THE RISK-TAKING BEHAVIOUR OF INDONESIAN BANKS USING SCP PARADIGM

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ABSTRACT

Bank has the main function as an intermediation institution, whose role is transferring funds from those who has excess in it to those who need it. Banks also have an objective in maximizing profit. Therefore, the rules and executions of bank's risk management are based on the balancing of maximization of profit and the minimization of risks that comes with this profit maximization activity. This paper is aiming at finding the factors that determine the risk-taking behaviour of Indonesian banks, using the Structure Conduct and Performance (SCP) paradigm. According to this paradigm, bank's decision making (its conducts) is influenced by the dynamic of its structure, and the level of performance it wants to achieve. Also, these conducts or decisions reflect bank's risk preference, or its risk-taking behaviour. Using 2 Stage Least Square regression method, this paper finds that there are seven factors that determine bank's risk-taking behaviour in Indonesia. These factors are the Capital Adequacy Ratio (CAR) level, the amount of capital, the expectation on profit, the expectation on inefficiency, industry concentration ratio, the level of bank's importance in Indonesia's economy, and the movement of Bank Indonesia's rate.

Keywords: Banking risk, bank's risk-taking behavior, banking risk management.

ABSTRAK

Bank memiliki fungsi utama sebagai lembaga intermediasi. Kegiatan intermediasi perbankan meliputi penyaluran dana dari pihak yang memiliki kelebihan dana kepada pihak yang membutuhkan dana. Di samping itu, bank memiliki tujuan memaksimalkan profit*. Maka, kebijakan dan pelaksanaan manajemen risiko perbankan dilaksanakan dengan menjaga keseimbangan antara memaksimalkan* return *atau* profit *dengan meminimalkan risiko yang timbul dari kegiatan maksimalisasi profit tersebut. Penelitian ini bertujuan mengetahui faktor-faktor yang mempengaruhi keberanian mengambil risiko yang dilakukan oleh perbankan di Indonesia, dengan menggunakan paradigma* Structure, Conduct dan Performance (SCP)*. Berdasarkan paradigma* SCP, *keputusan-keputusan* (conduct) *mengenai seberapa banyak dana yang disimpan dan disalurkan oleh bank akan dipengaruhi oleh keadaan* (structure) *industrinya, serta performance yang diharapkan akan dicapai. Keputusan-keputusan yang diambil bank ini juga mencerminkan seberapa berani bank tersebut dalam mengambil risiko. Dengan menggunakan metode regresi 2* Stage Least Square*, penelitian ini menemukan bahwa terdapat tujuh faktor yang mempengaruhi keberanian mengambil risiko oleh perbankan di Indonesia. Faktor-faktor tersebut adalah tingkat* Capital Adequacy *Ratio (CAR), jumlah modal, ekspektasi* profit*, ekspektasi inefisiensi, tingkat konsentrasi industri, pentingnya peran bank dalam perekonomian, serta perubahan suku bunga Bank Indonesia.*

Kata kunci: Risiko perbankan, bank's risk-taking behavior, *manajemen risiko perbankan.*

1.   RESEARCH BACKGROUND

Bank risk is defined as an uncertainty that cause a deviation in profits or losses. Bank Indonesia through *Peraturan Bank Indonesia (PBI) Nomor 5/8/PBI/2003* about *Penerapan*

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Manajemen Risiko bagi Bank Umum defines bank's risk as a potential of an event, which can lead to bank's loss, to occur. Another definition of bank's risk, according to Bank Indonesia, is a series of procedure and methodology that used to identify, measure, monitor, and control the risk that comes from bank's activity.

Bank has the main function as an intermediate institution whose role is transferring funds from those who has excess fund to whom who need fund, as well as participating in money market transaction. The main objective of a bank is maximizing profit (Santomero, 1988). In conjunction with this objective, the rules and executions of bank's risk management is based on the balance of risk and return profile of bank's portfolio (Bessis, 2011).

Of all the risks that emerge from bank's activities, the biggest exposure is coming from its intermediation activity (Matthews and Thompson, 2005). Those risks are credit risk, market risk, and liquidity risk. This paper uses only market risk and credit risk, the two biggest exposures of risks that bank faces. The higher the risk exposure that bank is facing as a result of its activity, the more risk-taker the bank become. In other words, the increasing of risk-taking behaviour (this term will be used frequently in this paper), the more risk-taker a bank is said. When a bank becomes an excessive risk-taker, it increases its potential failure, which will enhance the probability of systemic risk.

Bank's risk attitude is reflected in how it manages its asset and liability, or so-called the Asset and Liability Management (ALM). The composition of assets and liabilities on bank's balance sheet reflects bank's risk preference, or its risk-taking behavior. For example, when a bank prefers more loans than any other form of assets, that bank is said of having tendency towards risky behavior than a bank that prefers more government securities, and vice versa. Another example of bank with lower risk-taking behavior is a bank that prefers taking liability in the form of deposit, which carry out a relatively low risk than any other form of liabilities such as saving and giro.

Limited amount of research about bank's risk-taking behaviour in Indonesia has been encouraging the writer to find the factors which affect the Indonesian's bank risk-taking behaviour. Moreover, it is the writer's expectation that those factors could assist the regulators in issuing policies targeting the excessive risk-taking behaviour of banks that can lead to economic failure and systemic risk.

2. LITERATURE REVIEW

A lot of research has been done, internationally, regarding the factors that influence bank's risk-taking behaviour. Borio and Zhu (2012) and Altunbas *et al.* (2011) concluded that monetary policy, which is represented by increasing and decreasing interest rate, has a negative effect on bank's risk-taking behavior. Decreasing interest rate, also known as loose monetary policy, leads to increasing bank's risk-taking behaviour, and vice versa. Another research which also pointed out the negative effect of monetary policy on bank's risk taking behaviour is done by Delis *et al.* (2012). According to Delis *et al.*, this negative effect only happen in the long term, while in short term, the effect is positive. Delis and Kouretas (2011) has also discovered this negative effect of monetary policy on bank's risk-taking behaviour, while they also found that this effect is stronger in banks with higher off-balance transaction volume, and this effect is weaker in banks with relatively high level of capital. Furthermore, Koehn and Santomero (1980) which investigated the risk-taking behaviour of American banks, found the positive relationship between the capital regulation or Capital Adequacy Ratio (CAR) and bank's risk-taking behaviour. Bank with higher CAR is found to be more of a risk-taker through asset diversification. Laeven and Levine (2009), who investigated the relationship between CAR and the risk-taking behaviour of European banks in 38 countries, has found that this relationship is,
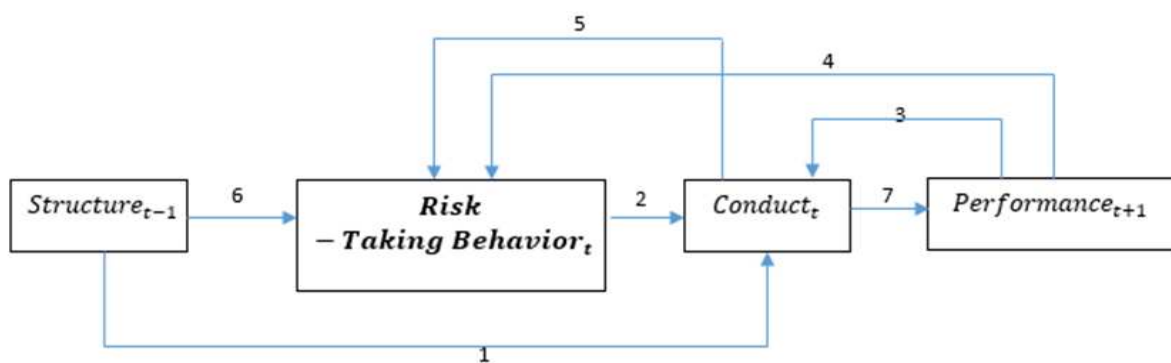
indeed, determined by another factor, the bank's ownership structure. On the contrary, Sheldon (1996) who assessing 219 banks on G10 countries, has found that the CAR, in fact, has a negative influence on bank's risk-taking behaviour. All of those research emphasized the ambiguous effect of capital regulation on bank's risk-taking behaviour.

Boyd and de Nicolo (2005) found the positive relationship between concentration of banking industry and bank's risk-taking behaviour. The relationship is found to be positive, with probability of default is used as the indicator of bank's risk-taking behaviour. They also found that bank's risk-taking behaviour is influenced by the change in Gross Domestic Product or GDP level, this influence is found to be positive. In good economic condition (relatively high GDP level), bank is taking more risk. This result is also backed by Delis and Kouretas (2011). However, Altunbas *et al.* (2011) found quite the opposite result. The rising in economic condition is inducingmore opportunity of profit in business activity, therefore lower the credit risk exposure (Altunbas *et al.*, 2011).

3. THEORITICAL BACKGROUND

This research is aiming at finding the factors that cause the change in Indonesian's bank risk-taking behaviour, with the use of the SCP (Structure, Conduct and Performance) paradigm. According to this paradigm, the conducts of a bank is affected by the dynamic of its structure and the level of performance it wants to achieve. On the other hand, these conducts reflect its risk-taking behaviour. In other words, bank's risk taking behaviour is influenced by its conduct. Since bank's conduct is determined by its structure and its performance, it can be concluded that bank's risk-taking behaviour is also determined by its structure and its performance.

Picture 1. Bank's Risk-Taking Behavior in SCP Paradigm

In Picture 1, a bank's conduct is considered as a reaction to the changes that happen in its surrounding, or its structure. In other words, the dynamic of banks surrounding or its structure could change bank's conducts (arrow 1). It has also been explained above that the conduct of a bank reflects its risk-taking behaviour (arrow 5). This relationship also works another way, that is, the risk taking behaviour of banks also could affects its future conducts (arrow 2). The conduct that taken by the banks affect its performance (arrow 7), and banks expectation of performance affect its conduct as well (arrow 3).

From Picture 1, it can be summarized that bank's conduct is affected by its structure and its expected performance. Since the bank's conduct is also the reflection of its risk-taking behaviour, so its risk taking behaviour is also affected by banks structure and its expectation of performance as well. This relationship is shown with arrow 6 and arrow 4, respectively.

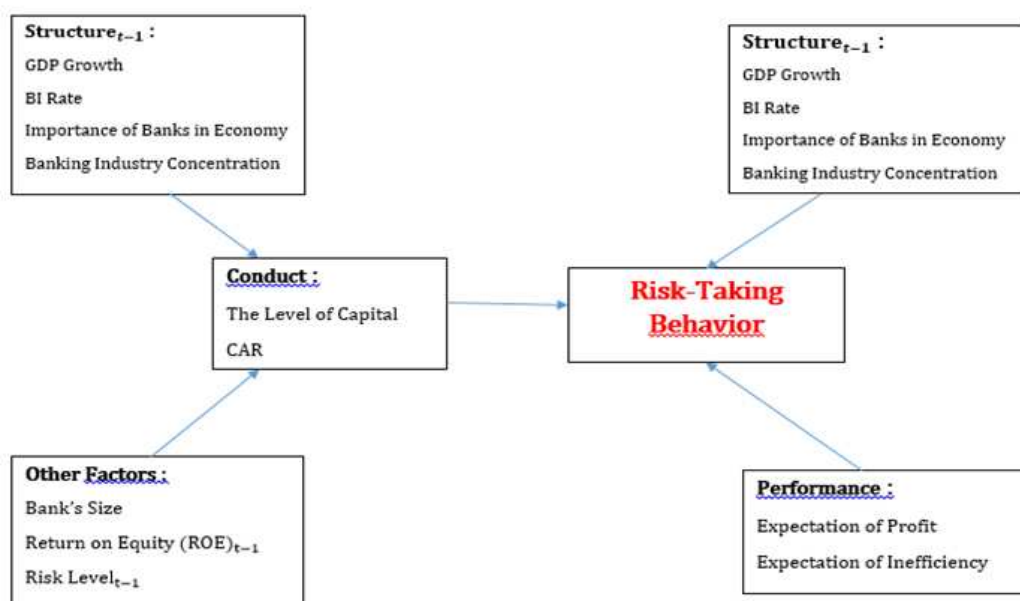### 3.1. The Structure, Conducts and Performance of Indonesian Banks

The structure of Indonesian banks is influenced by deregulation, regulation, innovation, and macroeconomic condition. Deregulation shortens the gap between bank and non-bank institution, which lead to tighter competition. Deregulation allows non-bank institutions to take over some of banks main responsibility in the Indonesian economy, that is, the role of credit provider. Non-bank institutions are also allowed to issue leasing, insurance and offer investment opportunities. Furthermore, deregulation also allows banks to expand abroad more freely, as well as loosen the requirements for mergers and acquisitions. Therefore, deregulation has not only strengthens the competition, but also limits bank's importance in economy.

Banks regulation has a main function of protecting consumer from loss due to bank's increasing risk exposure. One of the regulations that aims to strengthen banks capital back up in order to prevent systemic risk is Capital Adequacy Ratio or CAR regulation. Referring to Basel Regulation, Bank Indonesia states the minimum CAR level for Indonesian Bank is 8 % (Bank Indonesia, 2013). Aside from CAR regulation, the central bank's role in managing the money circulation through the change of interest rate (in this case, the Bank Indonesia's rate) also considered as an important factor affecting Indonesia's banking structure.

Financial innovation term is used to describe any change in the scale, scope and delivery of financial services (Matthew and Thompson, 2005). Financial innovation could be affected by economic condition, regulation and deregulation, and technological improvement. In financial activity, technological improvement has given opportunity for hedging activity as well as the use of low cost transaction equipment such as credit card, debit card, ATM, and so on. Innovation enhances competition, which leads to the decreasing of banking profit and the rising of bank's inefficiency level.

Macroeconomic condition has been considered as one of the main variable of banking structure. Delis and Kouretas (2011) use the growth rate of GDP as the indicator for macroeconomic performance. All of those deregulation, regulation, innovation and macroeconomic condition that influence the banking structure, finally affect each bank's conduct, which is represented by its level of CAR and its level of capital. These conducts, as explained in previous section, lead to the change in banks performance, which is indicated by the level of profitability and the level of inefficiency.

Picture 2. The Indonesian Banks Risk-Taking Behaviour in SCP Paradigm

Picture 2 illustrates the Indonesian bank's risk-taking behaviour in Structure, Conduct and Performance (SCP) paradigm. From picture 2, we can conclude that the structure of Indonesian banking is influenced by:

1. Macroeconomic condition, indicated by GDP growth rate
2. Deregulation in the facilities for mergers and acquisitions, which imply on the change in banking industry's concentration rate
3. Deregulation in the allowance of non-bank institution to take over some of the bank's role in economy, which affect the degree of the importance of banks in economy
4. Banking regulation, as indicated by the level of BI rate

As mentioned above, macroeconomic condition as well as deregulations and regulations affect bank risk-taking behaviour. The bank's risk-taking behaviour is reflected in its conduct, that is,*the level of CAR* and the level of *capital*. Previous research done by Atici and Gursoy (2011) showed that the level of capital and CAR that bank's choose to hold is, in fact, affected by two other factors ; the level of ROE (Return on Equity) of the previous period and the level of risk exposure of the previous period. Those conducts, the CAR and the level of capital, are finally aiming at reaching the expected performance, that is, the level of profit and the level of inefficiency.

3.2. Research Hypothesis

Based on the background theory explained earlier on, the hypotheses of this research are:

1. Interest rate (or BI Rate), importance of banks, and expected inefficiency level affect the bank's risk taking behaviour negatively. These three coefficients are represented with α_i. The operational hypothesis are : H0 : $\alpha_i \geq 0$ dan H1 : $\alpha_i < 0$
2. CAR level hold by banks, the level of capital, banking industry concentration, GDP growth and expected profitability affect the bank's risk-taking behaviour, both positively or negatively. That being said, the operational hypothesis are : H0 : $\beta_i = 0$ dan H1 : $\beta_i \neq 0$

4. RESEARCH METHOD

4.1. Research Variables

The dependent variable is bank's risk-taking behaviour. As explained above, how bank is behaving regarding its risk is reflected in the composition of bank's balance sheet. Bank with more risky asset and liabilities is considered more risk takers. The bigger the level of risky asset, the more risky its behaviour is. Regarding that reason, risky asset is used as the indicator for bank's risk taking behaviour. This indicator is also used in previous research by Delis and Kouretas (2011) in their paper which examines the effect of central banks rate on the US bank's risk-taking behaviour.

To separate the two biggest risks that bank is facing, the market risk and the credit risk, the risky asset indicator is split into two indicators, risky asset for market risk (denoted as *Riskpasar*) and risky asset for credit risk (denoted as *Riskkredit*). Risky asset for market risk, or Riskpasar, is calculated as the total market risk-weighted asset divided by total asset. The same goes for Riskkredit, which is total credit risk-weighted asset divided by total asset. Furthermore, the probability of default, which is indicated by Z-Score, is also used to measure bank's risk-taking behaviour (Delis *et al*., 2012; Konishi and Yasuda, 2004; Laeven and Levine, 2009). The Z-Score is calculated as follows:

$$Z - score_{i,t} = \frac{ROA_{it} + CAP_{it}}{SDROA_i}$$

Where ROA is Return on Asset, CAP is the ratio of capital to total asset, and SDROA is the standard deviation of ROA. The Z-Score measures bank's probability of default. The higher the deviation of profit or ROA, the lower the Z-Score, then the more likely the bank becomes default. In other words, the higher the Z-Score, the lower the probability of default, vice versa.

Table 1. Variables Represents Structure, Conducts and Performance of Indonesian Banks

Structure	Conduct	Performance
GDP Growth	CAR	Expected Profit
Concentration of Industry	The Level of Capital	Expected Ineficiency
Importance of banks		
Interest Rate		

Table 1. presents the variables representing Structure, Conducts, and Performance of Indonesian banks. Aside from all variables listed in Table 1, there are variables that also affect the bank's conducts, or, affect the bank's CAR and level of capital. Those variables are known as *instrumental variables*. Those variables are:

1. The level of GDP Growth of the previous period
2. Concentration of industry of the previous period
3. The importance of banks of the previous period
4. The interest rate of the previous period
5. Bank's size
6. The level of ROE of the previous period
7. The level of risk of the previous period

All of the variables can be classified into 3 categories; dependent variables, independent variables, and instrumental variables.

1. Dependent variable

   The bank's risk-taking behaviour as dependent variable isproxied with risky asset for market risk, denoted as *Riskpasar*, risky asset for credit risk, denoted as *Riskkredit*, and the Z-Score.

2. Independent Variables

   Independent variables used in this research are:

   a. Importance of banks (IMPORT), measured as the ratio of total loan made by commercial banks and Bank Perkreditan Rakyat (BPR) in rupiah and foreign currency, and the total Gross Domestic Product (GDP) of Indonesia.

   b. Banking industry concentration (CONCENT), is indicated with CR4 ratio. CR4 ratio is the ratio of the total asset of the 4 biggest banks in Indonesia and the total asset of all banks.

   c. Interest rate or Bank Indonesia's rate(IR), is the rate assigned by Bank Indonesia

   d. Growth of Gross Domestic Product (GDPGROWTH) is calculated as follow:

   $$\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$$

   Where GDP_t is the GDP on period t and GDP_{t-1} is the GDP on period t-1.

   e. Capital Adequacy Ratio (CAR), is the ratio of tier 1 and tier 2 capital hold by the banks and the bank's risk-weighted asset

f. The level of capital (CAP) is the ratio of tier 1 capital and total asset
g. Expected inefficiency (EFFIC), is the ratio of bank's operational cost and operational revenue, with 1 period lead
h. Expected profit (PROFIT) is the bank's Return on Asset (ROA) with 1 period lead. ROA is the return of every unit asset hold by bank.

3. Instrumental variables
Aside of their role as independent variables, the CAR and CAP are also functioned as intervening variables, also known as instrumental variables. That means, these two variables are also acted as *endogeneous variables*, the variables which values are determined by the other variables in the system. Other variables that act as the explanatory variables for CAR and CAP are:
1. Bank's size (SIZE), calculated as natural logarithm of total asset
2. Bank's Return on Equity (ROE) of the previous period (ROE_{t-1})
3. The bank's level of risk of the previous period ($RISKASSET_{t-1}$). RISKASSET is the ratio of risk-weighted asset and total asset
4. The importance of banks of the previous period (IMPORTt-1)
5. Indonesia's GDP growth of the previous period (GDPGROWTHt-1)
6. Banking industry's concentration of the previous period (CONCENTt-1)
7. Interest rate of the previous period (IRt-1)

Table 2. summaries all of the variables issued in this research.

Table 2. Research Variables

Type of Variable	Notation	Explanation	Indicator
Dependent	Riskpasar	Risk-taking Behaviour for Market Risk	*Risk Asset(market risk)to Total Asset Ratio*
Dependent	Riskkredit	Risk-taking Behaviour for Credit Risk	*Risk Asset (credit risk) to Total Asset Ratio*
Dependent	Z-Score	Probability of Default	*(ROA + CAP)/ SD ROA*
Independent	CAP	The Level of Capital	*Tier 1 Capital to Total Asset Ratio*
Independent	EFFICIENCY	TheLlevel of Inefficiency	*Total Expenses to Total Revenue Ratio*
Independent	PROFIT	The Level of Profit	*Profit before Tax to Total Asset Ratio (ROA)*
Independent	CAR	*Capital Adequacy Ratio*	*(Capital/Weighted Asset)* x 100%
Independent	GDP(t-1)	GDP Growth(t-1)	*3-month GDP Growth*
Independent	CONCENT(t-1)	Concentration Ratio (t-1)	*4-bank concentration rate*
Independen	IMPORT(t-1)	Importance of Banks (t-1)	*Domestic credit provided by banking sector as a share of GDP*
Independent	IR(t-1)	Interest Rate (t-1)	BI *Rate*

Type of Variable	Notation	Explanation	Indicator
Instrumental	SIZE	Bank's Size	Log to *Total Asset*
Instrumental	RISKSSET(t-1)	The Level of Risk (t-1)	*Risky Asset to Total Asset Ratio*
Instrumental	ROE	Return on Equity	*Total Equity to Total Asset Ratio*
Instrumental	GDP(t-1)	GDP Growth (t-1)	
Instrumental	IR(t-1)	Interest Rate (t-1)	
Instrumental	CONCENT(t-1)	Concentration Ratio (t-1)	
Instrumental	IMPORT(t-1)	Importance of Banks(t-1)	

The relationship between variables can be conversed in the equations presented below:

1. Riskpasar/Riskkredit = a + b1 GDPt-1 + b2 IRt-1 + b3 CONCENTt-1 + b4 IMPORTt-1 + b5 PROFITt+1 + b6 EFFICt+1 +b7 CAPt + b8 CARt + e1

2. CAP = a + b9 GDPt-1 + b10 IRt-1 + b11 CONCENTt-1 + b12 IMPORTt-1 + b13 RISKASSETt-1 + b15 SIZEt + b16 ROEt-1 + e2

3. CAR = a + b17 GDPt-1 + b18 IRt-1 + b19 CONCENTt-1 + b20 IMPORTt-1 + b21 RISKASSETt-1 + b22 SIZEt + b23ROEt-1 + e3

Since there are more than one equation that need to be regressed simultaneously, the 2 Stage Least Square (2SLS) regression method is used to estimate the model.

4.2. Identification test, F-Test, t-test and Coefficient of Determination Test

An estimation is fit to be regressed with 2-Stage Least Square only if it fulfils the requirements needed for identification test. According to identification test, an equation can be categorized into 3 category; under identified, exactly identified, or over identified. An equation is over identified or exactly identified if the result of the regression is one unique figure. Obviously, an equation is under identified if the regression cannot produce one unique figure. The exactly identified, over identified or under identified condition can be calculated as follows:

If k=m-1, the equation is exactly identified,

If k>m-1, the equation is over identified,

If k<m-1, the equation is under identified

Whereas m is the number of endogenous variable in the model, and k is the number of all variables (both endogenous and exogenous) included in the model, but not included in the equation being tested. Based on above criteria, the result of identification test for each equation is presented in the Table 3 below.

Table 3. Identification Test

Dependent Variables	K	M	Result of Identification Test
Risk Asset	3	2	Over identified
CAR	2	2	Over identified
CAP	2	2	Over identified

In table 3, all of three equations that about to be estimated are classified as overidentified, which means that all of the equation is qualified to be estimated using 2 Stage Least Square regression method. The F-test is done to acknowledge the effect of independent variable, simultaneously, on dependent variables, while t-test is done to acknowledge the effect of independent variable partially on dependent variable. The coefficient of determination measures the percent of the variation that can be explained by the regression equation (Gujarati and Porter, 2009).

4.3. The Data

This research is using the Indonesian commercial bank classified as BUKU 3 and BUKU 4 bank. According to BI Regulation No. 14/26/PBI/2102 dated December 27, 2012 on "Business Activities and Active Networks Based on Bank Core Capital", the BUKU 3 and BUKU 4 banks are those banks with more than 5 trillion core capital, and are allowed to do all types of business activity, in rupiah or foreign currency. Banks that are classified into BUKU 4 are Bank Mandiri, BNI, BCA and BRI, while banks included in BUKU 3 are CIMB Niaga, Bank Mizuho, Bank Mega, Bank BJB, Bank Danamon, Bank Panin, DBS, Bank Bukopin, OCBC NISP, BTPN, BII, Bank Sumitomo, UOB, BTN, and Bank Permata. Research period is between 2004 (quarter 1) and 2013 (quarter 4).

The data related to banks financial report are obtained from Laporan Statistik Perbankan Indonesia published by Bank Indonesia. Other data are obtained from Badan Pusat Statistik (BPS).

5. THE RESULT

Table 4 shows the estimation result using 2 Stage Least Square regression methods.

Table 4. Estimation Result

Variable	Riskpasar	Riskkredit	Z-Score
CAR	0.027**	-0.016**	-0.125**
CAP	5.194**	7.513**	11.804**
IR	-0.029**	0.003	0.100**
GDPGROWTH	-0.933	0.225	-2.129
CONCENT	5.915**	1.646**	13.49**
IMPORT	-0.023	-0.008	-0.103**
PROFIT	-0.039**	-0.036**	0.458**
EFFIC	0.004**	0.0001	-0.017**

* = significant on 10% level, ** = significant on 5% level, *** = significant on 1% level

The estimation result using 2-Stage LEAST square presented in Table 4 shows that the capital level (CAP), CAR level (CAR), the BI Rate (IR), the banking industry concentration (CONCENT), the importance of banks (IMPORT), the expected profitability (PROFIT) and the expected inefficiency (EFFIC) are variables with significant effect on the risk-taking behaviour of Indonesian banks in 2004-2013 period.

The coefficient of CAR has a positive and significant sign to *Riskpasar*, meaning that the level of CAR has a positive effect on the bank's risk-taking behaviour. On the other hand, it carries a negative sign toward Z-Score and *Riskkredit*, which means that the higher the level of CAR, the lower the Z-Score and the level of credit risk exposure, respectively. The positive effect of CAR on the *Riskpasar* means that higher level of CAR triggers bank to conduct higher level of market risk exposure, but lower level of credit risk exposure. This circumstance happen since the higher level of CAR trigger bank to switch its asset from loans to another higher return-higher risk asset such as derivatives. This condition, in the end, leads to higher probability of default, or lower Z-Score. The result from Porter and Chiou (2012) also drew the same conclusion, that is, the higher level of CAR can lead to more market risk exposure due to more off-balance activity.

The capital or CAP, has a positive and significant sign toward *Riskpasar* and *Riskkredit*. The rise of capital hold by a bank will lead to more exposure to market risk and credit risk, but to lower probability of default. This result shows that, despite the lower probability of default due to the stronger capital level, the banks effort in raising main capital has cost itself of the exposure to market risk and credit risk. The lower probability of default as a result of more capital is also the result of a research conducted by Poghosyan and Cihak (2012) that concluded that the relatively high level of capital is a sign of bank's stability.

The banking industry concentration (CONCENT) has also a positive and significant sign towards *Riskpasar* and *Riskkredit* and the Z-Score. The positive sign on *Riskpasar* and *Riskkredit* means that the more concentrated the industry is, the more risk-taking its members are, in order to retain their profit and market power. Some research supported this view, which also known as "concentration fragility view" (de Nicolo *et al.*, 2014). This view appointed that in a more concentrated banking structure, bank will conduct more risky behaviour in the form of higher loan rate, which could lead to increasing loan default and finally increasing the credit risk exposure. The same result also found by Boyd and de Nicolo (2005), which examine the relationship between banking industry concentration and risk-taking behaviour of 134 banks in non-industrial country between 1993 and 2004. Poghosyan and Cihak (2011), also found the positive relationship between concentration rate and bank distress.

On the contrary, Beck *et al.* (2006) found that the rise in concentration ratio leads to the rise in Z-Score, which means the more concentrated the banking industry is, the lower the member's probability of default. This view, which also known as "concentration stability view", generated that in a more concentrated industry, banks will gain more profit that can be used as a capital buffer. Other research with similar results comes from Baselga-Pascual (2013), which stated that European banks lower their default risk in a more concentrated condition. The result of this reaserach, however, follows the "concentration fragility views" that appoints the positive relationship between the concentration ratio and risk-taking behaviour.

On the other hand, Table 4 also shows that the coefficient of CONCENT has a positive effect on Z-Score, which shows the positive effect of the concentration on the bank's Z-score, or, its negative effect on probability of default. This result is logical since the relatively highly concentrated industry is a result of many mergers and acquisitions (as a result of deregulation) which strengthen the smaller banks's capital and finally reduce bank's probability of default in general. Ivicivic, Kunavoc and Ljubac (2008) who examined the insolvency risk in seven Central and Eastern Europe (CEE) countries has found that the concentration ratios has a positive effect to the bank's stability (which also indicated as Z-Score). The higher the degree of consolidation between banks, the lower their volatility of return; and, the higher the degree of consolidation between banks, the lower their probability of default. Moreover, Boyd, De Nicolo and Smith (2004) show that the probability of banking crises is not determined by the concentration ratio,

instead it is influenced by the inflation rate. Caminal and Matutes (2002) also point out the unclear relationship between the structure of industry and the bank's default.

The diminishing of bank's importance in Indonesian economy (IMPORT) causes the increasing probability of default, according to the result presented in Table 4. The decreasing of importance of banks as credit provider trigger the diminishing of profit, and therefore increase the banks probability of default. Conversely, the more chance of banks to act as a sole credit provider, the higher the stability of its return will be.

Banks expectation on profit has a negative impact on its risk-taking behaviour. This result is valid for all three indicators, *Riskpasar, Riskkredit* and Z-score. The higher the expected profit of a bank, the less risk-taker it become. In other words, in order to keep its profit high in the long term, a bank is willing to take less risk. Furthermore, it also drives the probability of default down. Poghosyan and Cihak (2011) who examined the factors behind bank distress in European banks, also found that banks with good earning profile have a tendency to take less risk. Louzis (2012) also stated that good performance is an indicator of good loan management in Greece banks.

The level of inefficiency that bank expected has a positive and significant *Riskpasar* coefficient, and a negative and significant Z-Score coefficient. That is to say, the rise in expected BOPO ratio (inefficiency ratio) will lead to the rise in risky asset for market risk and the low in Z-Score (or the rise in probability of default). That means, the more inefficient bank in the future, the more risk it is willing to take, in order to regain profit. Similar result also achieved by Delis and Kouretas (2011), and Delis, Hasan, and Mylonidis (2012).

The result presented in Table 4 also point out the negative and significant impact of BI Rate on *Riskpasar* and a positive and significant impact on Z-score. This relationship between monetary policy and bank's risk-taking behaviour is informally known as risk-taking channel (Borio and Zhu 2008). The reduction in monetary policy rate, in order to boost the economy, will increase the prices and collateral values of the assets on bank's balance sheets, which in turn can modify bank's estimates of probability of default (Altunbas *et al.*, 2011), and increasing its risk-taking behaviour. The risk-taking channel also can operate in another way, that is, through the increased "search for yield" (Altunbas *et al.*, 2011). When central bank lower its rate, the return on government bond is also decreasing, which affect the bank's margin and push banks to search for another form of assets with higher return, and therefore increase their risk exposure.

6.   CONCLUSION

This paper examines empirically the determinants of the risk-taking behaviour of Indonesian bank from 2004 through 2013 period. The results suggest that there are seven factors that determine the risk-taking behaviour of Indonesian banks. Those factors are the level of Capital Adequacy Ratio (CAR), the level of capital, the BI rate, banking industry concentration ratio, the importance of banks in economy, expected profitability, and expected inefficiency.

The level of CAR, capital, expected profitability and expected inefficiency are internal factors controlled by the bank. In SCP paradigm, the level of CAR and capital fall under the conducts of banks, while the expected profitability and expected inefficiency are the measurement of performance. The results show that the conduct of bank in the form of increasing level of CAR and capital is the sign of bank's willingness to increase its market risk exposure. Meanwhile, if the concern is the future performance, or in this case, the expected profitability, bank is reluctant to take on more risk. In other words, the short term objective (the conduct) and the long term goal (the performance) have a different impact on bank's risk taking behaviour. The rise in expected inefficiency is indeed pushing banks to take on more risk, both

credit risk and market risk and also drive up the probability of default. Meanwhile, the rise of capital and expected profitability can lead to the decreasing probability of default.

The structure side of SCP paradigm also suggests that bank is eager to take on more risk, both market risk and credit risk, as the industry become more concentrated. The rise in industry concentration ratio force the bigger banks (that have market power) increase its risk-taking behaviour (that is, increasing its risk exposure). On the other hand, these banks carry the biggest chance of systemic risk. Although the exposure of market risk and credit risk is increasing, the probability of default is, on the contrary, decreasing. This condition happens possibly because the increasing concentration ratio is, in fact, caused by the activity of merger and acquisition which could strengthen the banks in general.

The expansion in monetary policy in the form of the falling of BI rate facilitates the producer in adding the capital needed for expansion, and boost the economy. The results show that the decreasing in BI rate leads to the increasing in bank's risk-taking behaviour, therefore support the risk-taking channel theory; although, the probability of default is decreasing.

Research on the bank's risk-taking behaviour in Indonesia has been limited. The findings of this research are expected to contribute and encourage other research on the similar topic/ Moreover, it is expected that more factors behind the bank's risk-taking behavior can be found through more advanced research in Indonesia.

7. THE IMPLICATION OF THE FINDINGS ON INDONESIAN BANKING RISK MANAGEMENT

The conduct of banks in increasing the level of CAR and capital can lead to increasing risk-taking behaviour, while the rise in expected profitability can cause bank's reluctant behaviour in taking more risk. Therefore, the risk management is critical in managing the balance between the short term objective, the level of CAR and the level of capital, and the long term goal of increasing expected profitability.

Otoritas Jasa Keuangan (OJK) as the bank's authority in Indonesia is expected to be more careful in setting the regulation and deregulation regarding the banking industry, for example, the deregulation in merger and acquisition, which resulting in bank's willingness to take on more risk. The OJK also needs to supervise the execution of deregulation in order to avoid the excessive risk-taking behaviour by market-leader banks that can lead to economic crises.

This research also finds that the loose monetary policy in the form of decreasing BI rate can trigger bank to take on more risk. Although the aim of these loose monetary policy is to boost the economic growth, Bank Indonesia should keep an eye on bank's risk taking behaviour and their risk exposure so that it always been under tolerated limit. One of the regulation that on the way of being executed is countercyclical capital buffer, that obliges banks to increase its capital reserve when economy is in expansion period, in order to prevent banks from issuing excessive loans which can cause default and increasing the probability of systemic risk (Bank Indonesia, 2014).

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