Determinants of Net Interest Margin: A Case Study of Bank XYZ in Indonesia

Harya Buntala Koostanto[1] Hermanto Siregar[2] Hendro Sasongko[2]
1. Student at the Graduate Program of Management and Business School, Bogor Agricultural University
2. Lecture at the Graduate Program of Management and Business School, Bogor Agricultural University

Abstract

High net interest margin are usually interpreted as an indicator of inefficiency which burden the economy through higher intermediation cost. Over the study 2007-2015 period, Bank XYZ has reform a declining ratio of net interest margin. This research is an unique case of Indonesian banking industries because the model figure in merger variable which is atypical for NIM research. During the downward trend of net interest margin. Using an error correction model, this study analyzes the determinants of net interest margin in bank XYZ. Results found that bank specific factors affect bank XYZ net interest margin. Furthermore operational cost, credit risk, and merger has an significant effect to net interest margin.
Keywords: net interest margin, merger and acquisition
JEL Classification: C32, E43, G21

1. Introduction

Indonesia is one of the country that has a problem on net interest margin. Data afirm that banking industry in Indonesia has a relatively higher value of net interest margin than banks in other countries. Studies that conducted by Rosengård and Prasetyantoko (2011) on the ASEAN region, predicate Indonesia as the first position with highest percentage of net interest margin. In line with the studies, the most recent data from the Global Financial Development Dataset by world bank measuring bank's net interest margin in 2013 and obtained result that Indonesia has the highest net interest margin 4.35%, followed by the Philippines 3.97 %, Vietnam 2.81%, Singapore 1.54%, Thailand 0.81% , and last Malaysia by 0.58 % (Table 1).

Table 1 ASEAN Banks NIM

Country	NIM %
Malaysia	0,58
Thailand	0,81
Singapore	1,54
Vietnam	2,81
Philippines	3,97
Indonesia	4,35

Several studies have also been done related to level of net interest margin in Indonesia, including Dermiguc - Kunt and Huizinga (1998) which found that the average banking margin Indonesia period 1988-1995 was 3.6%, higher than other ASEAN countries such as Singapore (2.2%) and Malaysia (2.7 %). Research conducted Lin et al (2012) also give results that in the period 1997 to 2005 the average value of bank's net interest margin in amount of 6.36% in Indonesia is the highest value among other Asian countries that become the research sample.The high value of the net interest margin becomes an important issue that must be resolved by banks in Indonesia. Research has been proved as well as providing a comparison of net interest margin in Indonesia and other countries. This result requires banks in Indonesia to be able to work more efficient and produces better performance to create better quality in banking industry.

The alternative to survive and developing in the banking industry is mergers and acquisitions. Mergers and acquisitions were believed to provide solutions in the competition. Brealey, Myers and Allen (2006) states that, mergers and acquisitions are one of the company's growth strategy which believed to provide better economies of scale if it is done through synergy. This statement is intended to provide an explanation that economic benefits will be obtained as a result of increase in business scale.

Bank XYZ is a national commercial bank that has a foreign exchange business bank license in Indonesia. Established in 1906, the bank had been developing its business for years in Indonesian banking industry. In early 2014, Bank Indonesia (Central Bank of Indonesia) issued an acquisition permit of the bank's acquisition by one of the largest Bank in ASIA. The value of net interest margins tend to be higher on the average bank in Indonesia, This condition also occur at Bank XYZ. Data afirm throughout the year 2011 to 2014, Bank XYZ's

net interest margin stated in the range from 7.14% to 10.42%. However, as a time series point of view, the value of Bank's net interest margin experienced a downward trend and drastic stepping up to the point of 1.89% in December 2014 after the merger and acquisition process.
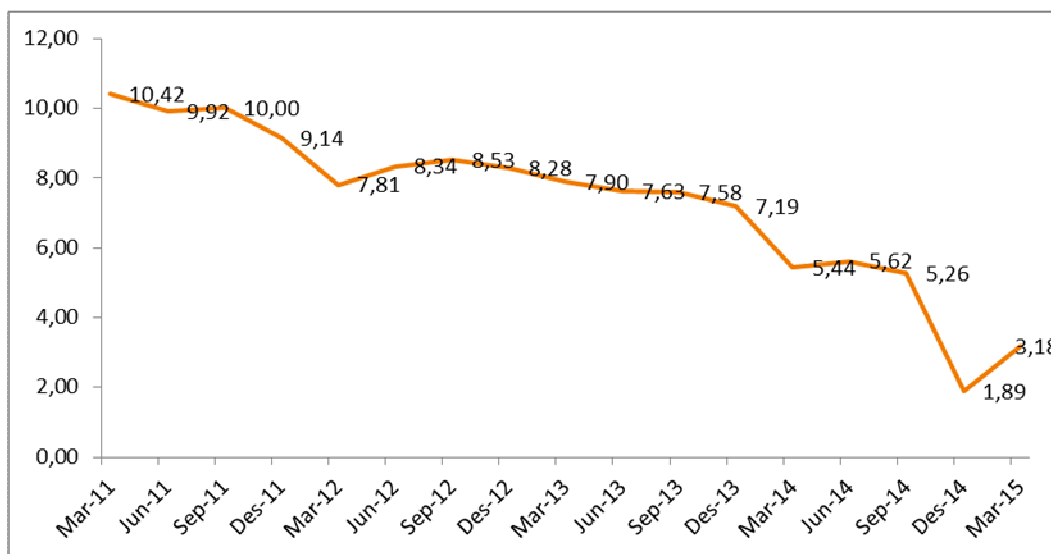

Figure 1. Bank XYZ Net Interest Margin 2011 - 2015

The significant decrease suspiciously affected by the occurrence of mergers and acquisitions. This process makes believe that the bank would be better in capital structure and business capacity, which will provide an increase in bank efficiency. Mergers and acquisitions that occur can help to observe changes that occur at level of net interest margin on Bank as well as the factors that influence it. This phenomenon pose related questions : First, how does the process of mergers and acquisitions? Second, what factors influence value of net interest margin in the period before and after process of mergers and acquisitions?

2. Literature Review
2.1 Net Interest Margin

Net interest margin is one of indicators which commonly used in monitoring bank's performance through financial statements, with this intention NIM also regularly used as a benchmark to see the efficiency of a bank in its role as a financial intermediary. The lower value of a bank NIM, then the lower the intermediation fees charged to the public. Net interest margin (NIM) by definition is the ratio between the net interest income (net interest income) to total loans (outstanding credit) Net interest income is obtained by calculating the difference between interest received from loans (interest income) at a cost the interest of the source of funds collected (interest expense). Net Interest Margin shows the bank's ability to generate income from interest by looking at the performance of banks in lending, given the bank's operating income is highly dependent on the interest margin (spread) of lending.

Net interest margin is the ratio of net interest income to average earning assets of the bank. Net interest income is the difference between interest income (interest income) to the interest expense paid (interest expense). Productive assets are taken into account is the productive assets which generate interest (interest bearing assets).

2.2. Mergers and Acquisitions

Intense competition in the Indonesian banking industry demanding bank to improve the performance so it can continue to survive on the market. According to data from the Indonesian financial services authority, in the third quarter of 2015 the number of banks operating in Indonesia is amounted to 118 banks. This number has decreased when compared to the first quarter of 2007 which is amounted to 130 banks. The decline in the number of banks illustrates the tendency of banks in Indonesia to merge in the face of market uncertainty.

Mergers and Acquisitions be solution to the bank in the midst of rapid dynamics in the market. Mukherjree et al. (2004) stated that the main motivation for mergers and acquisitions is to achieve operating synergies. This view says that most companies believe diversification is justified motive for the acquisition as a means of reduction of losses in the event of an economic downturn.

Economies of scale as the amplification of the output based on the scale of the company is one of the main arguments behind the occurrence of mergers and acquisitions (Sharma, 2009). According to (Gaughan, 2010), merger is a combination of the two companies that produce one of the merged company, while acquired firm is no longer in operation. In this condition the company that took over (acquiring firm) kept the name and identity,

and the company acquired cease its existence as an independent business entity. Generally, companies merged larger in size than the companies merged.

3. METHODOLOGY

This research is focused on study of the net interest margin using regression and time series on bank as well as observing determinant factors of value change on net interest margin. The research uses secondary data of researches between 2007 – 2015 when companies becoming public companies, through the sale of ownership to public or implementation of Initial Public Offering (IPO). The change of the bank status into public company indicating increase of customer trust to bank professionalism on community fund management that have followed by the bank efficiency. The selection of time period is aimed to provide description / illustration of the bank on the actual period

No	Type of Data	Symbol	Unit	Source of Data
1	*Net Interest Margin*	R	%	Bank XYZ Publication Report (Audited)
2	*Operational cost*	BO	*%*	Bank XYZ Publication Report (Audited)
3	*Credit Risk (Non Performing Loan)*	RK	*%*	Bank XYZ Publication Report (Audited)
4	*Bank Concentration*	KB	*%*	Publication Report of 4 Banks with highest asset (Audited), processed with CR4
5	*Gross Domestic Product Growth*	PDB	*%*	Indonesian Center of Statistical Data
6	*Inflation*	INF	*%*	Indonesian Center of Statistical Data

This research is aimed to analyze data of net interest margin of the bank uses time series data type. The availability of the net interest margin data in certain period provide opportunity for the researcher to process and determine what factors that influence value of net interest margin on bank

3.1 Descriptive Analysis

According to Bogdan and Biklen (1997), the qualitative data analysis that have been done through working with data method/approach, organizing data, separate data into manageable data unit, synthesize data, find data pattern/trend and decide which part of data that can be informed. Qualitative data analysis in this research have been done through observation and study in the form of reference of the merger and acquisition process that happening to bank XYZ. The information would be reference on making description to answer research questions.

3.2 Error Correction Model

ECM or Error Correction Model is a model that is used to correct regression equation among variables that non-stationaire individually in order to be back on it equilibrium values at the long term, with the main requirement is existence of cointegration relation within variables that composing the regression. The definition of cointegration relation could be meant as long term relation among non-stationaire variables. This model was first time introduced by Dennis Sargan and being popularized by Engle and Granger. The theory that known as Granger representation theory explains that if variable X and variable Y are cointegrated the relation between variables can be stated in the ECM.

Application of ECM by Engle and Granger is known as a two steps EG. The use of two steps words in this model is obviously based on the two stages that is done on the model estimation with residual calculation of the preliminary regression equity to further include the residual into the regression equity. Recognizing the frequent limitation found of the stationaries in the financial data, this model is being alternative solution that able to address first difference problem using general to specific approach which is from reduced form of general equation into structural equity.

In ECM, X variable and Y variable are assumed as in the stochastic process which linear combination between variables are stationary. A stochastic process could be defined as stationary if the mean value and the variants are constant along time and covarians value between two periods only depending on distance / gap between two time period and not in the actual period when the covariants is calculated. If it is assumed the variable is non stationary in level changing the form of first difference or so called degree of integration 1 I (1)

will change the variable to a stationary. The equation will no longer become spurios equation, and it can show that the two variable are cointegrated as described through ECT (error correction term). The basic model ECM is generated from the following equation

$$Y_t = \beta_0 + \beta_1 Xt + \beta_2 X_{t-1} + \mu Y_{t-1} + \varepsilon_t$$

3.3 Dummy Variable Regresion

Dummy variable regression model is model which emphasize the variables that influence dependent variable being qualitative form od data. These variable is at the existence or inexistence of attributes that indicated by I and 0 value. This research quantify data after merger as 1 value and before merger as 0. Regression model that containing dummy or qualitative variable is called by Analysis of Variance model or well known as ANOVA (Gujarati and Porter, 2013).

The use of dummy variable regression in this research is functioned to include qualitative regressor which is the impact of the merger in the form of Financial report result at point period of December 2014 and march, 2015 in this research. This model could catch the difference within response of regressant to qualitative variable variation through the financial report after merger.

3.4 Model Specification

This research is done by applying written model in the above equation (3) by Tarus and Checol (2012), in their research the model is used with aggregate data of bank in the country of research object. This research trying to apply model in bank XYZ with modification of occurring merger process, and so tre statistic model is:

$$R_t = \beta_0 + \beta_1 BO + \beta_2 RK + \beta_3 KB + \beta_4 PDB + \beta_5 INF + \beta_6 D + \varepsilon_i \tag{1}$$

R_t	= *Net Interest Margin*
BO	= Operating Cost
RK	= Credit Risk
KB	= Bank Concentration
PDB	= Gross Domestic Product
INF	= Inflation
β_0	= *Intersept*
βi	= Regression Coefficient
D	= Dummy Variabel 1= after merger point; 0 = before merger point

3.5 Model Testing
3.5.1 Test of Stationarity

Data can be said as stationary if the average value of variance did not change systematically or having a constant variant average (Nachrowi and Usman, 2006). The use of time series in this study requires the form of stationary data or we can state that if the average value and the variance of the time series data is constant. Stationarity become an important issue in time series data as it pertains to the estimation method used. The impact of stationary in this study will generate a regression model which is less from good (Nachrowi & Usman, 2006) If this is not taken into account, the impact is likely to occur apparent regression (spurious regression) A formal test known as the "Unit Root" is to anticipate this matter. The test were introduced by David Dickey and Wayne Fuller was developed with Augmented Dickey-Fuller (ADF) Test.

3.5.2 Cointegration test

Cointegration test attend to analyze the long-term relationship between the explanatory variables with the dependent variable, especially in models which contain variables that are not stationary. If the observed variables form a set of mutually cointegrated variables, the dynamic model from which to look for short- term balance is an Error Correction Model (ECM). The error correction model will be a valid model when the variables are cointegrated supported by statistically significant.Error Correction Term (ECT).

3.5.3 Classical Assumption Test

In addition to the need for stationary testing data, each estimation need to be cleaned from the basic assumption which expected. Some issues related to the classical assumption, among others, are normality, multicollinearity, heteroscedasticity, and autocorrelation.

3.6. Hypothesis testing
3.6.1. F test

This test was conducted to determine the effect of all independent variables included in the model with same dependent variable. The use of a significance level of 5 percent, the F ratio of each regression coefficient compared with the t table value. If F-rasio is greater than F-table or prob-small sig greater than α 5 percent means that each independent variable have a positive effect on the dependent variable. Or we can conclude in

this study, operating costs, credit risk, concentration of banks, the gross domestic product, and the inflation have a significantly simultaneous affect toward net interest margin.

3.6.2. T test

The T test is performed to determine the partial role of independent variable toward dependent variable to assume that other independent variables are constant. The use of significance level of 95 percent, the t value of each regression coefficient then compared with the value of t-table. If the t-value larger than t-table or prob-sig α less or equal to 5 percent, it means that each independent variables affect the dependent variable.

4. RESULTS AND ANALYSIS
4.1. Mergers and Acquisitions

PT Bank XYZ, Tbk was founded in 1906 by batik leather craft merchants in Bandung (Indonesia) and other surrounding areas, up on the initiative of three merchant who want to conduct merchant association. With the aim to deliver savings and loan financial services.. The association is also active in the Indonesian national movement as a Boedi Utomo (First political organization in Indonesia) partner who engaged in the economy sector. Bank passed its legal entity with the Statutes Government Besluit 33 on 4 October 1913. On 11 November 1955 the Indonesian Minister of Finance gave a permit to perform retroactive savings bank business in line with the enactment of Government Regulation No. 1 In 1955 the State Gazette No. 2, on Control of Credit Affairs assign all companies and entities that hold efforts to giving a credit loan but dependents with the founder is a Savings Bank.

Bank required to change the legal form from association into a limited company in line with enactment of Law No. 14 on the Indonesian Fundamentals of Banking Regulation and Implementation in Finance by ministerial decree dated December 18 1968. On June 15, 1974, the Association was formally dissolved and at the same time the Bank established as a limited company. Capital and management stewardship by MEDCO Group (a private company engaged in oil and gas as well as contractors business) sign at Bank XYZ and in July 1993 with enactment of the Banking Act No. 7/92 and based on certificate of Indonesian Minister of Finance No. Kep.067 / KM.17 / 1993, Bank XYZ started to operates as a commercial bank.

On December 15, 2006, Bank XYZ launch the company IPO (Initial Public Offering) and become listed on Jakarta Stock Exchange (JSX) in effort to enhance the company performance as well as being a trusted company by share the ownership into public. PT Bank XYZ Tbk constantly improves the company performance and services to customers as well as its capacity and professionalism of human resources by conducting training both internally and externally. the company was trying to get closer to the customer that authenticated in the form of offices expansion in several regions of Indonesia.

4.1.1. merger

The merger process of Bank XYZ is an exciting event for the stakeholder and Indonesian Banking Industries. This process associate the power of XYZ Bank in the business areas of retail banking and acquirer in the field of corporate banking. Collaborating strength of the two banks were expected to give the bank a better position to thrive in Indonesian banking Industries that grows competitively, creating strong synergies, and strengthen its capital structure.

In order to comply with the Indonesian banking regulation. Board of Directors of Bank XYZ and the Acquirer has prepared the Merger Draft which have been approved by the board of Commissioners XYZ Bank and Acquirer according to provisions in Article 123 of Indonesian Limited Company Regulation 2007.

On 22 September 2014 XYZ Bank and Acquirer announces summary of the Merger Draft to newspapers namely "Investors Daily" and "Tribun Jabar". Newspaper announcement is one of the important steps to do. aims to safeguard the interests of stakeholders, the minority shareholders, employees, creditors and business partners of the company.

In establishment of Merger Plan, the Bank who involved in the merger process should understand the potential risks that may arise. The risks include the following.
1. The potential impact of taxation as a result of the merger.
2. The risk in accordance with legislation.
3. The cost and risk of implementing integration
4. Not achieving the expected synergies
5. Loss of customers
6. The resignation of employees.

After the public announcement, the Extraordinary General Meeting Shareholders (EGM) of Bank XYZ held on 7 November 2014 to approve the Merger, Merger Plan and the deed of incorporation draft. Likewise, approval has been granted by the EGM on the acquirer bank. The implementation of a merger depends on the

approval given by the regulator. Regulators became the parties who has the authorities to assess the Bank feasibility in undertaking this process. Having the bank considered feasible, the bank will be granted a license to carry on effective date of merger. On December 30, 2014 issued an approval by Indonesian Financial Services Authority as well as the Ministry of Law and Human Rights, which became the effective date of the merger.

Next process after bank obtained the license is opertional merger. It takes synergies at operational merger in order to achieve the purpose of merger. Operating synergy is when the value and performance of the merged bank is greater than the performance of bank separately, thus allowing for banks to increase their operating income and achieve higher growth. Operational synergies on bank mergers that have different business competencies such as XYZ Bank in retail banking and acquirer bank in corporate banking is expected to occur because it is the primary key to success that one may gain a competitive advantage on the merged bank.

The operational merger process started on 1 April 2015. Ongoing operational merger officially create an impact at Bank XYZ and amend on some conditions related to

1. RTGS Code (Real-time gross settlement system), SKN Code (National Clearing System), and RMDS dealing code (Reuters Market Data System)

2. SWIFT Code (Society for Worldwide Interbank Financial Telecommunications)

3. Consolidation of the two banks Nostro accounts related to the interests of commercial and treasury transactions.

Operational Merger is an essential step to support the bank's business activities. The advantage of operational merger include:

1. The Bank will have access to cheaper source of funds due to high availability of capital and better credit rating.

2. The acquirer has the advantage in corporate financing business, especially to Korean firms in Indonesia. Meanwhile, Bank XYZ has an advantage in retail financing business, particularly to small and medium business and consumer financing. Bank XYZ will have a variety of customers and broader distribution of funds.

3. Wider network services network with 112 branch offices Bank XYZ plus 8 branch office networks of acquirer;

4. The bigger number of corporate customers and individuals;

5. Bank acquirer, has experience of more extensive risk management. This experience will be helpful in addressing various risks both associated with the Merger as well as other operational risks; and

6. Bank XYZ will also synergize IT systems by utilizing the experience of IT operations, in order to increase the efficiency and profitability of Bank XYZ

With effectiveness of merger, means the two banks had been officially merged. And as it effective Acquirer dissolved without liquidation process. Statutes Bank XYZ as the surviving bank changes as contained in Deed of Shareholder General Meeting. Board of Directors and Board of Commissioners are changing and become effective as stated in the Deed of Extraordinary General Meeting.

The dissolution of the Acquirer bank of Mergers and Acquisitions in the case of Bank XYZ commonly known as the Reverse Acquisition, where all assets and liabilities of the Azquirer will be transferred to the shareholder Bank XYZ acting as the surviving bank, with following the merger reference, Bank XYZ directly owned by the acquirer as the Ultimate and Controlling Shareholder.

4.1.2. Financial performance

Some changes can be obviously seen on the condition of Bank's financial performance in period of December 2014. This change is due to the merger that occurs in the company. The table below provides an overview of the financial performance for the period.

Table 4 Third party funds benchmark on the merger period

	September-14		December-14		Growth	
	Value	Composition	Value	Composition	Value	(%)
Demand deposit	450.089	6,49%	1.194.686	1,05%	744.597	165,43%
Saving deposit	605.634	8,74%	1.735.339	1,53%	1.129.705	186,53%
Time deposit	5.870.845	84,75%	8.373.933	74,08%	2.503.088	42,64%
CASA	15,24%		25,92%		10,68%	70,06%

On September 2014. The composition of third party funds is still dominated by time deposits with a composition of 84.76% amounting to Rp 5.87 trillion, followed by a 8.74% savings deposit amounting to Rp 605 billion and 6.5% demand deposit amounting to Rp 4.50 trillion. The ratio of funds which reflected CASA is

15.24%. In December 2014 there was an increase in CASA to 25.9%. With time deposits dominate the third party funds composition by 74.08% amounting to Rp 8.373 trillion, followed by savings deposit 15.3% in the amount of Rp 1,73 trillion and demand deposits 10.5% in the amount of Rp 1.19 trillion.

Table 5 Financial highlight on the merger period

	September-14	December-14	Growth	
	Value	Value	Value	(%)
Asset	8.289.330	16.432.776	8.143.446	98,24%
Net Profit after tax	21.380	138.073	116.693	545,80%
Core Capital	471.425	2.278.625	1.807.200	383,35%
Total Equity	772.824	4.132.218	3.359.394	81,30%
CAR	11,45	27,91	16,46	143,76%
NPL net	2,21	1,81	-0,40	-18,10%
ROA	0,44	2,81	2,37	538,64%
ROE	5,69	8,35	2,66	46,75%
NIM	5,26	1,89	-3,37	-64,07%
Operating Cost/Income Ratio	96,79	56,04	-40,75	-42,10%
LDR	94,18	101,20	7,02	7,45%

There was a significant increase in bank asset reaching to 98.24% in amount of Rp 16.43 trillion in December 2014 from Rp 8.28 trillion in September 2014. The increase occurred because all assets of the acquirer at effective date of the merger were transfered to bank XYZ as the surviving entity. These enhancements strengthen the position of Bank XYZ on the banking industry in Indonesia. The greater the total assets can certainly encourage the business capacity of the banks to be able to generate a bigger profit.

Bank's net profit increased to Rp 116.69 billion in December 2014. An increase of 545.8% from Rp 21.38 billion in September 2014. The increase in net income pushed to increase the return on assets (ROA) and return on equity ratio (ROE). ROA increased to 2.81% in December 2014 from 0.44% in September 2014. The value of ROE increased to 8,35% in December of 2014 from 5.69% in September 2014.

Capital adequacy aspects maintained properly reflected in the value of CAR above 8% with the provisions of Bank Indonesia. Values of CAR increased to 27.91% in December 2014, an increase of 11.45% in September of 2014. This increase is due to additions to the bank's capital. Capital increase occurred as the purchase of shares of Bank XYZ.

There is an increase in equity reaching to Rp 4.13 trillion in December 2014 from Rp 772.8 billion in September 2014. This increase is a result directly from the addition of issued and paid up capital of Bank XYZ shares which is arising from the conversion. The additional capital to improve the position of Bank XYZ becomes BUKU 2.

BUKU (Bank Umum Kegiatan Usaha) is is a commercial bank grouping system on business activity adjusted by core capital owned. This grouping is regulated in Bank Indonesia Regulation Number 14/26 / PBI / 2012 dated 27 December 2012 on Business Operations and Office Network Based on Core Capital Bank.

Based on the regulation, Bank divided into 4 group, namely:

a. BUKU 1 is a bank with core capital to less than 1,000,000,000,000.00 (one trillion Rupiah)

b. BUKU 2 is a bank with core capital of at least 1,000,000,000,000.00 (one trillion Rupiah) to less than Rp5.000.000.000.000,00 (five trillion Rupiah)

c. BUKU 3 is a bank with core capital of at least Rp5.000.000.000.000,00 (five trillion Rupiah) to less than Rp30.000.000.000.000,00 (thirty triliun Rupiah)

d. BUKU 4 is a bank with core capital of at least Rp30.000.000.000.000,00 (thirty trillion Rupiah).

The increase in the Bank's position based on BUKU classification giving some advantage. This because in the classification, Bank with greater core capital is considered more stable in course of its business to be given within the scope of more complex business activities. Scope of business activities that may be conducted by Bank XYZ in BUKU 2 is the obtaining of operations permits in rupiah and foreign currency which includes funding activities, loan distribution activities with wider coverage, trade financing, limited treasury based activities, system activities payment and electronic banking with a broader scope, agency activities and cooperation with broader scope and provision of other services. Bank can also do activities such as equity capital inclusion on financial institutions in Indonesia with temporary investment in resuing financing. The

improvement of Bank XYZ position will provide flexibility in business activities which are intended for the Bank BUKU 2.

4.2. Factors Affecting the NIM

Factors influencing value of net interest margin on Bank XYZ can be explained statistically on the model of ECM (Error Correction Model) that introduced by Engle-Granger. This model requires two steps which need to be done so that the model is often known as the two steps EG. First step is to calculate the residual value of the initial regression equation. The second stage is to include residual from the first step in the regression.

The advantages of this mechanism is the model capable to correct a state of imbalance (disequilibrium) through short-term relationships and long-term model which can be seen on the error correction coefficients. Statistical test in terms of fulfilling the classical econometric assumptions also conducted to identify the estimate model is BLUE (Best Linear Unbiased Estimator) by performing classical assumption in regression models. The assumption made by testing autocorrelation, heteroscedasticity, multicollinearity and normality. Fulfillment of classical assumption is intended so interpretation of the results can be well trusted.

4.2.1. Classical Assumption
Autocorrelation Test

Autocorrelation Tests conducted to determine the correlation on a series of observations in time series. Tests on the research conducted by the LM test (Lagrange Multiple test) introduced by Breusch-Godfrey. Serial correlation will lead increasingly wide confidence interval on the model. So it would be obtained higher residual variance than it should be.

Table 6 Autocorrelation Test

P-Value Obs* R-Squared	Result
0,078	No Autocorrelation

LM tests results conducted scored probability of Obs * R-squared greater than 0.05 equal to 0.078 which can be seen in Table 7 Autocorrelation test. This means there is no problems in autocorrelation at a critical point of 5%.

Multicollinearity Test

To meet the criteria for initiation of model with the Best Linear Unbiased Estimation is necessary to fulfill the terms of classical assumptions. Multicollinearity testing could detect the linear relationship between the independent variables in the model. This relationship is reflected in the higher degree of correlation in the model.

Multicollinearity can be determined by the value of correlation between independent variables that is more than 0.8. This means, if the correlation value is at the point it can be declared as research model is free from multicolinearity. Multicolinearity test results can be seen through the correlation matrix presented in table Correlation Matrix.

Table 7 Correlation Matrix

	R	BO	RK	KB	PDB	INF	M	ET
R	1.000000	0.035804	-0.718555	0.414471	-0.095620	0.114045	-0.729208	0.357179
BO	0.035804	1.000000	0.054227	-0.139353	0.145027	-0.027500	-0.488862	8.18E-14
RK	-0.718555	0.054227	1.000000	-0.651394	0.140492	-0.006285	0.363027	1.15E-14
KB	0.414471	-0.139353	-0.651394	1.000000	-0.484920	-0.226730	-0.266144	-2.06E-14
PDB	-0.095620	0.145027	0.140492	-0.484920	1.000000	-0.043622	0.158325	1.82E-15
INF	0.114045	-0.027500	-0.006285	-0.226730	-0.043622	1.000000	0.085701	7.95E-16
M	-0.729208	-0.488862	0.363027	-0.266144	0.158325	0.085701	1.000000	6.61E-16
ET	0.357179	8.18E-14	1.15E-14	-2.06E-14	1.82E-15	7.95E-16	6.61E-16	1.000000

The table shows results that correlation between independent variables is at value below 0.8. The value indicates that there is no excessive correlation between independent variables and the results can be stated that the study was free of multicolinearity.

Multicolinearity problem becomes one aspect that needs serious attention because this study examines the relationship between independent variables and dependent variable. If the standard deviation coefficient is not significant it will be difficult to separate the effect of each independent variable.

Heteroscedasticity test

This test aims to determine the presence of heteroscedasticity symptoms on research. heteroscedasticity is inequality in variants of residuals for all observations on the regression model. A good regression model is a model which is homoscedasticity. Heteroscedasticity occurrence will cause the variant not to constant so that it can cause the standard error to be biased and untrustworthy.

This study uses White test methods. The test results is conditional mean squared residual equation with white test obtained value of X^2 (Obs R-squared value) > (X^2 table) at 5% confidence interval is shown in table below.

Table 8 Heteroscedasticity White

P-Value Obs* *R-Squared*	Result
0,0887	homoscedasticity

These results indicate p-value of 0.0887 which is greater than 0.05, which means the estimation is not significant and the model tested at the significance level of 5% has a homoscedasticity variance, means this research model pass the heteroscedasticity test.

Normality test

Normality test is a test to determine whether the data is normally distributed so the data can be used in parametric statistics. The reason of why the normality assumption required in many situations, is because the procedure is based on the distributions derived from the normal distribution. One of the ways used to test normality is Jarque-Bera test, this test measures the skewness and kurtosis in accordance with the normal distribution. In its application, the value of the Jarque-Bera is compared with value of Chi-Square Table on the degree of 2. Jarque-Bera test results shown in the table below.
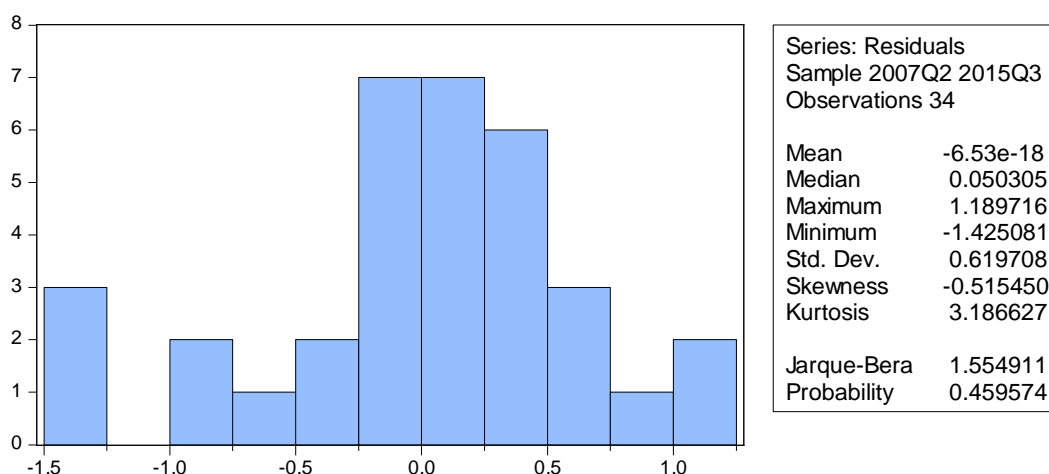

Figure 2 Normality test

The test results for normality in this research get a probability value of 0.459 in Jarque-Bera, this value is greater than α = 5% and indicates the data in this study has to be normally distributed.

4.2.2. Test and result analysis of ECM

Stationarity testing

Research with time series data requires a pre estimation testing. One of the test is stationary test. This test is the first step to specify model of determinant net interest margin. Stationary data is a constant value of average

and variance in the data. Generally, time series data in the financial sphere tend to be non-stationary. The study involved some financial data, therefore the first phase need to be done in this study is testing the stationary data.

Stationarity test data is done by a formal test known as Augmented Dickey-Fuller test. This test able to detect unit root in the data, which means the data are nonstationary in level as well as see whether a variable can be stationary on the next order which is in the 1st Difference. Table below shows the results Stationarity Tests conducted on the variables used in this study.

Table 9 Stationarity test augmented Dickey-fuller

Variable	Level		1st Difference	
	P-Value	Result	P-Value	Result
R	0,1478	Non Stationary	0.0000	Stationary
BO	0,5681	Non Stationary	0.0000	Stationary
RK	0,7769	Non Stationary	0.0000	Stationary
KB	0,2920	Non Stationary	0.0000	Stationary
PDB	0,9030	Non Stationary	0.0000	Stationary
Inflation	0,1189	Non Stationary	0.0001	Stationary

From the ADF test results presented in the table. P-value of the net interest margin amounted to 0.1478 which is greater than the critical point of 0.05. This condition indicates that the variable contains a unit root. in other words, the data is not stationary at level. Meanwhile ADF test results show the p-value of 0.00 which is smaller than critical point of 0.05 which means the data is stationary on the 1st difference.

Operational costs variable is at the level of p-value 0.5681 greater than the critical point of 0.05% in the level or in other words the operational costs variable are non-stationary in level. Meanwhile ADF test showed p-value of 0.00 which is smaller from a critical point of 0.05 this means operational cost is stationary on 1st difference.

ADF test for credit risk indicate p-value of 0.7769. The values greater than the critical point of 0.05 which is indicates that the variable contains a unit root or in other words the data is not stationary at level. Meanwhile on 1st ADF test results show the difference p-value of 0.00 which is smaller than the critical point of 0.05. which means credit risk variables stationary at 1st difference

Tests conducted at concentrations bank variable gives results in a p-value of 0.2920. The results of the ADF test is greater than the critical point of 0.05 which is indicates that variable contains a unit root or in other words, the data is not stationary at level. Meanwhile on 1st ADF test results show the difference p-value of 0.00 is smaller than the critical point of 0.05. which means the 1st difference bank concentration variable is stationary.

Gross domestic product variable shows the p-value of 0.7769 to the ADF test. This value is greater than critical point of 0.05 means that the variable contains a unit root or in other words the data are nonstationary in levels. Meanwhile ADF test results show the p-value of 0.00 is smaller than the critical point of 0.05 on the 1st difference. which means that the gross domestic product stationary in 1st difference.

ADF test for inflation showed p-value of 0.1189. This value is greater than the critical point of 0.05 means that the variable contains a unit root and the data are nonstationary in levels. ADF test results show the p-value of 0.00 is smaller than the critical point of 0.05 on the 1st difference. which means that the variable inflation is stationary in 1st difference.

The stationary tests that performed on independent and dependent variables in the regression equation indicates that null hypothesis of unit root can not be rejected it means that all variables in the regression equation are nonstationary in levels. But after differentiated test results showed that all variables are stationary at 1st diffference. The variables are more likely founded in to a cointegration relationship. If the data is not stationary but shows cointegration relationship, there is a long-term relationship or balance between variables. We can conlude that there is possible short-term imbalances and it is necessary to perform corrections with ECM (error correction model)

Cointegration testing

The results of the stationary test states that all variables are non-stationary in level but stationary on the 1st differences. The next step needs to be done is to find a cointegration relationship beetween regression variables. To determine the cointegration relationship in the model we need to process ADF test on the residual (error term) from the regression model.

Table 10 Cointegration test

Null Hypothesis: ET has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.579898	0.0008
Test critical values:	1% level	-2.634731	
	5% level	-1.951000	
	10% level	-1.610907	

*MacKinnon (1996) one-sided p-values.

The test results show that the data residuals (error term) is stationary. Residual data which is stationary means that there is a cointegration relationship in the independent variables consisting of operating costs, credit risk, concentration of banks, gross domestic product, inflation and merger toward net interest margin. The concept of cointegration is clearly an important theory to ECM. Cointegration relationship indicates that ECM can be applied in this model. ECM equation on net interest margin determinant Bank XYZ case study are as follows

$\Delta Rt = \beta 0 + \beta 1 \Delta BO + \beta 2 \Delta RK + \beta 3 \Delta KB + \beta 4 \Delta GDP + \beta 5 \Delta + INF + \beta 6M + \beta 7ECT + \varepsilon i$

Regression and Analysis of Results of ECM

The regression model is to determine how much the variable operating costs, credit risk, concentration of banks, gross domestic product, inflation and merger affect to net interest margin.

The specification generate the following equation

$dR_t = - 0{,}07\ dBO - 1{,}27\ dRK + 0{,}15\ dKB + 0{,}11\ dPDB + 0{,}17\ dINF - 6{,}61\ dDM - 0{,}41ECT$

The variables that statistically having significant effect on the net interest margin are operating cost, credit risk and merger. All three of these variables have an influence on a significance level of five percent. Another variable that also has an influence on the net interest margin is the gross domestic product and inflation with the level of significance at ten percent. While the variable concentration of banks found to have no significant effect on the net interest margin.

R-square value obtained equal to 62.6%, which means that in amounted to 62.6% of the variation in the growth of net interest margin can be explained by the variable operating costs, credit risk, concentration of banks, the gross domestic product, inflation and merger in the model. The remaining portion of 37.4% can be explained by variables outside the model.

Table 11 long run & Short run coeficient

Variable	Regression coeficient			
	Short run	-value	Short run	-value
Operational cost	0,070	,008	0,113	,000
Credit Risk	1,278	,017	2,206	,000
Bank Concentration	,150	,248	0,075	,726
Gross Domestic Product	,116	,058	,154	,142
Inflation	,171	,070	,199	,034
Error correction term	0,419	,004		

Significantly negative correlation founded in this regression equation. Improvement of operational costs of is accompanied by impairment of net interest margin in the period of merger. These results are consistent with research Manurung (2013) that operating costs had a negative correlation with the net interest margin. This case can occur in the banking market with a high level of competition. The high competition in banking can narrow the value of net interest margin (Kamarizah 2012) it will be difficult for banks to charge fees to the customer by imposing interest rates in the form of a large margin. Imposition of a large margin on the client can lead customers to switch to competitor bank.

Credit risk variables affect the net interest margin negatively significant. This finding is consistent with Manurung (2013) research that credit risk increase giving impact on the value of net interest margin. A rational explanation in this case is the need to increase of bank loan makes the bank creating a portfolio that tend to be risky, but on the other hand the bank does not have the ability to compensate for the high default risk of loan through interest charges on customers.

The result found that concentration of bank have a positive effect on net interest margin. test results are greater than critical point so it is concluded to be a significant effect. The high competition in the Indonesian banking industry leads in a more concentrated market. Once the market becomes more concentrated bank will have the power to regulate and improve profit margins.

Gross Domestic Product became one of the most important variables that affect the net interest margin. These variables can influence the demand and supply of financial services which offered by banks. The influence of gross domestic product toward net interest margin was found at a significance level of ten percent positively. Possible explanation in this case study is the increase in gross domestic product was the cause of the high demand for and supply of financial services that make banks were able to widen the margin as an action to increase profits.

On the macroeconomic variables result found that inflation were positively affecting on net interest margin. These results are not significant because the test result is above the critical point. In line with the research Nassar (2014) Explanation on this positive relationship is a low inflation rate gives an opportunity to the bank to interest rate in accordance with the risk and improve efficiency in the allocation of resources through the narrowing in the interest margin of the bank.

Merger that happens to Bank XYZ have a significant effect on the value of net interest margin negatively. This means that with merger, the value of the Bank's net interest margin decreased. Explanations on the positive correlation is the merger giving serious effect in implementation of the bank's management efficiency. Efficiency with optimum resource allocation will be reflected in a lower margin charged to customers.

Error correction term ECT coefficient has a statistically significant effect toward net interest margin. This means that the net interest margin adjusting to the operating costs, credit risk, concentration of banks, gross domestic product, inflation and mergers that are independent variables with lag and has a difference of forty-one percent. Expected error correction coefficient is always negative to make the value of the net interest margin in regression model back to the equilibrium level.

Managerial Implications

Improvement to performance of the Bank XYZ needs to be done through the policy making refer to operational costs and credit risks that shown as factors affecting NIM. The policy is implemented through the review of credit risk indicators as well as assessment of operational costs that burden the company. Results from analysis of determinants of net interest margin case study at Bank XYZ can formulate managerial implication that serves to facilitate the application of research for the benefit of interested parties.

Credit Risk review improvement to NIM

Credit Risk loans as reflected by value of non-performing loans at Bank XYZ is caused by factors that divided into internal and external factors Bank XYZ. Internal factors triggered by the inability to conduct an assessment of risk management to customers accurately. While external factors caused by the change of management power in the face of economic conditions and bad faith of the customer.

Policies that should be taken from the internal side of the company is to increase the competence of human resources associated with the credit risk management process to potential customers. This can be done through provision of training on a regular basis so that Bank XYZ human resource able to understand customer profile carefully and apply the principle of prudence better. Particularly necessary training that cater to the account officer (AO), which acts as a representation company in the context of granting loan to concerned customers. Besides AO the training also needs to be given to employees that involved in credit committee because the committee is in charge to give approval to the loan application.

On the external side, the regulator should be involved in making provisions to address loans problem through the issuance of PBI in September 2008 (Central Bank of Indonesia Regulation). The point of the regulation is in dealing with loans problem, Banks need to do three attempts namely Rescheduling, Reconditioning as well as the Restructuring.

Assessing Corporate Operational Costs

The more efficient the operations performed, the greater the profit gained. In controlling the amount of operating costs, Bank XYZ needs to look at some of the exposures that involved. Among the most dominant is the high labor costs that weigh on the company. It can be anticipated by reducing labor required. This step will improve the branch offices with a low level of profitability at Bank XYZ by improving the efficiency of human

resources, or other possible alternative is to anticipate through improved selection of human resources in hiring employees. Better recruitment process will reduce the number of human resources with a lower performance so there is no need for staff reductions in the long term.

5. Conclusion

1. The process of mergers and acquisitions at XYZ Bank took place with formation of the merger draft, legal merger and operational merger. The sustainability of this process was officially marked with permission given by the Indonesian Financial Services Authority and the Ministry of Justice and Human Rights on 30 December 2014 which is became the effective date of the merger. Mergers process in the bank able to make an impact with form of increase in the bank's financial performance.

2. Application of ECM (error correction model) can be used for determining the relevant factors affecting on net interest margin at XYZ Bank. It is found that the operational cost is being factor which explain the value of net interest margin with long-term elasticity, response is negative and significant. Subsequent findings of this study are Credit risk also significantly affect the net interest margin to a negative response. Furthermore, merger also be the factors which significantly affect net interest margin, in case of Bank XYZ Merger could push down value of net interest margin.

Recommendation

1. We recommend further research to determine factors affecting net interest margin. To enhance the yield on these observations, further research expected to respond the limitations for actual time period of observation with a longer period after the merger. The longer period of study is expected to deliver better results in accordance with prevailing theory.

2. The equation in this study has a variable outside the model that may affect the value of the net interest margin. Future studies should build models with other variables that affecting net interest margin. Diversity of variable will enrich information to the determinants of net interest margin.

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