

BRKP

BULETIN RISET KEBIJAKAN PERBANKAN



Departemen Penelitian dan Pengaturan Perbankan



9 772714 579004

VOL. 2, NO. 2, APRIL 2021

ISSN 2714-5794

BRKP

BULETIN RISET KEBIJAKAN PERBANKAN



Departemen Penelitian dan Pengaturan Perbankan
Menara Radius Prawiro Lantai 9-10
Kompleks Perkantoran Bank Indonesia
JI M.H. Thamrin No. 2, Jakarta 10350

BULETIN RISET KEBIJAKAN PERBANKAN

Pengarah

Heru Kristiyana, S.H., M.M.

Penasihat

Dr. Teguh Supangkat S.E., Akt., M.Si. CA.

Penanggung Jawab

Dr. Anung Herlianto E.C., S.E., Akt., CA., M.B.A.

Mohamad Miftah, S.E., M.B.A.

Editor Umum

Prof. Rofikoh Rokhim SE, SIP, DEA, Ph.D, Universitas Indonesia

Dr. Wahyoe Soedarmono, Universitas Sampoerna

Siti Yayuningsih, S.P., M.A

Joko Siswanto, S.E., S.H., M.Sc., M.H.

Yudhisti Ramadiantio

Nila Khusnika Sari

Sekar Dwi Nadesky

Kontributor

Oktofa Yudha Sudrajad, Institut Teknologi Bandung

Ahmad Maulin Naufa, Universitas Gadjah Mada

Muizzuddin, Universitas Sriwijaya

Adong Purba, Bank Jawa Barat

Eric Triputra Witono, STIE Indonesia Banjarmasin

Fidya Kasih Maulidya, Universitas Andalas

Raihan Imaduddin Rahmat, Universitas Katolik Parahyangan

Yolanda Dienul Fathia, Universitas Islam Bandung

KATA PENGANTAR

Puji syukur ke hadirat Allah SWT, Tuhan yang Maha Kuasa, karena dengan rahmat dan hidayah-Nya maka Buletin Riset Kebijakan Perbankan (BRKP) ini dapat diterbitkan. Penerbitan BRKP Vol. 2, No. 2 April 2021 ini merupakan salah satu upaya Otoritas Jasa Keuangan (OJK) dalam mendorong peningkatan publikasi riset mengenai kebijakan dan perkembangan industri perbankan untuk mewujudkan kebijakan berbasis penelitian (*research-based policy*). Hal tersebut sangat mendukung pelaksanaan tugas pokok OJK dalam mengatur dan mengawasi sektor jasa keuangan, termasuk sektor perbankan.

Penerbitan BRKP kali ini menyajikan sejumlah karya terpilih hasil kompetisi tahunan *Call for Paper* OJK tahun 2020 dengan tema "Penguatan Daya Saing Industri Perbankan di Era Kompetisi Digital". Karya ilmiah dalam BRKP ini telah melalui proses penjurian yang selektif oleh tim OJK dan akademisi. Beragam topik menarik terkait pemanfaatan teknologi dalam kegiatan operasional perbankan disajikan dengan mengidentifikasi permasalahan yang ada, menganalisis berdasarkan teori dan metodologi yang sesuai kaidah keilmuan, dan memberikan kesimpulan serta rekomendasi kebijakan yang sangat bermanfaat terhadap pengambilan kebijakan OJK khususnya dalam pengembangan bisnis perbankan berbasis digital.

Pemanfaatan teknologi dalam operasional perbankan telah berlangsung sejak lama dan merupakan suatu proses yang berkelanjutan. Saat ini industri perbankan telah memasuki era Bank 4.0 dimana kegiatan operasional perbankan semakin intensif dalam memanfaatkan teknologi digital seperti *Artificial Intelligence*, *Blockchain*, *Big Data*, dan *Cloud Computing*. Di sisi lain, pandemi Covid-19 juga mendorong perubahan signifikan pada pola konsumen dan akselerasi bank dalam memanfaatkan kemajuan teknologi digital pada *internal business process*. Pada

akhirnya, industri perbankan dihadapkan pada pilihan untuk terus berubah semakin maju atau berdiam diri untuk kemudian tertinggal.

Transformasi digital sektor jasa keuangan dengan mempercepat digitalisasi sektor jasa keuangan merupakan salah satu kebijakan dan inisiatif dalam kebijakan strategis OJK tahun 2020. Selaku regulator, OJK telah dan akan terus mengembangkan kebijakan yang bersifat *forward-looking* agar dapat sejalan dengan dinamika industri dan mengantisipasi potensi risiko pada sektor perbankan ke depan, sehingga stabilitas sektor jasa keuangan dapat terjaga. Hasil riset yang teruji secara empiris dan berbagai masukan dari segenap pemangku kepentingan akan mendukung proses penyusunan regulasi yang tepat sasaran dan sesuai kebutuhan. Tidak hanya itu, riset yang berkualitas juga akan memicu inovasi pada perbankan di Indonesia sehingga akan terus berkembang di masa yang akan datang.

Untuk merespons perkembangan teknologi informasi yang sangat pesat, OJK sedang menyusun Cetak Biru Transformasi Digital Perbankan tahun 2021 yang bertujuan memberikan kerangka kerja yang berimbang antara inovasi dan keamanan perbankan. Transformasi layanan bank dari cara-cara tradisional menuju layanan berbasis digital diharapkan berjalan sesuai dengan ekspektasi kebutuhan nasabah sekaligus mendorong persaingan usaha yang sehat dan kolaboratif dalam industri perbankan.

Akhir kata, semoga BRKP ini dapat memberikan manfaat dan menjadi referensi bagi seluruh pemangku kepentingan yang memiliki perhatian terhadap pengembangan industri perbankan di Indonesia. Semoga perbankan Indonesia dapat tumbuh dan berkembang semakin tangguh, inovatif, dan berkontributif bagi perekonomian Indonesia.

Selamat membaca.

Deputi Komisiner
Pengawas Perbankan I
Otoritas Jasa Keuangan



Teguh Supangkat

DAFTAR ISI

- iii KATA PENGANTAR
- 2 Why Banks Perform Consolidation:
to Avoid Failure or to Expand?
Evidence From Indonesian Banking Industry
- 21 The Covid-19, Banking Stock Price,
and Policy in Indonesia
- 42 Pendeteksian *Fraud E-Channel* menggunakan
Algoritma Pembelajaran Mesin
- 62 Analisis Ketepatan Model Prediksi Kebangkrutan
Emiten Perbankan yang Tercatat Di Bursa Efek
Indonesia (Periode 2019 – Kuartal I 2020)
- 84 Securitization: Economic Stimulus with
Strengthening of Banking Intermediation in Facing
the Covid-19 Pandemic
- 111 Hubungan Konsentrasi dan Efisiensi Industri
Perbankan Di Indonesia

Halaman ini sengaja dikosongkan

Penguatan Daya Saing Industri Perbankan di Era Kompetisi Digital

1. *Why Banks Perform Consolidation: To Avoid Failure Or To Expand? Evidence From Indonesian Banking Industry* (Oktofa Yudha Sudrajad)
2. *The Covid-19, Banking Stock Price, And Policy In Indonesia* (Ahmad Maulin Naufa dan Muizzuddin)
3. *Pendeteksian Fraud E-Chawannel Menggunakan Algoritma Pembelajaran Mesin* (Adong Purba)
4. *Analisis Ketepatan Model Prediksi Kebangkrutan Emiten Perbankan Yang Tercatat Di Bursa Efek Indonesia (Periode 2019 – Kuartal I 2020)* (Eric Triputra Witono)
5. *Securitization : Economic Stimulus With Strengthening Of Banking Intermediation In Facing The Covid-19 Pandemy* (Fidya Kasih Maulidya)
6. *Hubungan Konsentrasi Dan Efisiensi Industri Perbankan Di Indonesia* (Raihan Imaduddin Rahmat & Yolanda Dienul Fathia)

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

OKTOFA YUDHA SUDRAJAD

*School of Business and Management, Institut Teknologi Bandung
Bandung, Indonesia*

ABSTRACT

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

Keywords: *Bank failure, Merger and Acquisition, Competing Risk, Z-index, Cox proportional hazard model*

JEL classification: G21, G24, G33

1. Introduction

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

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

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

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

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

2. Data and Methodology

2.1. Data

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

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

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

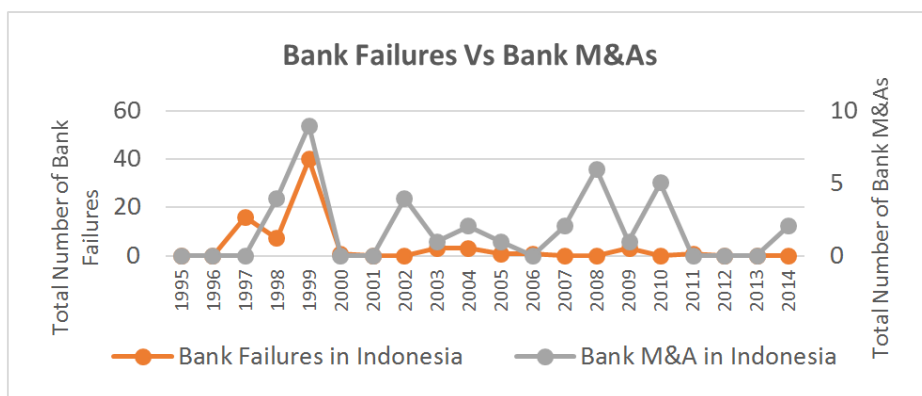


Figure 1 Number of Banks M&A Activities

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

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

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

Table 1 Banks Classification

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

2.2 Methodology

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

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

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

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

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

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

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

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

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

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

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

Table 2 Operational Variables and Expected Sign for The Coefficients

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

3. Results

3.1. Preliminary Statistics

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

Table 3 Descriptive Statistics of The Variables

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

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

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

Table 4 Correlations of The Explanatory Variables

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

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

3.2. Determinants of Banks' Failure Hazard

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

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

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

Table 5 Banks' Failures Hazard

(Wald statistics in parentheses)

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

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

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

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

3.3. Determinants of Banks' M&A Hazard

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

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

Table 6 Banks' M&A Hazard

(Wald statistic in parentheses)

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

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

3.4. Checking Model Assumption and Robustness Check¹

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

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

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

4. Conclusion

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

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

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

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

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

References

- Altunbas, Y. & Marques, D., 2008. Mergers and acquisitions and bank performance in Europe: The role of strategic similarities. *Journal of Economics and Business*, 60(3), pp.204–222.
- Batunanggar, S., 2002. Indonesia's banking crises resolution: Lessons and the way forward. *Banking Crisis Resolution Conference, CCBS, Bank of England*, 2002(December), p.47.
- Berger, A.N., Demsetz, R.S. & Strahan, P.E., 1999. The consolidation of the financial services industry: Causes, consequences, and implications for the future. *Journal of Banking & Finance*, 23, pp.135–194.
- Berger, A.N., Herring, R.J. & Szegö, G.P., 1995. The role of capital in financial institutions. *Journal of Banking and Finance*, 19(3-4), pp.393–430.
- Blum, J., 1999. Do capital adequacy requirements reduce risks in banking? *Journal of Banking & Finance*, 23(5), pp.755–771.
- Cihák, M. & Hesse, H., 2007. Cooperative Banks and Financial Stability. *IMF Working Papers*, 07(2), p.36.
- Cox, D.R., 1972. Regression Models and Life-Tables. *Journal of the Royal Statistical Society. Series B (Methodological)*, 34(2), pp.187–220.
- de Paula, Luiz F.M., 2002. Expansion strategies of banks: does size matter?. *Nova Economia Belo Horizonte*, 12(2), pp.133-145.
- Elsas, R., 2007. Preemptive Distress Resolution Through Bank Mergers. *unpublish manuscript*.
- Enoch, C. et al., 2001. Indonesia: Anatomy of a Banking Crisis Two Years of Living Dangerously 1997-1999. *IMF Working Papers*.
- Goddard, J., Molyneux, P. & Zhou, T., 2012. Bank mergers and acquisitions in

- emerging markets: evidence from Asia and Latin America. *The European Journal of Finance*, 18(5), pp.419–438.
- Keeton, W.R., 1989. The new risk-based capital plan for commercial banks. *Federal Reserve Bank of Kansas City - Economic Review*, (December), pp.40 – 60.
- Koehn, M. & Santomero, A.M., 1980. Regulation of Bank Capital and Portfolio Risk. *Journal of Finance*, 35(5), pp.1235–1244.
- Koetter, M. et al., 2007. Accounting for distress in bank mergers. *Journal of Banking and Finance*, 31(10), pp.3200–3217.
- Lepetit, L. & Strobel, F., 2013. Bank insolvency risk and time-varying Z-score measures. *Journal of International Financial Markets*, Pangestu, M., 2003. The Indonesian Bank Crisis and Restructuring: Lessons and Implications for other Developing Countries. , (23), pp.1–48.
- Santoso, W., 1998. *The determinants of problem banks in Indonesia: an empirical study*,
- Sato, Y., 2005. Bank restructuring and financial institution reform in Indonesia. *Developing Economies*, 43(1), pp.91–120.
- Shalendra D. Sharma, 2001. the Indonesian Financial Crisis : From Banking Crisis To Financial 1997-2000. *Indonesia*, 71(71), pp.79–110.
- Wheelock, D.C. & Wilson, P.W., 2000. Why do banks disappear? The determinants of US banks failures and acquisitions. *The Review of Economics and Statistics*, 1(February), pp.127–138.



The Covid-19, Banking Stock Price, and Policy in Indonesia

AHMAD MAULIN NAUFA¹, MUIZZUDDIN^{1,2}

¹ *Faculty of Economics and Business, Universitas Gadjah Mada*

² *Faculty of Economics, Universitas Sriwijaya*

ABSTRACT

This study examines whether COVID-19 has an impact on banking stock price and whether any policy from the Indonesian government and regulators could alleviate its impact. We use time-series daily data from January to July 2020, regression models (ordinary least square and generalized method of moments), and some robustness tests. We find that COVID-19 has a negative effect on the banking stock price, where new deaths have the greatest one. Nonetheless, the policies could mitigate its negative effect to be insignificant on the price. Therefore, it is pivotal to measure COVID-19's drawback by providing relevant policies.

Keywords: *COVID-19, Banking Stock Price, Policy, Indonesia*

JEL Code: G10, G18

1. Introduction

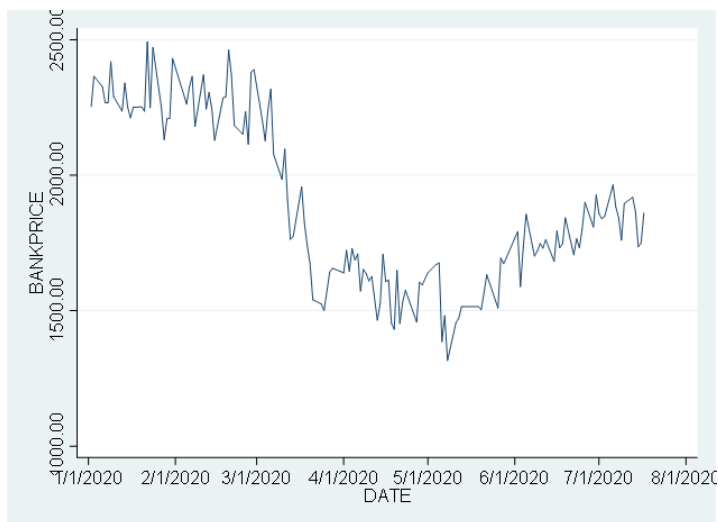
The Coronavirus disease (COVID-19), as the global pandemic, has devastated massively various aspects of the economy and financial markets (Goodell & Goutte, 2020; Zaremba, Kizys, Aharon, & Demir, 2020). In a recent pioneer study, Goodell (2020) highlighted that the COVID-19 pandemic caused unprecedented global economic damage in most of the countries entailing Indonesia. It firstly infected Indonesia with two new cases on March 2, 2020 (WHO, 2020). It also dramatically caused various impacts on the economy; therefore, all governments worldwide attempt to measure it with multiple policy responses (IMF, 2020). The effect was proven through the fall in stock prices, including the banking sector, so that the price of banking stock fell sharply to an average of Rp1,316 (Reuters, 2020).

The rapid spread of COVID-19 recently has confirmed up to 100,303 people in 34 provinces as of July 27, 2020. So, it is pivotal to prove its impact empirically on the banking sector because several studies show that sentiment or a significant event affects the return of stocks (Al-Awadhi, Alsaifi, Al-Awadhi, & Alhammedi, 2020; Alfaro, Chari, Greenland, & Schott, 2020; Ashraf, 2020; Gangopadhyay, Haley, & Zhang, 2010). Meanwhile, the government responded with various policy approaches to minimize the pandemic (Narayan, Phan, & Liu, 2020). Various countermeasures for handling COVID-19 by providing medical facilities and equipment, medicines, providing incentives to medical teams, social distancing, and economic stimulus packages.

Therefore, based on those backgrounds, this study aims to examine whether COVID-19 has an impact on banking stock price. We argue that it would negatively affect the bank since it creates devastating shocks and leads to panic for investors; hence the price would plunge. This posit is supported by prior studies that find that the COVID-19 creates freefall of global markets and banks due to increasing panic and deterioration (Ali, Alam, & Rizvi, 2020; Haroon & Rizvi,

2020). The COVID-19 pandemic is causing a direct global destructive economic impact present in every globe (Goodell, 2020). Second, this study also proposes to test whether any policy from the Indonesian government and authorities could alleviate its impact. The previous review stated that policymakers should tackle COVID-19 together through significant policies to reduce unfavorable outcomes (Liu, Manzoor, Wang, Zang, & Manzoor, 2020; Wagner, 2020). The Indonesian government implements some measures to maintain financial stability and avoid recession, such as the task force (Gugus Tugas) to accelerate COVID-19 handling, Presidents' regulations (KEPRES), lockdown relaxation, and new normal. It is interesting to explore whether and which policies are adequate to measure COVID's negative impact.

We choose Indonesia as an emerging market since Indonesia is a country with the 4th largest population in the world. Indonesia is also quite a different condition than other developing and developed countries (Naufa, Lantara, & Lau, 2019). The prior studies mostly focused on cross-country levels (Ali et al., 2020; Haroon & Rizvi, 2020), but to best our knowledge, there is a limited study that specifically elaborates COVID-19's impact on a particular market, particularly Indonesia. Its banking sector, as a vital economic pillar, is the most affected sector due to COVID-19's widespread, reflected by the highest drop on the banking stock price on average (Reuters, 2020). It started to recover its stock price in the middle of May due to the Indonesian governments' interventions (IMF, 2020). According to the Financial Stability Board's reports, Indonesia has taken out some financial policy measures in response to the COVID-19 pandemic, i.e., reducing policy rate and fiscal stimulus as the monetary and fiscal policy, government guarantees on lending, and other policies. Further, the details of banking stock price movements are presented in Figure 1 as follows:



Note: This figure depicts the movement of banking stock price from January 1, 2020, to July 24, 2020, per day.

Figure 1. Banking stock price index from January to July 2020

(Sources: Thomson Reuters Eikon)

The Indonesian government and other regulators attempt to measure COVID-19's impact by promoting some regulations like lockdown in many regions and cities (PSBB), national emergency status, learning and working from home, health protocol, health awareness campaigns, wearing a masker mandatory, and other regulations (IMF, 2020). However, the number of new cases and new deaths fluctuate, up to 2,657 new cases and 139 new deaths per day. The number of cumulative cases and cumulative deaths also upsurge sharply up to 91,751 and 4,459 cases per July 25, 2020, according to the World Health Organization's data (WHO). There is a message from the WHO's Director; many countries take some wrong policies to conduct relaxations from lockdown

without considering the number of COVID's pattern that is still continuously increasing. The conditions of ineffective policies to reduce the amount of those cases could be caused by the indiscipline of the Indonesian citizens to obey the government rules or regulations. On the other hand, there is a possible condition that those policies are still ambiguous due to without explicit punishment or penalty to a person who did not commit the rules.

To best our knowledge, the COVID-19 research for the Indonesian context, primarily related to the banking sector with empirical evidence, is limited, so further investigation about its potential impact empirically is essential (Goodell & Goutte, 2020). For instance, prior studies only focused on many financial markets (Liu et al., 2020) and investment instruments (Ashraf, 2020), and we only found two papers: (i) Nicolaidis (2020) elaborates on the Coronavirus relationship with the European Union (EU) bank. However, it only tells the literature and regulations without empirical testing or evidence, and (ii) Talbot and Ordonez-Ponce (2020) relates COVID-19 and Canadian bank with content analysis only. Therefore, we attempt to contribute literature in this field to capture more detail in a specific country (Goodell & Huynh, 2020; Sharif, Aloui, & Yarovaya, 2020) about the effect of COVID-19 on banking, rather than broader context (cross-country analysis). It helps us to get more of its far-reaching impact as previous studies done (Ali et al., 2020; Liu et al., 2020). We also offer new empirical evidence whether the policy from the Indonesian government or other authorities effectively could reduce COVID-19's impact on Indonesian banks. It is an absolute novelty that the prior studies did not explore specifically (Sharif et al., 2020; Zhang, Hu, & Ji, 2020).

This study contributes to twofold as follows. For the literature, this research would enhance the empirical studies related to COVID-19 and how it could alleviate its negative impact, significantly the more in-depth understanding of Indonesia as one of the emerging markets to contribute globally. Second, for

the policymakers, this study promotes which and from whom policies in detail that effectively could measure COVID-19's drawbacks in Indonesia. This study reports each policy from all regulators simultaneously and partially evaluates its impact COVID-19 on banking stock price.

2. Data and Methodology

2.1. Data

In this study, we used some data sourced from Thomson Reuters (DataStream), The World Health Organization (WHO), The Financial Service Authority (OJK), The Indonesian Website of COVID-19 (www.covid19.go.id), The Indonesian Stock Exchange (IDX), and International Monetary Fund (IMF). We use time-series data from January 1, 2020, to July 24, 2020. The data, such as bank price, is the average value of stock price from all public banks daily in Indonesia from the Thomson Reuters database. The new cases, cumulative cases, new deaths, and cumulative deaths are from the WHO database that consists of each case.

The policy data, such as OJK, is the dummy variable. We put one if there is any policies or regulation from the OJK and 0 for otherwise daily. The government is also a dummy variable where we put one if there is any policies or law from The Indonesian President, ministries, and local government, and 0 for otherwise daily. The other variable, IDX, is from that website if there are any rules or regulations to measure COVID-19 in the capital market. We also obtain from the IMF reports any policies background, reopening economy, fiscal, monetary and macroeconomic, exchange rate and balance of payments by inputting dummy one if there are any policies related to those fields and 0 for otherwise. We retrieve the exchange rate from local currency (IDR) to obtain 1 dollar per day as a control variable by DataStream. The details of our variables are presented in Table 1 as follows:

Table 1 Operationalized Variables

Variable	Definition	Source	Reference
BANKPRICE	The average value of stock prices from all public banks daily in Indonesia	Thomson Reuters	(Haroon & Rizvi, 2020) ^a
NEWCASES	The number of new cases of COVID-19 per day in Indonesia	The World Health Organization	(Goodell, 2020)
CUMCASES	The number of cumulative cases of COVID-19 per day in Indonesia	The World Health Organization	(Sharif et al., 2020)
NEWDEATHS	The number of new deaths of COVID-19 per day in Indonesia	The World Health Organization	(Liu et al., 2020)
CUMDEATHS	The number of cumulative deaths of COVID-19 per day in Indonesia	The World Health Organization	(Sharif et al., 2020)
OJK	Dummy 1 if there is any policies or regulations from The Indonesia Financial Service Authority (OJK) and 0 for otherwise daily	www.ojk.go.id	(Berardi et al., 2020)
GOVERNMENT	Dummy 1 if there is any policies or regulations from The Indonesian President, Ministries, local governments, and 0 for otherwise daily	www.COVID19.go.id	(Goodell, 2020)
IDX	Dummy 1 if there is any policies or regulations from The Indonesian Stock Exchange (IDX), and 0 for otherwise daily	www.idx.co.id	(Liu et al., 2020)
POLICY	Dummy 1 if there is any policies background from The Indonesian government to measure COVID-19 such as lockdown, etc., and 0 for otherwise daily	International Monetary Fund	(Sharif et al., 2020)
REOPENINGECONOMY	Dummy 1 if there is any policy to reopen the economy from The Indonesian government such as new normal, etc., and 0 for otherwise daily	International Monetary Fund	(He et al., 2020)

Variable	Definition	Source	Reference
FISCAL	Dummy 1 if there is any policy related to fiscal from the Indonesian government such as stimulus packages, etc., and 0 for otherwise daily	International Monetary Fund	(Ashraf, 2020)
MONETARYMACRO	Dummy 1 if there is any policy related to monetary and macroeconomic from the Central Bank (BI), and 0 for otherwise daily	International Monetary Fund	(Conlon et al., 2020)
EXRATEBALANCEPAYMENT	Dummy 1 if there is any policy related to exchange rate and balance of payments from the Central Bank (BI), and 0 for otherwise daily	International Monetary Fund	(Lawley, 2020)
IDRUSD	The exchange rate from local currency (IDR) to obtain 1 Dollar per day.	DataStream	(Wójcik & Ioannou, 2020)

2.2 Methodology

To analyze our hypotheses, we utilize the ordinary least square (OLS) regression model since it is the most straightforward estimator that could capture the relationship between the independent and dependent variables (Haroon & Rizvi, 2020). We examine the direct effect of COVID-19. It is proxied by four measures (the number of new cases, cumulative cases, new deaths, and cumulative deaths) on Indonesian banking stock prices with the exchange rate (IDR to USD) as a control variable since it could influence the stock price index. We choose it as the control variable as it could affect banking stock prices in Indonesia. In this study. We offer COVID-19 measures from not only many cases (cumulative cases), but also the new cases, new deaths, and cumulative cases. Our composed model is as follows:

$$BANKPRICE_t = \alpha_t + \beta_1 COVID - 19_t + \beta_2 EXRATE_t + \varepsilon_t \quad (1)$$

$BANKPRICE_t$ denotes the banking index stock prices at time t (daily) from the average value of all banks stock prices, while $COVID-19_t$ is proxied by new cases, cumulative cases, new deaths, and cumulative deaths on the day t . $EXRATE_t$ is the exchange rate obtained from local currency (IDR) to United States Dollar (USD). ε_t is the standard errors or residuals. Further, in this study, we provide the price of the stock index rather than return or volatility of stock index like most prior studies focus (Haroon & Rizvi, 2020; He et al., 2020). This study also offers deep understanding by focusing on one capital market (Indonesia) to explore a more in-depth market in each sector rather than a broader context or cross-country analysis like previous research (Ali et al., 2020).

Our second hypothesis is whether any policy from the Indonesian government or other regulators could reduce the negative impact of COVID-19 on the Indonesian stock market. We argue that any regulations or interventions from the regulators diminish its impact. We modify the regression model from previous studies (Sharif et al., 2020; Zhang et al., 2020) by accommodating policy with dummy values. So, we include various kinds of regulations into the regression model from Equation (1) to compose Equation (2) as follows:

$$BANKPRICE_t = \alpha_t + \beta_1 COVID_19_t + \beta_2 POLICIES_t + \beta_3 EXRATE_t + \varepsilon_t(2)$$

$POLICIES_t$ denotes dummy 1 values if there are any kinds of policies from various regulators such as the OJK, President or other local governments, Indonesian Stock Exchange (IDX), policy background, reopening economy, fiscal, monetary and macroeconomic, and exchange rate and balance of payments. We will run all of the proxies in Equation (2) like Equation (1) in various proxies for stock index price and COVID-19.

As the robustness, we also estimate the generalized method of moments (GMM) to address the possible endogeneity issue. We put the lagged values

(t-1) of the dependent variable as the instrumental variable (IV) in this GMM model to avoid serial correlations since the benefits of the dependent variable this year could be influenced by itself from the previous year. GMM is the best regression model that could address all endogeneity issues. We could obtain the most efficient and consistent results since this model assumed the error to be zero compared to other least squares.

This argument is supported by Dietrich, Hess, and Wanzenried (2014) state that the GMM model could account for potential problems in the regression model specifications. They used the lagged value of the dependent variable as the instrumental variable (IV) since it could suffer from endogeneity (serial correlation).

Further, we include the policies from the government and other authorities as to the explanatory variable together with COVID-19 to examine whether those could minimize the negative impact of COVID-19 on the banking stock price. As additionally, we also test whether the specific regulations from the OJK (POJK) partially are also useful to measure COVID-19's effect.

3. Results

We present the descriptive statistics, including the number of observations, mean, standard deviation, minimum, and maximum values from each of the variables in Table 2. This step follows prior studies that provided the descriptive statistic to give the detail of data variation for each of the variables (Goodell & Goutte, 2020; Goodell & Huynh, 2020; Haroon & Rizvi, 2020). The results depict that the mean value of banking stock price in Indonesia per day is IDR1,887.54. The maximum amount of new cases, cumulative cases, new deaths, and cumulative deaths are up to 2,657, 91,751, 139, and 4,459 people per day. The exchange rate (IDR to 1 USD) per day is IDR14,559.45 on average. The details are presented below:

Table 2 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
BANKPRICE	139	1,887.54	309.17	1,316.18	2,492.52
NEWCASES	204	449.76	549.48	0.00	2,657.00
CUMCASES	204	17,640.71	24,745.11	0.00	91,751.00
NEWDEATHS	204	21.86	25.82	0.00	139.00
CUMDEATHS	204	972.00	1,222.04	0.00	4,459.00
OJK	204	0.10	0.30	0.00	1.00
GOVERNMENT	204	0.25	0.43	0.00	1.00
IDX	204	0.10	0.30	0.00	1.00
IDRUSD	146	14,559.45	815.72	13,572.50	16,575.00
POLICY	204	0.19	0.39	0.00	1.00
REOPENINGECONOMY	204	0.24	0.43	0.00	1.00
FISCAL	204	0.56	0.50	0.00	1.00
MONETARYMACRO	204	0.40	0.49	0.00	1.00
EXRATEBALANCE	204	0.70	0.46	0.00	1.00

We run the relationship test between COVID-19 (proxied by new and cumulative cases, new and cumulative deaths), and banking stock index price with the exchange rate as the control variable using ordinary least squares (OLS) on Panel A Table 3. We find that all COVID-19 proxies have a negative relationship with bank stock price. These findings confirm prior studies from prior studies that Covid-19 is linked to lower the financial markets since it creates market shocks and negative sentiment for investors (Goodell & Huynh, 2020; Zhang et al., 2020) causing investors to suffer significant loses in a very short period of time. This paper aims to map the general patterns of country-specific risks and systemic risks in the global financial markets. It also analyses the potential consequence of policy interventions, such as the US' decision to implement a zero-percent interest rate and unlimited quantitative easing (QE. In comparison,

the most variable with the highest negative effect is new deaths, compared to other proxies. It indicates that COVID-19 leads to lower banking stock prices, and new deaths have the greatest one.

Those above results are robust and consistent, using the generalized method of moments (GMM) to measure possible endogeneity issues (Panel B Table 3). This argument is supported by Dietrich et al. (2014), who stated that the GMM model could account for potential problems in the regression model specifications. They used the lagged value of the dependent variable as the instrumental variable (IV) since it could suffer from endogeneity (serial correlation).

So, we put the lagged values of the dependent variable as the IV in this GMM model to avoid serial relationships, since the benefits of the dependent variable this year could be influenced by itself from the previous year. We find that all COVID-19 proxies still decrease the banking stock price. This finding is supported by Nicolaidis (2020), who stated that the COVID-19 challenges banks to rescue the business, so it is quite difficult for banks. The new deaths due to COVID-19 is a devastated one. The details are presented as follows:

Table 3 Regression Analysis of COVID-19 on Banking Stock Price

Panel A. Ordinary Least Squares (OLS)	
Variables	Dependent variable = Banking Stock Price
NEWCASES	-0.23*** (0.03)
CUMCASES	-0.00*** (0.00)
NEWDEATHS	-4.88*** (0.68)
CUMDEATHS	-0.10*** (0.01)

Panel A. Ordinary Least Squares (OLS)				
Variables	Dependent variable = Banking Stock Price			
IDRUSD	-0.27*** (0.02)	-0.28*** (0.02)	-0.25*** (0.02)	-0.28*** (0.02)
Constant	5,912.25*** (240.02)	6,059.71*** (252.95)	5,693.76*** (251.86)	6,018.62*** (239.35)
Observations	115	115	115	115
R-squared	0.75	0.73	0.73	0.76

Panel B. Generalized Method of Moments (GMM); IV = Lag-1 of Price				
Variables	Dependent variable = Banking Stock Price			
NEWCASES	-0.53*** (0.06)			
CUMCASES	-0.01*** (0.00)			
NEWDEATHS	-13.05*** (1.50)			
CUMDEATHS	-0.24*** (0.03)			
IDRUSD	-0.26*** (0.01)	-0.30*** (0.02)	-0.21*** (0.02)	-0.28*** (0.02)
Constant	5,946.85*** (214.45)	6,407.86*** (252.85)	5,266.35*** (287.64)	6,223.01*** (225.86)
Observations	97	97	97	97
R-squared	0.53	0.34	0.38	0.52

Note: Panel A (Standard errors in parentheses). Panel B (Robust standard errors in parentheses). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Further, we attempt to include any government and authorities' policies to test whether those policies could alleviate the negative impact of COVID-19 on banking stock price. We present our results in Table 5, Panel A (OLS), and Panel

B (GMM). The results depict that the negative impact of COVID-19 on banking stock price becomes insignificant.

It means that those policies are significant to mitigate drawback's effects of COVID-19 on banks. The relevant policies to reduce COVID19's impact on banks are the government (the President and ministries), The Indonesian Stock Exchange (IDX), and the Bank Indonesia through exchange rates balance of payments. These results indicate that the policy from the government and authorities could lower the negative impact of Covid-19 on the capital market. The results are consistent with the previous study who find that any policy from the government could minimize the adverse effects from Covid-19 on the capital market since it would maintain stock price (Sharif et al., 2020).

Table 4 COVID-19 To Banking Stock Price with Policy

Panel A. Ordinary Least Squares (OLS)				
NEWCASES	-0.00			
	(0.08)			
CUMCASES		0.00		
		(0.00)		
NEWDEATHS			0.78	
			(1.19)	
CUMDEATHS				-0.01
				(0.04)
OJK	-19.13	-19.49	-21.56	-18.73
	(32.35)	(31.97)	(32.14)	(32.02)
GOVERNMENT	-54.87*	-58.69*	-54.88*	-52.50
	(31.99)	(32.09)	(31.41)	(32.08)
IDX	-73.33*	-76.05*	-76.50*	-71.27*
	(42.58)	(42.36)	(42.34)	(42.51)
POLICY	95.39	83.76	86.19	101.62
	(76.11)	(78.20)	(76.69)	(77.27)

Panel A. Ordinary Least Squares (OLS)				
REOPENING	72.42 (94.02)	46.91 (88.27)	49.89 (83.56)	86.90 (87.18)
FISCAL	-146.16 (116.77)	-183.09 (122.91)	-176.87 (114.32)	-118.46 (128.05)
MONETARY	8.14 (80.46)	-7.18 (83.70)	3.42 (79.55)	19.83 (84.85)
EXRATEBALANCE	-318.98** (121.71)	-293.33** (128.34)	-305.03** (121.87)	-335.01*** (127.15)
IDRUSD	-0.11*** (0.02)	-0.11*** (0.02)	-0.11*** (0.02)	-0.11*** (0.02)
Constant	3,817.29*** (332.48)	3,783.61*** (332.45)	3,825.07*** (327.64)	3,850.81*** (339.19)
Observations	115	115	115	115

Panel B. Generalized Method of Moments (GMM); IV = Lag-1 of Price				
NEWCASES	-12.88 (37.40)			
CUMCASES		0.13 (0.20)		
NEWDEATHS			67.10 (69.53)	
CUMDEATHS				-7.14 (26.37)
OJK	1,290.65 (3,877.26)	-191.50 (348.48)	-391.83 (404.55)	621.85 (2,521.48)
GOVERNMENT	1,107.11 (3,500.73)	-610.33 (785.43)	-121.60 (239.97)	1,266.40 (5,245.51)
IDX	699.23 (2,498.13)	-396.75 (567.94)	-316.33 (289.95)	815.29 (3,406.94)

Panel B. Generalized Method of Moments (GMM); IV = Lag-1 of Price				
POLICY	1,993.71 (5,945.15)	-1,800.36 (3,043.22)	-721.82 (1,121.20)	3,899.37 (14,562.16)
REOPENING	8,373.94 (24,205.92)	-3,253.09 (5,118.31)	-1,665.60 (1,791.88)	7,578.54 (27,586.36)
FISCAL	8,254.12 (24,704.45)	-5,448.04 (7,998.34)	-2,571.84 (2,706.99)	14,642.18 (55,053.59)
MONETARY	1,682.79 (5,060.17)	-2,014.06 (3,010.37)	-224.42 (438.66)	5,484.18 (20,384.37)
EXRATEBALANCE	-2,758.26 (7,688.37)	3,193.79 (5,232.43)	586.72 (1,284.61)	-8,011.91 (29,117.07)
IDRUSD	-1.20 (3.14)	0.40 (0.82)	-0.07 (0.15)	-1.88 (6.49)
Constant	18,647.03 (42,929.97)	-3,130.38 (11,277.64)	3,237.72 (2,098.94)	28,046.96 (89,048.77)
Observations	97	97	97	97

Note: Panel A (Standard errors in parentheses). Panel B (Robust standard errors in parentheses). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

We separately examine which policies from The OJK able to mitigate the impact of COVID-19 on banking stock price. The policies are from The OJK's rules (POJK) such as collecting debt, rural and Islamic bank policies (BPR/S) of COVID-19, written order of problem banks, risk management to use information technology, general bank consolidation, and national economic stimulus as the countercyclical impact of COVID-19. We find that all those policies are significantly reducing the adverse effects of COVID-19 to be insignificant on banking stock price. In the details, risk management, written order, consolidation, and stimulus policies could diminish the impact of new cases on banks.

In contrast, only risk management could alleviate the cumulative case's effect on banking stock price to be insignificant.

4. Conclusions

We conclude that, firstly, COVID-19 (proxied by new cases, cumulative cases, new deaths, and cumulative deaths) is linked to lower banking stock prices where the new death cases are the most significant ones. Secondly, the Indonesian government's policies from the President and other authorities such as OJK, BI, and IDX effectively can measure its negative impact on that price to be insignificant. The IMF reports those policies into four categories: policy background, reopening economy, fiscal, monetary, and macroeconomic, exchange rate, and balance of payments. Thirdly, these findings are consistent and robust by using both OLS and GMM. Fourth, we also find that OJK's rule itself is separately related to banking. i.e., procedures to collect debt in the financial service, policy for BPR and BPRS as the impact of Corona widespread, written order to solve banking problems, risk management and the information technology, consolidation for global banks, and national economic packages as the countercyclical impact of COVID-19 have benefits to reduce its effect in some proxies significantly. It is less powerful compared to all policies from the Indonesian government and other authorities together. So, the strategies from all policymakers are more effective than a strategy from OJK itself to tackle COVID-19's impact on banks. In conclusion, it is pivotal to measure COVID-19's drawback by providing relevant policies.

There are some policy implications from this study. First, this study provides empirical evidence of the drawbacks due to COVID-19 on Indonesian banking. Second, to measure those drawbacks, it is necessary to promote policies not only from the Financial Services Authorities (OJK) and all regulators. Third, even though those policies could solve its negative impact on the bank, it is pivotal

to seek more applicable policies from countries that succeed in diminishing COVID-19 since Indonesia is still facing a sharp increase in cases. Fourth, this paper also depicts which effective and ineffective system to reduce Corona's impact.

We are still aware that our study still has limitations, such as a limited proxy for banking performance with daily basis data. Further research could accommodate that issue by exploring more proxies of banking performance with detailed data. We only included one control variable, the exchange rate, to test COVID-19's effect on the banking sector. So, there are possible other control variables that could be included in this model. However, the multicollinearity issue must be considered. Further, future research could examine which policies from Indonesian authorities could combat COVID-19 cases in Indonesia. This study also limits banks, and there is room for improvement in comparing banking with other financial institutions.

References

- Al-Awadhi, A. M., Alsaifi, K., Al-Awadhi, A., & Alhammadi, S. (2020). Death and contagious infectious diseases: Impact of the COVID-19 virus on stock market returns. *Journal of Behavioral and Experimental Finance*, 27, 100326. doi:<https://doi.org/10.1016/j.jbef.2020.100326>
- Alfaro, L., Chari, A., Greenland, A. N., & Schott, P. K. (2020). *Aggregate and firm-level stock returns during pandemics in real time*. National Bureau of Economic Research.
- Ali, M., Alam, N., & Rizvi, S. A. R. (2020). Coronavirus (COVID-19) — An epidemic or pandemic for financial markets. *Journal of Behavioral and Experimental Finance*, 27, 100341. doi:<https://doi.org/10.1016/j.jbef.2020.100341>
- Ashraf, B. N. (2020). Stock markets' reaction to COVID-19: Cases or fatalities? *Research in International Business and Finance*, 54, 101249. doi:<https://doi.org/10.1016/j.ribaf.2020.101249>
- Dietrich, A., Hess, K., & Wanzenried, G. (2014). The good and bad news about the new liquidity rules of Basel III in Western European countries. *Journal of Banking & Finance*, 44, 13-25. doi:10.1016/j.jbankfin.2014.03.041
- Gangopadhyay, P., Haley, J. D., & Zhang, L. (2010). An Examination of Share Price Behavior Surrounding the 2005 Hurricanes Katrina and Rita. *Journal of Insurance Issues*, 33(2), 132-151. Retrieved from www.jstor.org/stable/41946307
- Goodell, J. W. (2020). COVID-19 and finance: Agendas for future research. *Finance Res Lett*, 35, 101512. doi:10.1016/j.frl.2020.101512
- Goodell, J. W., & Goutte, S. (2020). Co-movement of COVID-19 and Bitcoin: Evidence from wavelet coherence analysis. *Finance Research Letters*, 101625. doi:<https://doi.org/10.1016/j.frl.2020.101625>

- Goodell, J. W., & Huynh, T. L. D. (2020). Did Congress trade ahead? Considering the reaction of US industries to COVID-19. *Finance Research Letters*, 101578. doi:<https://doi.org/10.1016/j.frl.2020.101578>
- Haroon, O., & Rizvi, S. A. R. (2020). COVID-19: Media coverage and financial markets behavior—A sectoral inquiry. *Journal of Behavioral and Experimental Finance*, 27, 100343. doi:<https://doi.org/10.1016/j.jbef.2020.100343>
- IMF. (2020). Policy Responses to COVID-19. Retrieved from <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>
- Liu, H., Manzoor, A., Wang, C., Zang, L., & Manzoor, Z. (2020). The COVID-19 Outbreak and Affected Countries Stock Markets Response. *International Journal of Environmental Research and Public Health*, 17(8), 19. doi:<https://doi.org/10.3390/ijerph17082800>
- Narayan, P. K., Phan, D. H. B., & Liu, G. (2020). COVID-19 lockdowns, stimulus packages, travel bans, and stock returns. *Financ Res Lett*, 101732. doi:10.1016/j.frl.2020.101732
- Naufa, A. M., Lantara, I. W. N., & Lau, W.-Y. (2019). The impact of foreign ownership on return volatility, volume, and stock risks: Evidence from ASEAN countries. *Economic Analysis and Policy*, 64, 221-235. doi:<https://doi.org/10.1016/j.eap.2019.09.002>
- Nicolaides, P. (2020). The Corona Virus Can Infect Banks Too. *European State Aid Law Quarterly*, 19(1). doi:10.21552/estal/2020/1/7
- Reuters, T. (2020). Thomson Reuters Eikon Database. Retrieved from <https://www.thomsonreuters.com/en.html>
- Sharif, A., Aloui, C., & Yarovaya, L. (2020). COVID-19 pandemic, oil prices, stock market, geopolitical risk and policy uncertainty nexus in the US economy: Fresh evidence from the wavelet-based approach. *International Review of Financial Analysis*, 70, 101496. doi:<https://doi.org/10.1016/j.irfa.2020.101496>

- Talbot, D., & Ordonez-Ponce, E. (2020). Canadian banks' responses to COVID-19: a strategic positioning analysis. *Journal of Sustainable Finance & Investment*, 1-8. doi:10.1080/20430795.2020.1771982
- Wagner, A. F. (2020). What the stock market tells us about the post-COVID-19 world. *Nature Human Behaviour*, 4(5), 440-440. doi:10.1038/s41562-020-0869-y
- WHO. (2020). Indonesia Situation. Retrieved from <https://covid19.who.int/region/searo/country/id>
- Zaremba, A., Kizys, R., Aharon, D. Y., & Demir, E. (2020). Infected Markets: Novel Coronavirus, Government Interventions, and Stock Return Volatility around the Globe. *Finance Research Letters*, 35, 101597. doi:<https://doi.org/10.1016/j.frl.2020.101597>
- Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance Research Letters*, 101528. doi:<https://doi.org/10.1016/j.frl.2020.101528>



Pendeteksian *Fraud E-Channel* menggunakan Algoritma Pembelajaran Mesin

ADONG PURBA

Bank Jawa Barat (BJB)

Indonesia

ABSTRAK

Perbankan adalah sektor yang paling sering menjadi korban penipuan menggunakan transaksi *e-channel*, salah satunya adalah menggunakan *Automatic Teller Machine (ATM)*. *Fraud* adalah tindakan penyimpangan atau kelalaian yang sengaja dilakukan untuk menipu atau memanipulasi pelanggan, atau pihak lain, yang terjadi di bank atau menggunakan fasilitas bank sehingga menyebabkan pihak lain menderita kerugian dan pelaku penipuan mendapatkan keuntungan finansial baik langsung atau tidak langsung. Untuk mengendalikan penipuan, bank wajib memiliki dan menerapkan strategi anti-*fraud* yang efektif dengan menganalisis data transaksi untuk mencari pola yang mencurigakan sehingga memudahkan identifikasi transaksi sebagai transaksi yang sah atau tidak. Pada bidang data sains, kasus transaksi *fraud* dipandang sebagai permasalahan klasifikasi pembelajaran mesin. Pada penelitian ini telah dilakukan analisis data dan implementasi algoritma pembelajaran mesin untuk mendeteksi transaksi *fraud*. Tahapan eksplorasi data dan pra proses merupakan bagian yang sangat penting sebelum implementasi algoritma. Dari 6 algoritma yang diuji *Random Forest (RF)* memberikan hasil yang paling baik diikuti *Logistic Regression (LR)*, *Linear Discriminant Analysis (LDA)* dan *Support Vector Machine (SVM)*.

Kata Kunci: *bank, fraud detection, e-channel, algoritma pembelajaran mesin*

ABSTRACT

Banking is a sector that is the most frequent victim of fraud using e-channel transactions, one of which is using an Automatic Teller Machine (ATM). Fraud is an act of irregularity or negligence that is intentionally carried out to deceive or manipulate customers, or other parties, which occurs at a bank or uses bank facilities so as to cause the other party to suffer losses and the fraudster to get financial gain either directly or indirectly. To control fraud, banks are required to have and implement an effective anti-fraud strategy by analyzing transaction data to look for suspicious patterns to make it easier to identify transactions as legitimate or not. In the field of data science, fraud transaction cases are seen as a classification problem for machine learning. In this study, data analysis and machine learning algorithms were implemented to detect fraudulent transactions. The data exploration and preprocessing stages are very important parts before algorithm implementation. Of the 6 algorithms tested, Random Forest (RF) gave the best results followed by Logistic Regression (LR), Linear Discriminant Analysis (LDA) and Support Vector Machine (SVM).

Keywords: *banking, fraud detection, e-channel, machine learning algorithm*

JEL Classification: C38

1. Pendahuluan

Transaksi elektronik pada sektor perbankan yang biasa dikenal dengan *e-banking* atau *e-channel* telah berkembang pesat dengan berbagai *channel* seperti *Automated Teller Machine* (ATM), *Electronic Data Capture* (EDC), internet banking, SMS banking dan mobile banking. Pada tahun 2014 Otoritas Jasa Keuangan (OJK) mencatat volume *e-banking* di Indonesia sudah mencapai 6.447 triliun dan pada tahun 2016 jumlah pengguna *e-banking* di Indonesia mencapai 50,4 juta nasabah, dengan frekuensi 405,4 juta transaksi. Perkembangan tersebut dalam praktiknya disamping telah memberikan berbagai kemudahan bagi nasabah namun juga menimbulkan berbagai bentuk modus operandi tindak pidana yang menimbulkan kerugian bagi nasabah.

Dari semua transaksi *e-channel* tersebut diatas sering terjadi masalah penipuan (*fraud*) yang menggunakan rekening bank sebagai media untuk menerima hasil kejahatan, sehingga menuntut bank untuk dapat bertindak cepat dalam rangka melindungi kepentingan nasabah yang menjadi korban penipuan. Untuk dapat melindungi kepentingan nasabah korban penipuan diperlukan tindakan bank untuk segera melakukan deteksi *fraud* (*fraud detection*) untuk mengurangi dampak risiko khususnya risiko reputasi, risiko operasional (karena ada kerugian untuk mengganti uang nasabah) dan risiko hukum (atas tuntutan nasabah karena terdapat kelemahan sistem di internal bank). Dari permasalahan diatas diperlukan sebuah cara yang efektif untuk mencegah *fraud* yang terjadi pada transaksi perbankan. Saat ini ada ilmu baru yang bernama *data science* yang bisa dimanfaatkan untuk memberikan solusi atas permasalahan diatas.

Data science adalah suatu teknik analisa yang membutuhkan keterampilan (Asniar & Surendro, 2014) rekayasa perangkat lunak. *Data science* juga bisa disebut mengekstrak suatu data agar bisa difilter dan ditemukan data yang benar adanya agar bisa menghasilkan produk data yang sebenarnya. Selain

bidang pemrograman seseorang harus memiliki beberapa kemampuan dan pengetahuan yang cukup dibidang lain seperti matematika dan statistik agar bisa menyaring data dengan cara yang cepat, agar bisa menganalisis data dengan baik dan benar melalui model probabilitas, program komputer dan hal yang berkaitan dengan ilmu sains. *Data science* merupakan sebuah proses yang akan mengubah data dengan memanfaatkan ilmu matematika dan statistika sehingga menghasilkan wawasan, keputusan dan produk yang berguna bagi individu maupun perusahaan dalam mengambil keputusan yang strategis (Asniar & Surendro, 2014).

Fraud detection dapat dikategorikan sebagai permasalahan klasifikasi biner karena *output* dari metode ini ada 2 yaitu *fraud* dan *non-fraud*. Pada keilmuan *data science* terdapat beberapa metode yang umum digunakan untuk menyelesaikan masalah klasifikasi biner, antara lain *Logistic Regression* (LR), *Linear Discriminant Analysis* (LDA), *K-Nearest Neighbours* (KNN), *Classification and Regression Tree* (CART), *Support Vector Machine* (SVM) dan *Random Forest* (RF). Namun menggunakan metode-metode ini untuk kasus *fraud detection* pada sektor perbankan memiliki tantangan tersendiri. Pertama, adanya *imbalance* kelas pada dataset transaksi perbankan dimana data *non-fraud* memiliki jumlah yang jauh lebih banyak dibandingkan data *fraud*. Kedua, adanya variasi perilaku penipuan. Ketiga, masalah sensitif biaya dimana kerugian kesalahan klasifikasi memberikan dampak berbeda untuk *false positive* dan *false negative*. Keempat, metrik evaluasi yang digunakan. Pada paper ini akan disajikan langkah tuah implementasi pembelajaran mesin untuk kasus pendeteksian transaksi *fraud* pada perbankan mulai dari tahap eksplorasi data, pra proses, implementasi *code* dan pengujian pada beberapa algoritma yang sudah dipilih.

Berdasarkan penjelasan diatas, penelitian ini bertujuan untuk melakukan analisis data dan implementasi algortima pembelajaran mesin untuk mendeteksi transaksi *fraud* pada sektor perbankan.

2. Data dan Metodologi

2.1. Data

Pada data yang digunakan terdapat 28 atribut pada dataset, ke 28 atribut data itu yang ditunjukkan pada Tabel 1:

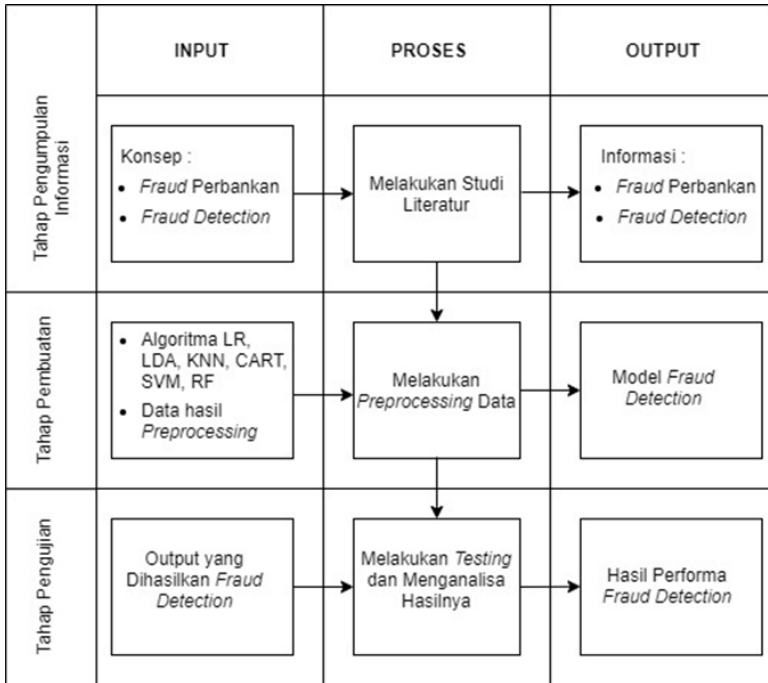
Tabel 1 Atribut dan Deskripsi

No	Atribut	Deskripsi
1.	Id_Transaksi atau Id_Tx	Serangkaian huruf dan angka yang digunakan untuk mengidentifikasi setiap transaksi yang terjadi.
2.	Id_tanggal_transaksi_awal	Huruf dan angka yang digunakan untuk mengidentifikasi pertukaran mata uang digital antara bank dan nasabah.
3.	Tanggal_transaksi_awal	Tahun, bulan dan tanggal yang tercatat pada transaksi digital di sistem bank.
4.	Tipe_kartu	Jenis produk kartu yang dimiliki bank (seperti <i>gold</i> , <i>silver</i> , <i>platinum</i> , <i>classic</i>) yang memiliki fitur limited amount, limited frekuensi penarikan, dan biaya administrasi.
5.	Id_merchant	Id yang terdapat pada mesin baik itu Debit/Kredit yang memiliki <i>unique number</i> pada mesin.
6.	Nama_merchant	Nama daerah <i>merchant</i> berada (misal: daerah A, B, C, D), berdasarkan <i>unique number</i> pada mesin.
7.	Tipe_mesin	Tipe dari mesin. (misal ATM: NDC, DDC, CRM).
8.	Tipe_transaksi	Bisa juga disebut sebagai jenis transaksi yang berkaitan erat dengan kode transaksi. (misal : tarik tunai, setor tunai, <i>transfer</i> , <i>payment</i> (PBB, PLN, PDAM)).
9.	Nama_transaksi	Fitur transaksi yang bisa dilakukan oleh nasabah.
10.	Nilai_transaksi	Maksimum atau minimum nilai transaksi yang bisa dilakukan oleh nasabah berdasarkan kebijakan internal bank.
11.	Id_negara	Multi <i>currency</i> transaksi yang bisa dilakukan di sistem bank (boleh atau tidak boleh multi <i>currency</i> beda negara) berdasarkan jarak negara A ke B.
12.	Nama_negara	Kode mata uang yang diberikan untuk masing-masing negara. (misal: Indonesia = 360 IDR).
13.	Nama_kota	Nama tempat <i>e-channel</i> berada (melakukan operasional).

No	Atribut	Deskripsi
14.	Lokasi_mesin	Keberadaan mesin yang di daftarkan di google maps dan lokasi menggunakan GPS.
15.	Pemilik_mesin	Unit kerja (kantor cabang) pemilik untuk penghitungan jurnal. (misal: Kas ATM > < No Rekening nasabah Kredit > < Debet Tarikan tunai.)
16.	Waktu_transaksi	Waktu transaksi selama 24 jam (Waktu transaksi < Waktu tempuh minimal).
17.	Kuartal_transaksi	Durasi transaksi per 4 (empat) bulan (KW I, KW II, KW III dan KW IV).
18.	Kepemilikan_kartu	Kepemilikan kartu berdasarkan perorangan dan perusahaan.
19.	Nama_channel	Bisa disebut juga tipe <i>channel</i> . (misal: ATM, EDC, SMS Banking, Internet Banking, Mobile Banking)
20.	Id_channel	Bisa disebut juga kode <i>channel</i> atau kode <i>merchant</i> . (misal: 6011: ATM, 6010: Teller, 6012: Internet Banking)
21.	Flag_transaksi_finansial	Pendefinisian yang diberikan terhadap sukses atau gagalnya suatu transaksi. (misal: -False = Gagal, -True (Good) = Sukses)
22.	Status_transaksi	Keterangan transaksi berdasarkan flag_transaksi_finansial. (misal: -False = Gagal -True (Good) = Sukses)
23.	Bank_pemilik_kartu	Bank penerbit kartu yang digunakan oleh nasabah.
24.	Rata_rata_nilai_transaksi (Rata-rata <i>amount</i>)	Jumlah transaksi dalam 1 (satu) hari. (misal : 1 hari = 1 juta, 10 juta)
25.	Maksimum_nilai_transaksi	Nilai transaksi berdasarkan tipe kartu dan limit kartu.
26.	Minimum_nilai_transaksi	Transaksi minimum yang dapat dilakukan sesuai ketentuan internal bank dan tidak berpengaruh ke tipe kartu.
27.	Rata_rata_jumlah_transaksi	Jumlah transaksi yang dilakukan per hari. (misal : 1 kali sehari dalam sebulan)
28.	Flag_transaksi_fraud	Label diberikan untuk menyatakan transaksi itu <i>Fraud</i> atau <i>Non Fraud</i> .

2.2 Metodologi

Pada Gambar 1 menggambarkan tahapan langkah penelitian yang dilakukan dalam studi tentang deteksi *fraud* dalam *data science*.



Gambar 1 Metodologi Penelitian

Exploratory Data Analysis (EDA) merupakan salah satu metode pada statistika deskriptif yang digunakan untuk penyajian data yang nantinya akan bermanfaat menjadi informasi yang berguna. EDA ini dapat digunakan untuk mengetahui pola data serta bentuk sebarannya. Untuk mengidentifikasi pola data dan sebarannya ada beberapa metode yang dapat digunakan diantaranya diagram batang dan histogram.

Persentase transaksi yang *fraud* adalah 6.933% dan tidak *fraud* 93.067% dari total keseluruhan jumlah transaksi 12215.



Gambar 2 Distribusi *Fraud VS Non Fraud*

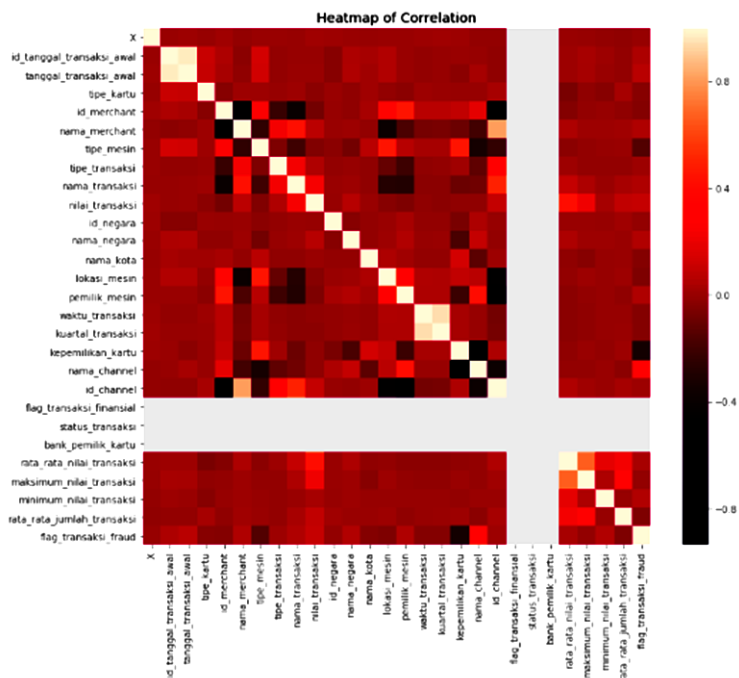
Heatmap of Correlation adalah cara untuk menghitung kovarian antara variable, metrik kovarian kemudian dapat dengan mudah divisualisasikan sebagai *heatmap*. *Heatmap* secara efektif merupakan *pseudocolor* plot dengan baris dan kolom berlabel dengan nilai korelasi berkisar antara -1 dan 1. Ada dua komponen kunci dari nilai korelasi:

1. *Magnitude*

Semakin besar magnitude (semakin dekat ke 1 atau -1) semakin kuat korelasinya (pada gambar ditunjukkan warna putih dan hitam).

2. *Sign*

Jika negatif ada korelasi terbalik, jika positif korelasi berbanding lurus.



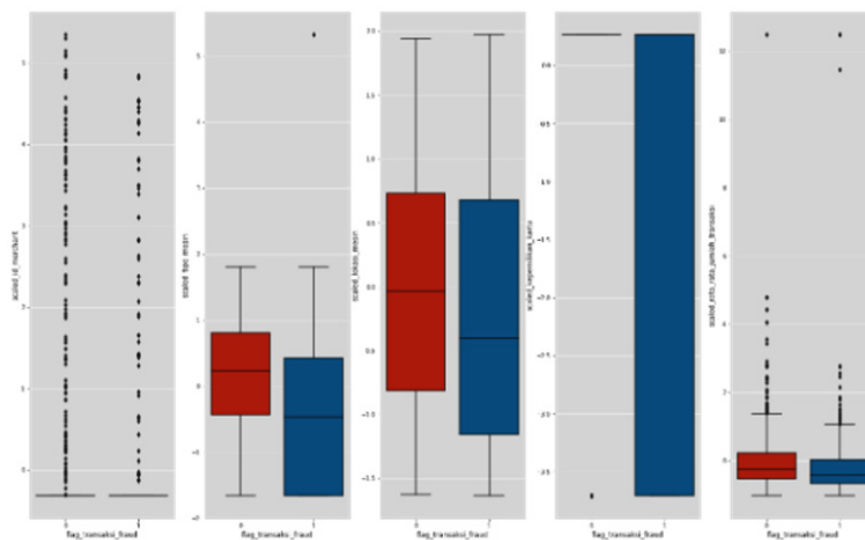
Gambar 3 Heatmap Korelasi Antar Atribut

Skew adalah ukuran dari asimetri distribusi probabilitas dari variabel acak bernilai *riil* tentang nilai tengahnya. Nilai *skewness* bisa positif atau negatif, atau tidak terdefinisi. Untuk model distribusinya, condong negatif biasanya menunjukkan bahwa ekor grafik berada di sisi kiri distribusi, dan condong positif menunjukkan bahwa ekor berada di sebelah kanan. Sedangkan untuk distribusi simetris ekor di kedua sisi rata-rata menyeimbangkan keseluruhan.

Pra proses data adalah suatu proses pengubahan bentuk data yang belum terstruktur menjadi data yang terstruktur sesuai dengan kebutuhan, untuk proses *mining* yang lebih lanjut. Berikut *preprocessing* data yang dilakukan pada penelitian ini:

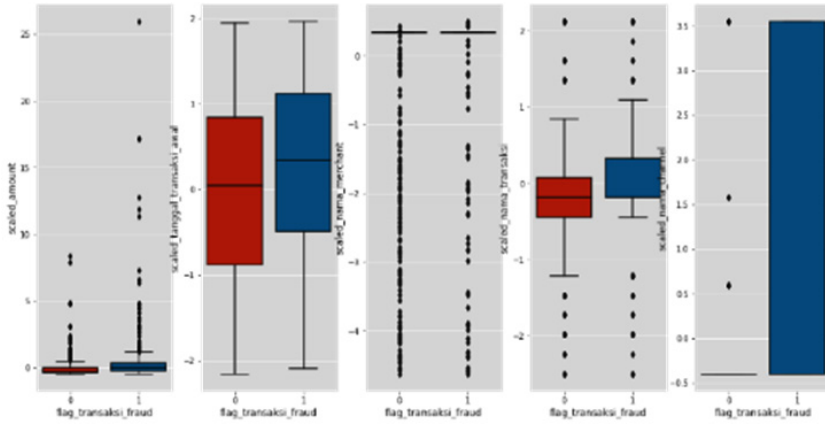
Dari 28 atribut dari dataset maka dipilih 22 fitur berdasarkan korelasi antara *flag_transaksi_fraud* dengan atribut lainnya (lihat gambar IV.5 Heatmap Korelasi antar Atribut). Dari hasil tabulasi korelasi antara *flag_transaksi_fraud* dengan atribut lainnya terdapat 3 (tiga) atribut dengan nilai korelasi NaN, yaitu *flag_transaksi_finansial*, *status_transaksi*, dan *bank_pemilik_kartu*. Hal ini dikarenakan semua nilai pada atribut tersebut sama. Oleh karena itu ketiga attribut ini di *drop* (dibuang). Kemudian attribut dengan nilai korelasi antara -0.1 s.d 0.1 juga di *drop*.

Feature With Hight Negative Correlation

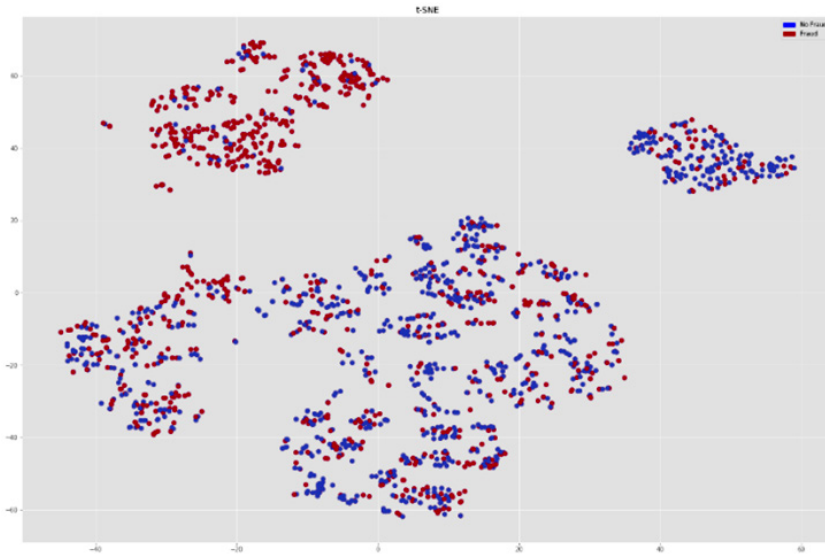


Gambar 4 Lima Fitur dengan Korelasi Negatif Terbesar

Feature With Hight Positive Correlation



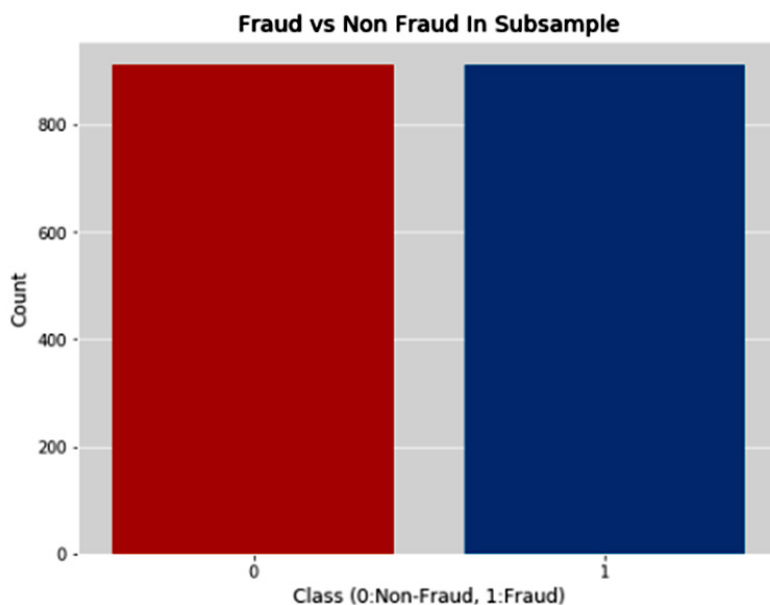
Gambar 5 Lima Fitur dengan Korelasi Positif Terbesar



Gambar 6 t-SNE Scatter Plot

Scaling atau standarisasi fitur adalah langkah *pre processing* data yang diterapkan pada variabel independen atau fitur data. Ini dilakukan pada dasarnya membantu untuk menormalkan data dalam rentang tertentu, terkadang juga membantu mempercepat perhitungan dalam suatu algoritma. Proses *scaling* diatas sangat penting dilakukan untuk meningkatkan nilai *accuracy* dari *precision*, *recall* dan *f1-score* pada table *predictive* dan *actual confusion matrix*.

Seperti pada *point* sebelumnya, bahwa *fraud* : *non fraud* = 910 : 12215. Ketimpangan ini dapat menyebabkan model menjadi kurang maksimal sehingga untuk menyeimbangkan jumlah data dilakukan pengambilan sampel secara acak dari data *non fraud* sebanyak 910. Dengan demikian jumlah data *fraud* : *non fraud* = 1 : 1.



Gambar 7 Distribusi *Fraud VS Non Fraud* Setelah Pra Proses

Pada eksperimen ini dipilih 6 algoritma yang paling sering digunakan dalam kasus pendeteksian *fraud*:

Logistic Regression

Algoritma Regresi Logistik adalah metode analisis statistik yang digunakan untuk memprediksi nilai data berdasarkan pengamatan sebelumnya atas suatu kumpulan data (Puh & Brkić, 2019). Regresi logistik telah menjadi alat penting dalam disiplin pembelajaran mesin. Pendekatan tersebut memungkinkan algoritma digunakan dalam aplikasi pembelajaran mesin untuk mengklasifikasikan data yang masuk berdasarkan data historis. Saat data yang lebih relevan masuk, algoritma harus menjadi lebih baik dalam memprediksi klasifikasi dalam kumpulan data. Regresi logistik juga dapat berperan dalam aktivitas persiapan data dengan memungkinkan kumpulan data dimasukkan ke dalam *bucket* yang telah ditentukan sebelumnya secara khusus selama proses ekstrak, transformasi, *load* (ETL) untuk menyusun informasi untuk analisis. Model regresi logistik memprediksi variabel data dependen dengan menganalisis hubungan antara satu atau lebih variabel independen yang ada.

Linear Discriminant Analysis

Algoritma Analisis Diskriminan Linier (LDA) adalah jenis kombinasi linier pada proses matematika yang menggunakan berbagai item data dan menerapkan fungsi ke himpunan untuk menganalisis secara terpisah beberapa kelas objek atau item. Analisis diskriminan linier dapat berguna di berbagai bidang seperti pendeteksian, pengenalan gambar dan analisis prediktif dalam pemasaran (Mahmoudi & Duman, 2015). Analisis diskriminan linier membantu merepresentasikan data lebih dari dua kelas, ketika regresi logika tidak cukup. Analisis diskriminan linier mengambil nilai rata-rata untuk setiap kelas dan mempertimbangkan varian untuk membuat prediksi dengan asumsi distribusi

Gaussian. Ini adalah salah satu dari beberapa jenis algoritma yang merupakan bagian dari pembuatan model *machine learning* yang kompetitif.

K-Nearest Neighbours

K Nearest Neighbors atau KNN adalah salah satu algoritma pembelajaran mesin untuk melakukan klasifikasi terhadap objek baru berdasarkan sejumlah k tetangga terdekatnya. Untuk tetangga terdekatnya ditentukan oleh analisis yang dinyatakan dengan k . Misal nilai $k=3$, maka setiap data testing dihitung jaraknya terhadap data training dan dipilih 3 data training yang jaraknya paling dekat dengan data *testing*. Tujuan penggunaan KNN adalah untuk memprediksi objek, apakah objek tersebut masuk dalam satu golongan tertentu atau golongan yang lain. Pada KNN data akan dinyatakan dalam ruang *vector*. Sesuai dengan namanya, "*nearest neighbor*", KNN menggunakan klasifikasi berdasarkan "kedekatan" dengan tetangga. KNN merupakan algoritma pembelajaran mesin yang paling sederhana dan dapat digolongkan sebagai *supervised learning*, *lazy learning* algorithm, dan *instance-based learning* atau *memory-based learning*.

Disebut *lazy* karena KNN tidak menggunakan sampel data latih untuk keperluan pembelajaran (generalisasi) atau hanya sedikit sekali tahapan pembelajaran. Sebagian besar waktu hanya dipakai untuk melakukan klasifikasi. Semua data diperlukan dan harus disimpan (tidak boleh dihapus). Disebut *instance-based* karena KNN tidak menggunakan asumsi/model apapun, sebagai gantinya KNN akan membentuk hipotesis secara langsung berdasarkan data latih yang disediakan, artinya semakin bertambah data akan semakin kompleks juga proses pencapaian hipotesis (ROSA, PRIMARTHA, & WIJAYA, 2020).

Classification and Regression Tree

Algoritma *Classification and Regression Tree* (CART) adalah metode teknik eksplorasi data berupa pohon keputusan. CART dikembangkan untuk

melakukan analisis klasifikasi pada variabel respon, baik yang nominal, ordinal, maupun kontinu. CART menghasilkan suatu pohon klasifikasi jika peubah responnya kategorikal dan menghasilkan pohon regresi jika peubah responnya kontinu (Lucaroni et al., 2019). Nilai tingkat kesalahan yang paling kecil pada pohon klasifikasi yang dihasilkan akan cenderung membuat pohon keputusan digunakan untuk memperkirakan respon. Prinsip dari metode pohon klasifikasi ini adalah memilah seluruh pengamatan menjadi dua gugus pengamatan dan memilah kembali gugus pengamatan tersebut menjadi dua gugus pengamatan berikutnya, hingga diperoleh jumlah pengamatan minimum pada tiap-tiap gugus pengamatan berikutnya.

Support Vector Machine

Algoritma *Support Vector Machine* (SVM) adalah algoritma pembelajaran mesin yang menganalisis data untuk klasifikasi dan analisis regresi. SVM merupakan metode pembelajaran yang diawasi yang melihat data dan mengurutkannya menjadi salah satu dari dua kategori. SVM mengeluarkan peta dari data yang diurutkan dengan margin di antara keduanya sejauh mungkin. SVM digunakan dalam kategorisasi teks, klasifikasi gambar, pengenalan tulisan tangan, dan sains (Sahin & Duman, 2011b).

Pembelajaran yang diawasi dalam hal ini artinya mengurutkan data menjadi dua kategori, dilatih dengan serangkaian data yang sudah diklasifikasikan ke dalam dua kategori dan membangun model seperti yang awalnya dilatih. Tugas dari algoritma SVM adalah untuk menentukan di kategori mana sebuah titik data baru berada. Hal ini membuat SVM menjadi semacam pengklasifikasi linier non-biner. Algoritma SVM seharusnya tidak hanya menempatkan objek ke dalam kategori, tetapi juga memiliki margin di antara objek tersebut pada grafik selebar mungkin.

Random Forest

Algoritma *Random Forest* merupakan modifikasi dari model *decision tree* yang cukup populer digunakan untuk berbagai masalah pembelajaran mesin karena mudah digunakan dan diinterpretasikan. Setiap pohon keputusan dengan sendirinya sensitif terhadap *overfitting*, tetapi jika digabungkan, mereka akan bekerja dengan baik. *Random Forest* adalah pengklasifikasi *bagging* dan menerapkan dua tingkat keputusan stokastik dalam proses pembelajarannya untuk setiap pohon keputusan individu dalam ansambel memilih subset sampel serta subset fitur untuk pelatihan (Kumar, Soundarya, Kavitha, Keerthika, & Aswini, 2019b).

3. Hasil dan Pembahasan

Skenario pengujian dilakukan dengan membagi dataset menjadi data latih dan data uji dengan perbandingan 0.8 : 0.2. Data latih digunakan untuk membentuk model dan data uji digunakan untuk evaluasi. Skenario pengujian terdiri dari 4 skenario yaitu:

1. Fitur *scaling* + *under sampling*
2. *Under sampling*
3. Fitur *scaling*
4. Tanpa *scaling* dan tanpa *sampling*

Semua algoritma diimplementasikan menggunakan bahasa pemrograman python. Pengujian dilakukan dengan 10 *fold cross validation* kemudian diambil nilai rata-rata (*mean*) dan simpangan baku (SB). Hasil perhitungan AUC untuk keempat skenario disajikan pada Tabel 2.

Tabel 2 AUC Pada Berbagai Algoritma Pembelajaran Mesin

Algoritma	Fitur <i>Scaling</i> + <i>Under Sampling</i>		<i>Under Sampling</i>		<i>Fitur Scaling</i>		Tanpa <i>Scaling</i> dan <i>Sampling</i>	
	Mean	SB	Mean	SB	Mean	SB	Mean	SB
LR	0.79	0.028	0.668	0.026	0.779	0.028	0.672	0.033
LDA	0.78	0.021	0.78	0.013	0.786	0.032	0.78	0.033
KNN	0.72	0.056	0.669	0.046	0.685	0.027	0.657	0.013
CART	0.677	0.033	0.66	0.044	0.622	0.022	0.616	0.029
SVM	0.775	0.046	0.5	0	0.704	0.041	0.5	0.001
RF	0.793	0.032	0.782	0.029	0.757	0.017	0.755	0.024

Dari Tabel 2 di atas dapat dilihat bahwa fitur *scaling* dapat meningkatkan AUC pada semua algoritma. Dilain sisi *under sampling* dapat meningkatkan AUC pada algoritma KNN, CART dan RF. Sementara pada LR dan LDA, *under sampling* malah menurunkan AUC namun tidak signifikan. Hal ini diakibatkan karena LR dan LDA tidak sensitif terhadap masalah *imbalance* kelas namun reduksi data karena adanya *under sampling* mengakibatkan data latihan yang digunakan menjadi lebih sedikit sehingga terjadi sedikit penurunan nilai AUC.

Pada skenario terbaik dari masing-masing algoritma, nilai AUC yang paling tinggi adalah RF namun tidak terlalu signifikan dibandingkan dengan LR, LDA dan SVM. Sementara CART dan KNN memiliki nilai AUC yang paling rendah.

4. Kesimpulan dan Rekomendasi

Dengan mengacu pada hasil penelitian maka adapun kesimpulan yang dapat diambil adalah sebagai berikut:

1. Telah dilakukan analisis data dan implementasi algoritma pembelajaran mesin untuk mendeteksi transaksi *fraud* pada perbankan. Tahap eksplorasi data dan pra proses merupakan tahapan yang sangat penting dalam implementasi pembelajaran mesin untuk kasus pendeteksi transaksi *fraud*.

2. Masalah *imbalance* kelas tidak sensitive pada algoritma berbasis regresi seperti LR dan LDA namun penanganan masalah *imbalance* kelas dapat meningkatkan kinerja pendeteksian *fraud* dengan algoritma SVM, KNN, CART dan RF.
3. Dari 6 algoritma yang diajukan RF memiliki nilai yang paling baik diikuti LR, LDA dan SVM.

Adapun saran dan rekomendasi yang dapat dipertimbangkan untuk penelitian selanjutnya adalah sebagai berikut:

1. Perlu melakukan uji coba dengan dataset yang lebih besar.
2. Apabila memungkinkan, algoritma dikembangkan dengan prinsip *adaptive base learner* dan diujikan langsung menggunakan data perbankan sehingga dapat merepresentasikan kondisi nyata.

Referensi

- Asniar, & Surendro, K. (2014). Using data science for detecting outliers with k Nearest Neighbors graph. *Proceedings - 2014 International Conference on ICT for Smart Society: "Smart System Platform Development for City and Society, GoeSmart 2014", ICISS 2014*, (i), 300–304. <https://doi.org/10.1109/ICTSS.2014.7013191>
- Besenbruch, J. (2018). *Fraud Detection Using Machine Learning*. Retrieved from https://beta.vu.nl/nl/Images/werkstukbesenbruch_tcm235-910176.pdf%0Ahttp://www.yannispappas.com/Fraud-Detection-Using-Machine-Learning/
- Gómez, J. A., Arévalo, J., Paredes, R., & Nin, J. (2018). End-to-end neural network architecture for fraud scoring in card payments. *Pattern Recognition Letters*, 105, 175–181. <https://doi.org/10.1016/j.patrec.2017.08.024>
- Hoens, T. R., Polikar, R., & Chawla, N. V. (2012). Learning from streaming data with concept drift and imbalance: An overview. *Progress in Artificial Intelligence*, 1(1), 89–101. <https://doi.org/10.1007/s13748-011-0008-0>
- Kumar, M. S., Soundarya, V., Kavitha, S., Keerthika, E. S., & Aswini, E. (2019b). Credit Card Fraud Detection Using Random Forest Algorithm. *2019 Proceedings of the 3rd International Conference on Computing and Communications Technologies, ICCCT 2019*, 149–153. <https://doi.org/10.1109/ICCCT2.2019.8824930>
- Lucaroni, F., Cicciarella Modica, D., Maclno, M., Palombi, L., Abbondanzieri, A., Agosti, G., ... Vinci, A. (2019). Tree-Cart. *BMJ Open*, 9(12), 1–6. <https://doi.org/10.1136/bmjopen-2019-030234>
- Mahmoudi, N., & Duman, E. (2015). Detecting credit card fraud by Modified Fisher Discriminant Analysis. *Expert Systems with Applications*, 42(5), 2510–

2516. <https://doi.org/10.1016/j.eswa.2014.10.037>

- Malini, N., & Pushpa, M. (2017). Analysis on credit card fraud identification techniques based on KNN and outlier detection. *Proceedings of the 3rd IEEE International Conference on Advances in Electrical and Electronics, Information, Communication and Bio-Informatics, AEEICB 2017*. <https://doi.org/10.1109/AEEICB.2017.7972424>
- Puh, M., & Brkić, L. (2019). Detecting credit card fraud using selected machine learning algorithms. *2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics, MIPRO 2019 - Proceedings*, 1250–1255. <https://doi.org/10.23919/MIPRO.2019.8757212>
- ROSA, T., PRIMARTHA, R., & WIJAYA, A. (2020). *Comparison of Distance Measurement Methods on K-Nearest Neighbor Algorithm For Classification*. 172(Siconian 2019), 358–361. <https://doi.org/10.2991/aisr.k.200424.054>
- Sahin, Y., & Duman, E. (2011a). *Detecting Credit Card Fraud by Decision Trees and Support Vector Machine. I*.
- Sahin, Y., & Duman, E. (2011b). *IMECS2011_pp442-447. I*.
- Zareapoor, M., & Shamsolmoali, P. (2015). Application of credit card fraud detection: Based on bagging ensemble classifier. *Procedia Computer Science*. <https://doi.org/10.1016/j.procs.2015.04.201>



Analisis Ketepatan Model Prediksi Kebangkrutan Emiten Perbankan yang Tercatat Di Bursa Efek Indonesia (Periode 2019 – Kuartal I 2020)

ERIC TRIPUTRA WITONO

Sekolah Tinggi Ilmu Ekonomi Indonesia Banjarmasin

Indonesia

ABSTRAK

Tahun 2020 merupakan tahun dimana perusahaan termasuk di Indonesia mengalami penurunan kinerja baik dari harga saham maupun kinerja keuangan perusahaan khususnya di bidang perbankan sejak diumumkan pada bulan Maret 2020 Indonesia mengalami wabah *pandemic* COVID-19, maka dari itu dilakukan analisis terhadap emiten perbankan yang merupakan salah satu emiten kedua terbanyak tercatat di Bursa Efek Indonesia dan beberapa perbankan yang tidak dapat bertahan dalam situasi perekonomian yang tidak menentu. Penelitian ini bertujuan untuk mengetahui ketepatan dalam memprediksi perusahaan yang rawan untuk bangkrut di masa yang akan datang dengan uji kesalahan sebagai ketepatan penggunaan model untuk ketepatan prediksi kebangkrutan perusahaan. Penelitian ini menggunakan beberapa metode seperti Altman, Springate, Zmijewski dan Grover dengan 44 perusahaan perbankan dan data dianalisis secara per kuartal sehingga didapatkan total sampel berjumlah 219.

Ditemukan hasil akurasi prediksi perkuartal secara beruntun dari kuartal pertama 2019 hingga kuartal pertama 2020 pada model Altman sebesar 20,45%; 20,45%; 22,72%; 20,45%; 13,95%, Springate 4,54%; 6,81%; 6,81%; 6,81%; 6,97%, Zmijewski sebesar 77,27%; 81,81%; 72,72%; 75%; 79,06%, serta Grover 90,9%; 95,45%; 97,72%; 90,9%; 97,67%. Dari hasil perhitungan, model Grover dapat menjadi pertimbangan bagi beberapa pihak untuk melakukan aksi korporasi.

Kata Kunci : Perbankan, Kebangkrutan, Akurasi

JEL : G21, G33

ABSTRACT

2020 is a year in which companies including in Indonesia have experienced a decline in performance both in terms of stock prices and financial performance, especially in the banking sector since it was announced in March 2020 Indonesia experienced a pandemic outbreak of COVID-19, therefore an analysis of banking issuers is one of the second largest issuer listed on the Indonesia Stock Exchange and several banks that could not survive in an uncertain economic situation. This study aims to determine the accuracy in predicting companies that are prone to bankruptcy in the future with the error test as the accuracy of using the model for the accuracy of company bankruptcy predictions. This study uses several methods such as Altman, Springate, Zmijewski and Grover with 44 banking companies and the data are analyzed on a quarterly basis to obtain a total sample of 219.

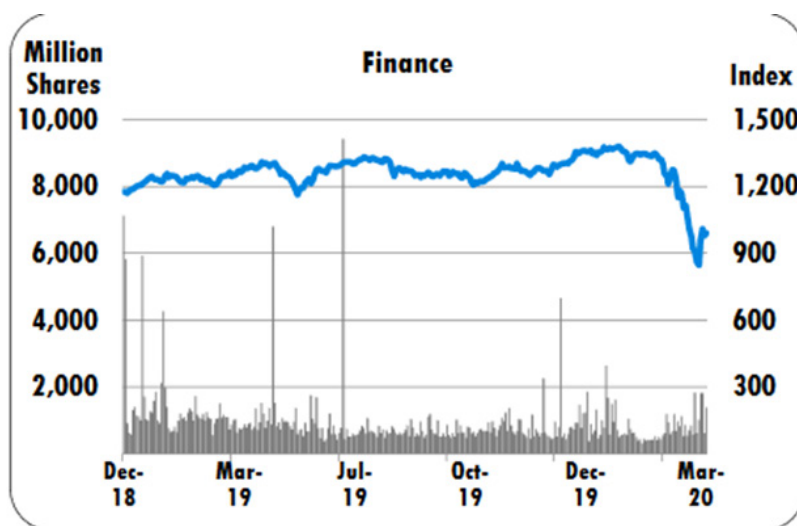
The results of succession prediction accuracy in a row from the first quarter of 2019 to the first quarter of 2020 on the Altman model of 20.45%; 20.45%; 22.72%; 20.45%; 13.95%, Springate 4.54%; 6.81%; 6.81%; 6.81%; 6.97%, Zmijewski by 77.27%; 81.81%; 72.72%; 75%; 79.06%, and Grover 90.9%; 95.45%; 97.72%; 90.9%; 97.67%. From the results of calculations, the Grover model can be considered for several parties to take corporate action.

Keywords : Banks, Banckruptcy, Accuracy

JEL Codes : G21, G33

1. Pendahuluan

Pada hari Senin 3 Maret 2020 pemerintah Indonesia mengumumkan adanya dua Orang Indonesia yang telah mengidap positif virus corona dan mengidap penyakit COVID-19 sehingga pergerakan IHSG mengalami penurunan setelah pengumuman berita tersebut dan diakhiri dengan poin ke level 5.361,25 yang dimana sebelum pembukaan perdagangan poin IHSG masih di level 5.451. Dampak dari berita tersebut juga menyebabkan beberapa emiten terutama di bidang perbankan mengalami penurunan drastis hingga bulan Mei dengan poin terendah 849 poin yang dimana pada bulan Maret indeks keuangan masih berada di poin 1267.



Gambar 1 Indeks *FINANCE* Desember 2018 – Maret 2020

Sumber: *Fact book* IDX Kuartal I 2020

Banyaknya harga saham yang menurun juga diakibatkan banyaknya investor yang menjual sahamnya sehingga menyebabkan perusahaan harus mengatur kembali strategi bisnis seperti melakukan PHK dini terhadap karyawannya karena tidak mampu membayar gaji dan pemasukan yang hampir tidak ada membuat perusahaan tidak dapat bertahan di masa pandemik. Pemerintah mulai mengumumkan kebijakan baru seperti PSBB (Pembatasan Sosial Berskala Besar), *Social Distancing*, dan *Work From Home* secara bertahap di beberapa daerah sehingga menyebabkan pertumbuhan ekonomi Indonesia pada kuartal I 2020 hanya mencapai 2,97 persen akibat dari penurunan konsumsi dan Produk Domestik Bruto.

Emiten sektor perbankan juga mengalami penurunan akibat masih ada perbankan yang mengalami rugi pada periode sebelumnya. Menurut Direktur Asosiasi Riset dan Investasi Pilarmas Investindo Sekuritas Nico Demus menyatakan bahwa prospek perbankan kedepan masih positif terutama bagi bank umum kegiatan usaha besar seperti BBNI, BBRI, BBCA dan BMRI meskipun ada restrukturisasi hutang.

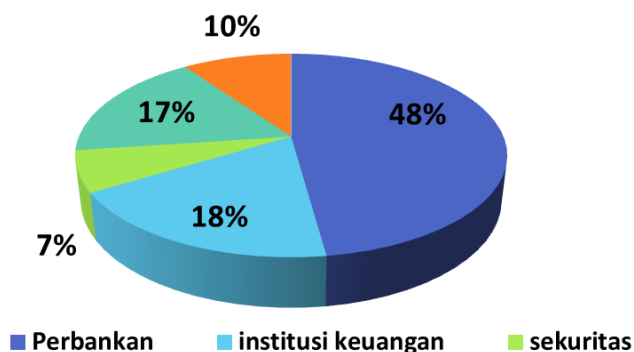
Ada beberapa cara untuk memprediksi kebangkrutan usaha salah satunya dengan metode Altman (Z-Score) yang sudah ada sejak tahun 1968 dan telah berkembang menyesuaikan dengan kondisi perusahaan dan makroekonomi suatu negara. Banyaknya penelitian telah menerapkan metode ini termasuk Indonesia sehingga dapat dijadikan acuan dalam penentuan suatu perusahaan mengalami kebangkrutan atau *financial distress* yang dimana perusahaan tersebut dianggap rawan dan masih berjalan membuat metode ini menjadi salah satu metode yang digunakan praktisi dan perusahaan dalam membuat keputusan berinvestasi. Dan model ini mulai dimodifikasi oleh beberapa ahli dengan indeks yang berbeda seperti *Springate*, *Zmijeski*, dan *Grover*. Dalam pengamatan data statistik IDX yang didapat selama kuartal pertama 2019 hingga kuartal pertama 2020 hanya ada satu emiten yang mengalami kerugian

bersih berturut – turut sehingga dalam penelitian ini hanya satu emiten yang dianggap bangkrut untuk diprediksi.

Penelitian ini bertujuan untuk mengetahui seberapa akurat dan tepat dalam memprediksi kebangkrutan emiten perbankan di Indonesia sebelum terjadinya wabah pandemik COVID-19 yang menyebabkan perbankan harus melakukan restrukturisasi bisnis dan ketepatan masing masing metode dalam memprediksi kebangkrutan perbankan sehingga perbankan harus melakukan aksi korporasi seperti merger, akuisisi, atau likuidasi jika perusahaan tidak mampu untuk membayar hutang yang dimiliki.

Kinerja Perbankan yang terdaftar di Bursa Efek Indonesia

Emiten keuangan (*finance*) merupakan emiten kedua terbanyak yang terdaftar di Bursa efek Indonesia dan perbankan adalah emiten subsektor terbanyak dalam perusahaan tercatat bidang keuangan yaitu sebanyak 44 emiten dari 92 emiten sehingga indeks FINANCE sangat dipengaruhi oleh perbankan.



Gambar 2 Persentase Emiten Keuangan yang Terdaftar di Bursa Efek Indonesia

Sumber: diolah Kembali (2020)

Kinerja perbankan pada tahun 2019 kuartal pertama menunjukkan bahwa ada 5 emiten yang mencatat kerugian dari 44 emiten. Emiten tersebut yaitu AGRS, ARTO, BCIC, BEKS dan BKSW. Sedangkan beberapa perbankan dianggap tidak rugi karena adanya *tax amnesty* yang digunakan sehingga diperlukan analisis terhadap perusahaan perbankan kedepannya.

Menurut Undang-Undang Negara RI Nomor 1988 tanggal 10 November tentang perbankan, yaitu Bank adalah "badan usaha yang menghimpun dana masyarakat dalam bentuk simpanan dan menyalurkannya pada masyarakat dalam bentuk kredit atau dalam bentuk lainnya dengan rangka meningkatkan taraf hidup rakyat banyak". Bank syariah adalah bank yang berasas pada asas kemitraan, keadilan, transparasi, universal dan melakukan kegiatan usaha perbankan berdasarkan prinsip syariah (bagi hasil).

Dalam bisnis perbankan dibagi menjadi beberapa jenis seperti BUKU (Bank Umum Kegiatan Usaha) serta prinsip perbankan yang digunakan. Semakin tinggi penggolongan BUKU maka semakin kecil peluang perbankan tersebut mengalami kebangkrutan.

Tujuan Penelitian

Tujuan dari penelitian ini adalah untuk mengetahui besaran akurasi penggunaan serta menelaah metode prediksi kebangkrutan terhadap emiten perbankan yang terdaftar di Bursa Efek Indonesia sehingga dapat ditemukan metode baru dalam memprediksi kebangkrutan suatu perusahaan.

2. Studi Literatur

2.1. Metode Altman

Model ini diciptakan oleh Seorang Profesor di New York University yaitu Edward L Altman pada tahun 1968 dengan menguji 66 perusahaan dengan kondisi perusahaan bangkrut sebanyak 33 dan tidak bangkrut sebanyak

33 sehingga terbentuk model awal dengan. perkembangan model yang menyesuaikan untuk perusahaan yang tercatat di Bursa. Lalu dilakukan penyesuaian kembali pada tahun 1997 karena model perhitungan sebelumnya digunakan untuk perusahaan Manufaktur saja dengan melakukan revisi pada model perhitungan menjadi Model Z'' khusus untuk Perusahaan jasa sehingga persamaan yang digunakan dalam analisis yakni:

$$Z'' = 6,56X_1 + 3,36X_2 + 6,72X_3 + 1,05X_4$$

Keterangan :

$$X_1 = \frac{\text{Modal Kerja (Aset lancar – Hutang Lancar)}}{\text{Total Aset}}$$

$$X_2 = \frac{\text{Laba Ditahan}}{\text{Total Aset}}$$

$$X_3 = \frac{\text{Laba sebelum Bunga dan Pajak}}{\text{Total Aset}}$$

$$X_4 = \frac{\text{Total Ekuitas}}{\text{Total Hutang}}$$

Model ini awalnya menggunakan angka 3,25 untuk menyesuaikan dengan peringkat obligasi dalam penelitian altman dalam menyesuaikan peringkat obligasi di negara Mexico. Hasil dari analisis kebangkrutan Altman akan menghasilkan nilai yang digunakan untuk memperkirakan perusahaan yang memiliki kemungkinan tinggi untuk bangkrut dan tidak bangkrut yang selanjutnya disebut Z-score. Nilai Z'' ini digunakan untuk mengklasifikasikan perusahaan dengan perolehan skor < 1,1 berpotensi untuk mengalami kebangkrutan. Perusahaan dengan perolehan skor 1,1 < Z < 2,6 akan diklasifikasikan berada dikondisi abu-abu (grey area) atau zona ketidaktahuan,

sedangkan untuk perusahaan yang tidak berpotensi mengalami kebangkrutan akan memiliki perolehan skor $> 2,6$ hasil ini akan menyimpulkan bahwa perusahaan tidak berpotensi mengalami kebangkrutan karena memiliki keuangan perusahaan yang sehat.

2.2. Metode Grover

Metode Grover merupakan metode yang diciptakan dengan melakukan pendesainan dan penilaian ulang terhadap metode Altman (Z-Score). Sampel yang digunakan sebanyak 70 perusahaan dengan 35 perusahaan yang bangkrut dan 35 perusahaan yang tidak bangkrut pada tahun 1982 sampai 1996. Metode ini menggunakan persamaan sebagai berikut:

$$G = 1,65X_1 + 3,404X_2 - 0,016X_3 + 0,057$$

Keterangan :

$$X_1 = \frac{\text{Modal Kerja (Aset lancar - Hutang Lancar)}}{\text{Total Aset}}$$

$$X_2 = \frac{\text{Laba Sebelum Bunga dan Pajak}}{\text{Total Aset}}$$

$$X_3 = \frac{\text{Laba Bersih}}{\text{Total Aset}}$$

Model Grover (G-Score) mengkategorikan perusahaan dalam kondisi bangkrut dengan skor kurang dari atau sama dengan $-0,02$ ($G < -0,02$). Sedangkan skor untuk perusahaan yang dikategorikan dalam kondisi tidak bangkrut adalah lebih dari atau sama dengan $0,01$ ($G > 0,01$).

2.3. Metode Zmijewski

Zmijewski (1984) menggunakan analisis rasio yang mengukur kinerja, *leverage*, dan likuiditas suatu perusahaan untuk model prediksinya. Zmijewski menggunakan probit analisis yang di-terapkan pada 40 perusahaan yang telah bangkrut dan 800 perusahaan yang masih bertahan saat itu. Model yang berhasil dikembangkan yaitu:

$$X - \text{Score} = -4,3 - 4,5X_1 + 5,7X_2 - 0,004X_3$$

Keterangan :

$$X_1 = \frac{\text{Modal Kerja (Aset lancar - Hutang Lancar)}}{\text{Total Aset}}$$

$$X_2 = \frac{\text{Total Hutang}}{\text{Total Aset}}$$

$$X_3 = \frac{\text{Aset Lancar}}{\text{Hutang Lancar}}$$

Zmijewski (1984) menyatakan bahwa perusahaan dianggap mengalami potensi kebangkrutan jika skor lebih dari atau sama dengan 0 ($X > 0$). Sebaliknya, perusahaan yang memiliki skor kurang dari atau sama dengan 0 ($X < 0$) diprediksi tidak akan mengalami potensi kebangkrutan.

2.4. Metode Springate

Springate (1978) menghasilkan model prediksi kebangkrutan yang dibuat dengan mengikuti prosedur Altman. Springate menggunakan *step-wise Multiple Discriminate Analysis* (MDA) untuk memilih 4 dari 19 rasio keuangan populer yang paling membedakan antara bisnis yang sehat dan yang benar-benar gagal. Setelah melakukan pengujian kembali, Springate memilih 4 rasio yang digunakan dalam menentukan kriteria perusahaan yang termasuk dalam

kategori sehat atau perusahaan yang berpotensi bangkrut. Model ini memiliki tingkat keakuratan 92,5% dengan menggunakan 40 sampel perusahaan dalam memprediksi kebangkrutan. Metode yang digunakan dalam penelitian ini yakni:

$$S = 1,03A + 3,07B + 0,66C + 0,4D$$

Keterangan :

$$A = \frac{\text{Modal Kerja (Aset lancar – Hutang Lancar)}}{\text{Total Aset}}$$

$$B = \frac{\text{Laba Sebelum Bunga dan Pajak}}{\text{Total Aset}}$$

$$C = \frac{\text{Laba sebelum Pajak}}{\text{Hutang Lancar}}$$

$$D = \frac{\text{Penjualan}}{\text{Total Aset}}$$

Meskipun model Springate (S-Score) merupakan pengembangan dari model Altman Z-Score, namun model Springate memiliki nilai cut off yang berbeda yaitu 0,862. Skor yang kurang dari atau sama dengan 0,862 ($S < 0,862$) menunjukkan bahwa kondisi tidak sehat dan memiliki potensi untuk mengalami kebangkrutan (failed). Sedangkan perusahaan yang memiliki skor lebih dari atau sama dengan 0,862 ($S > 0,862$) dikategorikan tidak bangkrut yang berarti perusahaan dalam kondisi sehat.

2.5. Keakuratan Metode Prediksi

Tingkat akurasi menunjukkan berapa persentase model dalam memprediksi kondisi perusahaan dengan benar berdasarkan keseluruhan objek penelitian

yang ada. Ketepatan model prediksi yang tertinggi dapat dilihat dari tingkat akurasi yang paling tinggi. Adapun tingkat akurasi setiap model dapat dihitung dengan formula sebagai berikut:

$$\text{Tingkat Akurasi} = \frac{\text{Jumlah Prediksi Benar}}{\text{Jumlah Sampel}} \times 100\%$$

3. Data dan Metodologi

Penelitian ini bersifat deskriptif kuantitatif yaitu dengan melakukan perhitungan dengan menggunakan model prediksi yang ada dan menyimpulkan hasil dari data penelitian yang digunakan bersumber dari *website* IDX dan beberapa *website* perusahaan karena tidak semua perbankan melaporkan laporan keuangan triwulan di *website* IDX dan ditemukan total 219 laporan keuangan yang digunakan untuk melakukan penelitian komparatif antar metode dan per kuartal. Berikut adalah kerangka pemikiran penelitian yang digunakan.



Gambar 2 Kerangka Penelitian

4. Hasil dan Pembahasan

Dari 44 emiten yang diuji dengan metode prediksi dan periode yang berbeda beda, penelitian ini mencoba untuk menjelaskan adanya perbedaan dari keempat metode yang digunakan sehingga akurasi data dapat diperkirakan. Maka dari itu didapatkan sampel keseluruhan sebanyak 219 data dengan perbedaan data pada kuartal 1 tahun 2020 karena satu perusahaan mengalami mergerisasi bersama bank lain yaitu BEKS pada tanggal dan melakukan merger pada emiten BJBR. Berdasarkan hasil perhitungan dan ketentuan angka maka didapatkan hasil akurasi dengan menghitung emiten yang tepat untuk dapat menjadi keputusan untuk emiten perbankan lain untuk melakukan aksi korporasi.

Pada Kuartal I tahun 2019 Metode Altman memiliki hasil akurasi sebesar 20,45% dengan perusahaan tergolong rawan sebanyak 17 emiten atau 38,63% sampel, Metode Springate sebesar 4,54%, Metode Zmijewski sebesar 77,27%, dan Metode Grover sebesar 90,9%. Maka dari itu metode Grover memiliki akurasi terbesar yaitu 90,9% pada kuartal I tahun 2019.

Pada Kuartal II tahun 2019 Metode Altman memiliki hasil akurasi sebesar 20,45% dengan perusahaan yang tergolong rawan sebanyak 17 emiten atau 38,63% sampel, Metode Springate sebesar 6,81%, Metode Zmijewski sebesar 81,81%, dan Metode Grover sebesar 95,45%. Maka dari itu metode Grover memiliki akurasi yang lebih akurat pada kuartal II tahun 2019

Pada Kuartal III tahun 2019 Metode Altman memiliki hasil akurasi sebesar 22,72% dengan perusahaan yang tergolong rawan sebanyak 19 emiten atau 43,18% sampel, Metode Springate sebesar 6,81%, Metode Zmijewski sebesar 72,72%, dan Metode Grover sebesar 97,72%. Maka dari itu metode Grover memiliki akurasi yang lebih tepat pada kuartal III tahun 2019

Pada Kuartal IV tahun 2019 Metode Altman memiliki hasil akurasi sebesar 20,45% dengan perusahaan yang tergolong rawan sebanyak 19 emiten atau

43,18% sampel, Metode Springate sebesar 6,81 %, Metode Zmijewski sebesar 75%, dan Metode Grover sebesar 90,9%. Maka dari itu metode Grover memiliki akurasi yang lebih besar dan tepat pada kuartal IV tahun 2019

Pada Kuartal I tahun 2020 Metode Altman memiliki hasil akurasi sebesar 13,95% dengan perusahaan yang tergolong rawan sebanyak 15 emiten atau 34,88% Sampel, Metode Springate sebesar 6,97%, Metode Zmijewski sebesar 79,06%, dan Metode Grover sebesar 97,67%. Maka dari itu metode Grover memiliki akurasi terbesar yaitu sebesar 97,76% maka metode Grover adalah metode yang paling akurat pada kuartal I tahun 2020.

Metode Altman memfokuskan pada likuiditas dan laba yang dicadangkan sehingga belum memberikan gambaran jelas standar asset perusahaan yang tergolong aman dari kebangkrutan. Metode Springate lebih ke penjualan atau sumber pendapatan yang didapat oleh perusahaan sehingga metode ini tidak akurat jika digunakan pada perusahaan jasa seperti perbankan. Metode Zmijewski menggunakan analisis rasio yang mengukur kinerja, *leverage*, dan likuiditas suatu perusahaan untuk model prediksi sehingga masih relevan untuk digunakan untuk melakukan prediksi secara umum. Sedangkan metode grover lebih kearah profitabilitas yang bisa didapat oleh suatu perusahaan dan mempunyai nilai jika kondisi perusahaan dianggap bangkrut atau masih belum dianggap bangkrut.

Kesimpulan dan Rekomendasi

Berdasarkan dari hasil analisis data, maka model Grover yang memiliki akurasi tertinggi dari ketiga model lain yang digunakan. Secara empiris, emiten BEKS terbukti mengalami kebangkrutan dengan semua model prediksi yang digunakan kecuali pada perhitungan model Grover kuartal I tahun 2019, Zmijewski pada tahun 2019 yang menyatakan tidak bangkrut. Model Altman memiliki banyak kekurangan dalam penggunaannya karena tidak semua perbankan

mengalami surplus. Model Springate lebih memfokuskan pada pendapatan sehingga kurang relevan terhadap perusahaan jasa. Model Grover Dan model Zmijewski hanya menjelaskan secara umum seperti likuiditas dan profiabilitas tetapi memiliki perbedaan bobot yang digunakan sehingga menghasilkan kesimpulan yang berbeda dengan Model Grover.

Adanya perbedaan dari setiap kondisi perusahaan dan bentuk usaha yang baru diperlukan penelitian secara menyeluruh untuk perusahaan yang melakukan IPO atau melantai di bursa sehingga dapat diketahui seberapa besar bobot dan akurasi model tersebut dalam memprediksi perusahaan dapat bertahan dalam menjalankan bisnis di Indonesia maupun di negara lain.

Referensi

- Altman, E. ... (2014). Distressed Firm and Bankruptcy prediction in an international context: a review and empirical analysis of Altman's Z-Score Model. *SSRN Electronic Journal*, 1-48.
- Altman, E., & Hotchkiss, E. (2006). *Corporate Financial Distress and Bankruptcy Predict and Avoid Bankruptcy: Analyze and Invest in Distressed Debt 3rd Edition*. New York: John Wiley & Sons.inc .
- B.I., T., & Hendrawan, R. (2020). Z-Score or S-Score Model is Better to Predict Financial Distress?: Test in State-Owned Enterprise Listed in IDX. *3rd Global Conference On Business, Management, and Entrepreneurship (GCBME 2018)* (pp. 125-128). Bandung: Atlantis press.
- IDX. (2020). *IDX Quarterly Statistics 1st quarter 2020*. Indonesia: Indonesia Stock Exchange.
- Investments and Wealth Institute. (2019). THE MASTERS SERIES Edward I. Altman, PhD: Fifty Years of Z-Scores to Predict the Probability of Corporate Bankruptcy. *the journal of Investment Consulting*, 15-22.
- Kompas.com. (2020, March 3). *Kompas.com*. Retrieved from Kompas.com: <https://nasional.kompas.com/read/2020/03/03/13114161/pasien-baru-tahu-mengidap-covid-19-setelah-diumumkan-presiden-jokowi?page=all>
- Market bisnis. (2020, March 3). *Market bisnis*. Retrieved from Market bisnis.com: <https://market.bisnis.com/read/20200303/7/1208221/rekomendasi-saham-dan-pergerakan-ihsg-hari-ini-3-maret-2020>
- Qolbi, N. (2020, May 25). *Kontan Investasi*. Retrieved from Kontan Bisnis.id: <https://investasi.kontan.co.id/news/ini-sektor-yang-catat-kenaikan-dan-penurunan-kinerja-pasca-laporan-kuartali-i-2020?page=all>
- Thomas, V. f. (2020, May 11). *tirto.id*. Retrieved from tirto.id: <https://tirto.id/ekonomi-kuartal-i-2020-tersungkur-indonesia-terancam-resesi-fpp5>



LAMPIRAN

Nilai Z" (Altman) Kuartal I 2019 – Kuartal I 2020

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
1	AGRO	1,71	1,60	1,53	1,45	0,55
2	AGRS	-0,16	1,65	1,42	0,79	0,98
3	AMAR	3,11	2,98	1,37	2,53	2,22
4	ARTO	4,65	-0,65	-0,74	3,57	3,15
5	BABP	-0,34	-0,05	0,21	0,23	-3,41
6	BACA	0,85	0,91	0,86	0,77	0,78
7	BBCA	2,06	2,06	2,03	1,12	2,06
8	BBHI	0,33	0,37	0,29	0,56	0,15
9	BBKP	0,46	0,43	0,68	-0,07	0,60
10	BBMD	2,49	2,74	2,67	2,40	2,58
11	BBNI	1,26	1,45	1,55	1,38	1,13
12	BBRI	1,98	1,13	1,91	1,92	1,71
13	BBTN	0,84	1,80	1,84	0,86	1,48
14	BBYB	0,95	0,82	1,11	0,82	0,90
15	BCIC	-1,87	-2,67	-1,45	-1,33	-1,09
16	BDMN	2,38	3,12	2,98	2,66	2,07
17	BEKS	-0,52	-0,76	-0,96	-1,00	-
18	BGTG	-2,18	1,85	2,37	0,75	1,68
19	BINA	5,37	2,21	2,11	1,85	1,71
20	BJBR	0,98	1,51	0,66	2,02	0,74
21	BJTM	1,28	1,15	1,23	1,39	1,26
22	BKSW	1,26	1,02	1,09	0,96	0,19
23	BMAS	0,90	1,08	0,42	1,06	0,97
24	BMRI	1,62	1,94	1,72	1,72	1,62
25	BNBA	1,18	1,23	1,28	1,22	1,09
26	BNGA	0,70	1,33	1,27	1,00	0,91

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
27	BNII	1,14	1,92	1,38	1,49	0,43
28	BNLI	0,78	1,42	0,79	0,84	0,21
29	BRIS	4,92	5,34	5,09	5,25	5,01
30	BSIM	1,70	1,73	2,12	2,58	1,36
31	BSWD	1,79	2,12	5,66	0,99	-0,10
32	BTPN	3,27	3,33	3,30	3,69	2,43
33	BTPS	8,44	8,87	4,18	9,44	9,01
34	BVIC	0,86	1,26	1,18	1,75	0,97
35	DNAR	1,13	0,78	3,03	2,92	3,21
36	INPC	0,51	0,80	0,79	1,01	-0,09
37	MAYA	1,15	1,15	0,83	1,13	-0,58
38	MCOR	0,95	1,15	1,00	0,55	1,00
39	MEGA	1,70	1,10	1,19	1,11	1,58
40	NISP	0,91	0,84	0,86	1,27	0,95
41	NOBU	0,89	1,53	1,01	1,62	0,85
42	PNBN	2,29	1,62	2,44	1,69	1,76
43	PNBS	3,56	7,79	8,18	8,40	9,32
44	SDRA	2,60	3,09	4,94	3,01	2,97

Nilai S (Springate) Kuartal I 2019 – Kuartal I 2020

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
1	AGRO	0,288	0,232	0,222	0,223	0,063
2	AGRS	-0,053	0,215	0,197	0,020	0,134
3	AMAR	0,651	0,435	0,235	0,462	0,310
4	ARTO	-2,534	-0,112	-0,152	0,132	0,321
5	BABP	-0,022	0,025	0,078	0,101	-0,511
6	BACA	0,100	0,126	0,129	0,122	0,097
7	BBCA	0,221	0,255	0,276	0,159	0,233
8	BBHI	0,067	0,084	0,071	0,082	0,046

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
9	BBKP	0,050	0,055	0,100	-0,009	0,075
10	BBMD	0,256	0,342	0,358	0,334	0,273
11	BBNI	0,146	0,201	0,241	0,233	0,137
12	BBRI	0,244	0,146	0,300	0,330	0,216
13	BBTN	0,109	0,277	0,287	0,136	0,225
14	BBYB	0,127	0,118	0,171	0,140	0,113
15	BCIC	0,005	-0,077	0,117	0,139	0,120
16	BDMN	0,279	0,426	0,428	0,391	0,236
17	BEKS	-0,016	-0,066	-0,090	-0,106	-
18	BGTG	-0,381	0,275	0,380	0,112	0,233
19	BINA	0,775	0,291	0,289	0,268	0,228
20	BJBR	0,100	0,243	0,116	0,358	0,098
21	BJTM	0,175	0,191	0,226	0,255	0,167
22	BKSW	0,179	0,161	0,181	0,173	0,043
23	BMAS	0,098	0,146	0,058	0,174	0,111
24	BMRI	0,195	0,277	0,268	0,290	0,213
25	BNBA	0,119	0,140	0,161	0,169	0,106
26	BNGA	0,045	0,168	0,128	0,150	0,085
27	BNII	0,134	0,267	0,191	0,242	0,021
28	BNLI	0,127	0,262	0,195	0,236	0,039
29	BRIS	0,719	0,785	0,760	0,797	0,739
30	BSIM	0,264	0,334	0,439	0,614	0,244
31	BSWD	0,268	0,330	0,930	0,167	-0,026
32	BTPN	0,461	0,498	0,518	0,608	0,332
33	BTPS	1,130	1,419	0,821	1,997	1,170
34	BVIC	0,099	0,174	0,168	0,259	7,783
35	DNAR	0,110	0,061	0,402	0,360	0,380
36	INPC	0,032	0,088	0,094	0,108	-0,026
37	MAYA	0,153	0,166	0,137	0,191	-0,127
38	MCOR	0,108	0,151	0,141	0,085	0,140

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
39	MEGA	0,226	0,165	0,204	0,213	0,214
40	NISP	0,095	0,104	0,127	0,212	0,095
41	NOBU	0,127	0,230	0,161	0,265	0,116
42	PNBN	0,266	0,198	0,348	0,249	0,191
43	PNBS	0,175	0,881	0,894	0,930	0,914
44	SDRA	0,337	0,453	0,447	0,472	0,406

Nilai X (Zmijewski) Kuartal I 2019 – Kuartal I 2020

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
1	AGRO	0,29	0,35	0,38	0,45	0,54
2	AGRS	-0,06	0,03	0,36	0,51	0,52
3	AMAR	-0,04	-0,83	-0,72	-0,46	-0,27
4	ARTO	2,14	0,66	0,76	-1,13	-1,57
5	BABP	0,65	0,63	0,65	0,55	0,62
6	BACA	0,71	0,69	0,70	0,93	0,68
7	BBCA	0,25	0,26	0,19	0,14	0,35
8	BBHI	0,52	0,68	0,68	0,79	0,67
9	BBKP	0,89	0,89	0,87	0,88	0,91
10	BBMD	-0,21	-0,29	-0,29	-0,27	-0,08
11	BBNI	0,34	0,38	0,29	0,25	0,46
12	BBRI	0,50	0,48	0,43	0,34	0,54
13	BBTN	0,58	0,57	0,59	0,62	0,77
14	BBYB	0,48	0,43	0,36	0,34	0,27
15	BCIC	1,05	0,92	0,82	0,80	0,62
16	BDMN	0,14	0,12	0,06	-0,03	0,19
17	BEKS	0,37	1,04	1,06	1,10	-
18	BGTG	-0,06	-0,07	1,37	0,04	0,06
19	BINA	-0,27	-0,20	-0,13	0,07	0,12
20	BJBR	0,58	0,63	0,60	0,53	0,64

21	BJTM	0,57	0,64	0,63	0,64	0,60
22	BKSW	0,02	0,18	0,19	0,24	0,32
23	BMAS	-9,37	0,44	-25,85	0,44	0,45
24	BMRI	0,11	0,13	0,07	0,02	0,27
25	BNBA	0,28	0,23	0,180	0,23	0,33
26	BNGA	0,49	0,49	0,47	0,43	0,56
27	BNII	0,63	0,59	0,54	0,45	0,59
28	BNLI	0,57	0,48	0,50	0,51	0,62
29	BRIS	-2,41	-2,60	-2,59	-2,72	-2,52
30	BSIM	0,02	0,14	0,02	-0,21	0,01
31	BSWD	-0,31	-0,36	-0,29	-0,29	-0,19
32	BTPN	0,33	0,23	0,15	0,11	0,26
33	BTPS	-3,40	-3,58	-0,83	-3,78	-3,50
34	BVIC	0,55	0,52	0,48	0,52	0,55
35	DNAR	0,25	0,28	-0,54	-0,84	-0,96
36	INPC	0,40	0,39	0,37	0,40	0,67
37	MAYA	0,70	0,68	0,65	0,62	0,64
38	MCOR	0,48	0,48	0,57	0,49	0,61
39	MEGA	0,37	0,36	0,33	0,41	0,48
40	NISP	0,57	0,52	0,47	0,45	0,56
41	NOBU	0,72	0,71	0,70	0,75	0,76
42	PNBN	0,27	0,24	0,20	0,12	0,21
43	PNBS	-3,86	-3,83	-3,89	-3,94	-3,96
44	SDRA	0,20	0,34	-3,87	0,28	0,36

Nilai G (Grover) Kuartal I 2019 – Kuartal I 2020

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
1	AGRO	0,38	0,39	0,37	0,36	0,14
2	AGRS	-0,09	0,38	0,35	-0,13	0,04
3	AMAR	0,63	0,66	0,28	0,19	0,10
4	ARTO	1,20	-0,09	-0,14	-0,29	-0,02
5	BABP	-0,02	0,07	0,13	0,10	0,07
6	BACA	0,21	0,22	0,21	0,08	0,08
7	BBCA	0,39	0,40	0,40	0,21	0,11
8	BBHI	0,15	0,16	0,13	-0,01	0,08
9	BBKP	0,12	0,12	0,18	0,08	0,08
10	BBMD	0,48	0,53	0,52	0,22	0,09
11	BBNI	0,26	0,32	0,35	0,19	0,10
12	BBRI	0,41	0,22	0,42	0,23	0,11
13	BBTN	0,21	0,46	0,47	0,08	0,08
14	BBYB	0,24	0,20	0,28	0,09	0,09
15	BCIC	0,09	-0,07	0,21	0,10	0,17
16	BDMN	0,47	0,67	0,64	4,75	0,11
17	BEKS	0,04	-0,03	-0,07	3,25	-
18	BGTG	-0,57	0,45	0,58	0,09	0,09
19	BINA	1,28	0,49	0,48	0,09	0,08
20	BJBR	0,26	0,39	0,17	0,16	0,09
21	BJTM	0,29	0,29	0,32	0,19	0,11
22	BKSW	0,33	0,29	0,31	0,10	0,08
23	BMAS	7,58	0,25	0,18	0,13	0,09
24	BMRI	0,33	0,43	0,39	0,22	0,11
25	BNBA	0,226	0,24	0,25	0,12	0,08
26	BNGA	0,10	0,27	0,24	0,16	0,10
27	BNII	0,26	0,45	0,32	0,15	0,09
28	BNLI	0,20	0,40	0,27	0,26	0,11

No.	Kode Emiten	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
29	BRIS	1,19	1,28	1,22	0,14	0,13
30	BSIM	0,36	0,49	0,61	0,48	0,18
31	BSWD	0,46	0,55	1,43	0,11	0,08
32	BTPN	0,76	0,79	0,78	0,19	0,11
33	BTPS	1,51	1,66	0,94	0,75	0,34
34	BVIC	0,21	0,31	0,29	0,08	0,07
35	DNAR	0,22	0,13	0,65	0,07	0,09
36	INPC	0,10	0,17	0,16	0,06	0,07
37	MAYA	0,28	0,28	0,21	0,11	0,07
38	MCOR	0,22	0,27	0,24	0,12	0,09
39	MEGA	0,40	0,25	0,29	0,20	0,11
40	NISP	0,18	0,17	0,18	0,18	0,10
41	NOBU	0,25	0,40	0,27	0,10	0,08
42	PNBN	0,49	0,32	0,53	0,18	0,10
43	PNBS	0,33	1,45	1,43	0,36	0,44
44	SDRA	0,58	0,73	0,70	0,17	0,10



Securitization: Economic Stimulus with Strengthening of Banking Intermediation in Facing the Covid-19 Pandemic

FIDYA KASIH MAULIDYA

*International Accounting, Universitas Andalas
Sumatera Barat, Indonesia*

ABSTRACT

The function of financial institutions as intermediaries is to fund back from the community in the form of loans or credit to real business sectors in an effort to develop businesses. But, since Covid-19 was confirmed, the role of financial institutions began to weaken. This paper investigates an economic stimulus effort to learn from the experiences and practices of foreign countries. In this paper, the authors suggest implementing credit asset securitization. The research method that will be used in this research is descriptive qualitative method that is used to obtain a comprehensive picture related to the solution to strengthen intermediation and banking performance in the face of slowing economic growth due to the impact of the Covid-19 disease pandemic. This research is a systematic review based on the literature using qualitative descriptive analysis by describing research results through several sources and drawing conclusions from several related articles and journals. So the source of the data obtained from this research is secondary data in the literature review related to banking securitization in an effort to strengthen banking intermediation. From this analysis, the authors conclude and recommend the implementation of asset securitization policies as the right step that securitization which aims to increase credit to businesses that needs and the stability of the banking intermediation function based on the theory of securitization and learning from several countries.

Keywords: Financial Institutions, Intermediaries, Covid-19, Economic Stimulus, Securitization.

ABSTRAK

Fungsi lembaga keuangan sebagai intermediasi adalah untuk mendanai kembali dari masyarakat dalam bentuk pinjaman atau kredit ke sektor bisnis nyata dalam upaya mengembangkan bisnis. Tapi sejak Covid-19 dikonfirmasi, peran lembaga keuangan mulai lemah. Makalah ini menyelidiki upaya stimulus ekonomi untuk belajar dari pengalaman dan praktik negara asing. Dalam tulisan ini, penulis menyarankan penerapan sekuritisasi aset kredit. Metode penelitian yang akan digunakan dalam penelitian ini adalah metode deskriptif kualitatif yang digunakan untuk memperoleh gambaran komprehensif terkait solusi untuk memperkuat intermediasi dan kinerja perbankan dalam menghadapi perlambatan pertumbuhan ekonomi akibat dampak pandemi penyakit Covid-19. Penelitian ini adalah tinjauan sistematis berdasarkan literatur menggunakan analisis deskriptif kualitatif dengan menggambarkan hasil penelitian melalui beberapa sumber dan menarik kesimpulan dari beberapa artikel dan jurnal terkait. Jadi sumber data yang diperoleh dari penelitian ini adalah data sekunder dalam tinjauan pustaka terkait sekuritisasi perbankan dalam upaya memperkuat intermediasi perbankan. Dari analisis ini, penulis merekomendasikan implementasi kebijakan sekuritisasi aset sebagai kebijakan yang tepat pada saat ini dimana sekuritisasi yang bertujuan untuk meningkatkan kredit kepada bisnis yang membutuhkan dan stabilitas fungsi intermediasi perbankan berdasarkan teori sekuritisasi dan pembelajaran dari beberapa negara.

Kata Kunci: Lembaga Keuangan, Intermediasi, Covid-19, Stimulus Ekonomi, Sekuritisasi

JEL Classification: E51; G20; G21

1. Introduction

1.1. Background

In an economic system, the main role of financial institutions is to carry out their functions as an intermediary institution. The function of financial institutions as intermediaries is to fundings back from the community in the form of loans or credit to real business sectors in an effort to develop businesses. In other words, through its intermediation function, the financial sector must act as an agent in accelerating development and increasing economic growth of a business which will ultimately improve the welfare of market participants.

Economy is an important factor in life. It can be ascertained that in everyday human life is always related to the economy because the economic existence can provide opportunities for humans to meet their daily needs such as food, drinks, clothing, shelter, and so forth. However, since the emergence of a virus in December 2019, its emergence which has now been named the Covid-19 pandemic has had a very serious impact on almost all aspects of human life on earth, especially in the economic sector.

The detrimental impact of the Corona virus (Covid-19) in the health side has also affected the economies of countries around the world, including Indonesia. The global economy has experienced a downturn, followed by a decree by WHO which established the Corona outbreak as a pandemic affecting the business world. The virus that began to spread around the Wuhan region and has now infected more than 100 countries in various parts of the world poses a serious threat to the global economy because its widespread spread will prolong the period of collapse of the world economy. The crippling of economic activity due to physical distancing as a policy in breaking the chain of the spread of this virus causes economic growth to be hampered. One of the impacts is banking business activities, especially in maintaining credit collectability. The problem comes when informal businesses have credit at the bank and there

are difficulties in paying credit to the bank because the business sector is not running. Whereas the soundness of a bank is strongly influenced by the value of a bank's bad credit. This decline in bank performance means that the bank's function as a financial intermediary system has weakened.

Therefore, there should be a great support for OJK's policy to provide economic stimulus to businesses, including micro, small and medium enterprises (MSMEs) aimed at saving all parties from the onslaught of the corona virus (Covid-19), both business actors as a debtor or banking and finance as a creditor. In addition to OJK Regulation No. 11 / POJK.03 / 2020, the government has also pursued a policy of economic recovery through Government Regulation in Lieu of Law (PERPU) No. 1 of 2020 concerning State Financial Policies and Financial System Stability for Handling Pandemic Coronavirus Disease 2019 (COVID-19) and in the Context of Facing Threats that Endanger the National Economy and Financial Stability established on 31 March 2020.

In order to support the OJK policy and an effort to maintain economic stability over the conditions of limited access to finance, in this case the author will conduct an in-depth discussion related to securitization of credit assets as an alternative to increase the availability of credit in Indonesia. Asset securitization practices have been implemented in many developed countries such as France, Japan, the United States, and Germany. Central banks in France, Europe and Japan are known to play a role in encouraging the securitization of credit assets in their countries.

For example, the Asset-Based Securities (ABS) outright purchase scheme by the Bank of Japan is designed to reinvigorate Japanese economic activity by encouraging functional interactions between the financial markets, the banking sector and the real sector. This is done because the monetary transmission mechanism does not work at the time of deflation or economic slump. European Central Bank (ECB) also uses the securitization of SME credit assets as a tool to

improve monetary policy transmission. The malfunctioning of credit lines has several undesirable consequences for the real sector and causes a reduction in outstanding SME loans. This is the background of the ABS SME purchasing program in September 2014. However, the experience of the 2008-2009 crisis in the United States teaches us that asset securitization also has risks that have a systemic impact on the financial sector and the economy as a whole. In general, asset securitization contains several risks such as credit risk, market risk, liquidity risk, operational risk and legal risk.

This study analyzes the potential for securitization of credit assets so as to improve bank capacity when demand for credit is high with limited funding capacity. To support this, there are several literature studies that explain the securitization of credit assets. Some aspects analyzed in this study are aspects of BI's tasks in the monetary and macroprudential fields and the mechanism or scheme of securitization of credit assets in Indonesia.

1.2. Research Questions

1. How is the implementation in a policy of credit asset securitization carried out by the Central Bank in other countries to encourage financing?
2. What are the recommendations for Indonesia economic stimulus in the face of Covid-19 through credit asset securitization?

1.3. Research Objectives

1. Study the policy and implementation of credit asset securitization carried out by the Central Bank in other countries in order to encourage financing.
2. Formulating recommendations related to economic stimulus efforts in the face of Covid-19 through securitization of credit assets by Bank Indonesia.

2. Literature Review

2.1. Asset Securitization

According to Presidential Regulation No. 19/2005 amended by Presidential Regulation No. 1/2008, asset securitization is a transformation of illiquid assets into liquid assets by purchasing financial assets from original creditors and issuers of Asset Backed Securities (EBA). Then according to Bank Indonesia Regulation (PBI) No.7 / 4/2005 concerning Prudential Principles in Asset Securitization Activities for Commercial Banks, asset securitization is defined as the issuance of securities by the issuer of EBA based on the transfer of financial assets from the original creditor followed by payment originating from the sale of EBA to the capital owner. According to Bapepam Regulation No.IX.KI, EBA is a securities issued by KIK-EBA whose portfolio consists of financial assets in the form of bills arising from commercial paper, credit card bills, future bills (future receivables), lending including housing or apartment ownership loans, debt securities guaranteed by the Government, Credit Enhancement or Cash Flow facilities, as well as equivalent financial assets and other financial assets related to these financial assets. Then according to OJK Regulation No.23 / POJK.04 / 2014 secondary financing is the organization of medium and / or long-term fund distribution activities to the original creditor by purchasing a Collection of Original Creditor Receivables and selling it through the issuance of EBA-SP; or purchase of Origin Creditors Receivables Collection from the issuance of EBA-SP.

Lumpkin (1999) defines asset securitization as a more specific structured finance where it says that asset securitization is a "structured finance" because it is a collection of a number of assets with relatively the same characteristics and then is repackaged by adding features in the form of certain interest rates and profits Other economies are then sold to investors as third parties. This opinion was strengthened by Bank For International Settlements (BIS, 2005)

which said that structured finance instruments can be defined through three key characteristics:

- (1) pooling of assets (either cash-based or synthetically created);
- (2) tranching liabilities that are backed by the asset pool (this property differentiates structured finance from traditional “pass through” securitizations);
- (3) de-linking of the credit risk of the collateral asset pool from the credit risk of the originator, usually through use of a finite-lived, stand-alone Special Purpose Vehicle (SPV).

In addition, BIS states that asset securitization can transform a group of ordinary assets that are illiquid and risky into larger, more liquid assets, less risk, and easier to market. Thus the final results obtained from the asset securitization transaction process is that the corporation can obtain the proceeds or funds needed by selling its assets and not borrowing funds from other sources outside the company. The results obtained from the asset securitization process are generally known as Asset Backed Securities (EBA).

Based on these definitions, we can generally know that there are 3 (three) main parties involved in the process of asset securitization, namely the originator, issuer, and investor. Originator is an institution that has assets to be moved from on balance sheet to off balance sheet through the process of asset securitization, where in general the originator is a bank / other financial institution. The Originator will then transfer the financial assets held to the issuer which is a Special Purpose Vehicle (SPV) entity with the main task of issuing securities products with collateral in the form of a claim on the portfolio of financial assets transferred by the originator. Securities products formed by the issuer will then be sold on the capital market to be bought by investors.

According to Nassr and Wehinger (2014), asset securitization can be categorized in several main types, namely Mortgage-Backed Securities (MBS), Asset-Backed Securities (ABS), Collateralised Debt Obligations (CDO), and Asset-Backed Commercial Paper (ABCP). The categorization of the types of securitization is based on the nature of the collection of assets pledged and the cash flows generated by the portfolio of assets being securitized.

There are two types of asset securitization, the first being Mortgage-Backed Securities (MBS) and Asset-Backed Securities (ABS). MBS is a type of asset securitization supported by collateral in the form of a collection of housing loans (commercial or residential), while ABS is a type of asset securitization supported by a wider form of collateral including credit card bills, vehicle debt, SME securitization, leasing, and assets other financial bills (other account receivables). SBM is basically a part of ABS, but due to its large volume, especially in the United States, to minimize bias on data often MBS is separated from ABS. The next type is Collateralised Debt Obligations (CDO) is a type of asset securitization supported by collateral in the form of debt instruments such as senior secured bank loans, high yield bonds, credit default swaps (CDS), and collections of leveraged loans. Then Asset-Backed Commercial Paper (ABCP) is a type of asset securitization that is generally used to increase liquidity or short-term financial needs by issuing commercial paper to the capital market with collateral in the form of other financial assets.

Theoretically, asset securitization is a product in the capital market that is useful for bringing together parties who are overfunded with those who need funds. Here are some of the benefits of asset securitization, namely:

- 1) Can change less liquid assets to become more liquid;
- 2) Can change assets that are less attractive to be easier to trade because instruments produced from asset securitization are instruments that are easily traded;

- 3) In order to expand investors to an asset;
- 4) For the originator, asset securitization is a tool to transfer portfolio risk;
- 5) Investors who buy products from asset securitization will benefit in the form of higher interest rates than bank interest.
- 6) Is a suitable source of funding for long-term loans; currently in the banking sector the source of funds used to provide long-term credit is the source of short-term funds originating from deposits and savings, this causes an inadequate source of funding. With asset securitization, companies can match funding to corporate funding strategies;
- 7) Asset securitization can transfer accounts receivable from the original creditor's balance sheet, otherwise known as an on balance sheet transaction. This makes the original creditor not bear the burden of the receivables and reduces the pressure on adjusting the required capital ratio and facilitates the calculation of capital adequacy;
- 8) Makes companies able to withdraw funds by selling their receivables without adding new liabilities. For private companies, asset securitization can be used to issue debt securities without public disclosure;
- 9) Diversification of sources of financing that so far have only come from capital and debt have increased with the securitization of these assets.

2.2. Macroprudential Policy

According to Bank Indonesia Regulation No. 16/11 / PBI / 2014 concerning Macroprudential Regulation and Supervision, macroprudential policy is a policy determined by Bank Indonesia to prevent and reduce systemic risk, encourage a balanced and quality intermediary function, improve financial system efficiency, and financial access in promoting the maintenance of the SSK, and supports monetary stability and payment system stability.

The purpose of macroprudential policy according to Bank Indonesia Regulation No. 16/11 / PBI / 2014 concerning Macroprudential Control and Supervision are as follows: 1) Preventing and reducing systemic risk; 2) Encouraging a balanced and quality intermediary function; and 3) Improve financial system efficiency and financial access. The goal of macroprudential policy is to maintain financial system stability which is a condition that enables the national financial system to function effectively and efficiently and is able to withstand internal and external vulnerabilities so that the allocation of funding sources or funding can contribute to the growth and stability of the national economy.

According to Bank Indonesia Regulation No.16 / 11 / PBI / 2014 concerning macroprudential regulation and supervision, it is explained that there are several instrument provisions used, including the following: 1) Regulatory instruments strengthen capital resilience and prevent excessive leverage; 2) Manage the intermediation function and control credit risk, liquidity risk, exchange rate risk, and interest rate risk, as well as other risks that have the potential to become systemic risk; 3) Limiting exposure concentration; 4) Strengthening financial infrastructure resilience; and 5) Improve financial system efficiency and financial access.

2.3. Coronavirus 2019 (Covid-19)

The Coronavirus Disease 2019 outbreak was first confirmed in Indonesia on March 2, 2020. This condition gave rise to shocks not only in the world of health but the economy was also not free from its effects. Various Economic Stimulus policies have been issued by the Financial Services Authority as an economic rescue measure at this time. In order to face the impact of the distribution of Coronavirus Disease 2019, OJK issued Regulation of the Financial Services Authority Number 11 Year 2020 Regarding National Economic Stimulus as

Countercyclical Policy on the Impact of Spreading Coronavirus Disease 2019 (POJK Stimulus of Impact Covid-19). This policy must have a direct impact on the banking sector in Indonesia, which is an intermediary institution.

Covid-19 is a disease caused by the SARS CoV-2 virus and has symptoms similar to the common cold, which can lead to severe illness and inflammation of the lungs or also called pneumonia, causing breathing difficulties. The World Health Organization (WHO), as a world reference source in dealing with Covid-19, has released several basic protective measures for individuals in dealing with this Pandemic. Some of them are keeping hands clean by diligently washing hands with soap and running water or with alcohol-based liquids, maintaining social distancing by keeping a distance of at least 1 meter from other people or anyone who coughs or sneezes, avoid touching eyes, nose and mouth, because all three are the pathway for the virus to enter the body, maintain respiratory hygiene by covering the mouth and nose with a tissue or with elbows when coughing and sneezing, if you have a fever, cough and difficulty breathing, seek medical care as soon as possible, and keep looking for information and following the advice given by your local health service provider. However, this policy also had an impact on the global economy which affected 3 sectors, namely the stock market, bonds, and the value of gold, and also on the domestic economy.

Capital Market Sector

Corona Virus has made investors run wild from the global stock market. Global equity markets are moving with very high volatility. This is reflected in the volatility index (VIX) output of the Chicago Board Options Exchange at its highest level in five years. This means that Corona Virus has a pretty serious impact. It also affects the level of investment decisions of several investors so that the impact is seen so significant. Corona virus also makes the mental state of investors panic and makes the global stock market under intense pressure. If

calculated since the beginning of the year, the performance of the global stock market is still weakening.

Securities Trading

US 10-year bonds are at their lowest level in history. US government bond yields for 10-year tenors were at the level of 0.7070% on Friday (03/06/2020). This means that investors in the last 3 years have made a sudden decision amid the Corona Virus (Covid-19) by deciding not to be interested in debt securities issued by the US. Corona virus swiftly devoured the economic sector in the US quickly.

Gold trading

Gold prices bounced back and set a record high in seven years. Gold which was originally only categorized as a safe haven or assets with minimal risk has become an investment container that is quite attractive. This can be seen in gold trading in the spot market which continues to experience a surge amid the Corona Virus siege.

Domestic Economy

Various policies were carried out by Indonesia in order to deal with the global economic conditions caused by the Corona virus. The movement of exchange rates and oil prices continuously requires the government to immediately take policy. Among the government policies are interest rates and discounted airplane ticket prices so that people remain interested in making tourist visits to several tourist destination cities. Variation of stimulus to reduce the pressure experienced and high volatility in the stock market in the country, the stock exchange authorities decided to stop short selling transactions in the midst of panic conditions like now. In this case covid became a major concern

for the Indonesian people because of the problems that it continues to cause due to losses that have an impact on the Indonesian economy.

3. Data and Methodology

3.1. Data

This research is a systematic review based on the literature using qualitative descriptive analysis by describing research results through several sources and drawing conclusions from several related articles and journals. So the source of the data obtained from this research is secondary data in the literature review related to banking securitization in an effort to strengthen banking intermediation.

3.2. Methodology

The research method that will be used in this research is descriptive qualitative method. This method is used to obtain a comprehensive picture related to the solution to strengthen intermediation and banking performance in the face of slowing economic growth due to the impact of the Covid-19 disease pandemic.

4. Results

4.1 Implementation of Securitization in Other Countries

Securitization Practices in Malaysia

The Secondary Mortgage Market in Malaysia began with the operation of Cagamas Berhad in 1987. Cagamas Berhad was established to function as an intermediary between the primary lender (Primary Lender) and long-term investors with guarantees of securities that generate fixed income, by means of which the company will buy bills on housing mortgages and other mortgages

for the issuance of debt securities that will finance the purchase of mortgages. Initially Cagamas was established with three objectives, namely to reduce liquidity problems due to differences in the maturity structure of the source of funds with the structure of the maturity of housing loans, to reduce the interest rate risk faced by major lenders by creating a fixed interest rate during long-term financing , and to help the financial sector create investment options in the form of fixed income securities.

Securitization Practices in Spain

Securitization in Spain is motivated by the scarcity of credit which has a significant impact on the economy in Europe. Policy makers choose asset securitization as the main instrument in reactivating credit as a monetary policy transmission mechanism. Before the crisis, policymakers were more focused on contributing to market development and several laws relating to the framework of asset securitization. The process of asset securitization in Spain follows the traditional model, which is an easier structure and securitized assets are high quality assets. In the traditional model, the originator transfers the pool of assets to the SPV which will issue its securitization product to the market. Asset securitization in Spain is more likely to aim as a credit mechanism compared to risk transfer instruments. This asset securitization policy shows a positive impact on the economy by reactivating previously sluggish loans and contributing to improving lending.

Securitization Practices in China

In 2005, China conducted an asset securitization pilot project for the first time to expand funding instruments. China Construction Bank and China Development Bank won the inaugural project of asset securitization and Mortgage Backed Security. In 2009, the project was halted due to the subprime

mortgage crisis, but in 2012 the program was revived and in 2013 the state council expanded the program. The mechanism used for asset securitization is the originator as a financial institution and EBA can be traded on the National Inter-Bank Bond Market. Central banks and banking regulators speed up the process by allowing issuers to sell EBA freely after registering with regulators. Previously, every EBA issuance had to get approval based on deals.

In this case asset securitization helps banks and finance companies free up capital to be used in lending. The development of formal market securitization of assets that invites broader participation of market participants and is governed by clear and consistent arrangements has brought significant benefits to the Chinese economy.

Securitization Practices in Japan

The malfunctioning of the monetary transmission mechanism in Japan has resulted in quantitative easing conducted by the Bank of Japan (BOJ) being less efficient in achieving its targets to improve economic conditions that experience deflation and low growth. Accumulated credit risk, which is related to NPL problems, has resulted in a more limited banking intermediation function. Japanese SMEs face financing constraints due to asymmetric information and collateral limitations. Generally, SMEs in Japan use additional collateral in the form of land and government guarantees. The BOJ cooperates with relevant authorities and government financial institutions and only accepts publicly offered ABS that is more transparent in information than private ABS.

The impact obtained from asset securitization in Japan is the transfer of MSME credit risk to banks, investors, BOJ, and several other sectors of public institutions. This policy can increase ABS market liquidity schemes, thereby reducing costs and increasing funding availability. This policy paved the way for

providing access to new financing for MSMEs, contributing to strengthening the monetary policy transmission mechanism.

Securitization Practices in the United States

The emergence of asset securitization in the United States was driven by a government program that sought to increase the liquidity of the housing finance market or what is commonly called a residential mortgage with the aim of the banking sector to obtain cheaper funding. In 1932, the government formed the Federal Home Loan Bank which provided housing credit facilities for the American public. Then the government formed the secondary mortgage market, namely FNMA, GNMA, and FHLMC. In 1968, the first time asset securitization in the form of Mortgage Backed Securities with underlying assets in the form of mortgages was issued in America in 1968 through GNMA.

Securitization Practices in Indonesia

Credit assets in Indonesia began to be practiced in 1994 through the securitization of credit card bill assets that were implemented by Citibank Jakarta. The next milestone in asset securitization in Indonesia was in 2009, namely the securitization of mortgage loan assets by Bank BTN. However, asset securitization activities have not yet developed optimally in Indonesia, as reflected in the still limited types of assets being securitized and the minimum volume of transactions and market participants both in the primary and secondary markets participating in this asset securitization. The government has supported the development of asset securitization by establishing a State-owned Special Purpose Vehicle (SPV) or also called Government Sponsors Entity (GSE) specifically mandated to develop the secondary market for KPR asset securitization as well as an institution that can issue asset securitization products called PT Sarana Multigriya Financial (PT. SMF).

The role of Bank Indonesia in the Securitization Scheme

Bank Indonesia as the central bank in Indonesia currently has two functions, namely Bank Indonesia as monetary controller and Bank Indonesia as macroprudential regulator and supervisor. As a monetary controller in Indonesia, Bank Indonesia can carry out various monetary operations through open market operations (OPT) and standing facilities policies which consist of deposit facilities and lending or financing facilities. Monetary operations carried out by BI are carried out to absorb liquidity or provide liquidity to the financial system through OPT and standing facilities. While as a regulator and supervisor of macroprudential, the role of BI according to PBI No. 16/11 / PBI / 2014 are as follows:

- 1) Prevent and reduce systemic risk
- 2) Encouraging a balanced and quality intermediary function
- 3) Improve the efficiency of the financial system
- 4) Access to finance and MSMEs
- 5) Supports monetary stability and payment systems

Securitization of credit assets as a financial product can be used by BI as an instrument for conducting monetary and macroprudential policies. The existence of securitization of credit assets is expected to encourage banks to extend credit to business sectors that need it. Banks that have limited liquidity in lending can later obtain liquidity from the securitization process. For this reason, Bank Indonesia's participation in building credit asset securitization is not only in accordance with its function, but can also help improve the business sector, which in turn can boost Indonesia's economic growth. The role of Bank Indonesia in developing credit asset securitization, of course, must be adjusted to the functions of Bank Indonesia and existing regulations. There are at least two forms of roles that can be taken by Bank Indonesia related to the development

of credit asset securitization, the first is that Bank Indonesia is involved in the final part of the credit asset securitization process, which is to act as an investor of securities resulting from credit asset securitization and secondly Bank Indonesia can play a role in the process the beginning of securitization of credit assets. The first role requires the active role of Bank Indonesia in conducting transactions such as buying and selling securities as a result of credit asset securitization to increase investor confidence. The role of Bank Indonesia is needed to encourage the running of SME credit asset securitization because the inclusion of Bank Indonesia as an investor will create market confidence in the credit asset securitization product.

By law, the role of BI in securitization is possible both directly and indirectly, but still within certain limits. In accordance with the legislation in force, the three main pillars of BI in achieving and maintaining the stability of the Rupiah are setting and implementing monetary policy, regulating and maintaining a smooth payment system, and maintaining financial system stability. Therefore, Bank Indonesia's involvement in securitization must be in order to achieve the objectives and functions of BI and also within the scope of policies related to the implementation of the three BI pillars. Basically BI itself has the opportunity to have an active role even further in the creation of a securitization system, for example by building an institution that has an SPV function. In accordance with Article 64 paragraph 1 of the Law of the Republic of Indonesia No. 23 of 1999 concerning Bank Indonesia states that Bank Indonesia may conduct equity participation in legal entities or other entities that are indispensable in carrying out Bank Indonesia's tasks and with the approval of the House of Representatives. Paragraph 2 of Article 64 states that the funds for investment as referred to in paragraph (1) can only be taken from the Reserve Reserves.

In Europe, eligible collateral assets are in themselves high quality assets so that in addition to functioning as assets that can be used as collateral to obtain

credit from the central bank, these assets can also be used as collateral assets when applying for credit from other financial institutions. Therefore, aside from being a collateral, the existence of eligible collateral assets in Europe can also ease the function of the central bank in providing liquidity facilities to banks. By having eligible collateral assets, banks can get liquidity from banks and other financial institutions. In its implementation, there are several important issues that are closely related to the two conditions above. The issue is an issue related to the authority possessed by BI as the central bank in Indonesia. Policies related to rating institutions for MSMEs and the availability of SPV as EBA credit issuers are microprudential areas which are the authority and responsibility of OJK so that the achievement of the two preconditions above is very dependent on OJK as microprudential regulator and supervisor. And if it has been fulfilled, the regulation and supervision is also the responsibility and authority of the OJK so that BI must make efforts to communicate and coordinate with the OJK to ensure both conditions preconditions occur. Aside from being a securities repurchased in a lending facility, BI can provide additional incentives by providing a price reduction at the repo discount rate in the lending facility. The discount rate for repos is BI-rate plus a certain margin. If a bank has an EBA of business credit, BI can provide incentives by providing a lower discount rate for banks applying for a lending facility using the EBA of securitization of SME credit assets.

The policy for determining business credit ratios is a macroprudential policy related to increasing financial access for MSMEs. In PBI No. 17/11 / PBI / 2015, BI has combined policies related to the reserve requirement, LFR, and MSME credit ratio. The regulation stipulates that banks that have met the minimum MSME credit ratio to total loans and have MSME MSMEs as well as a total NPL below 5% will receive an upper limit incentive from previously only 92% to 94%. With this policy, banks that have channeled MSME loans according to the rules will get additional flexibility to channel funds collected from DPK and securities in

the form of credit to the real sector. With these additional incentives, banks that have difficulty in extending credit due to lack of resources can become credit asset securitization investors so they can continue to participate in increasing financial access for businesses that need it.

Within the macroprudential framework, securitization of SME credit assets can be considered as one of the things that BI can do in carrying out its duties as a macroprudential regulator and supervisor, especially in terms of increasing financial access to businesses and promoting a balanced and quality intermediation function. Through this securitization of credit assets, the source of funds for business loans that require not only come from third party funds but can also come from public funds through capital market mechanisms so that the task of BI in promoting a balanced and quality intermediary function can be achieved. Through securitization, liquidity problems can be overcome and the risk transfer process can also be carried out so that credit risk can be shared jointly by many parties. In addition, securitization of credit assets will also be able to increase lending to businesses that need funds so that BI's task to improve financial access for these businesses can be achieved.

5. Conclusions

Securitization of credit assets has been carried out in several countries, with a relatively similar objective of trying to encourage the entry of credit to business sectors that require business funding. But in practice, there are some differences, of course related to the conditions of each country. Credit asset securitization has the potential to be developed in Indonesia and is expected to provide benefits as in other countries. The potential for business credit itself is very large in Indonesia, especially in the midst of the Covid-19 pandemic conditions which necessitates an impetus for the public to do more business work due to the rise in early layoffs of workers at private companies, and the lack

of ability to pay credit by employers due to reduced input causing a decrease in funding capital for the banking cycle. Securitization of credit assets is expected to reduce the gap between demand and supply of credit, where the existence of credit asset securitization products is expected to increase funds for business credit supply.

The experience of securitizing assets has been owned by Indonesia, especially the securitization of KPR assets which was first carried out by Bank BTN in 2009. Bank BTN securitized KPR bills by registering KIK-EBA transactions at the Capital Market Supervisory Agency which is now known as OJK in 2008 which then listing transactions on the IDX in 2009. Up to 2014, Bank BTN has carried out seven mortgage loan securitization transactions with KIK-EBA transactions totaling Rp5.45 trillion. Then, Bank BTN changed the securitization transaction model from previously KIK-EBA to EBA-SP transaction.

The level of securitization in Indonesia has two modes of choice, namely using the KIK legal entity as SPV or issued in the form of Participatory Letters. KIK-EBA is based on Bapepam-LK Regulation Number IX.K.1 concerning Guidelines for Asset Backed Securities Collective Investment Contract Guidelines. Whereas the EBA-SP is regulated in Financial Services Authority Regulation No. 23 / POJK.04 / 2014 concerning Guidelines for Issuance and Reporting of Asset Backed Securities in the Form of Participation Letters in the context of Secondary Housing Financing. So far, the KIK-EBA system is more widely used in the securitization of KPR assets because the provisions on securitization in the form of EBA-SP were only issued in 2014. It may be that this will change considering that the EBA-SP system is considered to be more concise than KIK-EBA, because parties get involved less. The implication of a more concise EBA-SP process is less cost and shorter time.

During the experience of securitization of financial assets in the form of KIK-EBA and EBA-SP in Indonesia since 2009 until now, there has never been

any legal dispute or dispute from the parties involved in asset securitization. This reflects that the legal institutions in the form of institutions and regulations are sufficient with good implementation. The SME credit asset securitization process can also use the existing legal basis and has been used as a legal basis for mortgage asset securitization. The parties involved in the previous securitization process can also be involved in securitizing SME credit assets. One of the challenges of securitizing SME credit assets on the legal side is to increase understanding of securitization and encourage the birth of the Law on asset securitization needed as a legal umbrella for its users.

It is also necessary to have a policy to encourage the origination of SME credit asset securitization, given the lack of interest and the substantial cost from the originator side, making the originator less interested. The experience of BTN shows the advantages of using asset securitization as a way to obtain credit. So if the bank understands these advantages, then the enthusiasm of the bank to become originator is predicted to increase. One of the challenges to securitization of credit assets is the perception that the credit offered is relatively risky, so it is feared that it will affect investors' perceptions of securities resulting from the credit asset securitization. Socialization and introduction of securitization products need to be done to encourage the presence of investors and as an alternative can be obtained by banks as investors.

MSME credit has several characteristics that make it not too easy to use as an underlying asset in asset securitization, including a relatively short period of time, relatively heterogeneous or varies both in terms of size, time period, risk profile. Seeing the characteristics of MSMEs, there is a big challenge in making MSME loans can be an underlying asset of securitization. Because securitization requires a homogeneous type of credit, very safe, has a stable cash flow stream and has a relatively long life. Securitization can be started for loans of relatively large size, for example those in the category of small and medium business loans,

or types of loans with relatively large denominations and long tenors. Another alternative that can be done to try to overcome the difficulties in making SME loans as underlying assets for the securitization process is to combine SME loans with other loans that are more suitable for securitization underlying assets, or encourage banks to securitize assets with long-term underlying assets such as mortgages or loans investment, but the funds obtained from the securitization activities can be used for distribution in the form of MSME loans. Each alternative has different advantages and challenges. The role of Bank Indonesia in developing credit asset securitization in Indonesia amidst slowing global economic growth due to the impact of this pandemic, is expected to encourage economic growth in the future.

Policy Recommendation

In general, the discussion of securitization which aims to increase credit to businesses that need and the stability of the banking intermediation function based on the theory of securitization and learning from several countries, illustrates that these objectives can go through two processes:

- 1) The process of initiating or encouraging banks as initial creditors to securitize their credit assets. The results of the securities can provide liquidity for the initial creditor or bank so that they can extend credit to the business party again;
- 2) The process of conducting general securitization is not limited to business debtors, by banks as initial creditors or originators. Where the liquidity resulting from the securitization is used as a loan back to business entrepreneurs by the bank.

The proposed mechanism for the asset securitization process certainly requires the role of Bank Indonesia in the form of socialization, regulations

requiring incentives and other forms to be captured by the market as part of BI's support for development efforts and support to business entrepreneurs. In accordance with the previous discussion related to the BI Macropurdenial function, the incentives provided can be in the form of:

- 1) Making credit asset securitization products as one of the financial instruments that can be subject to repurchase other than SBI, SDBI, and SBN As a form of incentive to banks as investors who have securitization products.
- 2) Determine a cheaper discount rate for banks that apply for a lending facility using the instrument of securitization of business credit assets as a securities subject to repo. If previously the discount rate was BI-rate plus a certain margin, then the discount rate reduction could be done by reducing the BI rate enhancing margin.
- 3) In order for points 1 and 2 to be applied, the product resulting from securitization of business credit assets requires a rating that can be used to determine the credit included in high quality assets. In addition, the availability of SPV for SME credit asset securitization issuers is also needed.
- 4) Banks that have securitized business assets securitized products also get GWMLFR incentives or secondary GWM. BI can also reduce the secondary reserve requirement for banks that have SME loan asset securitization products.

The suggested mechanism for the KIK-EBA scheme is as follows:

1. The bank distributes credit to business entrepreneurs so that they have credit claims against business businesses.
2. The investment manager together with the custodian bank makes a KIK-EBA credit contract and sells the KIK-EBA participation unit to investors.

3. Investors get participation units as proof of their participation in business credit KIK-EBA.
4. The bank sells the credit claim to KIK-EBA credit. In this case the bank acts as the originator as well as the servicer.
5. Proceeds from the sale of KIK-EBA from investors are used by investment managers to buy credit from the originator's bank.
6. Banks as servicer provide credit installments to custodian banks periodically.
7. Custodian banks distribute credit installments to investors in accordance with the size of the investor participation unit in KIK-EBA.

In the KIK-EBA scheme, Bank Indonesia can have two roles, namely the role related to monetary operations and the role of macroprudential. The role related to monetary operations can be performed by Bank Indonesia by providing incentives for banks that become investors as KIK-EBA credit buyers. Bank Indonesia can make a KIK-EBA credit unit certificate as one of the securities that can be subject to repo in open market operations or lending facilities. However, to do this, Bank Indonesia must revise the relevant PBI governing monetary policy. The role related to macroprudential can be done by Bank Indonesia by providing incentives for banks that are originators.

The transaction mechanism with the suggested EBA-SP scheme is as follows:

1. Based on an agreement with the original creditor, the issuer appoints a trustee and custodian bank registered with the OJK.
2. The trustee appoints a service provider for the collection of mortgage loans.
3. Issuer submits EBA-SP issuance public offering statement to OJK.
4. Because through the public offering mechanism, the issuer must show the underwriter in the process of issuing credit asset securitization.

5. Issuer issues EBA-SP and sells it to investors through a public offering. EBA-SP is a proof of investor ownership in proportion to the financial assets.
6. Investors make payments for the purchase of EBA-SP to the custodian bank to be forwarded to the originating creditor at the issuance's instructions.

In the EBA-SP scheme, Bank Indonesia can play a role in providing incentives to originator banks and banks as investors as explained earlier.

References

- Bank Indonesia. (2017). *Penerapan Sekuritisasi Aset kredit UKM oleh Bank Indonesia*. Retrieved from Kajian Potensi.
- Bank Indonesia. (2020, Maret). *Memperkuat Kebiasaan Makroprudensial Akomodatif Menopang Pembiayaan Ekonomi*. Retrieved from Kajian Stabilitas Keuangan.
- Bidari, A. S., & Nurviana, R. (2020, Maret). *Stimulus Ekonomi Sektor Perbankan dalam menghadapi Pandemi Coronavirus Disease 2019 di Indonesia*. Retrieved from Legal STanding Jurnal Ilmu Hukum.
- Endri. (2009, January). *Jurnal Keuangan dan Perbankan : Penguatan Stabilitas Sistem Keuangan Melalui Peningkatan Fungsi Intermediasi dan Efisiensi Bank Pembangunan Daerah*. Retrieved from ABFI Institute Perbanas Jakarta.
- Kementrian Keuangan RI. (2020, April). *Press Conference : Langkah Penguatan Perlindungan Sosial dan Stimulus Ekonomi Menghadapi Dampak Covid-19*.
- Rahmadia, S., & Febriyani, N. (2020). *Dampak Covid-19 Terhadap Ekonomi*.
- Rahmawati, S. Y. (2005). *Analisis Pelaksanaan Fungsi Intermediasi Perbankan Pasca Krisis*.
- Shin, H. S. (2010, March). *BIS Working Papers: Financial Intermediation and the post-crisis financial system*. Retrieved from BIS website.
- Siringoringo, R. (2017). *Analisis Fungsi Intermediasi Perbankan Indonesia*. Retrieved from Jurnal Inspirasi Bisnis & Manajemen : <http://jurnal.unswagati.ac.id/index.php/jibm>



Hubungan Konsentrasi dan Efisiensi Industri Perbankan Di Indonesia

RAIHAN IMADUDDIN RAHMAT¹ DAN YOLANDA DIENUL FATHIA²

¹Fakultas Ekonomi, Universitas Katolik Parahyangan

²Fakultas Ekonomi Bisnis, Universitas Islam Bandung
Jawa Barat, Indonesia

ABSTRAK

Dalam mendorong dan mencapai pertumbuhan ekonomi suatu negara dibutuhkan lembaga pembiayaan yang baik dan efisien. Salah satu sumber pembiayaan berasal dari industri perbankan. Salah satu fungsi perbankan yang merupakan lembaga keuangan yaitu melakukan kegiatan intermediasi keuangan, dengan menyalurkan dana kepada masyarakat dan perusahaan dalam bentuk deposit menjadi kredit. Di sisi lain, bank juga berperan sebagai perusahaan yang berorientasi pada profit. Untuk meminimalisir kegagalan intermediasi yang dapat menyebabkan gangguan sistemik, bank harus beroperasi secara efisien. Berdasarkan pendekatan *Structure-Conduct-Performance* (SCP), dijelaskan bahwa struktur pasar mempengaruhi perilaku perusahaan yang akan menentukan kinerja perusahaan. Penelitian ini bertujuan melihat hubungan konsentrasi industri perbankan dan efisiensi perbankan di Indonesia, dengan menggunakan pengukuran *concentration ratio* untuk melihat konsentrasi pasar, menganalisa BOPO untuk mengukur efisiensi dan menggunakan korelasi untuk melihat hubungan konsentrasi industri perbankan dan efisiensi bank di Indonesia. Data yang digunakan dalam penelitian ini meliputi data bank umum di Indonesia pada tahun 2004-2017.

Kata Kunci: Bank, SCP, Konsentrasi, Kompetisi, Efisiensi

ABSTRACT

In encouraging and achieving a country's economic growth, good and efficient financing institutions are needed. One source of financing comes from the banking industry. One of the functions of banking, which is a financial institution, is to carry out financial intermediation activities, by channeling funds to the public and companies in the form of deposits into credit. On the other hand, the bank also acts as a profit-oriented company. In order to minimize intermediation failures that can lead to systemic disruption, banks must operate efficiently. Based on the Structure-Conduct-Performance (SCP) approach, it is explained that the market structure affects company behavior which will determine the company's performance. This study aims to examine the relationship between banking industry concentration and banking efficiency in Indonesia, using concentration ratio measurement to see market concentration, analyzing BOPO to measure efficiency and using correlation to see the relationship between banking industry concentration and bank efficiency in Indonesia. The data used in this study include data on commercial banks in Indonesia for the years 2004-2017.

Key Word: *Bank, SCP, konsentrasi rasio, kompetisi, Efisiensi*

JEL Classification: G21

1. Pendahuluan

1.1 Latar Belakang

Dalam upaya realisasi pertumbuhan ekonomi, bank memiliki peran utama pada pembiayaan. Bank merupakan lembaga intermediasi yang menghimpun dana (*deposit*) dari pihak yang kelebihan dana (*surplus unit*) dan menyalurkan dana (kredit) kepada pihak yang kekurangan dana (*deficit unit*) serta menciptakan arus keuangan. Menurut Undang-Undang No. 10 Tahun 1998 bank adalah badan usaha yang menghimpun dana dari masyarakat dalam bentuk simpanan dan menyalurkan kepada masyarakat dalam bentuk kredit dan atau bentuk lainnya dalam rangka meningkatkan taraf hidup rakyat banyak. Di negara berkembang, sektor perbankan merupakan lembaga pembiayaan yang mendominasi industri keuangan. Salah satunya di Indonesia, terlihat pada tabel 1 dari tahun 2015 hingga tahun 2017 bahwa jumlah aset institusi keuangan bank lebih besar dibandingkan jumlah aset institusi keuangan non-bank.

Tabel 1 Jumlah Aset Bank dan IKNB

	2015	2016	2017
	Total Aset (Miliar Rp)		
Bank	6.197.621	6.843.300	7.531.089
IKNB	1.709.960	1.907.000	2.208.693

Sumber: Data Statistik OJK

Bank harus beroperasi secara sehat dan efisien agar tercapai stabilitas sistem keuangan yang dapat membuat aktivitas ekonomi suatu negara dapat tumbuh dan berkembang. Dalam menjalankan fungsi intermediasi, bank dapat menghadapi beberapa risiko yang dapat menyebabkan bank mengalami kegagalan intermediasi. Jika bank mengalami kegagalan akan menyebabkan gangguan sistemik pada sistem keuangan dan perekonomian, yang dapat

berujung pada krisis keuangan. Kegagalan bank sering terjadi di negara berkembang karena sistem perbankan yang tidak canggih dan kurang memadai (Matthews & Thompson, Bank Regulation, 2005). Oleh karena itu, diperlukan regulasi perbankan untuk menghindari dan meminimalisir kegagalan bank yang antara lain meliputi regulasi ketentuan kecukupan modal inti bank, penentuan tingkat suku bunga, dan perlindungan nasabah.

Selain itu, bank juga bertidak sebagai perusahaan yang berorientasi pada profit. Sehingga kegiatan bank harus diregulasi agar kinerja bank dalam melakukan fungsi intermediasi dapat berjalan dengan baik. Dengan bank berperan sebagai perusahaan membuat adanya persaingan di industri perbankan. Untuk dapat bertahan di industri perbankan dalam menghadapi persaingan, bank harus beroperasi secara efisien. Kompetisi merupakan salah satu faktor yang dapat mempengaruhi efisiensi bank. Maka dari itu, regulasi perbankan juga perlu dibuat untuk meningkatkan tingkat kompetisi industri perbankan agar tercipta kegiatan bank yang sehat dan efisien. Di Indonesia, salah satu regulasi yang diterapkan berupa pengelompokan bank berdasarkan modal inti menurut Peraturan Bank Indonesia nomor 14/26/PBI/2012 yang bertujuan untuk mendukung pertumbuhan ekonomi Indonesia secara optimal dan berkesinambungan agar dapat menghadapi persaingan global, dengan cara meningkatkan ketahanan, kompetisi, dan efisiensi industri perbankan nasional.

Salah satu pendekatan untuk melihat hubungan konsentrasi pasar dan efisiensi bank dengan menggunakan pendekatan *Structure-Conduct-Performance* (SCP). Penelitian ini menggunakan kerangka pikir pendekatan SCP.



Gambar 1 Kerangka Pikir SCP

Pendekatan SCP menyatakan bahwa struktur pasar menentukan perilaku perusahaan dalam beroperasi pada penetapan strategi untuk meningkatkan *market power* dan menghadapi persaingan di industri, perilaku tersebut akan menentukan kinerja perusahaan. Kinerja perusahaan-perusahaan dapat menunjukkan kinerja industri. Namun, kinerja perusahaan juga dapat menentukan struktur pasar. Semakin banyak perusahaan yang memiliki kinerja baik yang dapat menghadapi persaingan akan mengubah struktur pasar. Sebagian penelitian dengan pendekatan SCP, (Bikker & Haaf, 2002) menemukan konsentrasi pasar bank berbanding terbalik dengan persaingan pasar bank yang akan membuat profitabilitas yang lebih besar. kompetisi di sektor perbankan diharapkan dapat menghilangkan inefisiensi biaya dan memberikan keuntungan kesejahteraan serta membantu dalam pertumbuhan ekonomi (Jayaratne & Strahan, 1996). Menurut (Cetorelli & Nicholson, 2001) kompetisi perbankan akan mendorong situasi pasar menuju yang lebih baik, adanya peningkatan jumlah bank akan mendorong industri perbankan menjadi lebih kompetitif dan efisien. Namun, (Demirgüç-Kunt A, 2000) menyatakan bahwa hubungan antara konsentrasi industri perbankan dan efisiensi bank itu kompleks dan bersifat ambigu bergantung pada karakteristik yang spesifik pada industri perbankan, hal tersebut membuat hubungan antara konsentrasi pasar dan efisiensi bank bisa positif ataupun negatif. Sedangkan, berdasarkan *Quiet Life Hypothesis* (QLH) menurut (Berger & Hannan, 1998) dan (Hicks, 1935), konsentrasi pasar (atau kekuatan pasar) berhubungan negatif dengan efisiensi bank karena kekuatan pasar memungkinkan bank untuk menikmati '*quiet life*' (yaitu memungkinkan bank bebas dari persaingan), yang dalam giliran mengurangi upaya manajer bank untuk memaksimalkan efisiensi bank. Adapun *Efficient Structure Hypothesis* (ESH) yang menyatakan bahwa efisiensi perusahaan akan menentukan konsentrasi pasar atau kompetisi perusahaan (Demsetz, 1973). Tingkat efisiensi perbankan dipengaruhi dari kegiatan usaha

bank, kondisi perekonomian dan tingkat persaingan. Untuk melihat tingkat efisiensi bank, tingkat persaingan menjadi faktor utama dalam mempengaruhi produktivitas, efisiensi, atau inovasi bank. Di sisi lain persaingan antar bank juga dianggap sebagai faktor pendorong dalam proses konsolidasi yang dilakukan oleh perbankan.

Pada penelitian sebelumnya (Phan, Daly, & Akhter, 2015) menemukan bahwa pada negara berkembang di Asia, konsentrasi pasar memiliki hubungan positif dengan X-efisiensi sedangkan kompetisi memiliki hubungan negatif dengan X-efisiensi. Berlawanan dengan penelitian (Claessen & Laeven, 2004) yang menemukan bahwa tingkat kompetisi yang tinggi di sektor keuangan dapat mendorong peningkatan efisiensi produksi, kualitas produk keuangan dan tingkat inovasi. Begitupun menurut (Lindegren, Garcia, & Saal, 1996) berpendapat bahwa pasar perbankan yang kompetitif akan memanfaatkan kekuatannya sendiri untuk mereduksi bank-bank lemah untuk mendorong bank-bank sehat dan efisien. Kemudian, penelitian (Arrawatia, Misra, & Dawar, 2014) telah meneliti bagaimana hubungan tingkat kompetisi dan efisiensi bank di India pada tahun 1996-2011. Hasil penelitian tersebut menemukan adanya hubungan kausalitas antara tingkat kompetisi industri perbankan dan efisiensi bank di India. Dari penelitian (Grigorian & Manole, 2016) menyatakan bahwa pangsa pasar perbankan yang diukur dari kepemilikan aset diekspektasikan memiliki pengaruh yang positif terhadap tingkat efisiensi perbankan karena bank dengan pangsa pasar yang lebih besar cenderung akan lebih efisien dibandingkan dengan bank lain.

Menurut (Muljawan, Hafidz, Astuti, & Oktapiani, 2014) ,semakin besar aset yang dimiliki suatu bank diharapkan dapat semakin meningkatkan efisiensi bank karena bank-bank dapat membayar biaya *input* yang lebih rendah dibandingkan bank pesaingnya dan dapat meningkatkan *return to scale* melalui alokasi biaya tetap. (Grigorian & Manole, 2016) Dikutip dari (Ferreira, 2013) penelitian (Schaeck

K, 2008) meneliti hubungan konsentrasi dan efisiensi bank menggunakan estimasi kausalitas *granger* untuk mengetahui kemungkinan hubungan adanya kausalitas antara dua hal tersebut. Maka dari itu, penelitian ini akan meneliti bagaimana hubungan konsentrasi dan efisiensi bank umum di Indonesia pada tahun 2004-2017. Penelitian ini juga bertujuan untuk mengetahui konsentrasi dan kompetisi bank umum, mengetahui efisiensi bank umum, serta mengetahui hubungan tingkat konsentrasi dan efisiensi bank umum di Indonesia.

2. Studi Literatur

2.1. Kompetisi Perbankan

Kompetisi pada industri merupakan suatu kondisi dimana setiap perusahaan memperebutkan sesuatu atau mencapai tujuan tertentu. Dikutip dari (Widyastuti & Armanto, 2013) bahwa pada industri perbankan, persaingan antar bank terjadi karena adanya perebutan sumber daya yang produktif seperti deposito, tabungan dan penyaluran kredit. Untuk dapat menghadapi kompetisi, perusahaan harus memiliki *market power*. Menurut (Rozas & Guitierrez, 2007) *market power* mengacu pada perilaku perusahaan secara individual dalam menetapkan strategi untuk menentukan harga sedangkan persaingan berkaitan dengan interaksi antara anggota pasar atau lebih bersifat secara agregat. Bentuk persaingan terbagi menjadi pasar persaingan sempurna, monopolistik, oligopoli dan monopoli. Berdasarkan jumlah perusahaan pada pasar, persaingan sempurna dan monopolistik terdiri dari banyak perusahaan, sedangkan pada pasar oligopoli terdapat sedikit perusahaan dan pada pasar monopoli hanya terdapat satu perusahaan. Dikutip dari (Widyastuti & Armanto, 2013) menurut (Alhadeff, 1951) bahwa terdapat beberapa ciri pada pasar perbankan antara lain pertama, adanya kehadiran lebih dari satu penyedia layanan kredit dalam satu wilayah, kedua hubungan antara *bankers* dan peminjam dibangun berdasarkan pengalaman-pengalaman yang berkaitan dengan penyaluran kredit waktu

sebelumnya, ketiga jumlah penawaran pinjaman untuk peminjam jumlah kecil sangat terbatas, keempat adanya hambatan untuk perusahaan baru untuk masuk pasar yang menunjukkan adanya kondisi monopoli atau oligopoli dalam mendapatkan keuntungan dalam jangka panjang dan kelima, tindakan *bankers* umumnya saling berkorelasi biasanya disebut *mutual assistance*, pengurangan kompetisi tidak sehat, dan koordinasi.

2.2. Structure-Conduct-Performance (SCP)

Berdasarkan (Matthews & Thompson, *The Structure of Banking*, 2005) *structure conduct performance* merupakan sebuah pendekatan yang dapat digunakan untuk menentukan kinerja perusahaan dengan mengidentifikasi struktur pasar dan mengukur konsentrasi dalam pasar. Pada pendekatan ini menyatakan bahwa kinerja suatu perusahaan dipengaruhi oleh struktur pasar yang akan menentukan perilaku perusahaan dalam beroperasi menghadapi persaingan, perilaku tersebut dapat menentukan kinerja perusahaan. Disisi lain, kinerja perusahaan juga dapat mempengaruhi struktur pasar. Struktur (*structure*) merupakan bentuk persaingan industry, persaingan tersebut bias dalam pasar monopoli, oligopoli, monopolistik atau persaingan sempurna yang akan menentukan bagaimana pelaku industri berperilaku (*conduct*) dan pada akhirnya menentukan kinerja (*performance*). Dalam struktur pasar meliputi tiga elemen yaitu pangsa pasar (*market share*), konsentrasi pasar (*market concentration*) dan hambatan-hambatan untuk masuk pasar (*barrier to entry*). Perilaku pasar terdiri dari strategi yang dipakai oleh pelaku pasar dan juga pesaingnya, terutama dalam hal strategi penentuan harga dan karakteristik produk. Perilaku pasar meliputi perilaku dalam menentukan strategi harga, strategi produk dan strategi promosi. Perilaku perusahaan dapat dilihat dari tingkat persaingan ataupun kolusi antar produsen. Sedangkan kinerja industri biasanya dilihat dari tiga aspek yaitu efisiensi, kemajuan teknologi dan kesinambungan dalam

distribusi. Kinerja suatu industri diukur antara lain dari derajat inovasi, efisiensi dan profitabilitas.

2.3. Efficient Structure Hypothesis (ESH)

Terdapat beberapa hipotesis yang menyatakan hubungan konsentrasi pasar, kompetisi bank dan efisiensi bank. Pada *efficient structure hypothesis* (ESH) yang dikemukakan oleh (Demsetz, 1973) menyatakan bahwa ada hubungan antara konsentrasi pasar, kompetisi dan efisiensi, yang mana ketika bank efisien akan dapat menurunkan biaya produksi dan memperoleh keuntungan yang lebih tinggi serta pangsa pasar yang lebih luas. ESH mendukung penelitian (Smirlock, 1985) ditemukan bahwa konsentrasi pasar akan membuat bank dapat mencapai efisien yang diperoleh dari pangsa pasar yang luas. Kemudian, bank yang efisien dengan produk yang unggul dapat mencapai pangsa pasar yang lebih luas pada tingkat konsentrasi pasar yang tinggi. Maka dari itu, ESH menunjukkan efisiensi bank berpengaruh positif dengan konsentrasi pasar. Selain itu, ditemukan bahwa bank yang efisien akan memperoleh pangsa pasar yang luas dibandingkan bank lainnya di pasar. Hal tersebut membuat pasar akan lebih terkonsentrasi yang membuat bank menjadi efisien dan memiliki *market power* yang besar serta tingkat kompetisi industri perbankan akan menurun. ESH juga menunjukkan adanya hubungan positif antara efisiensi dan *market power* serta hubungan negatif antara efisiensi bank dan tingkat kompetisi perbankan.

2.4. Quiet Life Hypothesis (QLH)

Pertama kali *quiet life hypothesis* (QLH) ditemukan oleh (Hicks, 1935) pada penelitiannya ditemukan bahwa ada hubungan efisiensi bank dan struktur pasar. Pada struktur pasar monopoli akan membuat perusahaan memiliki *market power* yang kuat karena hanya ada satu perusahaan dan perusahaan tersebut

menikmati *quiet life* bebas dari kompetisi. Hal tersebut membuat perusahaan tidak melakukan upaya meningkatkan efisiensi pada kegiatan operasionalnya karena sudah mendapatkan profit yang besar. Berdasarkan penelitian (Hicks, 1935) dan (Berger & Hannan, 1998) menemukan bahwa perusahaan dapat memperoleh profit besar tanpa harus berusaha mengendalikan biaya operasional untuk meningkatkan efisiensi bank. Maka, peningkatan kekuatan pasar akan menurunkan tingkat efisiensi yang mana kompetisi itu mendorong efisiensi bank.

2.5. Information Generation Hypothesis (IGH)

Pada *information generation hypothesis* (Marquez, 2002) menemukan bahwa kompetisi dan efisiensi berhubungan negatif, adanya kompetisi pada industri perbankan membuat penurunan pada tingkat efisiensi bank. IGH melihat bank sebagai lembaga intermediasi yang dapat memperoleh informasi peminjam dan melakukan seleksi pada peminjam yang berkualitas rendah (Koetter, Kolari, & Spierdijk, 2008) Ketika industri perbankan kompetitif membuat bank bersaing untuk mendapatkan nasabah yang membuat bank menurunkan persyaratan pinjaman dan dapat menyebabkan peningkatan peminjam berkualitas rendah yang dapat membuat *non-performing loans* meningkat, maka tingkat efisiensi bank menurun. Upaya lainnya untuk menarik nasabah bank melakukan penawaran bunga rendah untuk pinjaman yang membuat biaya bank meningkat dan tingkat efisiensi bank menurun (Marquez, 2002). Maka, IGH menyatakan bahwa tingkat kompetisi industri perbankan akan mengurangi kapasitas bank dalam mengumpulkan data nasabah yang akan meningkatkan kemungkinan peminjam yang merugikan dan menurunkan tingkat efisiensi bank.

3. Data dan Metodologi

Data yang digunakan dalam penelitian ini adalah data triwulanan jumlah aset, penyaluran kredit dan biaya operasional pendapatan operasional (BOPO) bank umum dan bank BUKU 4 di Indonesia pada tahun 2004-2017, yang diperoleh dari statistik perbankan Indonesia dan laporan publikasi perbankan oleh otoritas jasa keuangan (OJK). Penelitian ini menggunakan *concentration ratio* untuk mengukur tingkat konsentrasi industri perbankan di Indonesia, yang dapat mengindikasikan kompetisi perbankan. CR merupakan persentase pangsa pasar perusahaan yang dominan pada suatu industri dihitung dengan menjumlahkan total pangsa pasar dari perusahaan-perusahaan tersebut. Biasanya penelitian menghitung *concentration ratio* dengan CR_3 , CR_4 , dan CR_5 . Rasio konsentrasi berkisar antara 0% sampai 100%, semakin tinggi rasio konsentrasi dapat mengindikasikan bahwa tingkat kompetisi industri akan semakin rendah dan sebaliknya. Pada rasio konsentrasi kisaran 0%-60% mengindikasikan tingkat konsentrasi rendah maka struktur pasar *perfectly competitive* atau *monopolistic*. Sedangkan jika rasio konsentrasi lebih dari 60% industri memiliki struktur *oligopoly* dan jika 100% maka struktur industri *monopoly*.

$$CR_n = \sum_{i=1}^n S_i$$

Keterangan:

n = jumlah bank dominan yang diobservasi

S = *market share* pada bank i

Concentration ratio yang digunakan adalah CR_4 dengan menggunakan empat bank dominan pada industri bank umum di Indonesia berdasarkan empat bank yang mendominasi pangsa pasar kredit, memiliki jumlah aset terbesar dan

modal inti paling sedikit Rp. 30.000.000.000.000,00 (tiga puluh triliun rupiah) menurut BUKU 4. Empat bank dominan tersebut yaitu Bank Mandiri, BRI, BNI, dan BCA. CR_4 diperoleh dari penjumlahan jumlah aset dan jumlah penyaluran kredit empat bank tersebut. Efisiensi diukur dengan menganalisa BOPO bank umum. Analisis hubungan kausalitas antara tingkat konsentrasi industri perbankan dan efisiensi bank menggunakan metode *granger causality test*.

Berdasarkan (Gujarati, 2007; Ferreira, 2013) *granger causality test* merupakan salah satu metode ekonometrika yang digunakan untuk mengetahui hubungan kausalitas antara variabel-variabel dan dalam jangka waktu tertentu dampak perubahan pada variabel akan dapat mempengaruhi variabel lain. Pada penelitian ini akan melihat apakah perubahan pada *concentration ratio aset* atau *concentration* kredit akan mempengaruhi efisiensi perbankan dilihat dari BOPO ($CR_4 \rightarrow BOPO$) atau perubahan pada BOPO akan mempengaruhi CR_4 ($BOPO \rightarrow CR_4$) yang mana panah menunjukkan arah hubungan kausalitas antar variabel tersebut. Ada empat persamaan yang digunakan dalam uji kausalitas *granger* sebagai berikut:

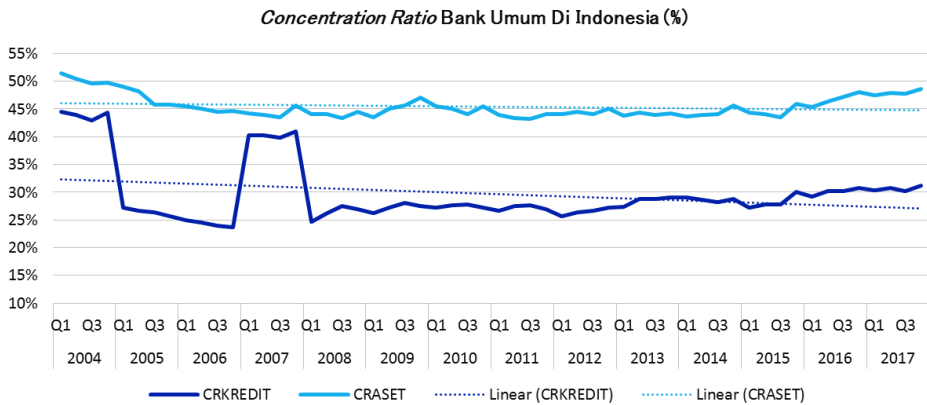
$CR_{ASETt} = \sum_{i=1}^n \alpha_i BOPO_{t-i} + \sum_{j=1}^n \beta_j CR_{ASETt-j} + u_{1t}$ $BOPO_t = \sum_{i=1}^n \lambda_i BOPO_{t-i} + \sum_{j=1}^n \delta_j CR_{ASETt-j} + u_{2t}$
$CR_{KREDITt} = \sum_{i=1}^n \alpha_i BOPO_{t-i} + \sum_{j=1}^n \beta_j CR_{KREDITt-j} + u_{1t}$ $BOPO_t = \sum_{i=1}^n \lambda_i BOPO_{t-i} + \sum_{j=1}^n \delta_j CR_{ASETt-j} + u_{2t}$

Diasumsikan bahwa *error term* u_1 dan u_2 tidak saling berhubungan dan adanya kausalitas bilateral karena menggunakan dua variabel.

4. Hasil dan Pembahasan

4.1. Konsentrasi Industri Bank Umum Indonesia

Perkembangan tingkat konsentrasi (CR_4) pangsa pasar dari jumlah aset dan jumlah penyaluran kredit bank umum di Indonesia dari tahun 2004-2017 dapat mengindikasikan struktur pasar bank umum yang dapat menunjukkan tingkat kompetisi. Semakin tinggi *concentration ratio* dapat mengindikasikan bahwa industri perbankan semakin terkonsentrasi dan hanya beberapa bank yang menguasai pasar maka tingkat kompetisi pada industri perbankan semakin rendah. Sedangkan jika *concentration ratio* semakin rendah dapat mengindikasikan bahwa industri perbankan tidak terkonsentrasi pada beberapa bank saja, banyak bank dapat menguasai pasar yang akan meningkatkan tingkat kompetisi perbankan.



Gambar 1 *Concentration Ratio* Bank Umum di Indonesia (%)

Sumber: Statistik Perbankan Indonesia (OJK), diolah

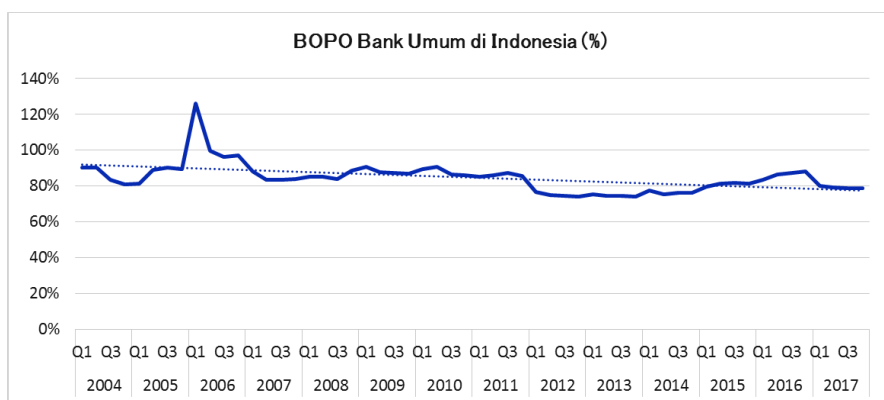
Gambar 1 menunjukkan bahwa perkembangan tingkat konsentrasi bank umum jumlah aset dan jumlah kredit (CR_{ASET} dan CR_{KREDIT}) di Indonesia memiliki kecenderungan menurun, dapat mengindikasikan bahwa bank umum tidak terkonsentrasi pada beberapa bank saja yang membuat tingkat kompetisi bank umum semakin meningkat. Nilai *concentration ratio* aset tertinggi sebesar 50,41% pada tahun 2004 kuartal 1 dan terendah pada tahun 2011 kuartal 3. Sedangkan, nilai *concentration ratio* kredit tertinggi terdapat pada tahun 2004 kuartal 4 sebesar 44,36% dan terendah pada tahun 2006 kuartal empat sebesar 23,67%. Dari gambar 1, *concentration ratio* aset dan kredit berkisar pada 30-52% menunjukkan bahwa struktur industri bank umum di Indonesia cenderung monopolistik, berarti produk yang dihasilkan cenderung serupa tetapi bervariasi dan memiliki ciri khas masing-masing yang membuat nasabah tidak akan mudah berpindah ke bank lain, *market power* berupa penguasaan dalam menentukan harga bukan faktor untuk menambah nasabah tetapi kemampuan bank melakukan variasi produk, menciptakan kepercayaan nasabah dan meningkatkan citra perusahaan. Berdasarkan tren *concentration ratio* kredit memiliki kecenderungan menurun dapat mengindikasikan bahwa banyak bank umum yang dapat menguasai industri, tidak hanya terkonsentrasi pada bank-bank umum besar yang mendominasi perbankan, hal tersebut membuat tingkat kompetisi semakin meningkat. *Concentration ratio* yang semakin menurun mungkin dikarenakan adanya program keuangan inklusif Bank Indonesia dengan memperluas layanan keuangan kepada masyarakat melalui perbankan, salah satunya dengan mempermudah penyediaan layanan kredit. Dengan kemudahan akses layanan kredit membuat jumlah penyaluran kredit perbankan meningkat.

4.2 Efisiensi Bank di Indonesia

Agar dapat bertahan menghadapi persaingan di industri perbankan, bank harus memiliki kinerja yang baik dalam beroperasi agar dapat mencapai efisiensi. Tingkat efisiensi bank, dalam melakukan kegiatan operasional digambarkan dengan tingkat biaya operasional pendapatan operasional (BOPO). BOPO merupakan rasio antara biaya bunga yang harus dibayarkan kepada depositor dengan pendapatan bunga yang berasal dari kreditur, dituliskan sebagai berikut:

$$BOPO = \frac{\text{Biaya Operasional}}{\text{Pendapatan Operasional}} \times 100\%$$

Semakin tinggi tingkat BOPO mengindikasikan tingkat efisiensi bank akan semakin rendah, dan sebaliknya.



Gambar 2 BOPO Bank Umum di Indonesia

Sumber: Statistik Perbankan Indonesia (OJK), diolah

Pada Gambar 2 menunjukkan perkembangan BOPO perbankan Indonesia dari tahun 2004-2017 memiliki kecenderungan tren menurun yang mengindikasikan bahwa bank di Indonesia beroperasi semakin efisien, salah satunya dikarenakan adanya perkembangan teknologi yang dapat mengurangi biaya operasional bank dan membuat kinerja bank semakin efisien. Nilai rata-rata BOPO terendah terdapat pada tahun 2013 kuartal 4 yaitu sebesar 74,08% dan tertinggi pada tahun 2006 kuartal 1 mencapai 126,20%. Dapat dilihat pada tahun 2005 kuartal 4 sampai tahun 2006 kuartal satu terdapat peningkatan BOPO yang cukup tinggi sebesar 36,7%, hal tersebut dikarenakan perekonomian saat itu sedang mengalami inflasi karena adanya kenaikan harga minyak mentah dunia yang menyebabkan kenaikan pada harga bahan bakar minyak (BBM) dan adanya kenaikan tingkat suku bunga di negara Amerika. Respon yang dilakukan Bank Indonesia untuk meredam laju inflasi dengan meningkatkan suku bunga secara bertahap dari 7,4% pada triwulan IV 2005 menjadi 12,75% di triwulan I 2006 yang membuat bank umum menaikkan tingkat suku bunga *deposit*. Selain itu, adanya peningkatan *non-performing loans* hal tersebut membuat biaya operasional bank meningkat. Setelah triwulan I tahun 2006, terjadi penurunan sebesar 30,14% dikarenakan adanya kebijakan Bank Indonesia berupa memperkuat struktur permodalan dalam rangka mempercepat proses konsolidasi yang memperkuat manajemen internal perbankan, agar fokus pada implementasi konsepsi *best practices* yang merujuk pada efisiensi dan efektivitas kegiatan usaha bank.

4.3 Hubungan Konsentrasi dan Efisiensi Bank Umum di Indonesia

Dalam penelitian ini, untuk melihat hubungan tingkat konsentrasi dan efisiensi bank umum dilakukan uji stasioneritas dan uji *granger causality*. Pada tabel 2 menunjukkan hasil uji stasioneritas data BOPO serta data *concentration ratio* aset signifikan pada tingkat level dan data *concentration ratio* kredit

signifikan pada *first difference*. Mengindikasikan bahwa data yang digunakan memiliki rata-rata serta varians yang bersifat stabil serta tidak mengalami perubahan secara sistemik sepanjang waktu.

Tabel 2 Uji Stasioneritas

Augmented Dickey-Fuller Test Statistic	t-Statistic	Prob.	Keterangan
BOPO	-3,274825	0,0209**	signifikan tingkat level
CRASET	-2,716969	0,0781*	
CRKREDIT	-6,766461	0,0000***	signifikan pada <i>first difference</i>

*, **, *** mengindikasikan *significant levels* 90%, 95% dan 99%

Tabel 3 menunjukkan hasil uji *granger causality* untuk mengetahui hubungan *concentration ratio* aset, *concentration ratio* kredit dan efisiensi bank umum. Menggunakan *lag* 8 pada hubungan CR_{ASET} dan BOPO dan *lag* 14 pada hubungan CR_{KREDIT} dan BOPO dengan nilai 10%, bahwa BOPO bank umum memengaruhi *concentration ratio* aset dan *concentration ratio* kredit memengaruhi BOPO bank umum.

Tabel 3 Uji Granger Causality

Granger Causality Tests	F-statistic	Prob.
CRASET does not Granger Cause BOPO	1,37593	0,2455
BOPO does not Granger Cause CRASET	1,95235	0,0871*
BOPO does not Granger Cause DCRKREDIT	0,73601	0,7109
DCRKREDIT does not Granger Cause BOPO	10,4261	0,0001***

*, **, *** mengindikasikan *significant levels* 90%, 95% dan 99%.

Selain itu, hasil uji *granger causality* mengindikasikan ketika ada perubahan pada BOPO bank umum atau tingkat efisiensi bank umum akan mempengaruhi *concentration ratio* aset setelah dua tahun dari perubahan tersebut, dengan asumsi faktor lain dianggap tetap. Seperti pada penelitian (Smirlock, 1985) yang didukung ESH menemukan bahwa konsentrasi pasar akan membuat bank dapat mencapai efisiensi yang diperoleh dari pangsa pasar yang luas. Kemudian, hasil menunjukkan bahwa perubahan *concentration ratio* kredit memengaruhi BOPO bank umum atau tingkat efisiensi bank umum setelah 3,5 tahun dari perubahan tersebut, didukung seperti penelitian (Phan, Daly, & Akhter, 2015) yang menemukan adanya hubungan positif antara konsentrasi pasar dengan X-efisiensi. Maka, ditemukan bahwa tingkat konsentrasi industri bank umum memiliki hubungan dengan tingkat efisiensi bank umum.

5. Kesimpulan

Dalam upaya realisasi pertumbuhan ekonomi, bank memiliki peran utama pada pembiayaan. Bank merupakan lembaga intermediasi yang menghimpun dana (*deposit*) dari pihak yang kelebihan dana (*surplus unit*) dan menyalurkan dana (kredit) kepada pihak yang kekurangan dana (*deficit unit*) serta menciptakan arus keuangan. Sektor perbankan mendominasi industri keuangan, seperti di Indonesia terlihat dari data jumlah aset institusi keuangan bank lebih besar dibandingkan jumlah aset institusi keuangan non-bank. Selain itu, bank juga berperan sebagai perusahaan yang bersaing dan berorientasi profit. Agar tidak terjadi kegagalan intermediasi dan dapat menghadapi persaingan bank harus beroperasi dengan efisien.

Hasil penelitian menemukan bahwa di Indonesia *concentration ratio* bank umum berkisar di 30-52%, sehingga dapat dikategorikan bahwa struktur pasar bank umum di Indonesia cenderung mengarah pada struktur pasar monopolistik. Berdasarkan perkembangan *concentration ratio* aset dan kredit

bank umum Indonesia 2004-2017 memiliki kecenderungan tren menurun menunjukkan bahwa tingkat konsentrasi bank umum di Indonesia mengalami penurunan semakin tidak terkonsentrasi, maka tidak hanya beberapa bank besar saja yang memiliki *market power* dan dapat bersaing di industri bank umum di Indonesia, serta dapat mengindikasikan tingkat kompetisi bank umum di Indonesia semakin meningkat. Kemudian, tingkat efisiensi industri bank umum yang digambarkan dengan rata-rata biaya operasional pendapatan operasional (BOPO) menunjukkan bahwa perkembangan rata-rata BOPO bank umum di Indonesia memiliki kecenderungan tren menurun, dapat mengindikasikan bahwa bank-bank umum di Indonesia cenderung beroperasi semakin efisien.

Hubungan antara tingkat konsentrasi industri bank umum dan tingkat efisiensi bank umum yang diuji menggunakan uji *granger causality*, menunjukkan bahwa ketika ada perubahan pada tingkat BOPO atau efisiensi industri bank umum akan mempengaruhi *concentration ratio* aset bank umum setelah empat kuartal atau dua tahun dari perubahan tersebut, dengan asumsi faktor lain dianggap tetap. Kemudian, terdapat hubungan antara *concentration ratio* kredit dan BOPO, ketika terjadi perubahan pada *concentration ratio* kredit bank umum akan mempengaruhi BOPO atau efisiensi bank umum setelah empat belas kuartal atau 3,5 tahun terjadi perubahan CR tersebut. Maka, dapat disimpulkan bahwa tingkat konsentrasi bank umum di Indonesia memiliki hubungan dengan tingkat efisiensi bank umum di Indonesia.

Referensi

- Arrawatia, R., Misra, A., & Dawar, V. (2014). Bank competition and efficiency. *empirical evidence from Indian market*.
- Cetorelli, & Nicholson. (2001). Competition Among Banks: Good or Bad? *Economic Perspective Federal Reserve Bank of Chicago*.
- Bikker, J. A., & Haaf, K. (2002). Competition, concentration and their relationship. *Journal of Banking & Finance*.
- Jayaratne, & Strahan. (1996). "The finance-growth nexus: evidence from bank branch deregulation". *Quarterly Journal of Economics*, 639-670.
- Berger, A., & Hannan, T. (1998). The Efficiency Cost Of Market Power In The Banking Industry: A Test Of The "Quiet Life" And Related Hypotheses. *The Review of Economics and Statistics*, 454-465.
- Otoritas Jasa Keuangan. (2017, Desember 20). *Statistik Perbankan Indonesia*. Retrieved from Otoritas Jasa Keuangan: <https://www.ojk.go.id/id/kanal/perbankan/data-dan-statistik/statistik-perbankan-indonesia/Documents/Pages/Statistik-Perbankan-Indonesia---Desember-2017/SPI%20Desember%202017.pdf>
- Bank Indonesia. (2007, Desember 27). *Perbankan dan Stabilitas Keuangan*. Retrieved from Bank Indonesia: <https://www.bi.go.id/id/publikasi/perbankan-dan-stabilitas/laporan-pengawasan/Pages/lpp3.aspx>
- Bank Indonesia. (2006, January 13). *Siaran Pers*. Retrieved from Bank Indonesia: <https://www.bi.go.id/id/ruang-media/siaran-pers/Pages/sp%2080206.aspx>
- Otoritas Jasa Keuangan. (Various Year). *Statistik Perbankan Indonesia, Year 2004-2017*. Jakarta: OJK. Retrieved from Otoritas Jasa Keuangan: Jakarta
- Otoritas Jasa Keuangan. (Various Year). *Laporan Publikasi Bank Umum Konvensional, year 2004-2017*. Jakarta: OJK. Retrieved from <https://www>.

ojk.go.id/id/kanal/perbankan/data-dan-statistik/laporan-keuangan-perbankan/Default.aspx

- Demsetz, H. (1973). Law Econ. *Industry structure, market rivalry, and public policy*, 1-9.
- Hicks, J. (1935). Annual survey of economic theory: the theory of monopoly. *Econometrica*, 1-20.
- Phan, H. M., Daly, K., & Akhter, S. (2015). Bank efficiency in emerging Asian countries. *Research in International Business and Finance*.
- Claessen, S., & Laeven, L. (2004). What Drives Bank Competition: Some International Evidence. *Journal of Money, Credit, and Banking*.
- Lindegren, C., Garcia, G., & Saal, M. (1996). *Bank Soundness and Macroeconomic Policy*. Washington DC: International Monetary Fund- Publication Service.
- Rozas, d., & Guitierrez, L. (2007). *Testing for the Competition in the Spanish Banking Industry: the Pazar-Rosse Approach Revisited*. Madrid: The Working Paper Series, Banco de Espana.
- Alhadeff, D. A. (1951). The Market Structure of Commercial Banking in the United States. *The Quarterly Journal of Economics*, 62-86.
- Smirlock, M. (1985). Evidence on the (non) relationship between concentration and profitability in banking. *Money Credit Bank*, 69-83.
- Marquez, R. (2002). Competition, adverse selection, and information dispersion in the banking industry. *Rev. Financial Stud*, 901–926.
- Koetter, M., Kolari, J., & Spierdijk, L. (2008). Efficient Competition? Testing the 'Quiet Life' of the US Banks with Adjusted Lerner Indices. *Working Paper*.
- Gubernur Bank Indonesia. (2012). *Peraturan Bank Indonesia Nomor 14/26/PBI/2012 tentang Kegiatan Usaha dan Jaringan Kantor Berdasarkan Modal Inti*. Jakarta: Bank Indonesia.
- Adita, C., & Kusuma, C. (2015). The Dynamics of Indonesian Banking Competition 2006-2013. *Bina Ekonomi*, 26-42.

- Munawar, Y. (2017). Kompetisi dan Efisiensi Bank Umum di Indonesia Periode 2008-2013. *Bina Ekonomi*, 1-12.
- Matthews, K., & Thompson, J. (2005). The Structure of Banking. In K. Matthews, & J. Thompson, *The Economics of Banking* (pp. 141-158). Southern Gate: John Wiley and Sons, Ltd.
- Matthews, K., & Thompson, J. (2008). Banking Competition. In K. Matthews, & J. Thompson, *The Economics of Banking* (pp. 171-185). Southern Gate: John Wiley & Sons Ltd.
- Bank Indonesia. (2013). *Keuangan Inklusif*. Retrieved from Bank Indonesia: <https://www.bi.go.id/id/perbankan/keuanganinklusif/Indonesia/Contents/Default.aspx>
- Berita Satu. (2011, November 25). *Bi dan Perbankan Kembangkan Keuangan Inklusif*. Retrieved from Berita Satu : <http://id.beritasatu.com/home/bi-dan-perbankan-kembangkan-keuangan-inklusif/25035>
- Investopedia. (2018). *Concentration Ratio* . Retrieved from Investopedia: <https://www.investopedia.com/terms/c/concentrationratio.asp>
- Nabhani, A. (2008, Desember 24). *Jalan Berliku Perbankan Indonesia di 2008-2009*. Retrieved from Okezone Finance: <https://economy.okezone.com/read/2008/12/23/277/176453/jalan-berliku-perbankan-indonesia-di-2008-2009>
- Kurniawan, S. (2011, Februari 21). *Peta Perbankan Indonesia: Trennya Positif tapi Masih Banyak Peluang*. Retrieved from Marketeers: <http://marketeers.com/peta-perbankan-indonesia-trennya-positif-tapi-masih-banyak-peluang/>
- Gujarati, D. N. (2007). *Basic Econometric Fourth Edition*. Singapore: McGraw-Hill Companies.
- Ferreira, C. (2013). Bank Market Concentration and Bank Efficiency in the European Union: A Panel Granger Causality Approach. *International Economics and Economic Policy*, 365-391.

- Schaeck K, C. M. (2008). How does competition affect efficiency and soundness in banking? New empirical evidence. *ECB Working Paper Series*.
- Matthews, K., & Thompson, J. (2005). Bank Regulation. In K. Matthews, & J. Thompson, *The Economics of Banking* (pp. 161-181). Southern Gate: John Wiley & Sons, Ltd.
- Demirgüç-Kunt A, L. R. (2000). *Bank Concentration: Cross-Country Evidence*. World Bank, Mimeo.
- Owen , A. L., & Pereira, J. (2016, September 8). *Bank Concentration, Competition, and Financial Inclusion*. Retrieved from MPRA: https://mpr.aub.uni-muenchen.de/73598/1/MPRA_paper_73598.pdf
- Widyastuti, R. S., & Armanto, B. (2013). Buletin Ekonomi Moneter dan Perbankan. *Kompetisi Industri Perbankan Indonesia*.
- Grigorian, D., & Manole, V. (2016, April 20). *Determinants of Commercial Bank Performance in Transition: An Application of Data Envelopment Analysis*. Retrieved from SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=636214
- Muljawan, D., Hafidz, J., Astuti, R. I., & Oktapiani, R. (2014, Desember). *Faktor-Faktor Penentu Efisiensi Perbankan Indonesia serta Dampaknya Terhadap Perhitungan Suku Bunga Kredit*. Retrieved from Efisiensi Perbankan: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwj74MjY_YLfAhUBeCsKHYYQBx8QFjAAegQIABAC&url=https%3A%2F%2Fwww.bi.go.id%2Fid%2Fpublikasi%2Fwp%2FDocuments%2FEfisiensi-Perbankan-revisi-final%2520Juni-2-2014.pdf&usg=AO



Halaman ini sengaja dikosongkan



Departemen Penelitian dan Pengaturan Perbankan

Menara Radius Prawiro Lantai 9-10
Kompleks Perkantoran Bank Indonesia
Jl M.H. Thamrin No. 2, Jakarta 10350
Email : srkp.ojk@ojk.go.id