Penguatan Daya Saing Industri Perbankan di Era Kompetisi Digital

Why Banks Perform Consolidation: to Avoid Failure or to Expand? Evidence From Indonesian Banking Industry

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ABSTRACT

In this study, we examine whether bank consolidation using merger & acquisition is an exit strategy to avoid failure or as an expansion strategy by examining the determinants of bank failure and bank merger & acquisition (M&A) in the Indonesian banking sector. We employ quarterly data from 131 commercial banks in Indonesia over the period 2002-2014. We perform competing-risk using Cox Proportional Hazard Model for estimating the parameters. Our findings show that troubled banks maintain a higher level of capital reserves to comply with risk-weighted capital adequacy regulation even though action still could not prevent banks to fail. We also find that a bank with poor asset quality and low profitability is more likely to fail. On the other hand, we find that a bank with lower efficiency and lower profitability has a higher probability to be merged or acquired. Our findings suggest that there is no strong evidence for the voluntary merger and acquisition activities in the banking sector is performed to avoid bank failure.

1. Introduction

Nowadays, banks might perform many strategies to lever their competitive advantages to encounter high level competition in the banking industry. In doing so, increasing the size of its asset to get the benefit from economic of scale by can be proceed using consolidation strategy (de Paula, 2002). On the other hand, for Indonesian banking consolidation also can be seen as a strategy from bank to stay alive in the business after being hit by the two crises.

Indonesia banking industry has faced two big financial crisis for the past three decades, Asian financial crisis in 1997-1998 and global recession in 2008-2009. The former financial crisis resulted in the closure of 16 commercial banks in 1997 and 18 commercial banks in 1998. The number of commercial banks dropped by 37% from 239 banks at the end of 1996 and left only 151 banks at the end of 2000 (Sato, 2005). Enoch et al. (2001) claim that the Indonesian banking crisis is the most serious in any country in the world in the twentieth century. While for the latter financial crisis, even though had an impact on the Indonesian banking sector, but it appears in small tension, only three banks were closed in 2009 and none in 2008. It could happen, perhaps because the Indonesian government has been taken a significant reform on the banking regulation and supervision after facing a banking crisis in 1997-1998 (Shalendra D. Sharma (2001), Batunanggar (2002), Pangestu (2003), Sato (2005)). On the other hand, there was a significant number of banking merger and acquisition (M&A) activities. It is counted to be 26 banks consolidated by M&A activities (17.5% of the total bank population) during 2002 - 2014. While for the Indonesian banking sector it was a relatively new phenomenon. However, the global wave of consolidation in the banking industry has been started in many countries. In the US banking industry, the wave bank consolidation using M&A has occurred during the late 1980s and 1990s (Berger et al., 1999; Goddard et al., 2012)consequences, and future implications of financial services industry

consolidation, reviews the extant research literature within the context of this framework (over 250 references. Berger et al. (1999)consequences, and future implications of financial services industry consolidation, reviews the extant research literature within the context of this framework (over 250 references find that technological improvement, financial condition development, excess capacity or financial deterioration, consolidation of international markets, and deregulation as the motives behind the M&A wave in the US banking sector. While in the European banking industry, the M&A wave has been started during the late 1990s which are parallel with the establishment of Monetary Union in the euro region (Altunbas and Marques, 2008). Altunbaas & Marques (2008) argue that the underpinning motives behind the bank M&A are technological innovation, financial globalization, and relatively small concentration in the European banking sector.

The main objective of this paper is to investigate whether bank consolidation using merger and acquisition is an exit strategy to avoid failure or just an effect of the global wave of consolidation for expanding its business. This paper contributes to the fast growing literature on bank failures and bank M&As. Our paper is in the same spirit with Wheelock & Wilson (2000) in the use of competing-risk proportional hazard model with time-varying covariates for the study. However, this paper differs with Wheelock & Wilson (2000) which focus on the effect of efficiency on bank failures and bank acquisitions. We take more attention on the impact of the distressed bank, in particular on the bank failures and bank M&As. We consider the minimum capital adequacy requirement imposed by the financial authority. This paper also differs with Koetter et al. (2007) and Elsas (2007) which are focusing on bank resolving bank distress. We elaborate the link between bank distress and bank failure. Also, we introduce Z-index as a proxy variable for bank insolvency to predict bank failure.

We find that the determinants of bank failures in Indonesia banking sector can be distinguished from the consolidation factors. Our empirical findings show that a bank with poor asset quality and lower probability is more likely to fail. Indeed, it is consistent with the growing literature on banking theory. A bank which has difficulties in the collection of their loans has a higher probability to fail because if the bad loans are uncollected, this will result in the asset deterioration. Moreover, a bank which could not generate a sufficient profit is more likely to fail because it will find difficulties to overcome their expenses. However, we find an unexpected result on the relationship between bank capital leverage and bank failure, which is significant but in the opposite direction. It means that banks which going to fail were maintaining their capital leverage to comply with the capital adequacy regulation, otherwise the bank will be categorized as a problematic bank. On the other hand, a bank that poorly managed and with lower profitability has a higher probability to be merged or acquired. Our results also show that there is no strong evidence in the relationship between the distressed bank with the probability of a bank to be failed as well as a bank to be merged or acquired.

2. Data and Methodology
2.1. Data

In the first quarter of 2002, there were 148 commercial banks in Indonesia. In which around 21% of this population were government banks, 72% were private banks and joint venture banks, while the rest are foreign banks. Table 1 provides Indonesian commercial banks' classification. However, this number is decreased into only 119 commercial banks in the last quarter of 2014. This occurred because of bank closure and M&A (merger and acquisition) activities during the period. Even though there was a global recession in 2008/2009, the reduction of commercial banks relatively small compared to the impact of the

Asian financial crisis in 1997/1998. The Asian crisis causing on the closure for about 40% commercial banks (there were 248 banks in 1995 and remained only 148 in 2002). Furthermore, if we compare Indonesian bank failure trend to the US bank failure trend, it appears that the impact of the Asian Crisis and Global recession on the banking industry is in the opposite direction for both countries. Figure 1 shows the evolution of bank failures in Indonesia compare to the US over the period 1995 – 2014.

On the other hand, in the same period, there was an increasing number of bank M&A activities in Indonesia. Figure 1 shows the number of bank M&A in Indonesia during 1995 – 2014. However, the higher level of merger and acquisition in 1998-1999 were due to government intervention to stabilize the banking crisis after had been hit by the Asian financial crisis.
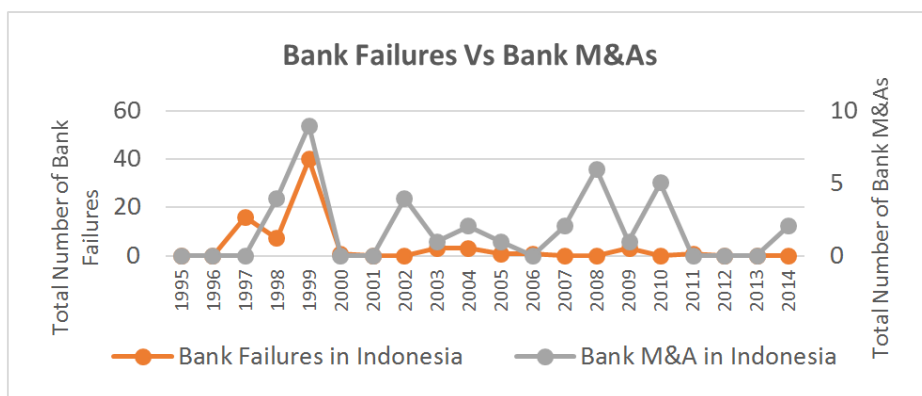

Figure 1 **Number of Banks M&A Activities**

In the present paper, the sample of commercial banks is taken from the Indonesian Central Bank database. We collected quarterly financial report for all commercial banks during the period of first quarter 2002 through fourth quarter

2014 with 52 total quarters. This report is submitted by all the commercial banks to Indonesian Central Banks database in quarterly basis and yearly basis and consists of balance sheet report, income statement report, asset quality report and minimum capital adequacy ratio report. The selected financial ratio will be calculated based on these financial reports.

The database is featuring 148 commercial banks in the first quarter of 2002 and 119 commercial banks for the last quarter of 2014. These commercial banks composed of government banks, private banks, joint venture banks, and foreign banks. From the population, we exclude 5 Islamic commercial banks due to the difference in accounting standards to prevent the bias calculation of the financial ratio. We also excluded 12 banks with incomplete data which resulting in 131 commercial banks as a sample with 10 failed banks ($\approx$ 7.6%) and 18 merged/acquired banks ($\approx$ 13.7 %). In this case, we define failed bank as a legal definition which is the bank that closed by the Indonesia Central Bank as a regulator and stop its operation at the specific date of the closure. While for bank M&A, we define as the bank which is merged with other banks or acquired by other banks without government intervention in the M&A process.

Table 1 Banks Classification

Banks Classification	Failed	M&A	Survived	Total
Government banks	0	0	28	28
Private Banks	6	14	54	74
Joint Venture Banks	4	4	12	20
Foreign Banks	0	0	9	9
Total	**10**	**18**	**103**	**131**

2.2 Methodology

To investigate the relationship between variables and the hazard of failure and hazard of M&A we use competing-risk proportional hazards model with time-varying covariates. In this competing-risk model, we assume that a bank could have two possibilities to exit from the sample during the studio period, either from failure or M&A action as target bank. In the duration model literature, these outcomes labeled as an event of interest.

We employed competing risk model using Cox (1972) proportional hazards model (Cox's model). In the Cox's model, the proportional hazards function of the failure time conditional on a set of time-dependent covariates can be expressed as:

$$\lambda_i(t, Z_i(t)) = \lambda_{i,0}(t) \exp(Z_i(t)\beta) \tag{1}$$

where λ_i is the hazards function of bank i and $\lambda_{i,0}(t)$ is unspecified baseline sub-hazard. Hazard function is instantaneous rate of occurrence of the event of interest (failure or M&A). The expression $\exp(Z_i(t)\beta)$ is the systemic part of the hazards function, where $Z_i(t)$ denotes the vector of covariates applying to bank i and β is a vector of unknown parameters.

Using competing risk model, we consider a type-specific hazard function as follows:

$$\lambda_{ij}(t; Z_i(t)) = \lim_{\Delta t \to 0} \frac{1}{\Delta t} Pr\{t \leq T \leq t + \Delta t, J = j \mid T \geq t, Z_i(t)\} \tag{2}$$

for $j = 1, \ldots, m$ and $t > 0$. In equation (2) $\lambda_{ij}(t; Z_i(t))$ represents the instantaneous rate for failures of type j at time t given $Z_j(t)$ and in the presence of all other failure types. It is specifies the rate of type j.

Under this condition, the competing risk model estimation yields separate coefficients for each of the different type risks for the event of interest. In this case, we will provide report competing-risk proportional hazard estimation for bank failures and bank M&A. The estimation for β can be obtained by maximizing the following partial likelihood.

$$L(\beta) = \prod_{k=1}^{n} \left[\frac{\exp \{Z_k(t_k)\beta\}}{\sum_{l \epsilon R(t_k)} \exp \{Z_l(t_k)\beta\}} \right] \qquad (3)$$

where (t_k), for k = 1,…,k, denotes the bank failure times and $R(t_k)$ the risk-set at time t_k (i.e. the set of banks still in the study just before t_k).

Next, we select the potential determinants as the representation of bank-specific factors for the empirical model. As we can see from the summary of the literature review section, the determinants between bank failures, bank M&As and the determinants that link between bank distress and bank M&A are relatively similar. Therefore, to infer these determinants, we adopted CAMEL rating system framework for calibrating our empirical model. The following are the proxy for the CAMEL rating system employed on our paper:

Table 2 **Operational Variables and Expected Sign for The Coefficients**

Covariates	Explanation	Expected coefficient for bank failures	Expected coefficient for bank M&A
CAR1	Ratio between total equity and total asset (Total equity is computed at the current period; Total assets is computed at the current period)	–	–
CAR2	Ratio between total 1 Capital risk-weighted Assets, (Tier 1 capital is computed based on the Indonesian central bank regulation at the current period; Risk-weighted assets is computed based on central bank regulation at the current period; both measures provided by each bank)	–	–
ZS1	Equation (4); Z-Index based on Cihák & Hesse (2007)	–	–
ZS2	Equation (5); Z-Index based on Lepetit & Strobel (2013)	–	–
NPLA	Ratio between uncollectable Loans and total assets (uncollectable loans are computed at the current period; Total assets is computed at the current period)	+	+/–
EFF	Ratio between non-interest expenses and net interest income (non-interest expenses are computed at the current period; net interest income is computed at the current period)	+	+
ROA	Ratio between average of earnings before taxes and average of total assets (Earnings before interest and taxes is calibrated from quarterly data to annual data to have the average of earnings before taxes; Total asset is calibrated from quarterly data to annual data to have the average of total assets)	–	–
NIM	Ratio between average net interest income and average of earnings assets (Net interest income is calibrated from quarterly data to annual data to have the average of net interest income; Earnings assets is calibrated from quarterly data to annual data to have the average of earnings assets)	–	–
LIQ	Ratio between total loans and total assets (Total loans are computed at the current period; Total assets is computed at the current period)	+	+/–
LnA	Log of total assets (Total assets is computed at the current period)	–	–

3. Results
3.1. Preliminary Statistics

Table 3 provides descriptive statistics for the variables of interest in the overall sample. On average during the study period, bank leverage ratio (CAR1) of the bank's sample is 15.61% and has intermediate variation. Even more for the capital required ratio (CAR2) has mean 33.36% with high variation across the year. These statistics show that on average Indonesian commercial banks have satisfied the capital adequacy requirement above the minimum standard of 8%. While for insolvency ratio is measured using ZS1 and ZS2, both measures provide a relatively similar result on the average and variation.

Table 3 Descriptive Statistics of The Variables

Covariates	Observation	Mean	Std. Dev.
CAR1	5979	0.1561	0.1215
CAR2	5979	0.3336	0.9534
ZS1	5979	15.2246	10.0408
ZS2	5979	15.2246	10.1424
NPLA	5979	0.0253	0.0879
EFF	5979	0.6418	2.2709
ROA	5979	0.0230	0.0479
NIM	5979	0.0630	0.0392
LIQ	5979	0.5561	0.1916
LnA	5979	15.1033	1.8773

Asset quality is measured by NPLA and has a relatively small ratio on average and fall below the minimum government requirement 5%, but the variation is relatively high. Net interest expenses over net income is a proxy for bank management inefficiency. Even though the average for this ratio is 64.18%

but some banks suffered from negative net interest income during the study period, considering the negative value in the minimum ratio value. Return on assets (ROA) and net interest margin are used for profitability calibration. The high variability on the return on asset is found in the sample with average ratio 2.3%, while net interest margin has a relatively lower variation with average ratio 6.3%. Loan over asset measures illiquidity. This ratio shows that there are banks which have loan larger than its asset with a ratio above 100%. It is because some banks in several periods have negative provision for asset losses very large which reduce the value of its assets.

Table 4 **Correlations of The Explanatory Variables**

Pearson's correlation coefficient	NPLA	EFF	ROA	NIM	LIQ	LnA
NPLA	1					
EFF	0.0096	1				
ROA	-0.1079	-0.1883	1			
NIM	-0.1085	-0.0056	0.2426	1		
LIQ	0.3645	-0.0024	0.0194	0.069	1	
LnA	-0.0929	-0.032	0.1235	-0.0897	0.0691	1

Correlation between all the variables is given in table 4. We can see that our data do not suffer from collinearity problem between the operational variables, it is because no correlation larger than 0.5

3.2. Determinants of Banks' Failure Hazard

Table 5 presents the Cox proportional hazard models estimation for sample over the period 2002 - 2014. We perform the model based on our variables of

interest which varying only on the capital explanatory variables. Therefore, we have Model 1, Model 2, Model 3 and Model 4 for examining the determinant of bank failures. We differ the models in the capital proxy as follow: leverage ratio (equity to total asset, total capital to total risk-weighted assets) and insolvency score (Z-index 1, and Z-index 2) for model 1 to 4 consecutively, while the others explanatory variables remain the same. The results appear consistent across different capital measures, signs and also the level of significance in all models. We can see that the most significant effect on the bank failures time is provided by all capital proxies (CAR1, CAR2, ZS1, and ZS2), asset quality proxy (NPLA), and profitability proxy (ROA and NIM), illiquidity proxy (LIQ).

However, for capital adequacy proxy we find that leverage variables and insolvency score have a positive sign, which is the opposite from our expectation. The same result was obtained by Santoso (1998) and even if it is quite surprising. The possible explanation is that the troubled banks maintain their reserves of capital at the higher level to comply with the capital adequacy regulation. Nevertheless, there is literature argue that improperly chosen minimum capital risk-weighted could increase bank riskiness (see Koehn & Santomero (1980), Kim & Santomero (1988), Keeton (1989), Berger et al. (1995), and Blum (1999)). Koehn & Santomero (1980) & Kim & Santomero (1988) claim that in the context of basic portfolio-selection frameworks if a bank is adequately non-risk-averse will react to a higher capital requirement by selecting an asset mix with higher risk than before the leverage ratio increased. This action produces a contrary effect from the regulatory perspective that leads to the increase in the probability of bankruptcy. This investigation indicates that imposing capital adequacy ratio in banking industry could increase instability in the banking industry as a whole. Moreover, Blum (1999) demonstrates in his model that in the dynamic framework, capital adequacy rules may increase the riskiness of the banks.

Table 5 **Banks' Failures Hazard**

(Wald statistics in parentheses)

Covariates	Model 1	Model 2	Model 3	Model 4
CAR1	9.0711***			
	(2.87)			
CAR2		0.2260*		
		(1.68)		
ZS1			0.0843***	
			(3.05)	
ZS2				0.0863***
				(3.12)
NPLA	6.3638*	7.3228**	13.8728***	13.9152***
	(1.89)	(2.22)	(3.31)	(3.31)
EFF	-0.0228	0.0018	0.0207	0.0216
	(-0.31)	(0.01)	(0.08)	(0.08)
ROA	-20.2999***	-11.5929***	-13.7923***	-14.0804***
	(-3.69)	(-3.64)	(-4.09)	(-4.09)
NIM	-36.7431***	-23.6049*	-20.88314**	-21.4969**
	(-2.75)	(-1.94)	(-2.17)	(-2.21)
LIQ	-4.4190*	-5.9830**	-10.72361***	-10.7234***
	(-1.65)	(-2.21)	(-2.96)	(-2.96)
LnA	0.4041	0.0101	-0.0333	-0.0337
	(1.22)	(0.04)	(-0.12)	(-0.12)

Significance at the 0.01(***), 0.05(**), 0.1(*) level

Meanwhile, for asset quality (NPLA) and profitability (ROA & NIM) the results confirm the hypothesized sign. The positive relationship asset quality means that an increase in the nonperforming loan associate to the more likely bank

to fail. While for profitability variables, the negative sign indicates the opposite direction that the increase in the return on asset or net interest margin would correspond to a decrease in bank risk. The negative coefficient on the liquidity proxy is contrary to our expectation, perhaps suggesting that it is a poor proxy. On the other hand, we find that the management proxy (EFF) and size variable (LnA) are not significant with the mixed result on the sign. Perhaps is also indicating that these are a poor proxy.

3.3. Determinants of Banks' M&A Hazard

In this part, we will analyze the determinants of bank Merger & Acquisition whether the variables that describe the expected time to failure also determine the time to M&A hazard. Table 6 reports the estimations for Model 5 to Model 8. In the same manner, we differentiate the models on the capital variables. Our results show that only inefficiency variable measure and net interest margin variable that have a significant effect on the time to M&A, while other variables appear to be insignificant.

The significant result on the variables confirm by the hypothesized sign. The positive relationship between non-interest incomes over net interest income indicates that an increase in inefficiency variable would correspond to the more likely bank to be merged or to be acquired. The negative sign on net interest margin implies that the less profitable bank, the higher probability bank to be merged or acquired.

Table 6 **Banks' M&A Hazard**

(Wald statistic in parentheses)

Covariates	Model 5	Model 6	Model 7	Model 8
CAR1	0.9884			
	(0.62)			
CAR2		-0.0411		
		(-0.17)		
ZS1			-0.0115	
			(-0.47)	
ZS2				-0.0110
				(-0.45)
NPLA	-0.3818	-0.0074	-0.3366	-0.3280
	(-0.17)	(0.00)	(-0.14)	(-0.14)
EFF	0.1377*	0.1394*	0.1349*	0.1351*
	(1.67)	(1.79)	(1.74)	(1.74)
ROA	1.5588	1.7381	1.8010	1.8668
	(0.40)	(0.42)	(0.45)	(0.46)
NIM	-13.9921*	-13.1598*	-13.102*	-13.0674
	(-1.91)	(-1.81)	(-1.85)	(-1.84)
LIQ	1.1229	0.8276	0.9908	0.9830
	(0.76)	(0.53)	(0.67)	(0.67)
LnA	-0.1586	-0.2000	-0.2053	-0.2053
	(-0.97)	(-1.27)	(-1.30)	(-1.30)

Significance at the 0.01(***), 0.05(**), 0.1(*) level

3.4. Checking Model Assumption and Robustness Check[1]

In the assumption checking, this study use overall goodness of-fit and proportional hazard assumption. Both examinations indicate that the models hold the proportional hazards assumption and the models are fit.

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[1] The detail calculation for the model assumption checking and robustness are available upon request.

Meanwhile for the robustness check, this study evaluates the banks' group effect, relationship between bank distress and failure, and the final check is performed by comparing model using logistic regression approach. All the results for the robustness check also consistent with the results of our main model (Bank failure hazard and bank M&A hazard.

4. Conclusion

The Indonesian banking industry is in the period of re-regulation after hit by the Asian financial crisis in 1997/1998. Before the crisis, from the end of the 1980s through the mid-1990s Indonesia has savored liberalization in the banking industry environment since bank deregulation in 1988. However, significant reform in banking regulation has been taken by the Indonesian government for establishing the Indonesian banking system after the Asian financial crisis. Aftermath, the number bank failure has dropped sharply even though there was a global recession in 2008/2009. On the other hand, bank consolidation has risen, in particular during the global recession. In this paper, we have attempted to investigate whether bank using merger & acquisition (M&A) as an exit strategy to avoid failure by examining the determinants bank failure and bank merger & acquisition (M&A) in Indonesia. We also emphasize on the regulatory requirement of bank capital adequacy by putting into account leverage ratio and insolvency score.

In our investigation, we find that capital proxies which consist of leverage variables and insolvency score have a significant effect on bank failure. However, quite surprised that the sign is unexpected. This result shows that troubled banks maintain a higher level of capital reserves to comply with risk-weighted capital adequacy regulation. On the other hand, this characteristic is not found in bank M&A.

We also find evidence that, not surprisingly, a bank with poor asset quality and bank with low profitability is more likely to fail. This finding is in accordance with previous literature in bank failures. However, for bank M&A characteristic we find that bank with low profitability has a higher probability to be merged/acquired. But there is no evidence regarding the effect of poor asset quality on bank M&A.

Our finding also suggests that there is no strong evidence that either a distressed bank has a higher probability of failure or to be involved in merger and acquisition deal.

Finally, we find that bank with lower efficiency is more likely to be merged/acquired, but there is no evidence that efficiency has a significant impact on bank failure. All in all, we find that the determinants of bank failure and bank M&A are differ. It appears that the increasing number of voluntary M&A in the Indonesian banking industry during the study period, perhaps, more likely as an expansion strategy as the influence of the global wave of bank consolidation rather than an exit strategy to avoid failure.

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