

Research
**Domestic and Foreign Banks' Stability in Indonesia: The Grey Zone Trap
and Key Determinants**

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Abstract

The recent global financial crisis in 2008 has comprehensively predisposed the stability of most banking sectors all over the world, but apparently not in Indonesia. Reported by IMF, Indonesian banking industry showed such a remarkable stability level, facing the negative shocks. However, a noteworthy question persists, whether Indonesian domestic banking sectors are truly stable or perchance the foreign-owned banks are the ones which give a bigger share of stability contribution. Hence, this paper investigates the stability level using Z-score modification model and assesses the main constituents which imparts the stability levels of both foreign and domestic banks by applying VECM of micro-prudential and macroeconomics indicators. The research is based on the aggregate data of Indonesian foreign and domestic banks from the year of 2005 to 2015. The result then shows that the domestic banking sector in Indonesia was bridled of the grey zone, a high alert partial safe zone, due to its incommensurate loan control, inefficiency in generating profitability and liquidity from assets and lack of capital buffer's presence. Nevertheless, the findings also reveal that neither of the domestic nor foreign banks in Indonesia was completely safe against credit risk.

Keywords: *Bank stability, Z-score, domestic bank, foreign bank, bankruptcy, grey zone*

INTRODUCTION

According to IMF in 2010, Indonesia banking industry has been reported healthy and stable towards the global financial crisis of 2008 compared to most of the banking sectors around the world. While subprime crisis makes banks supposed to be vulnerable to credit, interest rate, and liquidity risks, yet a high capital and earnings buffer has provided a cushion for Indonesian banking sector against macroeconomic volatility (Ferhani & Lim, 2010). Moreover, Standard & Poor's (S&P) in 2015 also noted that the banking industry will most likely remain stable although its profitability may weaken (Indonesia Investments, 2015). This affirmative premonition reduced initial investor anxiety about Indonesia's trustiness.

Despite the whole system showed an outstanding performance, however, it is still obscure whether the domestic banking sector is the one which outperformed the system or the openness of foreign banks is the one that potentially strengthen the overall financial stability. In fact according to S&P, domestic banking industry faces higher risks due to direct exposure for low host-country per capita income, low commodity prices, weak infrastructure, legal uncertainties, and corruption which most likely curtail lending growth and make the domestic banking industry more vulnerable to higher credit losses.

Over the years, Bank Indonesia has introduced and enforced new regulations with the aim of ameliorating banks' efficiency and strengthening the country's banking system. As financial stability of both domestic and foreign banks is important to reflect the soundness of financial system in Indonesia, it is an utmost importance for the banking industry to analyze and pinpoint the coming factors of financial distress if any, and take remedial measures for minimizing its effects on the financial health of business by using an efficient bankruptcy evaluation model to assess each sector's bankruptcy rates (Jan & Marimuthu, 2016).

The objective of this study are first to analyze and determine the stability level of both domestic and foreign banking sectors in Indonesia by examining the stability rates of all listed domestic and foreign banks in Indonesia for the period 2005–2015, and performing comparative

analysis on the factors related to the bankruptcy predictors; Second, to determine which micro-prudential variables are the major determinants of bank failures in one sector and highlight any link, if any, between macroeconomic variables and instability level of both domestic and foreign banking industry in Indonesia. The evaluation of bank performance is thus important in revealing information and possible recommendations for banks, depositors, investors, and regulators to deal with the less stable sector.

The research focuses on aggregate data of all banks in Indonesia retrieved from www.bi.go.id. It includes data of state-owned bank, foreign exchange commercial banks, non-foreign exchange commercial banks, and regional development banks in the domestic sector, along with joined venture banks and foreign-owned banks' data included for foreign banking sector. The result depicts the stability level of all banks as an aggregate, not as an individual performance for bank in each sector. The ratio indicators used in performing CAMEL(S) evaluation also limited to only several ratios which considered appropriate to the literature review and observation studies.

The main result derived from the first empirical investigation is that foreign banks are more stable compared to domestic banks in Indonesia. The rest of the paper is organized as follows. In the second section, the authors present an overview of the banking industry in Indonesia, including domestic and foreign sector, also the explanation of Altman z-score bankruptcy evaluation. In the third section, the research methodology to quantify the result is explained through the method of Altman and regression analysis. Section four thus conduct an empirical implementation of the methodology to analyze which type of banks is more stable to a crisis and what factors underline the significant underperformance of the sector. Last, section five concludes.

LITERATURE REVIEW

Banking Industry in Indonesia

Indonesian banking system experienced numerous and complete structural adjustment reformation since Asian financial crisis in 1998, allowing more liberation and openness towards foreign encounters. Ten years later, when Indonesia encountered the global financial crisis, it showed great stability towards the negative shocks. The remarkable performance was supported by strong domestic spending and low dependence on exports sector (KPMG, 2015). Ernst & Young, in its report of Indonesian banking survey in 2015 is reported that the Indonesian banking sector has enjoyed a steady loan growth after the global financial crisis which contributed to the growth of bank's total assets (Ernst & Young, 2015). PwC Indonesia (2015) reported that Indonesian banks faced the main risks for credit, liquidity and operational with credit risk kept being the number one risk. Banker's view credit risk is manageable through the enhancement of the loan monitoring system and approval process as well as limiting exposures to certain high-risk industries.

Domestic and Foreign Banks in Indonesia

The Indonesian banking system can be classified into commercial banking financial institutions and non-commercial banking financial institutions, including finance companies and the merchant banks. The major players in the banking system are commercial banks since they are the largest and most significant funds providers in the banking system (Ong et al., 2011). Predominantly, there are two major categorizations of commercial banks in general: domestic and foreign banks. The domestic sector consists of state-owned banks, foreign exchange commercial banks, non-foreign exchange commercial banks, and regional development banks whereas joint venture banks and foreign-owned banks include in the foreign banking sector.

Foreign banks play double-edge sword role in Indonesian banking industry. It either can take the privilege of the external liquidity from their parent banks, which lowers the deposit cost and improves banking stability in emerging markets, or worsen the condition by imposing some risks from parent banks to the country ([Mian, 2003](#)). As for domestic players, domestic banks do not rejoice the access to external liquidity, however for state-owned banks; they have heavy support from the national government.

Indonesian Banking Stability

The stability of banks in Indonesia is important as banks play an important role as financial intermediaries ([Nasution, 2010](#)). Until the year of 2015, banking industry still faced risk due to its high proportion of total credit and high level of NPLs. Credit quality is still at risk of deteriorating in the future due to the weak economic environment. Loan relates to bank asset quality which affects not only banking performance but also further impinges on the soundness and stability of the national financial system. Therefore, Indonesian banking industry should focus more on the improvement of loan and credit quality in order to improve the stability of the whole financial sector in Indonesia ([Wisnubroto, 2015](#)).

The most complete approach established to assess Indonesian banking stability, includes the report Financial Sector Assessment Programs from IMF as well as Moody's Bank Financial Strength Rating, are indicated somewhat incompatible to be implemented in developing countries due to the emphasize of regional and systemic differentials, not performance-based only ([Kulathunga, 2012](#)). Monitoring financial stability is becoming a foremost issue to detect systemic disturbances or events that could lead to crisis. This early detection believes in enabling the central bank and the government to adopt policies capable of preventing financial instability that would bring down the economy.

[Bank Indonesia \(2015\)](#) has formed the indicators of financial stability which apparently compatible with Indonesian banking industry. The two types of indicators published by Bank Indonesia covers the micro-prudential indicators which help yielding information for liquidity risk, market risk, credit risk and profitability of financial institutions, also macroeconomic indicators that focus on domestic and international macroeconomic conditions that possibly affecting the country financial stability ([Bank Indonesia, 2015](#)). The whole lists of micro-prudential and macroeconomics indicators are summed in Table 1.

Table 1. Micro-prudential and Macroeconomics Indicators from Bank Indonesia

Microprudential indicators	Macroeconomic Indicators
Capital Adequacy Aggregate capital ratio	Economic Growth Aggregate growth rate Economic sectors in decline
Asset Quality - For creditors Sectoral concentration of credit Foreign capital loans Loan to related parties, bad debts (NPLs) and loan loss reserves - For debtors DER (debt to equity), corporate profit	BOP Current account deficit Adequacy of international reserves Foreign debt (including maturity profile) Terms of trade Composition and tenor of capital flows
Sound Financial System Management Growth in number of financial institutions, etc	Inflation Volatility of inflation
Revenues and Profit ROA, ROE, and cost to earning ratio	Interest Rates and Exchange Rates Interest rate and exchange rate volatility Domestic interest rates Long-term exchange rate stability Exchange rate guarantee
Liquidity Central bank loans to financial institutions, LDR,	Contagion Effect Trade spillover Financial market correlation
Asset and liabilities maturity profile	Other Factors Focused direction in investment and lending Government funds in the banking system Matured debt
Sensitivity to Market Risk Exchange rate risk, interest rates and share prices	
Market-Based Indicators Market prices for financial instruments, credit rating, sovereign yield spread, etc.	

Source: <http://www.bi.go.id/en/perbankan/ssk/peran-bi/kerangka/Contents/Default.aspx>

Bankruptcy Evaluation: Altman Z-score

Altman Z-score is a widely used evaluator tool for predicting bankruptcy, noted for its general robustness and high accuracy rate (Sherbo & Smith, 2013). It has been utilized by different researchers over the duration of time. Several studies applying the Altman model across different countries have shown that it can be highly effective in predicting financial distress. Research on the banking sector in Greece found the model to be particularly accurate in identifying potential bankruptcy. Similar evaluations in the Eurozone demonstrated near-perfect precision. Analyses of banks in India indicated that the model maintained a strong level of accuracy, though slightly lower than in Europe. In Kenya, the model also performed well, showing a high overall ability to detect bankruptcy risk. Particularly in Indonesia, this research model has been used by many researchers in the country, noted recently are Wahyu (2013), along with Sagho and Merkusiwati (2015) to evaluate bankruptcy rates for various industries, proven the undeniable historic compatibility of the model to be used in Indonesia.

Z-score in Altman model is the dependent variable which is utilized to depict the stability level. Therefore, the higher the Z-score, the more secure is the bank and the other way around. Altman categorized the result into three groups which were interpreted as safe zones is the Z-score above 2.99, grey zone if the Z-score lied between 1.81 to 2.99, and distress zone when Z-score was found under 1.81. The score indicated as the highest distress probability of distress within this distress category (Sherbo & Smith, 2013). Grey zone, in particular, can be indicated as an area of values where the discriminatory performance is 'insufficient', in the sense that a value in the grey zone does not allow the target bankruptcy to be scored as either present or absent. It is thus the range of values that do not eliminate uncertainty about the bankrupt status (Coste & Pouchot,

2003). Total of three equations are utilized from different industry as a part of Altman's bankruptcy model.

$$\text{If public firm} \quad Z = 1.20 X1 + 1.40 X2 + 3.30 X3 + 0.60 X4 + 1.00 X5 \quad (1)$$

$$\text{If private firm} \quad Z = 0.717 X1 + 0.847 X2 + 3.107 X3 + 0.420 X4 + 0.998 X5 \quad (2)$$

$$\text{If service firm} \quad Z = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4 \quad (3)$$

Source: (Altman, 2020)

The four representatives of independent variables used to quantify bank failure in this Altman model of service firms (Altman, 2020) are as below:

$$X1 = \text{Working Capital/Total Assets}$$

This proportion measures the liquidity level within the organizations. Liquidity is the most essential viewpoint in discovering bankruptcy as it describes the ability of one bank to pay back its short-term loan and debt.

$$X2 = \text{Retained Earnings/Total Assets}$$

This proportion measures the aggregate profitability of the banks and the bank's ability to accumulate earnings using its total assets

$$X3 = \text{Earnings before Interest and Taxes/Total Assets}$$

This proportion measures the aggregate productivity of the banks that how gainful the company's assets are).

$$X4 = \text{Book Value of Equity/Book Value of Total Liabilities}$$

This proportion is in charge of measuring the indebtedness of the firm. Higher the proportion most secure is the firm.

RESEARCH METHOD

The methodology in conducting this research occupies four phases, starting from problem restructuring & objective identification through literature review and data observation, continues respectively with data collection, research model selection & variables, and data analysis & result development.

Problem Restructuring & Objective Identification

In order to present a valid and robust result, the author would like to identify the problem underlying the gap within the Indonesian banking industry through literature review and observation data in assessing and validating the stability level of the commercial banks in Indonesia. The literature in this section was taken from various sources, such as journals, formal research publications, and articles, whereas real-time data observation were retrieved from recent

news, websites, report, and corporate publications among others to comprehend the health of banking sector and its surveillance for the past decade.

Data Collection

The data is taken from Statistik Perbankan Indonesia (SPI) which publication presents data on Indonesian banks. The research is particularly based on the monthly aggregate data of Indonesian foreign and domestic bank published in SPI from the year of 2005 to 2015. Domestic banks data include state-owned banks, foreign exchange commercial banks, non-foreign exchange commercial banks, and regional development banks whereas foreign banks consist of joint venture banks and foreign-owned banks.

Data and Processing Analysis

Altman Z-score Modification

Since this paper investigates the stability level of domestic banks and foreign banks in Indonesia during and after global financial crisis, then first the author uses Z-score modification model for service industry as the research model to evaluate banks' risk to bankruptcy.

$$Z = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4$$



Figure 1. Variables of Bankruptcy Valuation in Altman Z-score Modification
 (Source: [Sagho and Merkusiwati \(2015\)](#))

Regression and Error Correction Model

As most of established approaches are more appropriate to measure bank soundness of banking industry in developed rather than in developing countries ([Kulathunga, 2012](#)). Hence, the author chooses the tabulation of aggregate research method that compliment with Indonesian banking industry, referenced by [Bank Indonesia \(2015\)](#) and [Dzingirai and Katuka \(2014\)](#). The variables used almost cover CAMELS indicators, exclude the variable measuring sensitivity to market risk as it is found not significant in predicting bank failure based on Nurazi and Evans's research ([Nurazi & Evans, 2005](#)). In particular, the chosen variables are incorporated in the basic regression model to test the impact of both micro-prudential and macroeconomics observable indicators on bank stability from 2005 to 2015. The regression model includes unit root test which orders integration of time series properties for both micro-prudential and macroeconomic indicators through the Augmented Dickey-Fuller test or ADF. The complete regression framework has been shown in Figure 2.

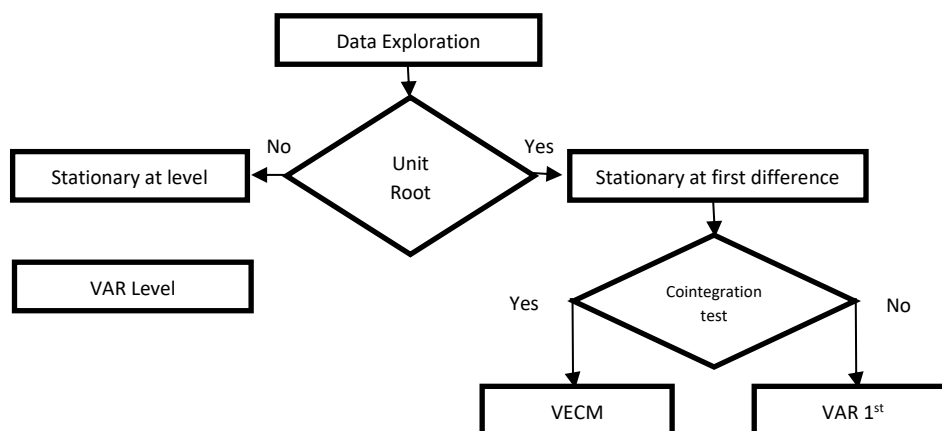


Figure 2. VAR and VECM Flowchart Process
 (Source: [Ascarya et al. \(2008\)](#), and [Bayuni and Ascarya \(2010\)](#))

Since the variables in the model are interdependent, then a mere linear regression would not be appropriate in conducting the research. Therefore, the author employs either VAR or VECM to find the determining stability factors.

RESULT AND ANALYSIS

Stability Level Evaluation

By comparing the z-score of two banking sector and electing them through Altman bankruptcy evaluation, the researcher observed that foreign banks had significantly indicated more stable than domestic banks for the past decade. The result showed that since the end of 2010, foreign banks succeeded to jump out of the grey zone, the area between $1.21 < Z < 2.90$ which considered safe but in high alert towards bankruptcy possibilities, which had underlined their stability level since 2005. Foreign banks had managed to mitigate the negative effect of the global financial crisis and improve their performance two years after facing the severe economic turbulence in 2008.

In contrast, nevertheless showing remarkable resiliency in terms of stability during the global financial crisis, just as reported from IMF in 2010, Indonesian domestic banks surprisingly were trapped in the grey zone area. It was presumably due to shrinking liquidity level, characterized by the low working capital flow, within the domestic banking sector which underlined the lower ability of domestic banks to pay back its short-term loan and debt. The less liquid issue in domestic banks possibly because they did not have the advantage of foreign banks in terms of access to external liquidity. Another issue which apparently trapped domestic banks is profitability return describing the whole banking aggregate productivity. Domestic banks generate less return invested in total assets compared to foreign banks, making them more prone to the bankruptcy issue. Altman Z-score results for both domestic and foreign banks in Indonesia are summarized, respectively, in Table 2.

Table 2. Altman Z-score of Indonesian Banking Sector (a) domestic (b) foreign

	Domestic											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2005	1,50	1,54	1,56	1,57	1,57	1,54	1,56	1,60	1,62	1,64	1,63	1,59
2006	1,51	1,53	1,56	1,58	1,58	1,62	1,64	1,63	1,65	1,64	1,66	1,68
2007	1,56	1,60	1,66	1,67	1,67	1,72	1,71	1,76	1,77	1,84	1,85	1,86
2008	1,81	1,85	1,91	1,96	2,00	2,07	2,13	2,21	2,18	2,18	2,15	2,09
2009	2,00	2,00	2,00	2,00	2,01	2,03	2,03	2,02	2,03	2,05	2,05	2,03
2010	1,80	1,83	1,95	1,96	2,00	2,04	2,05	2,19	2,15	2,14	2,18	2,13
2011	2,03	2,09	2,07	2,11	2,12	2,16	2,16	2,20	2,20	2,20	2,13	2,14
2012	2,11	2,14	2,07	2,12	2,15	2,19	2,20	2,20	2,21	2,23	2,24	2,30
2013	2,14	2,19	2,21	2,23	2,27	2,23	2,26	2,28	2,28	2,32	2,32	2,33
2014	2,22	2,23	2,26	2,26	2,23	2,25	2,31	2,29	2,27	2,26	2,27	2,29
2015	2,16	2,17	2,13	2,16	2,18	2,20	2,20	2,23	-	-	-	-

	Foreign											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2005	2,59	2,59	2,61	2,41	2,55	2,68	2,81	2,75	2,66	2,65	2,75	2,83
2006	2,65	2,68	2,67	2,74	2,70	2,69	2,68	2,73	2,85	2,89	2,92	2,87
2007	2,74	2,81	2,77	2,81	2,78	2,78	2,78	2,77	2,74	2,90	2,87	3,00
2008	2,79	2,88	2,98	3,01	2,94	2,97	2,99	3,07	3,10	2,87	2,93	2,88
2009	2,73	2,67	2,73	2,73	2,79	2,74	2,84	2,85	2,82	2,83	2,74	2,77
2010	2,76	2,69	2,63	2,75	2,89	2,88	2,85	2,95	2,97	2,97	3,05	3,03
2011	3,10	2,99	3,00	3,01	2,95	2,87	2,92	3,00	2,95	3,03	3,01	3,05
2012	2,98	3,02	3,02	3,12	3,15	3,26	3,25	3,31	3,38	3,36	3,39	3,37
2013	3,29	3,27	3,28	3,42	3,38	3,38	3,40	3,42	3,40	3,42	3,43	3,45
2014	3,35	3,39	3,41	3,52	3,51	3,58	3,70	3,72	3,62	3,60	3,57	3,62
2015	3,40	3,41	3,33	3,39	3,37	3,46	3,48	3,35	-	-	-	-

Stability Determinants

The author then applied regression analysis of micro-prudential indicators and macroeconomics indicators, such as GDP, inflation, and exchange rate return in order to evaluate the determinants. Combining Bank Indonesia's micro-prudential and macroeconomic indicators with references from [Dzingirai and Katuka \(2014\)](#), the author indicates some observable variables to portray the determinants of bank stability in Indonesia seen in Table 3.

Table 3. Observable Variables of Bank Failure in Indonesia

Latent Variables	Observable Variables	Formula	Details
Micro-prudential Indicators			
Capital Adequacy	Capital Adequacy Ratio (CAR)	Capital / Risk-weighted Assets	A substantial gap in capitalization can serve as a buffer against potential failure. In general, a higher capital adequacy ratio indicates a stronger and more resilient bank.
Asset Quality	Non-Performing Loan Ratio (NPL)	Non-performing loans / Credit loans	It helps manage the influence of both capital and credit risks on a bank's profitability and lowers the volume of problematic loans by setting aside provisions for potential losses. NPL measures of assets quality in both failed and surviving banks and positively correlates to bank failure.
Management Soundness	Efficiency Ratio (EFR)	Total operating expenses / Net operating income	This ratio reflects how effectively a bank uses its assets and liabilities. A lower value is preferable, as a higher efficiency ratio may indicate greater vulnerability to financial distress.
Earnings and Profitability	Return on Asset (ROA)	Net income / Average total assets	It reflects how well a bank is able to generate profits from its assets, showing its overall ability to turn resources into net earnings. This variable is expected to have negative impact on the failure of banks. Amount of <u>net income</u> returned as a percentage of <u>shareholders</u> capital. Generally, failed banks constitute lower levels of ROE.
	Return on Equity (ROE)	Net income / Capital	
Liquidity	Loan to Deposit Ratio (LDR)	Loans / Total deposits	LDR is the ratio measuring banks' ability to effectively accommodate deposits redemption by customers. Babanskiy (2012) indicated that too high ratios mean that banks might not have enough liquidity in case of contingency events. Implying that the more loans a bank holds, the higher possibility of failure. However, if the assets have not been efficiently used, the larger ratio could portray a more efficient used of assets in managing loan. Deposit indicates the level of investor trust in the bank and represents a stable source of funding while the bank remains reliable. Higher level of deposits offers banks opportunities to operate at the financial market and strong liquidity.
	Loan to Total Asset (LTA)	Loans / Total assets	
	Deposit to Total Asset (DTA)	Deposit / Total assets	
	Bank Size (SIZE)	Ln (total assets)	
Macroeconomic Indicators			

GDP growth rate	Most common macroeconomics indicators used to proxy economic growth and was recorded at market price. It is expected to draw a negative relationship between GDP growth rate and bank failure.
Inflation	If a bank's income rises more rapidly than its costs, inflation is expected to exert a positive effect on profitability and negative on bank failure. On the other hand, a negative coefficient is expected when its costs increase faster than its income.
Exchange Rate Return	Exchange rate fluctuations can be incorporated because Indonesia has its own currency. The source of disturbances proves to be important in determining the effect of exchange rate return to bankruptcy.

Source: [Dzingirai and Katuka \(2014\)](#).

The observable variables then implemented into ADF test. The result from ADF test and regression analysis in Table 4 show that all of the variables have a unit root, and their stationary level lied at first difference. In addition, as the variables are found to be non-stationary at their respective levels then we proceed to Johansen Cointegration test. Johansen test is based on the Augmented Dickey-Fuller test for unit roots in the residuals from a single (estimated) cointegrating relationship ([Davidson, 2000](#)).

Table 4. Unit Root Test Result

Category	Observable Variables	T-statistic	Unit root test	Stationary
Domestic	CAR	-2,918086	Yes	At first difference
	DTA	-2,350965	Yes	At first difference
	EFR	-3,589485	Yes	At first difference
	LDR	-2,789046	Yes	At first difference
	LTA	-2,74797	Yes	At first difference
	NPL	-1,160566	Yes	At first difference
	ROA	-2,917184	Yes	At first difference
	ROE	-7,33001	Yes	At first difference
	SIZE	-2,850821	Yes	At first difference
	Z	-1,796964	Yes	At first difference
Foreign	CAR	-1,163939	Yes	At first difference
	DTA	-2,378831	Yes	At first difference
	EFR	-4,124586	Yes	At first difference
	LDR	-1,116637	Yes	At first difference
	LTA	-1,49684	Yes	At first difference
	NPL	-1,898307	Yes	At first difference
	ROA	-3,366803	Yes	At first difference
	ROE	-2,046283	Yes	At first difference
	SIZE	-0,6823	Yes	At first difference
	Z	-1,57979	Yes	At first difference
Macro	GDP	-1,523374	Yes	At first difference
	INF	-9,336378	Yes	At first difference
	EXC	-11,28057	Yes	At first difference

The lags interval in first difference is 1 to 4 with assumption of linear deterministic trend. The result of both domestic and foreign banking sector can be found respectively in Table 5. The trace test indicates four cointegrating equations at the 0.05 level for domestic sector and five cointegrating equations for foreign banks. The probability is based on MacKinnon-Haug-Michelis' p-value. As the original variables have unit roots and are cointegrated, then the ones with unit roots should be differenced and the resulting stationary variables should be used in the VECM (Moniruzzaman et al., 2011).

Table 5. Johansen Cointegration Test Output (a) Domestic Banks (b) Foreign Banks

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob.**
None *	0,508164	346,9297	239,2354	0
At most 1 *	0,45668	268,1629	197,3709	0
At most 2 *	0,356407	200,4465	159,5297	0
At most 3 *	0,342207	151,5301	125,6154	0,0005
At most 4 *	0,281119	105,0361	95,75366	0,0099
At most 5	0,234183	68,39948	69,81889	0,0645
At most 6	0,147638	38,78338	47,85613	0,269
At most 7	0,131323	21,05177	29,79707	0,3544
At most 8	0,042743	5,424747	15,49471	0,7622
At most 9	0,005174	0,575844	3,841466	0,4479

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0,05 Critical Value	Prob.**
None *	0,499034	368,5484	239,2354	0
At most 1 *	0,42564	283,5287	197,3709	0
At most 2 *	0,348201	215,3252	159,5297	0
At most 3 *	0,29551	162,6789	125,6154	0
At most 4 *	0,280487	119,5944	95,75366	0,0004
At most 5 *	0,270063	79,10513	69,81889	0,0075
At most 6	0,177945	40,38511	47,85613	0,209
At most 7	0,067853	16,28352	29,79707	0,6922
At most 8	0,040924	7,640938	15,49471	0,5046
At most 9	0,020131	2,501354	3,841466	0,1137

The observable variables then implemented into regression analysis in form of:

$$\Delta Z = \alpha + \sum_{i=1}^4 \beta_i \Delta Car_{t-i} + \sum_{i=1}^4 \gamma_i \Delta NPL_{t-i} + \sum_{i=1}^4 \theta_i \Delta EFR_{t-i} + \sum_{i=1}^4 b_i \Delta ROA_{t-i} + \sum_{i=1}^4 \partial_i \Delta ROE_{t-i} + \sum_{i=1}^4 \delta_i \Delta LDR_{t-i} + \sum_{i=1}^4 \rho_i \Delta LTA_{t-i} + \sum_{i=1}^4 \tau_i \Delta DTA_{t-i} + \sum_{i=1}^4 \sigma_i \Delta SIZE_{t-i} + \sum_{i=1}^4 \varphi_i \Delta Z_{t-i} + \sum_{i=1}^4 \omega_i \Delta GDP_{t-i} + \sum_{i=1}^4 \eta_i \Delta INF_{t-i} + \sum_{i=1}^4 \theta_i \Delta EXC_{t-i}$$

$$\alpha = \alpha_0 + \alpha_1 Car_{t-1} + \alpha_2 NPL_{t-1} + \alpha_3 EFR_{t-1} + \alpha_4 ROA_{t-1} + \alpha_5 ROE_{t-1} + \alpha_6 LDR_{t-1} + \alpha_7 LTA_{t-1} + \alpha_8 DTA_{t-1} + \alpha_9 SIZE_{t-1} + \alpha_{10} Z_{t-1} + \alpha_{11} GDP_{t-1} + \alpha_{12} INF_{t-1} + \alpha_{13} EXC_{t-1}$$

The VECM regression model showed the t-statistic value of each observable variables and the changes occurring until significant lags of time. The level of p-value significance ranges from below 0.01, marked as the strongest factors, then less significant from 0.01 to 0.05, and last at 0.05 until 0.1 p-value. The result of both domestic and foreign banking sectors' p-value which segregate underlining factors of banking stability level is shown in Table 7, Table 8, and Table 9.

Statistical results which generated from Table 7, Table 8, and Table 9, stipulated the justification that foreign banks showed more stability compared to domestic banks in Indonesia for the last decade. The domestic banking sector was trapped in the grey zone and depicts as less stable due to its dependability on deposit, loan, total assets, and profitability measures which are directly influenced the level of stability of domestic banks. It was also influenced by the macroeconomics level of the home country, particularly for the level of inflation and exchange rate return.

The result justified the reason of why domestic banks cannot jump out of the grey zone area in bankruptcy evaluation. As the Altman Z-score emphasizes the essentials of working capital and profitability to preserve healthy performance and stable enterprises, domestic banks face underprivileged circumstances as it cannot mitigate the risk of sudden stops and capital flow reversals which foreign parents banks could provide to safeguard their investments in the respective host countries. It terms of return, domestic banks also generated lower return from their assets compared to foreign banks, meaning its capital also total assets were not efficiently used to generate income for the banks.

From the result, foreign banking sector indeed generated a flying colors stability performance compared to domestic sector. However, similar to domestic banks, it also faced risk in terms of high proportion of total credit and high level of NPLs. Credit quality was still at risk of deteriorating in the future together with other several risks, including low commodity prices, weak infrastructure, legal uncertainties and corruption which curtail lending growth and increase the vulnerability of the commercial banking industry, including foreign banking industry to higher credit losses.

Table 7. Cointegrating T-statistic Value from Vector Error Correction Estimates
(a) domestic banks (b) foreign banks

a.	Cointegrating Eq:	CointEq1	b.	Cointegrating Eq:	CointEq1
	CAR_DOM_URT(-1)	1		CAR_FOR_URT(-1)	1
	DTA_DOM_URT(-1)	-2.766		DTA_FOR_URT(-1)	-0.201643
		[-6.21235] ***			[-1.00837]
	EFFICIENCY_DOM_URT(-1)	-0.381		EFFICIENCY_FOR_URT(-1)	-0.499662
		[-2.13488] **			[-3.41533]
	LDR_DOM_URT(-1)	3.716		LDR_FOR_URT(-1)	-0.645832
		[6.61060] ***			[-3.80784]
	LTA_DOM_URT(-1)	-2.266		LTA_FOR_URT(-1)	2.566.465
		[-0.93627]			[6.04660]
	NPL_DOM_URT(-1)	-3.260		NPL_FOR_URT(-1)	-2.807.333
		[-3.57592] ***			[-4.61991]
	ROA_DOM_URT(-1)	1.832		ROA_FOR_URT(-1)	1.230.157
		[2.78735] ***			[4.65777]
	ROE_DOM_URT(-1)	-4.604		ROE_FOR_URT(-1)	-2.868.997
		[-4.10143] ***			[-6.07726]
	SIZE_DOM_URT(-1)	-2.283		SIZE_FOR_URT(-1)	-0.104041
		[-6.78142] ***			[-2.26939]
	Z_DOM(-1)	-0.125		Z_FOR(-1)	-0.311061
		[-0.96355]			[-3.02919]
	C	1.939		C	1.900.395

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Error Correction:	D(CAR_FOR_URT)	D(DTA_FOR_URT)	D(EFF_FOR_URT)	D(LDR_FOR_URT)	D(LTA_FOR_URT)	D(NPL_FOR_URT)	D(ROA_FOR_URT)	D(ROE_FOR_URT)	D(SIZE_FOR_URT)	D(Z_FOR)
CointEq1	-0.020566 [-0.44387]	-0.433549 [-6.78955]***	0.268734 [2.43917]	0.420702 [3.71881]***	-0.065463 [-1.36008]	0.005897 [0.56265]	0.014023 [0.85700]	0.097905 [1.05025]	0.227335 [1.89064]	-0.098996 [-0.33253]
D(CAR_FOR_URT(-1))	-0.153401 [-1.01994]	0.433009 [2.08904]**	-0.052278 [-0.14618]	-0.542226 [-1.47658]	-0.011896 [-0.07614]	-0.020714 [-0.60884]	0.026190 [0.49310]	0.084199 [0.27826]	-0.207272 [-0.53104]	1.066.845 [1.10397]
D(CAR_FOR_URT(-2))	0.062847 [0.43815]	-0.204688 [-1.03545]	-0.312223 [-0.91542]	0.450124 [1.28527]	-0.003817 [-0.02562]	-0.035988 [-1.10909]	-0.012933 [-0.25531]	-0.058275 [-0.20193]	0.214254 [0.57558]	0.945176 [1.02555]
D(CAR_FOR_URT(-3))	0.042884 [0.30750]	0.110698 [0.57597]	-0.467207 [-1.40893]	0.327055 [0.96053]	0.264449 [1.82543]*	-0.015119 [-0.47924]	-0.048426 [-0.98329]	-0.151225 [-0.53898]	-0.706100 [-1.95105]**	0.820321 [0.91548]
D(CAR_FOR_URT(-4))	0.254197 [1.85407]*	-0.108376 [-0.57358]	0.599038 [1.83752]*	-0.092642 [-0.27676]	-0.076252 [-0.53540]	0.088317 [2.84761]***	0.062006 [1.28067]	0.337210 [1.22249]	-0.250138 [-0.70304]	-1.537.394 [-1.74522]*
D(DTA_FOR_URT(-1))	-0.010307 [-0.05099]	-0.249752 [-0.89659]	-0.090933 [-0.18920]	-0.284221 [-0.57592]	-0.258820 [-1.23266]	0.009258 [0.02048]	0.066332 [0.92929]	0.188944 [0.46462]	0.474415 [0.90444]	-0.470648 [-0.36240]
D(DTA_FOR_URT(-2))	0.287732 [1.38127]	-0.881924 [-3.07202]	-0.253260 [-0.51130]	1.212.307 [2.38360]**	-0.124630 [-0.57594]	-0.002535 [-0.05379]	0.024236 [0.32945]	0.058630 [0.13989]	0.557706 [1.03167]	0.885666 [0.66171]
D(DTA_FOR_URT(-3))	-0.143725 [-0.72564]	-0.425067 [-1.55722]	-0.795551 [-1.68919]*	0.940896 [1.94563]*	0.189625 [0.92162]	0.023156 [0.51682]	-0.063586 [-0.90907]	-0.339218 [-0.85125]	-0.416828 [-0.81094]	1.679.633 [1.31981]
D(DTA_FOR_URT(-4))	0.439359 [2.20225]**	-0.578532 [-2.10416]**	0.756659 [1.59503]	0.142698 [0.29295]	0.036800 [0.17757]	-0.004190 [-0.09285]	0.104161 [1.47843]	0.579473 [1.44368]	-0.669378 [-1.29289]	-0.105765 [-0.08251]
D(EFFICIENCY_FOR_URT(-1))	0.038761 [0.82455]	-0.147471 [-2.27632]	-0.024495 [-0.21915]	0.172050 [1.49903]	-0.003822 [-0.07827]	0.002106 [0.19804]	-0.033289 [-2.00527]**	-0.197614 [-2.08945]**	-0.049516 [-0.40589]	-0.217786 [-0.72105]
D(EFFICIENCY_FOR_URT(-2))	-0.036426 [-0.79464]	-0.128643 [-2.03636]**	-0.117304 [-1.07622]	0.059330 [0.53012]	-0.059239 [-1.24405]	-0.003961 [-0.38195]	0.032797 [2.02606]**	0.206303 [2.23696]**	0.054145 [0.45516]	-0.484129 [-1.64374]
D(EFFICIENCY_FOR_URT(-3))	-0.021724 [-0.48306]	-0.078839 [-1.27203]	-0.048273 [-0.45142]	0.187868 [1.71093]*	0.050117 [1.07276]	-0.023825 [-2.34187]	-0.013977 [-0.88005]	-0.024087 [-0.26621]	-0.182194 [-1.56109]	0.215494 [0.74575]
D(EFFICIENCY_FOR_URT(-4))	-0.006964 [-0.15409]	-0.100182 [-1.60842]	-0.028171 [-0.26214]	0.087839 [0.79602]	0.005597 [0.11921]	-0.001941 [-0.18983]	0.024125 [1.51152]	0.149060 [1.63930]*	-0.020035 [-0.17082]	-0.092975 [-0.32017]
D(LDR_FOR_URT(-1))	-0.041859 [-0.27523]	-0.122542 [-0.58465]	0.062532 [0.17291]	-0.215371 [-0.58000]	-0.152437 [-0.96486]	0.021821 [0.63426]	0.073449 [1.36755]	0.286509 [0.93634]	0.444854 [1.12711]	-0.190845 [-0.19530]
D(LDR_FOR_URT(-2))	0.183728 [1.17252]	-0.567929 [-2.62991]***	-0.191319 [-0.51348]	0.978794 [2.55838]**	-0.014474 [-0.08892]	0.009851 [0.27791]	-0.002513 [-0.04540]	-0.114068 [-0.36182]	0.388821 [0.95617]	1.031.220 [1.02424]
D(LDR_FOR_URT(-3))	-0.134094 [-0.89970]	-0.373439 [-1.81807]	-0.693171 [-1.95591]	0.837777 [2.30221]	0.163022 [1.05293]	0.021874 [0.64878]	-0.054396 [-1.03349]	-0.244149 [-0.81420]	-0.341142 [-0.88199]	1.590.015 [1.66034]*
D(LDR_FOR_URT(-4))	0.195296 [1.23565]	-0.371916 [-1.70745]	0.349455 [0.92985]	0.055754 [0.14448]	0.066000 [0.40199]	-0.025033 [-0.70016]	0.067741 [1.21368]	0.399421 [1.25609]	-0.494804 [-1.20636]	0.204659 [0.20153]
D(LTA_FOR_URT(-1))	-0.265435 [-0.90105]	0.348183 [0.85763]	0.259684 [0.37073]	-0.129515 [-0.18007]	0.016416 [0.05364]	-0.022718 [-0.34091]	-0.162403 [-1.56110]	-0.884398 [-1.49220]	0.254935 [0.33347]	1.422.728 [0.75166]
D(LTA_FOR_URT(-2))	-0.126836 [-0.41371]	1.133.877 [2.68364]**	-0.090457 [-0.12409]	-1.990.467 [-2.65914]**	-0.111414 [-0.34983]	-0.070447 [-1.01578]	-0.151961 [-1.40358]	-0.841944 [-1.36499]	0.034705 [0.04362]	-1.679.293 [-0.85249]
D(LTA_FOR_URT(-3))	0.239127 [0.80284]	0.612319 [1.49169]	0.430462 [0.60779]	-1.450.458 [-1.99450]**	-0.462584 [-1.49505]	0.039734 [0.58972]	0.020934 [0.19902]	-0.035388 [-0.05905]	0.991890 [1.28323]	-2.856.888 [-1.49280]
D(LTA_FOR_URT(-4))	-0.226738 [-0.76249]	1.420.626 [3.46652]**	-1.112.206 [-1.57296]	-0.557419 [-0.76775]	0.097240 [0.31479]	0.029560 [0.43943]	-0.218373 [-2.07949]**	-1.390.725 [-2.32456]	0.041835 [0.05421]	1.441.296 [0.75435]
D(NPL_FOR_URT(-1))	-0.008184 [-0.01465]	-0.911057 [-1.18305]	3.396.425 [2.55622]	-0.466698 [-0.34208]	-0.864365 [-1.48908]	0.301395 [2.38437]**	0.396589 [2.00976]**	2.254.615 [2.00547]**	-0.850099 [-0.58623]	-9.466.309 [-2.63660]**
D(NPL_FOR_URT(-2))	0.562943 [1.06746]	-0.032527 [-0.04475]	1.355.279 [1.08079]	-0.821695 [-0.63816]	-0.458869 [-0.83762]	-0.006190 [-0.05189]	-0.266880 [-1.43302]	-1.377.424 [-1.29821]	0.706307 [0.51609]	-2.156.451 [-0.63641]
D(NPL_FOR_URT(-3))	0.845839 [1.55418]	-0.799189 [-1.06553]	1.471.539 [1.13713]	-0.199846 [-0.15040]	-0.425612 [-0.75283]	-0.120663 [-0.98010]	0.186210 [0.96887]	0.869649 [0.79423]	2.347.183 [1.66190]*	-1.767.993 [-0.50560]
D(NPL_FOR_URT(-4))	-0.640516 [-1.23763]	-0.041521 [-0.05821]	2.462.112 [2.00074]	-0.332599 [-0.26322]	-0.619757 [-1.15278]	-0.035086 [-0.29969]	0.101150 [0.55345]	0.725348 [0.69662]	1.602.737 [1.19334]	-4.597.919 [-1.38271]
D(ROA_FOR_URT(-1))	-0.636554 [-0.54967]	2.536.785 [1.58947]	-3.387.173 [-1.23006]	-3.340.979 [-1.81601]	0.299638 [0.24907]	-0.230297 [-0.87910]	-0.321559 [-0.78628]	-0.964986 [-0.41417]	1.948.882 [0.64848]	-4.759.631 [-0.63966]
D(ROA_FOR_URT(-2))	-0.263880 [-0.24399]	5.293.336 [3.55133]**	-1.935.359 [-0.75256]	-7.198.755 [-2.72613]**	-0.254478 [-0.22650]	0.105744 [0.43221]	-0.489649 [-1.28201]	-3.383.396 [-1.55489]	0.308107 [0.10977]	-6.750.898 [-0.97147]
D(ROA_FOR_URT(-3))	0.527892 [0.46514]	2.654.591 [1.69723]*	-2.902.331 [-1.07550]	-6.108.987 [-2.20465]**	-1.148.741 [-0.97438]	-0.009804 [-0.03819]	-0.322147 [-0.80379]	-2.247.170 [-0.98416]	-0.193115 [-0.06557]	-6.759.847 [-0.92701]
D(ROA_FOR_URT(-4))	0.936178 [0.87232]	2.389.004 [1.61525]*	0.299896 [0.11752]	-4.563.424 [-1.74156]*	-0.886329 [-0.79502]	-0.237498 [-0.97828]	0.148439 [0.39167]	0.836120 [0.38724]	-2.035.889 [-0.73100]	-3.645.325 [-0.52864]

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D(ROE_DOM_URT(-1))	-0.234012 [-2.61466]***	1.299.245 [0.94594]	-0.862697 [-1.83920]*	1.081.925 [0.98816]	1.106.109 [1.01140]	-0.033068 [-0.55842]	0.014550 [0.51886]	-0.537030 [-1.98615]*	0.109988 [0.59288]	2.064.351 [2.97678]***
D(ROE_DOM_URT(-2))	-0.188665 [-1.76985]*	0.914985 [0.55931]	-0.443628 [-0.79407]	0.754478 [0.57856]	0.696131 [0.53442]	-0.089715 [-1.27203]	-0.012166 [-0.36426]	-0.445500 [-1.38335]	0.065701 [0.29735]	2.598.223 [3.14564]***
D(ROE_DOM_URT(-3))	-0.351281 [-3.36707]***	-0.608123 [-0.37983]	-0.901741 [-1.64920]*	-0.432159 [-0.33861]	-0.464125 [-0.36407]	-0.108500 [-1.57186]	-0.026810 [-0.82016]	-0.266323 [-0.84497]	0.116945 [0.54078]	1.697.384 [2.09973]**
D(ROE_DOM_URT(-4))	0.009923 [0.10694]	-0.265035 [-0.18612]	-0.677629 [-1.39341]	-0.190855 [-0.16813]	-0.255185 [-0.22506]	-0.007536 [-0.12275]	0.011477 [0.39475]	0.050657 [0.18071]	0.016723 [0.08694]	0.515024 [0.71632]
D(SIZE_DOM_URT(-1))	-1.721 [-4.40644]***	5.960.829 [0.99420]	-1.720.691 [-8.40364]***	5.586.948 [1.16896]	5.613.874 [1.17593]	0.301305 [1.16563]	0.351824 [2.87416]	4.091.467 [3.46646]***	1.150.069 [1.42017]	1.210.988 [4.00034]***
D(SIZE_DOM_URT(-2))	0.333648 [0.63802]	9.335.357 [1.16325]	7.273.805 [2.65401]	9.099.747 [1.42243]	9.511.815 [1.48853]	0.411488 [1.18929]	-0.256601 [-1.56610]*	-3.216.298 [-2.03582]**	2.625.659 [2.42231]	2.566.508 [0.63340]
D(SIZE_DOM_URT(-3))	-0.722940 [-1.51041]	2.689.574 [0.36616]	-7.420.001 [-2.95795]***	2.357.960 [0.40270]	2.410.232 [0.41210]	0.182971 [0.57778]	0.196615 [1.31106]	2.329.982 [1.61132]*	0.183243 [0.18470]	3.403.715 [0.91777]
D(SIZE_DOM_URT(-4))	-0.589324 [-1.37230]	1.875.043 [2.84513]***	-1.273.242 [-0.56572]	1.545.680 [2.94220]	1.520.804 [2.89813]	-0.449574 [-1.58228]	-0.081916 [-0.60881]	-1.305.353 [-1.00615]	0.367771 [0.41316]	9.253.470 [2.78092]***
D(Z_DOM(-1))	-0.008032 [-0.37878]	0.369896 [1.13661]	-0.123642 [-1.11249]	0.289595 [1.11630]	0.289906 [1.11877]	-0.024036 [-1.71310]*	0.006118 [0.92083]	-0.011894 [-0.18564]	-0.013124 [-0.29857]	0.006590 [0.04010]
D(Z_DOM(-2))	-0.053511 [-2.37815]**	0.088657 [0.25675]	-0.204182 [-1.73145]*	0.067444 [0.24502]	0.069632 [0.25325]	-0.037637 [-2.52810]***	-0.013000 [-1.84403]*	-0.136064 [-2.00162]**	0.002475 [0.05306]	0.179986 [1.03235]
D(Z_DOM(-3))	-0.002033 [-0.08244]	-0.471013 [-1.24471]	-0.122775 [-0.95005]	-0.386383 [-1.28090]	-0.397552 [-1.31942]	-0.002620 [-0.16060]	-0.004378 [-0.56662]	-0.053130 [-0.71321]	0.001589 [0.03109]	-0.105576 [-0.55258]
D(Z_DOM(-4))	0.005438 [0.26123]	-0.536305 [-1.67883]*	0.144344 [1.32310]	-0.451076 [-1.77135]*	-0.448409 [-1.76288]*	-0.042163 [-3.06136]***	-0.002889 [-0.44292]	-0.084113 [-1.33753]	-0.018584 [-0.43071]	-0.351276 [-2.17789]**
C	0.002700 [2.03830]**	-0.034564 [-1.70012]*	0.001227 [0.17673]	-0.025055 [-1.54604]	-0.024969 [-1.54248]	-0.000884 [-1.00823]	-5.06E-05 [-0.12180]	-0.004186 [-1.04595]	0.006629 [2.41415]	-0.006486 [-0.63184]
GDP(-1)	-0.000787 [-1.84042]	0.007540 [1.14965]	0.000545 [0.24347]	0.004479 [0.85666]	0.004435 [0.84933]	0.000243 [0.85828]	-0.000106 [-0.79243]	0.000525 [0.40681]	-0.000355 [-3.78777]	-0.000779 [-0.23527]
INF(-1)	-9.38E-05 [-0.12806]	0.007119 [0.63327]	-0.005977 [-1.55698]	0.007233 [0.80712]	0.006867 [0.76716]	0.000548 [1.13153]	0.000297 [1.29364]	0.003193 [1.44294]	0.003107 [2.04610]	0.011736 [2.06775]**
EXC(-1)	6.41E-08 [1.09391]	-7.00E-07 [-0.77921]	-1.65E-08 [-0.05365]	-5.53E-07 [-0.77263]	-5.44E-07 [-0.76070]	1.27E-08 [0.32896]	6.62E-09 [0.36057]	1.04E-07 [0.58691]	2.27E-08 [0.18720]	-7.81E-07 [-1.72051]*
R-squared	0.617171	0.588378	0.871084	0.587591	0.588566	0.500235	0.929684	0.928645	0.445358	0.539978
Adj. R-squared	0.361952	0.313963	0.785140	0.312652	0.314277	0.167058	0.882806	0.881074	0.075596	0.233297

CONCLUSION AND RECOMMENDATION

Indonesia banking industry rejoices great stability endurance, even during the crisis period, reported by IMF in 2010 due to a high cushion of capital and earnings buffer in mitigating the risk of credit, interest rate, and liquidity. Segregating commercial banks into domestic and foreign sectors, thus testing them as different entities, are important to see whether domestic banking sector is truly considered healthy. However, in the past decades, nevertheless both banks rejoice increasing stability level, even unaffected by global financial crisis, domestic banks are trapped in the grey zone area due to incommensurate loan control, lower earning ability to total asset, and lack of capital buffer's presence. In contrast, after the financial crisis 2008, foreign banking sector jumped out of the grey zone and showed remarkable performance in terms of its stability level compared to domestic banks. Although foreign banks show quite satisfying result, but yet just like the domestic sector, the banks are still vulnerable to high proportion of total credit and high level of NPLs which curtail lending growth and increase the vulnerability of the commercial banking industry, including foreign banking industry to higher credit losses. Therefore, Indonesian banking industry should focus more on the improvement of asset efficiency and credit quality in order to enhance the stability of the whole financial sector in Indonesia and as domestic banking sector still faces vulnerability towards stability, the government should implement regulations that could support the domestic banking sector to break through the grey zone trap. Further research towards the domestic sector is needed to validate which domestic type of bank, for instance state-owned or private entity bank which is more vulnerable towards crisis.

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