Available online at: https://www.researchsynergy.org/aqa/
Applied Quantitative Analysis (AQA)
ISSN 2808-4640
Volume 1 Number 2 (2022): 01-16

Research

Domestic and Foreign Banks' Stability in Indonesia: the Grey Zone Trap and Key Determinants

Vanessa Purnawan[1], Ahmad Danu Prasetyo[1]

[1] School of Business and Management, Institut Teknologi Bandung, Indonesia

Abstract

The recent global financial crisis in 2008 has comprehensively predisposed the stability of most banking sectors worldwide, but not in Indonesia. As reported by IMF, the Indonesian banking industry showed such a remarkable stability level, facing negative shocks. However, an important question persists: whether Indonesian domestic banking sectors are truly stable or the foreign-owned banks are the ones that give a more significant share of stability contribution. Hence, this paper investigates the stability level using the Z-score modification model and assesses the main constituents that impart the stability levels of 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 2005 to 2015. The result then shows that the grey zone bridled the domestic banking sector in Indonesia, a high alert partial safe zone, due to its incommensurate loan control, inefficiency in generating profitability and liquidity from assets, and lack of capital buffers presence. Nevertheless, the findings also reveal that neither domestic nor foreign banks in Indonesia were completely safe against credit risk.

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

INTRODUCTION

According to the IMF, in 2010, Indonesia's banking industry was reported healthy and stable towards the global financial crisis of 2008 compared to most banking sectors worldwide. While the subprime crisis makes banks vulnerable to credit, interest rate, and liquidity risks, high capital and earnings buffer has cushioned the Indonesian banking sector against macroeconomic volatility [1]. Moreover, Standard & Poor's (S&P) in 2015 also noted that the banking industry would most likely remain stable although its profitability may weaken [2]. This affirmative premonition reduced initial investor anxiety about Indonesia's trustiness.

Despite the whole system showing outstanding performance, it is still obscure whether the domestic banking sector is the one that outperformed the system or the openness of foreign banks is the one that potentially strengthens the overall financial stability. In fact, according to S&P, the 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 to ameliorate banks' efficiency and strengthen the country's banking system. As financial stability provider for domestic and foreign banks, it is essential to reflect the soundness of the financial system in Indonesia. It is of utmost importance for the banking industry to analyze and pinpoint the coming factors of financial distress and take remedial measures to minimize its effects on the financial

Corresponding author
ahmad.danu@sbm-itb.ac.id
DOI: 10.31098/quant.596

health by using an efficient bankruptcy evaluation model to assess each sector's bankruptcy rates [3].

The objective of this study is 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 2005–2015 and performing comparative analysis on the factors related to the bankruptcy predictors. Second, to determine which micro-prudential variables are the significant determinants of bank failures in one sector and highlight any link between macroeconomic variables and instability level of both domestic and foreign banking industry in Indonesia. The evaluation of bank performance is thus crucial 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 banks, foreign exchange commercial banks, non-foreign exchange commercial banks, regional development banks in the domestic sector, and joined venture banks and foreign-owned banks' data included for the foreign banking sector. The result depicts the stability level of all banks as an aggregate. Not as an individual performance for the bank in each sector. The ratio indicators used in performing CAMEL(S) evaluation are also limited to only several ratios 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 than 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 the domestic and foreign sectors, 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 conducts an empirical implementation of the methodology to analyze which type of bank 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

The Indonesian banking system experienced numerous structural adjustment reforms since the 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 the exports sector [4]. Ernst & Young, in its report of the 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 the bank's total assets [5]. PricewaterhouseCoopers [6] reported that Indonesian banks faced the main risks for credit, liquidity, and operational, with credit risk kept being the number one risk. Bankers view credit risk are 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 and non-commercial financial institutions, including finance companies and 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 [7]. Predominantly, there are two significant categorizations of

2808-4640 (ISSN)
2808-4934 (e-ISSN)

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. In contrast, joint venture banks and foreign-owned banks include in the foreign banking sector.

Foreign banks play a double-edged sword role in the 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 [8]. As for domestic players, domestic banks do not rejoice in the access to external liquidity. However, state-owned banks; 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 [9]. Until 2015, the 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 banking performance and further impinges on the soundness and stability of the national financial system. Therefore, the Indonesian banking industry should focus more on improving loan and credit quality to improve the stability of the whole financial sector in Indonesia [10].

The complete approach established to assess Indonesian banking stability includes the report Financial Sector Assessment Programs from IMF and Moody's Bank Financial Strength Rating, which are incompatible with being implemented in developing countries. This situation is due to the emphasis on regional and systemic differentials, not performance-based only [11]. Monitoring financial stability is becoming a foremost issue with detecting systemic disturbances or events that could lead to crisis. This early detection allows the central bank and the government to adopt policies capable of preventing financial instability that would bring down the economy.

Bank Indonesia has formed the indicators of financial stability which are compatible with the Indonesian banking industry. The two types of indicators published by Bank Indonesia cover the micro-prudential indicators that yield information for liquidity risk, market risk, credit risk, and profitability of financial institutions. Also, macroeconomic indicators that focus on domestic and international macroeconomic conditions possibly affect the country's financial stability [12]. The whole list of micro-prudential and macroeconomics indicators is summed in Table 1.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

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

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

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 [13]. It has been utilized by different researchers over the duration of time. For instance, Georgios et al. [14] used the model on Greek banking industry and discovered the model extremely exact in discovering bankruptcy. Chieng [15] tested Altman model on Eurozone banks and reported the model 100% precise in discovering bankruptcy. Sharma [16] utilized Altman model on the Indian banking industry and reported the exactness of the model with 70%. Mamo [17] exercised the Altman model on the Kenyan banking industry and reported the model 90% precisely. Particularly in Indonesia, this research model has been used by many researchers in the country, noted recently are Wahyu [18], along with Sagho and Merkusiwati [19] to evaluate bankruptcy rates for various industries, proven the undeniable historic compatibility of the model to be used in Indonesia.

Z-score in the Altman model is the dependent variable that 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: safe zones with 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 the highest distress probability of distress within this distress category [13]. 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. Thus, the range of values does not eliminate uncertainty about the bankrupt status [20]. A total of three equations are utilized from the different industries as a part of Altman's bankruptcy model.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

If public firm	*Z = 1.20 X1 + 1.40 X2 + 3.30 X3 + 0.60 X4 + 1.00 X5*	*(1)*
If private firm	*Z = 0.717 X1 + 0.847 X2 + 3.107 X3 + 0.420 X4 + 0.998 X5*	*(2)*
If service firm	*Z = 6.56 X1 + 3.26 X2 + 6.72 X3 + 1.05 X4 (3)*	*(3)*

Source: Altman, E.I. [21]

The four representatives of independent variables used to quantify bank failure in this Altman model of service firms [21] are as below:

X1 = Working Capital/Total Assets

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

X2 = 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 = 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 = Book Value of Equity/Book Value of Total Liabilities

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

RESEARCH METHOD

The research methodology occupies four phases: problem restructuring & objective identification through literature review and data observation, 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. In contrast, real-time data observations were retrieved from recent news, websites, report, and corporate publications, among others, to comprehend the health of the banking sector and its surveillance for the past decade.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

Data Collection

The data is taken from Statistik Perbankan Indonesia (SPI), which publication presents data on Indonesian banks. The research is mainly based on the monthly aggregate data of Indonesian foreign and domestic banks published in SPI from 2005 to 2015. Domestic banks' data include state-owned banks, foreign exchange commercial banks, non-foreign exchange commercial banks, and regional development banks. In contrast, 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 the global financial crisis, the author first uses the Z-score modification model for the service industry as the research model to evaluate banks' risk of bankruptcy.

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

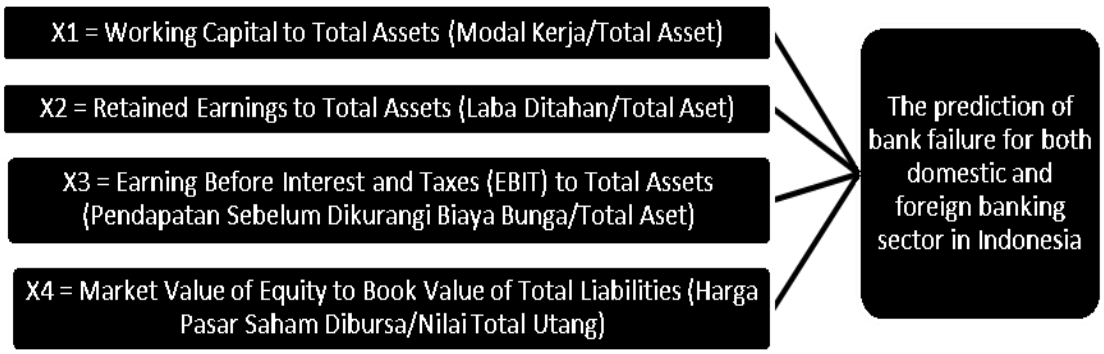

Figure 2. Variables of Bankruptcy Valuation in Altman Z-score Modification
(Source: Sagho and Merkusiwati [19]: 732)

Regression and Error Correction Model

Most established approaches are more appropriate to measure the bank soundness of the banking industry in developed rather than in developing countries [11]. Hence, the author chooses the aggregate research method tabulation that complements the Indonesian banking industry, referenced by Bank Indonesia [12] and Canicio and Blessing [22]. The variables used almost cover CAMELS indicators and exclude the variable measuring sensitivity to market risk. It is not significant in predicting bank failure based on Nurazi and Evans's research [23]. In particular, the chosen variables are incorporated in the basic regression model to test the impact of micro-prudential and macroeconomics observable indicators on bank stability from 2005 to 2015. The regression model includes a unit root test, which orders the integration of time series properties for micro-prudential and macroeconomic indicators through the Augmented Dickey-Fuller test or ADF. The complete regression framework is shown in Figure 3.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

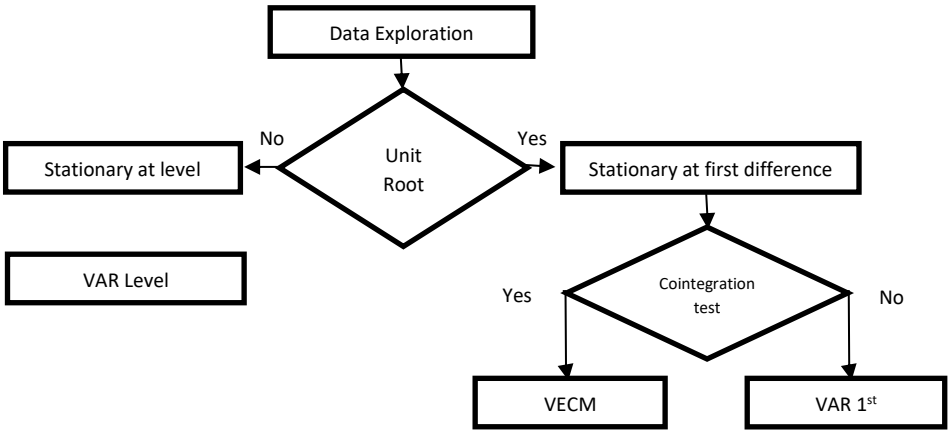

Figure 3. VAR and VECM Flowchart Process
(Source: Ascarya et al., [24] and Ascarya & Bayuni, E. M., [25])

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 sectors and electing them through Altman bankruptcy evaluation, the researcher observed that foreign banks had significantly indicated more stability than domestic banks for the past decade. The result showed that since the end of 2010, foreign banks have succeeded in jumping out of the grey zone. The area between $1.21 < Z < 2.90$ was considered safe but high alert towards bankruptcy possibilities, underlining 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 the 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 their short-term loan and debt. The less liquid issue in domestic banks is possible because they did not have the advantage of foreign banks regarding access to external liquidity. Another issue that trapped domestic banks are profitability return describing the whole banking aggregate productivity. Domestic banks generate less return invested in total assets than foreign banks, making them more prone to bankruptcy issues. 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

2808-4640 (ISSN)
2808-4934 (e-ISSN)

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 and macroeconomics indicators, such as GDP, inflation, and exchange rate return, to evaluate the determinants. Combining Bank Indonesia's micro-prudential and macroeconomic indicators with references from Canicio and Blessing [22], the author indicates some observable variables to portray the determinants of bank stability in Indonesia seen in Table 3.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

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	This means cushioning impending failure if there exists a significant difference in capitalization. The higher the capital adequacy ratio, the stronger the bank is [26].
Asset Quality	Non-Performing Loan Ratio (NPL)	Non-performing loans / Credit loans	Controls the effect of both capital risk and credit risk on a bank's profitability and reduces the bad debts loans amount by provisioning the bad debts [27]. NPL measures 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	Measures the effectiveness of the bank in utilizing its assets and liabilities. The lower this ratio is better as a high-efficiency ratio implies a higher chance for banks to go bankrupt [26].
Earnings and Profitability	Return on Asset (ROA)	Net income / Average total assets	Indicates the capacity of banks to convert their assets into profits and net earnings based on profitability ratio [26]. This variable is expected to have a negative impact on the failure of banks.
	Return on Equity (ROE)	Net income / Capital	Amount of net income returned as a percentage of shareholder's capital. Generally, failed banks constitute lower levels of ROE.
Liquidity	Loan to Deposit Ratio (LDR)	Loans / Total deposits	LDR is the ratio measuring banks' ability to accommodate deposits redemption by customers effectively. Babanskiy [28] indicated that too high ratios mean that banks might not have enough liquidity in case of contingency events.
	Loan to Total Asset (LTA)	Loans / Total assets	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 use of assets in managing loans.
	Deposit to Total Asset (DTA)	Deposit / Total assets	Deposit indicates the level of investor trust in the bank and represents a stable source of funding while the bank remains reliable. A higher level of deposits offers banks opportunities to operate in the financial market and strong liquidity.
	Bank Size (SIZE)	Ln (total assets)	It can be argued that strong and healthy banks have large assets volume. However, Li [29] cited that large banks might be prone to risky lending activities, leading to huge losses.
Macroeconomic Indicators			
GDP growth rate			Most common macroeconomics indicators were used to proxy economic growth and were 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 affect profitability

2808-4640 (ISSN)
2808-4934 (e-ISSN)

	and negatively on bank failure positively. 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 currency. The source of disturbances proves to be important in determining the effect of exchange rate return to bankruptcy.

Source: Canicio, D. and Blessing, K., [22]

The observable variables are then implemented into the ADF test. The result from the ADF test and regression analysis in Table 4 show that all variables have a unit root, and their stationary level lay at first difference. In addition, as the variables are non-stationary at their respective levels, we proceed to the 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 [30].

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 the first difference is 1 to 4 with an assumption of linear deterministic trend. The result of both the domestic and foreign banking sectors 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

2808-4640 (ISSN)
2808-4934 (e-ISSN)

unit roots should be differenced, and the resulting stationary variables should be used in the VECM [31].

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 are then implemented into regression analysis in the form of:

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

T

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

The VECM regression model showed the t-statistic value of each observable variable and the changes occurring until significant lags of time. The level of p-value significance ranges from below 0.01, marked as the most substantial factor, then less significant from 0.01 to 0.05, and last at 0.05 until 0.1 p-values. The result of 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.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

Statistical results generated from Table 7, Table 8, and Table 9 stipulated that foreign banks showed more stability than domestic banks in Indonesia for the last decade. The domestic banking sector was trapped in the grey zone and depicted as less stable due to its dependability on deposit, loan, total assets, and profitability measures, which directly influenced domestic banks' level of stability. 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 why domestic banks cannot jump out of the grey zone area in bankruptcy evaluation. 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 they cannot mitigate the risk of sudden stops and capital flow reversals that foreign parents banks could provide to safeguard their investments in the respective host countries. Domestic banks also generated lower returns from their assets than foreign banks, meaning their capital and total assets were not efficiently used to generate income.

From the result, the foreign banking sector generated a flying colors stability performance compared to the domestic sector. However, similar to domestic banks, it also faced risk regarding a high proportion of total credit and a high level of NPLs. Credit quality was still at risk of deteriorating in the future and 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	
CAR_DOM_URT(-1)	1	
DTA_DOM_URT(-1)	-2.766	
	[-6.21235]	***
EFFICIENCY_DOM_URT(	-0.381	
	[-2.13488]	**
LDR_DOM_URT(-1)	3.716	
	[6.61060]	***
LTA_DOM_URT(-1)	-2.266	
	[-0.93627]	
NPL_DOM_URT(-1)	-3.260	
	[-3.57592]	***
ROA_DOM_URT(-1)	1.832	
	[2.78735]	***
ROE_DOM_URT(-1)	-4.604	
	[-4.10143]	***
SIZE_DOM_URT(-1)	-2.283	
	[-6.78142]	***
Z_DOM(-1)	-0.125	
	[-0.96355]	
C	1.939	

b.

Cointegrating Eq:	CointEq1
CAR_FOR_URT(-1)	1
DTA_FOR_URT(-1)	-0.201643
	[-1.00837]
EFFICIENCY_FOR_URT(-1)	-0.499662
	[-3.41533]
LDR_FOR_URT(-1)	-0.645832
	[-3.80784]
LTA_FOR_URT(-1)	2.566.465
	[6.04660]
NPL_FOR_URT(-1)	-2.807.333
	[-4.61991]
ROA_FOR_URT(-1)	1.230.157
	[4.65777]
ROE_FOR_URT(-1)	-2.868.997
	[-6.07726]
SIZE_FOR_URT(-1)	-0.104041
	[-2.26939]
Z_FOR(-1)	-0.311061
	[-3.02919]
C	1.900.395

2808-4640 (ISSN)
2808-4934 (e-ISSN)

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	-0.433549	0.268734	0.420702	-0.065463	0.005897	0.014023	0.097905	0.227335	-0.098996
	[-0.44387]	[-6.78955]***	[2.43917]	[3.71881]***	[-1.36008]	[0.56265]	[0.85700]	[1.05025]	[1.89064]	[-0.33253]
D(CAR_FOR_URT(-1))	-0.153401	0.433009	-0.052278	-0.542226	-0.011896	-0.020714	0.026190	0.084199	-0.207272	1.066.845
	[-1.01994]	[2.08904]**	[-0.14618]	[-1.47658]	[-0.07614]	[-0.60884]	[0.49310]	[0.27826]	[-0.53104]	[1.10397]
D(CAR_FOR_URT(-2))	0.062847	-0.204688	-0.312223	0.450124	-0.003817	-0.035988	-0.012933	-0.058275	0.214254	0.945176
	[0.43815]	[-1.03545]	[-0.91542]	[1.28527]	[-0.02562]	[-1.10909]	[-0.25531]	[-0.20193]	[0.57558]	[1.02555]
D(CAR_FOR_URT(-3))	0.042884	0.110698	-0.467207	0.327055	0.264449	-0.015119	-0.048426	-0.151225	-0.706100	0.820321
	[0.30750]	[0.57597]	[-1.40893]	[0.96053]	[1.82543]*	[-0.47924]	[-0.98329]	[-0.53898]	[-1.95105]**	[0.91548]
D(CAR_FOR_URT(-4))	0.254197	-0.108376	0.599038	-0.092642	-0.076252	0.088317	0.062006	0.337210	-0.250138	-1.537.394
	[1.85407]*	[-0.57358]	[1.83752]*	[-0.27676]	[-0.53540]	[2.84761]***	[1.28067]	[1.22249]	[-0.70304]	[-1.74522]*
D(DTA_FOR_URT(-1))	-0.010307	-0.249752	-0.090933	-0.284221	-0.258820	0.009258	0.066332	0.188944	0.474415	-0.470648
	[-0.05099]	[-0.89659]	[-0.18920]	[-0.57592]	[-1.23266]	[0.20248]	[0.92929]	[0.46462]	[0.90444]	[-0.36240]
D(DTA_FOR_URT(-2))	0.287732	-0.881924	-0.253260	1.212.307	-0.124630	-0.002535	0.024236	0.058630	0.557706	0.885666
	[1.38127]	[-3.07202]	[-0.51130]	[2.38360]**	[-0.57594]	[-0.05379]	[0.32945]	[0.13989]	[1.03167]	[0.66171]
D(DTA_FOR_URT(-3))	-0.143725	-0.425067	-0.795551	0.940896	0.189625	0.023156	-0.063586	-0.339218	-0.416828	1.679.633
	[-0.72564]	[-1.55722]	[-1.68919]*	[1.94563]*	[0.92162]	[0.51682]	[-0.90907]	[-0.85125]	[-0.81094]	[1.31981]
D(DTA_FOR_URT(-4))	0.439359	-0.578532	0.756659	0.142698	0.036800	-0.004190	0.104161	0.579473	-0.669378	-0.105765
	[2.20225]**	[-2.10416]**	[1.59503]	[0.29295]	[0.17757]	[-0.09285]	[1.47843]	[1.44368]	[-1.29289]	[-0.08251]
D(EFFICIENCY_FOR_URT(-1))	0.038761	-0.147471	-0.024495	0.172050	-0.003822	0.002106	-0.033289	-0.197614	-0.049516	-0.217786
	[0.82455]	[-2.27632]	[-0.21915]	[1.49903]	[-0.07827]	[0.19804]	[-2.00527]**	[-2.08945]**	[-0.40589]	[-0.72105]
D(EFFICIENCY_FOR_URT(-2))	-0.036426	-0.128643	-0.117304	0.059330	-0.059239	-0.003961	0.032797	0.206303	0.054145	-0.484129
	[-0.79464]	[-2.03636]**	[-1.07622]	[0.53012]	[-1.24405]	[-0.38195]	[2.02606]**	[2.23696]**	[0.45516]	[-1.64374]
D(EFFICIENCY_FOR_URT(-3))	-0.021724	-0.078839	-0.048273	0.187868	0.050117	-0.023825	-0.013977	-0.024087	-0.182194	0.215494
	[-0.48306]	[-1.27203]	[-0.45142]	[1.71093]*	[1.07276]	[-2.34187]	[-0.88005]	[-0.26621]	[-1.56109]	[0.74575]
D(EFFICIENCY_FOR_URT(-4))	-0.006964	-0.100182	-0.028171	0.087839	0.005597	-0.001941	0.024125	0.149060	-0.020035	-0.092975
	[-0.15409]	[-1.60842]	[-0.26214]	[0.79602]	[0.11921]	[-0.18983]	[1.51152]	[1.63930]*	[-0.17082]	[-0.32017]
D(LDR_FOR_URT(-1))	-0.041859	-0.122542	0.062532	-0.215371	-0.152437	0.021821	0.073449	0.286509	0.444854	-0.190845
	[-0.27523]	[-0.58465]	[0.17291]	[-0.58000]	[-0.96486]	[0.63426]	[1.36755]	[0.93634]	[1.12711]	[-0.19530]
D(LDR_FOR_URT(-2))	0.183728	-0.567929	-0.191319	0.978794	-0.014474	0.009851	-0.002513	-0.114068	0.388821	1.031.220
	[1.17252]	[-2.62991]***	[-0.51348]	[2.55838]***	[-0.08892]	[0.27791]	[-0.04540]	[-0.36182]	[0.95617]	[1.02424]
D(LDR_FOR_URT(-3))	-0.134094	-0.373439	-0.693171	0.837777	0.163022	0.021874	-0.054396	-0.244149	-0.341142	1.590.015
	[-0.89970]	[-1.81807]	[-1.95591]	[2.30221]	[1.05293]	[0.64878]	[-1.03349]	[-0.81420]	[-0.88199]	[1.66034]*
D(LDR_FOR_URT(-4))	0.195296	-0.371916	0.349455	0.055754	0.066000	-0.025033	0.067741	0.399421	-0.494804	0.204659
	[1.23565]	[-1.70745]	[0.92985]	[0.14448]	[0.40199]	[-0.70016]	[1.21368]	[1.25609]	[-1.20636]	[0.20153]
D(LTA_FOR_URT(-1))	-0.265435	0.348183	0.259684	-0.129515	0.016416	-0.022718	-0.162403	-0.884398	0.254935	1.422.728
	[-0.90105]	[0.85763]	[0.37073]	[-0.18007]	[0.05364]	[-0.34091]	[-1.56110]	[-1.49220]	[0.33347]	[0.75166]
D(LTA_FOR_URT(-2))	-0.126836	1.133.877	-0.090457	-1.990.467	-0.111414	-0.070447	-0.151961	-0.841944	0.034705	-1.679.293
	[-0.41371]	[2.68364]***	[-0.12409]	[-2.65914]***	[-0.34983]	[-1.01578]	[-1.40358]	[-1.36499]	[0.04362]	[-0.85249]
D(LTA_FOR_URT(-3))	0.239127	0.612319	0.430462	-1.450.458	-0.462584	0.039734	0.020934	-0.035388	0.991890	-2.856.888
	[0.80284]	[1.49169]	[0.60779]	[-1.99450]**	[-1.49505]	[0.58972]	[0.19902]	[-0.05905]	[1.28323]	[-1.49280]
D(LTA_FOR_URT(-4))	-0.226738	1.420.626	-1.112.206	-0.557419	0.097240	0.029560	-0.218373	-1.390.725	0.041835	1.441.296
	[-0.76249]	[3.46652]***	[-1.57296]	[-0.76775]	[0.31479]	[0.43943]	[-2.07949]**	[-2.32456]	[0.05421]	[0.75435]
D(NPL_FOR_URT(-1))	-0.008184	-0.911057	3.396.425	-0.466698	-0.864365	0.301395	0.396589	2.254.615	-0.850099	-9.466.309
	[-0.01465]	[-1.18305]	[2.55622]	[-0.34208]	[-1.48908]	[2.38437]**	[2.00976]**	[2.00547]**	[-0.58623]	[-2.63660]***
D(NPL_FOR_URT(-2))	0.562943	-0.032527	1.355.279	-0.821695	-0.458869	-0.006190	-0.266880	-1.377.424	0.706307	-2.156.451
	[1.06746]	[-0.04475]	[1.08079]	[-0.63816]	[-0.83762]	[-0.05189]	[-1.43302]	[-1.29821]	[0.51609]	[-0.63641]
D(NPL_FOR_URT(-3))	0.845839	-0.799189	1.471.539	-0.199846	-0.425612	-0.120663	0.186210	0.869649	2.347.183	-1.767.993
	[1.55418]	[-1.06553]	[1.13713]	[-0.15040]	[-0.75283]	[-0.98010]	[0.96887]	[0.79423]	[1.66190]*	[-0.50560]
D(NPL_FOR_URT(-4))	-0.640516	-0.041521	2.462.112	-0.332599	-0.619757	-0.035086	0.101150	0.725348	1.602.737	-4.597.919
	[-1.23763]	[-0.05821]	[2.00074]	[-0.26322]	[-1.15278]	[-0.29969]	[0.55345]	[0.69662]	[1.19334]	[-1.38271]
D(ROA_FOR_URT(-1))	-0.636554	2.536.785	-3.387.173	-3.340.979	0.299638	-0.230297	-0.321559	-0.964986	1.948.882	-4.759.631
	[-0.54967]	[1.58947]	[-1.23006]	[-1.18160]	[0.24907]	[-0.87910]	[-0.78628]	[-0.41417]	[0.64848]	[-0.63966]
D(ROA_FOR_URT(-2))	-0.263880	5.293.336	-1.935.359	-7.198.755	-0.254478	0.105744	-0.489649	-3.383.396	0.308107	-6.750.898
	[-0.24399]	[3.55133]***	[-0.75256]	[-2.72613]***	[-0.22650]	[0.43221]	[-1.28201]	[-1.55489]	[0.10977]	[-0.97147]
D(ROA_FOR_URT(-3))	0.527892	2.654.591	-2.902.331	-6.108.987	-1.148.741	-0.009804	-0.322147	-2.247.170	-0.193115	-6.759.847
	[0.46514]	[1.69723]*	[-1.07550]	[-2.20465]**	[-0.97438]	[-0.03819]	[-0.80379]	[-0.98416]	[-0.06557]	[-0.92701]
D(ROA_FOR_URT(-4))	0.936178	2.389.004	0.299896	-4.563.424	-0.886329	-0.237498	0.148439	0.836120	-2.035.889	-3.645.325
	[0.87232]	[1.61525]*	[0.11752]	[-1.74156]*	[-0.79502]	[-0.97828]	[0.39167]	[0.38724]	[-0.73100]	[-0.52864]

2808-4640 (ISSN)
2808-4934 (e-ISSN)

D(ROE_DOM_URT(-1))	-0.234012	1.299.245	-0.862697	1.081.925	1.106.109	-0.033068	0.014550	-0.537030	0.109988	2.064.351
	[-2.61466]***	[0.94594]	[-1.83920]*	[0.98816]	[1.01140]	[-0.55842]	[0.51886]	[-1.98615]*	[0.59288]	[2.97678]***
D(ROE_DOM_URT(-2))	-0.188665	0.914985	-0.443628	0.754478	0.696131	-0.089715	-0.012166	-0.445500	0.065701	2.598.223
	[-1.76985]*	[0.55931]	[-0.79407]	[0.57856]	[0.53442]	[-1.27203]	[-0.36426]	[-1.38335]	[0.29735]	[3.14564]***
D(ROE_DOM_URT(-3))	-0.351281	-0.608123	-0.901741	-0.432159	-0.464125	-0.108500	-0.026810	-0.266323	0.116945	1.697.384
	[-3.36707]***	[-0.37983]	[-1.64920]*	[-0.33861]	[-0.36407]	[-1.57186]	[-0.82016]	[-0.84497]	[0.54078]	[2.09973]**
D(ROE_DOM_URT(-4))	0.009923	-0.265035	-0.677629	-0.190855	-0.255185	-0.007536	0.011477	0.050657	0.016723	0.515024
	[0.10694]	[-0.18612]	[-1.39341]	[-0.16813]	[-0.22506]	[-0.12275]	[0.39475]	[0.18071]	[0.08694]	[0.71632]
D(SIZE_DOM_URT(-1))	-1.721	5.960.829	-1.720.691	5.586.948	5.613.874	0.301305	0.351824	4.091.467	1.150.069	1.210.988
	[-4.40644]***	[0.99420]	[-8.40364]***	[1.16896]	[1.17593]	[1.16563]	[2.87416]	[3.46646]***	[1.42017]	[4.00034]***
D(SIZE_DOM_URT(-2))	0.333648	9.335.357	7.273.805	9.099.747	9.511.815	0.411488	-0.256601	-3.216.298	2.625.659	2.566.508
	[0.63802]	[1.16325]	[2.65401]	[1.42243]	[1.48853]	[1.18929]	[-1.56610]*	[-2.03582]**	[2.42231]	[0.63340]
D(SIZE_DOM_URT(-3))	-0.722940	2.689.574	-7.420.001	2.357.960	2.410.232	0.182971	0.196615	2.329.982	0.183243	3.403.715
	[-1.51041]	[0.36616]	[-2.95795]***	[0.40270]	[0.41210]	[0.57778]	[1.31106]	[1.61132]*	[0.18470]	[0.91777]
D(SIZE_DOM_URT(-4))	-0.589324	1.875.043	-1.273.242	1.545.680	1.520.804	-0.449574	-0.081916	-1.305.353	0.367771	9.253.470
	[-1.37230]	[2.84513]***	[-0.56572]	[2.94220]	[2.89813]	[-1.58228]	[-0.60881]	[-1.00615]	[0.41316]	[2.78092]***
D(Z_DOM(-1))	-0.008032	0.369896	-0.123642	0.289595	0.289906	-0.024036	0.006118	-0.011894	-0.013124	0.006590
	[-0.37878]	[1.13661]	[-1.11249]	[1.11630]	[1.11877]	[-1.71310]*	[0.92083]	[-0.18564]	[-0.29857]	[0.04010]
D(Z_DOM(-2))	-0.053511	0.088657	-0.204182	0.067444	0.069632	-0.037637	-0.013000	-0.136064	0.002475	0.179986
	[-2.37815]**	[0.25675]	[-1.73145]*	[0.24502]	[0.25325]	[-2.52810]***	[-1.84403]*	[-2.00162]**	[0.05306]	[1.03235]
D(Z_DOM(-3))	-0.002033	-0.471013	-0.122775	-0.386383	-0.397552	-0.002620	-0.004378	-0.053130	0.001589	-0.105576
	[-0.08244]	[-1.24471]	[-0.95005]	[-1.28090]	[-1.31942]	[-0.16060]	[-0.56662]	[-0.71321]	[0.03109]	[-0.55258]
D(Z_DOM(-4))	0.005438	-0.536305	0.144344	-0.451076	-0.448409	-0.042163	-0.002889	-0.084113	-0.018584	-0.351276
	[0.26123]	[-1.67883]*	[1.32310]	[-1.77135]*	[-1.76288]*	[-3.06136]***	[-0.44292]	[-1.33753]	[-0.43071]	[-2.17789]**
C	0.002700	-0.034564	0.001227	-0.025055	-0.024969	-0.000884	-5.06E-05	-0.004186	0.006629	-0.006486
	[2.03830]**	[-1.70012]*	[0.17673]	[-1.54604]	[-1.54248]	[-1.00823]	[-0.12180]	[-1.04595]	[2.41415]	[-0.63184]
GDP(-1)	-0.000787	0.007540	0.000545	0.004479	0.004435	0.000243	-0.000106	0.000525	-0.003355	-0.000779
	[-1.84042]	[1.14965]	[0.24347]	[0.85666]	[0.84933]	[0.85828]	[-0.79243]	[0.40681]	[-3.78777]	[-0.23527]
INF(-1)	-9.38E-05	0.007119	-0.005977	0.007233	0.006867	0.000548	0.000297	0.003193	0.003107	0.011736
	[-0.12806]	[0.63327]	[-1.55698]	[0.80712]	[0.76716]	[1.13153]	[1.29364]	[1.44294]	[2.04610]	[2.06775]**
EXC(-1)	6.41E-08	-7.00E-07	-1.65E-08	-5.53E-07	-5.44E-07	1.27E-08	6.62E-09	1.04E-07	2.27E-08	-7.81E-07
	[1.09391]	[-0.77921]	[-0.05365]	[-0.77263]	[-0.76070]	[0.32896]	[0.36057]	[0.58691]	[0.18720]	[-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's 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 essential to see whether the domestic banking sector is genuinely considered healthy. However, in the past decades, both banks rejoice increasing stability levels. Even unaffected by a global financial crisis, domestic banks are trapped in the grey zone area due to incommensurate loan control, lower-earning ability total asset, and lack of capital buffer presence. In contrast, after the financial crisis of 2008, the foreign banking sector jumped out of the grey zone. It showed remarkable performance in terms of its stability level compared to domestic banks. Although foreign banks show pretty satisfying results, just like the domestic sector, the banks are still vulnerable to a high proportion of total credit and a high level of NPLs. They curtail lending growth and increase the vulnerability of the commercial banking industry, including the foreign banking industry, to higher credit losses. Therefore, the Indonesian banking industry should focus more on improving asset efficiency and credit quality to enhance the stability of the whole financial sector in Indonesia. As the 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, state-owned or private entity, is more vulnerable to crisis.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

REFERENCES

[1] Ferhani, H., & Lim, C. H. (2010). "Indonesia: financial system stability assessment. International Monetary Fund", IMF Country Report No. 10/288.

[2] Standard & Poor's. (2015). "Indonesia's banking industry stable but profitability may weaken". Retrieved on March 20, 2016 from http://www.indonesia-investments.com/news/news-columns/s-p-indonesia-s-banking-industry-stable-but-profitability-may-weaken/item6323

[3] Jan, A., & Marimuthu, M. (2016). "Bankruptcy profile of foreign vs. domestic Islamic banks of Malaysia: a post crisis period analysis". International Journal of Economics and Financial Issues, 6 (1).

[4] KPMG. (2015). "Investing in Indonesia 2015". Retrieved March 27, 2016 http://www.kpmg.com/ID/en/IssuesAndInsights/ArticlesPublications/Documents/Investing%20in%20Indonesia%20May%202015.pdf

[5] Ernst & Young. (2015). "Indonesian banking industry: challenging yet promising". Retrieved March 27, 2016 http://www.ey.com/Publication/vwLUAssets/EY-Indonesian-banking-industry-challenging-yet-promising/$FILE/EY-indonesian-banking-industry-challenging-yet-promising.pdf

[6] PricewaterhouseCoopers. (2015). "Indonesian banking survey 2015". Retrieved on February 6, 2016 from https://www.pwc.com/id/en/publications/assets/banking-survey-2015.pdf

[7] Ong, T. S., Lim, Y. T., & Teh, B. H. (2011). "A comparison on efficiency of domestic and foreign banks in Malaysia: a DEA approach". Business Management Dynamics, 1(4), 33-49

[8] Mian, A. (2003). "Foreign, private domestic, and government banks: new evidence from emerging markets". Retrieved March 27, 2016 from http://siteresources.worldbank.org/INTMACRO/Resources/Mian_DFGMacro.pdf

[9] Nasution, D. (2010). "Strengthening Indonesian banking, embracing global recovery". Retrieved March 27, 2016 from http://www.bi.go.id/en/iru/presentation/speeches/Documents/d35b59a373aa43989cac12f37d88cfb5BankersDinnerSpeech_Jan_2011.pdf

[10] Wisnubroto, R. A. (2015). "Analysis: challenges for Indonesian banking industry in 2016". Retrieved April 10, 2016 from http://www.thejakartapost.com/news/2015/12/16/analysis-challenges-indonesian-banking-industry-2016.html

[11] Kulathunga, A. (2012). "Can contemporary banking sector soundness measures proxy for financial sector stability and risk in developing countries pre-financial crisis and mid-financial crisis?". The George Washington University. Available from ProQuest Dissertations Publishing (UMI No. 3494236).

[12] Bank Indonesia (2015), "Statistik Perbankan Indonesia", Retrieved on February 6, 2016 from http://www.bi.go.id/id/statistik/perbankan/indonesia/Default.aspx

[13] Sherbo, A. J. & Smith, A. J. (2013). "The Altman z-score bankruptcy model at age 45: standing the test of time?". American Bankruptcy Institute Journal, 32(11), 40-41, 86.

[14] Georgios, K., Kanta K., Mitou K., (2012), The edward I. Altman's model of bankruptcy and the implementation of it on the Greek cooperative banks. The 9th Annual Management of International Business and Economics Systems International Conference Proceding, 7, 423-436.

[15] Chieng, J. R. (2013).Verifying the Validity of Altman's Z Score as a Predictor of Bank Failures in the case of the Euro zone. National college of Ireland, Ireland.

[16] Sharma, N. M. (2013). Altman model and financial soundness of Indian banks. International Journal of Accounting and Finance, 55-60

[17] Mamo, A. Q. (2011). Applicability of Altman (1968) model in predicting financial distress of commercial banks in Kenya. SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI

[18] Wahyu, D. S. (2013). "Analisis z-score pada bank yang terdaftar di bursa efek Indonesia pada tahun 2013". Jurnal Akuntansi UNESA, 2 (2).

[19] Sagho, M. F., & Merkusiwati, N. K. L. A. (2015). "Penggunaan metode Altman z-score modifikasi untuk memprediksi kebangkrutan bank yang terdapat di bursa efek". E-Jurnal Akuntansi Universitas Udayana, 11 (3).

[20] Coste, J. and Pouchot, J. (2002). "A grey zone for quantitative diagnostic and screening tests". International Journal of Epidemiology, 32(2), 304-313.

2808-4640 (ISSN)
2808-4934 (e-ISSN)

[21] Altman, E.I. (2000), "Predicting Financial Distress of Companies: Revisiting the Z-score and Zeta Models", Stern School of Business, New York: New York University, Journal of Banking & Finance, 9-12.
[22] Canicio, D. and Blessing, K. (2014). "Determinants of bank failures in multiple-currency regime in Zimbabwe (2009-2012)". International Journal of Economics and Finance, 6 (8), 229-246.
[23] Nurazi. R., & Evans, M. (2005). "An Indonesian study of the use of CAMEL(S) ratios as predictors of bank failure". Journal of Economic and Social Policy, 10(1), 6.
[24] Ascarya, Hasanah, Heni and Achsani, N.A. (2008), "Permintaan Uang dan Stabilitas Moneter dalam Sistem Keuangan Ganda di Indonesia". Paper presented at "Seminar dan Kolokium Nasional Sistem Keuangan Islam II", Bandung, Indonesia, 6 September 2008.
[25] Ascarya & Bayuni, E. M. (2010), "Analisis Pengaruh Instrumen Moneter Terhadap Stabilitas Besaran Moneter dalam Sistem Moneter Ganda di Indonesia". Islamic Finance & Business Review, 5(1). Retrieved on March 22, 2016 from file:///C:/Users/Z1402/Downloads/42-106-1-PB.pdf
[26] Ouerghi, F. (2014). Are Islamic Banks More Resilient To Global Financial Crisis Than Conventional Banks ?. Asian Economic and Financial Review, 4(7), 941-955.
[27] Azam, M., & Siddiqui, S. (2012). Domestic and Foreign Banks' Profitability: Differences and Their Determinants. International Journal of Economics and Financial Issues, 2(1), 33-42.
[28] Babanskiy. (2012), "Determinants of Bank Failures: The Case of Russia", Umea University, 29–32, Retrieved March 27, 2016 from http://www.essays.se
[29] Li, Q. Y. (2013). "What causes bank failures during the recent economic recession?". Honors Projects (28). Retrieved March 27, 2016 from http://digitalcommons.iwu.edu/busadmin_honproj/28
[30] Davidson, J. (2000). "Econometric methods". Wiley. ISBN 0-631-21584-0.
[31] Moniruzzaman, MD., Toy, M. M., Hassan, A. B. M. R. (2011). "The export supply model of Bangladesh: an application of cointegration and vector error correction approaches". International Journal of Economics and Financial Issues, 1(4), 163-171.

2808-4640 (ISSN)
2808-4934 (e-ISSN)