demonstrated in Table 4, all three models show a 1% significantly positive parameter estimate of operating expense. This is convincing proof of the positive effect that a Vietnamese bank's operating expense poses on its NIM. This conclusion is in agreement with our expectation and the result yielded by other researchers using data from different markets (Maudos and Fernández de Guevara, 2004; Martinez and

Table 4: Regression results

	Model 1	Model 2	Model 3
OpEx	1.518*** (9.48)	1.524*** (9.69)	1.604*** (10.66)
CR	0.028 (0.22)		
LMQ	-0.010*** (-8.42)	-0.010*** (-8.61)	-0.010*** (-8.52)
RA	0.050*** (4.64)	0.049*** (4.82)	0.047*** (4.62)
IF	0.045** (2.43)	0.046** (2.46)	0.026* (1.83)
GR	-0.263 (-1.60)	-0.266 (-1.64)	
MC	-0.055** (-2.79)	-0.056** (-2.91)	-0.048** (-2.58)
Constant	0.037** (2.69)	0.038*** (2.89)	0.020*** (2.64)
Adj. R-squared	0.5946	0.5969	0.5929
Prob> F	0.000	0.000	0.000

*Note: Significance level: *** 1%, ** 5%, * 10%; N = 175*
Source: Compiled with STATA

Mody, 2004; Tarus et al., 2012). When operating expense becomes larger, the bank would actively increase its interest revenues and decrease its interest expenses in order to pass the higher expense on its customers (Maudos and Fernández de Guevara, 2004).

All models yield a nearly consistent result of management quality at the significance level of 1%. It is notable that because this variable is proxy by the ratio of operating expenses to gross operating income, the higher ratio associates with more operating expenses needed to generate income, and consequently a worse quality of management. Therefore, negative parameter estimates of quality management in all models denote a positive determining effect of this variable on Vietnamese banks' NIM, which is compatible with our expectation and

Table 5: Variance inflation factor of 7 independent variables

Variables	OpEx	CR	LMQ	RA	IF	GR	MC
VIF	1.58	1.21	1.31	1.48	1.85	1.87	1.27

Source: Compiled with STATA

with other studies such as Angbazo (1997), Maudos and Fernández de Guevara (2004), and Kalluci (2010). A better management picks out better assets with high return and low cost, which increases interest revenue and thus NIM (Maudos and Fernández de Guevara, 2004).

As we can see from Table 4, all parameter estimates of risk aversion are positive and statistically significant at a 1% level. Clearly, this variable has a positive effect on the NIM of observed commercial banks in Vietnam, which is in accordance with earlier research by Maudos and Fernández de Guevara (2004). Trying to avoid risks, banks would tend to finance themselves by equity instead of by debts. Due to the effect of tax shield in debts' interest, financing by more equity translates into a higher cost of capital, which then is passed by the bank to its customers in the form of higher loan interest rate and thus higher NIM (Maudos and Fernández de Guevara, 2004).

The regression results show that inflation rate has statistically significant coefficient estimates at a level of 5% in models 1 and 2 and at a level of 10% in model 3. Overall, we can conclude that inflation rate has a positive effect on Vietnamese banks' NIM. This finding is consistent with other studies conducted by Demirgüç-Kunt and Huizinga (1999), Brock and Suarez (2000), Claessens et al. (2001), and Drakos (2002). When inflation rate increases, the real cost of borrowing money decreases, which stimulates people into demanding more credits from their bank. Consequently, the bank responds by adjusting loan interest rates to a higher level, which leads to higher NIM (Tarus et al., 2012).

Banking market concentration, represented by the 3-firm concentration ratio, has significantly negative parameter estimates at all models running. This result shows that the market concentration of the Vietnamese banking industry has a negative effect on the NIM of member banks, and we reach the same conclusion as Tarus et al. (2012). As we expect, the more concentrated the market, the better the government can manage the industry (Samy, 2003). Since a lower NIM is desirable in order to make the financial intermediary system more effective and beneficial to the economy in general, banks' NIM would be suppressed actively by the government.

5. Conclusion, policy implications, and suggestions for further research

Within this paper, we identify determinants of commercial banks' NIM in Vietnam. According to the result, when factors such as operating expense, management quality, risk aversion, and inflation increase, they will also raise banks' NIM. Meanwhile, the banking market concentration has a negative causal effect on the NIM of banks within the market. In contrast to our prediction, credit risk and economic growth have no significant relation with NIM in the Vietnamese banking sector.

It is notable that bankers have incentives to increase NIM in pursuit of their own profit, while the government, assuming a benevolent one which always prioritizes the best for its citizens, would prefer a low average NIM in the banking sector in order to mitigate the cost of the financial intermediary system and improve the economic values provided to the society. Based on these findings, some implications are presented in order to put NIM under the discretion of both perspectives-bank managers' and

policymakers'.

The first thing to take into consideration is operating expenses, because it is the numerator in the measurement of both OpEx and MQ. Although OpEx positively affects NIM, it might be counterproductive for a bank to take on more overheads only for the purpose of higher NIM. Therefore, the main implication from this factor is for the government. Tight regulations regarding management and accounting practices should be established, which would help constrain the banks from freely raising NIM in order to make up for their high expenses at the cost of society. Moreover, more innovative market conditions allowing for free market, for example eliminating privileges of State-owned banks to promote fair competition, would force inefficiently operating banks to automatically reduce their operating expenses to stay competitive, which in turn lowers NIM and benefits the customers. From the banks' viewpoint, because good management quality (MQ) can result in better assets picks and thus higher NIM, a bank should keep good track of its board of managers, and focus on developing operating efficiency and cutting costs. These courses of action would bring about higher management quality, which translates into improved NIM.

The next implication comes from the variable inflation rate (IF). As inferable from the above result, the inflation rate in Vietnam has a positive effect on the country's banking sector's NIM, so the policymakers should try to put inflation under an acceptable threshold to keep NIM low. To tame inflation is also one of the Vietnamese government's main objectives alongside stabilizing macroeconomics since 2012 till now, in which it actually has achieved certain success, as the inflation rate dropped from an average of 13% during the observed period 2008-2012 to 4.09% at the end of 2014, according to the Statistics Bureau. For further improvements, well researched policies to control inflation would be either to appoint a conservative central banker (Rogoff, 1985), who is extremely intolerant of inflation, or to increase the central bank's independence from the government (Grilli et al., 1991).

Lastly, market concentration (MC) should also be taken into account, as it negatively affects banks' NIM. As a part of the course of action taken by the State Bank of Vietnam to restructure the national financial system, merger and acquisition (M&A) activities between large banks and under-performing ones have been strongly encouraged recently. Only within the first five months of 2015, according to news on the State Bank of Vietnam's website, three M&A contracts have been approved, and even more are to come in the following months. As the number of players reduces, the market share still lies in the hand of state-owned giants like Vietcombank, Vietinbank, Agribank, etc. Therefore, the government can easily get a grasp of the industry and impose restrictions on NIM. The most difficult thing for policymakers, however, is to set apart clearly in which field to intervene and in which to not so that the market mechanism still functions well to ensure fair competitiveness.

There are two limitations in this paper that need to be coped with and improved in further research. First, the secondary data collected in this research should be dealt with with care for objective reasons, such as inconsistency in the Vietnamese banks' pattern of establishing

annual financial statements and M&A deals of banks which may have a distorting effect on the data. Second, the unusual increase in Vietnam's inflation rate and the instability of macroeconomic conditions during the observed period of time may need to be taken into account in further research in the form of dummy variables included in the regression model. The timeline of observations may also be expanded to get a more generalized look at the subject. The authors of this research hope to shed light on the determinants of Vietnamese banks' NIM, to fill in the gap on this topic between Vietnam and other countries, and build a firm empirical reference base for future study of the subject.

References

Abreu, M., and Mendes, V. (2003), *Do Macro-Financial Variables Matter for European Bank Interest Margins and Profitability*, Financial Management Association International.

Ahmet, U., and Hakan, E. (2010), 'Determinants of the Net Interest Margins of Banks in Turkey', *Journal of Economic and Social Research*, Vol.12, Issue 2, pp. 101-118.

Allen, L. (1988), 'The Determinants of Bank Interest Margins: A Note', *Journal of Financial and Quantitative Analysis*, Vol. 23, Issue 2, pp. 231-235.

Angbazo, L. (1997), 'Commercial Bank Net Interest Margins, Default Risk, Interest-Rate Risk and Off-Balance Sheet Banking', *Journal of Banking and Finance*, Vol. 21, Issue 1, pp. 55-87.

Athanasoglou, P., Brissimis, S., and Delis, M. (2005), 'Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability', *Bank of Greece Working Paper*, No. 25.

Brock, P., and Suarez, L.R. (2000), 'Understanding Interest Rate Spreads in Latin America', *Journal of Development Economics*, Vol. 63, pp.113-134.

Carbo, V.S., and Rodriguez, F.F. (2007), 'The Determinants of Bank Margins in European Banking', *Journal of Banking and Finance*, Vol. 31, Issue 7, pp. 2043-2063.

Claessens, S., Demirgüç-Kunt, A., and Huizinga, H. (2001), 'How does Foreign Entry affect Domestic Banking Markets', *Journal of Banking and Finance*, Vol. 25, pp. 891-911.

Claeys, S., and Vander Vennet, R. (2007), 'Determinants of Bank Interest Margins in Central and Eastern Europe: A Comparison with the West', *Economic Systems*, Vol. 32, Issue 2, pp. 197-216.

De Haan, J., and Poghosyan, T. (2012), 'Bank Size, Market Size, Market Concentration and Bank Earnings Volatility in the U.S', *Journal of International Financial Markets & Institutions and Money*, Vol. 22, Issue 1, pp. 35-54.

Demirgüç-Kunt, A., and Huizinga, H. (1999), 'Determinants of Commercial Bank Interest Margins and Profitability: Some International Evidence', *World Bank Economic Review*, Vol. 13, No. 2, pp. 379-408.

Demirgüç-Kunt, A., Laeven, L., and Levine, R. (2004), 'Regulations, Market Structure, Institutions and the Cost of Financial Intermediation', *Journal of Money, Credit and Banking*, Vol. 36, Issue 3, pp. 593-622.

Drakos, K. (2002), 'The Dealership Model for Interest Margins: The Case of the Greek Banking Industry', *Journal of Emerging Finance*, Vol. 1, Issue 1, pp. 75-98.

Dumičić, M., and Ridzak, T. (2012), 'Determinants of banks' net interest margins in Central and Eastern Europe', *Financial Theory and Practice Journal*, Vol. 37, Issue 1, pp.1-30.

Gelos, G. (2006), 'Banking Spreads in Latin America', *IMF Working Paper*, WP/06/44.

Grilli, V., Masciandaro, D., and Tabellini, G. (1991), 'Political and Monetary Institutions and Public Financial Policies in the Industrial Countries', *Economic Policy*, Vol. 6, No. 13, pp. 341-392.

Ho, T., and Saunders, A. (1981), 'The Determinants of Banks Interest Margins: Theory and Empirical Evidence', *Journal of Financial and Quantitative Analysis*, Vol. 16, Issue 4, pp. 581-600.

Kalluci, I. (2010), 'Determinants of Net Interest Margin in the Albanian Banking System', *Bank of Albanian Working Papers*, 2012.

Maria, K., and Agoraki (2010), *The Determinants of Net Interest Margin during Transition*, Department of Accounting and Finance, Athens University of Economics and Business.

Martinez, P., and Mody, A. (2004), 'How Foreign Participation and Market Concentration Impact Bank Spreads: Evidence from Latin America', *Journal of Money, Credit and Banking*, Vol. 36, Issue 3, pp. 511-537.

Maudos, J., and Fernandez de Guevara, F. (2004), 'Factors Explaining the Interest Margin in the Banking Sectors of the European Union', *Journal of Banking and Finance*, Vol. 28, Issue 9, pp. 2259-2281.

McShane, W., and Sharpe, G. (1985), 'A Time Series/Cross Section Analysis of the Determinants of Australian Trading Bank Loan/Deposit Interest Margins: 1962-1981', *Journal of Banking and Finance*, Vol. 9, Issue 1, pp. 115-136.

Naceur, S.B. (2003), *The Determinants of the Tunisian Banking Industry Profitability: Panel Evidence*, Universite Libre de Tunis Working Papers.

Porter, M.E (1979), 'How Competitive Forces shape Strategy', *Harvard Business Review*, Vol. 55, Issue 2, pp. 137-145.

Rogoff, K. (1985), 'The Optimal Degree of Commitment to an Intermediate Monetary Target', *The Quarterly Journal of Economics*, Vol. 100, pp. 1169-1190.

Samy, B. (2003), *The Determinants of the Tunisian Banking industry Profitability: Panel Evidence*, Universite Libre de Tunis.

Saunders, A., and Schumacher, L. (2000), 'The Determinants of Bank Interest Rate Margins: An International Study', *Journal of International Money and Finance*, Vol. 19, Issue 6, pp. 813-832.

Sensarma, R., and Ghosh, S. (2004), 'Net Interest Margin: Does Ownership Matter', *Vikalpa*, Vol. 29, No.1, pp. 41-47.

Tarus, D.K., Chekol, Y.B, and Mutwol, M. (2012), *Determinants of Net Interest Margins of Commercial Banks in Kenya: A Panel Study*, 2nd Annual International Conference on Accounting and Finance (AF 2012) Publication.

Zuzana, F., and Tigran, P. (2008), 'Determinants of Bank Interest Margins in Russia', *Economic Systems*, Vol. 35, Issue 4, pp. 481–495.