Financial system stability in Indonesia and its relationship with economic growth before and during the Covid-19 pandemic

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Abstract

The purpose of this study is to assess the condition of financial system stability in Indonesia both before and during the Covid-19 pandemic and to look at its relationship with economic growth. This study develops six sub-sector groups described in 19 indicators in order to assess the condition of the financial system. Quarterly data for 6.5 years from Quarter I 2016 to Quarter II 2022 was evaluated. To assess the condition of the financial system, this study uses a composite index approach with the normalized max-min method. The correlation analysis method is used to assess the relationship between the index of financial system conditions and economic growth. The results showed that during the pandemic, there was a more significant increase in pressure on financial conditions than before the pandemic. The financial system instability index during the pandemic in the second quarter of 2020 was 3 times higher than the average and more than 5 times higher than the same quarter in 2019. In addition, the relationship between the financial condition index and economic growth is at 0.77 (strong category). The implication is this research can provide insight to the government, financial institutions, and the public regarding the condition of financial system stability before and during the Covid-19 pandemic. This research suggests that the government should control credit restructuring policies during the pandemic and strengthen financial institutions. This research has limitations in terms of objects that only include conventional financial institutions. Further studies can use other objects such as Islamic financial institutions.

Introduction

One of the factors that determines the stability of economic conditions in a country is to look at developments in financial system stability that are occurring in that country. A stable financial system will provide higher trust for customers and investors to save and invest their funds in financial institutions (Qi et al., 2022). Furthermore, a stable financial system will encourage the allocation of excessive funds from elements that are surplus to elements that are deficit so that in the long run it can contribute to the growth and stability of the national economy (Eze & Ogiji, 2016). Therefore, detection of sources of financial system instability is important and must be carried out to identify potential crisis risks that could arise in the future.

The occurrence of the Covid-19 pandemic in the world in early 2020 created potential pressure on the financial system in Indonesia. The existence of a social restriction policy that was implemented during the pandemic also contributed to the shock of the demand and supply sides due to disruption of the production supply chain and weakening global and domestic demand which resulted in a decrease in people's income (del Rio-Chanona et al., 2020). In addition, the pandemic also increases potential risks in the financial sector, such as increased credit risk, liquidity risk, and soaring market volatility (Wójcik & Ioannou, 2020).

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Several indicators of financial system stability during the pandemic recorded a significant increase in pressure. The pandemic has caused Indonesia to experience a sizeable outflow of capital abroad as a result of market uncertainty. In the January-March 2020 period, capital outflows from the financial market reached IDR 145.28 trillion or greater than the global financial crisis in 2008. In addition, the rupiah exchange rate also experienced a significant weakening, even reaching a level of IDR 16,575 per USD on March 23, 2020 (Gunadi et al., 2022). The pandemic has also driven an economic slowdown which is marked by the recorded inflation rate which is always below 2% due to weakening domestic demand (Bank Indonesia, 2021).

The pandemic has caused the performance of financial institutions, which is one of the determinants in assessing financial system stability, to deteriorate. The pandemic has created public panic so that many customers have withdrawn their funds from banks which has resulted in a decrease in the bank's capital adequacy ratio (CAR). In addition, the pandemic has also caused a decline in people's income so that many customers have difficulty paying off their debts at banks, which has pushed the non-performing loan ratio (NPL) to increase. Furthermore, the pandemic has also caused a number of banks to be more careful in channeling loans to customers to avoid the risk of default, which has resulted in reduced bank liquidity (Marcu, 2021). If this condition continues, it is possible that systemic risk in the financial system will occur in Indonesia and could affect the stability of the real sector. Therefore, to avoid this risk, it is necessary to carry out an analysis of the description or condition of financial system stability in Indonesia as reference material for the government in setting future policies. In the previous literature, an analysis of the condition of financial system stability in both Indonesia and other countries has been carried out using various indicators and approaches (Al-Rjoub, 2021; Arzamasov & Penikas, 2014; Dumičić, 2016; Karanovic & Karanovic, 2015; Risman et al., 2021).

The continued development of technology has contributed to the increasing trend of globalization in the financial sector which has resulted in the financial system becoming more integrated without time lags and regional boundaries (Gomber et al., 2018). This can be proven from the presence of NBFIs such as fintech and financial service infrastructure which are growing because they offer various conveniences and speeds in the financial system. This condition is supported by increasingly dynamic financial product innovations accompanied by high business complexity. These various developments can lead to new triggers for financial system instability, making it even more difficult to overcome this instability (Fung et al., 2020).

Broadly speaking, the purpose of this research is to analyze and provide an overview of the condition of financial system stability in Indonesia before and during the Covid-19 pandemic and how it relates to economic growth. This study develops indicators that trigger financial system instability, namely 1) Banking, 2) NBFI, 3) Money Markets and Capital Markets, 4) Central Government, 5) Corporations, 6) Households, 7) Property, 8) Inclusive Finance and MSMEs, 9) Financial Infrastructure, and 10) Domestic Economic Conditions (Al-Rjoub, 2021; Arzamasov & Penikas, 2014; Dumičić, 2016; Karanovic & Karanovic, 2015; and Risman et al., 2021).

This research seeks to accommodate the triggers for financial system instability in all sectors, in addition to filling in the gaps found in previous research as well as being based on the pandemic which has had an impact on all economic sectors. The difference between this research and previous studies lies in the indicators triggering financial system instability which are more comprehensive so that it is hoped that this research can provide a better picture of the condition of national financial system stability.

Literature Review

Identification of the factors that cause financial system instability (FSI) has been found in many previous studies both conducted in Indonesia and in other countries. In general, each study has different views regarding the indicators that trigger FSI. This is generally adjusted to the financial conditions in each country and at certain times. According to Swamy (2014), financial system stability is strongly influenced by the banking sector because most of the financial sector in a country is controlled by banks. According to Nugroho et al. (2021), several indicators are used to assess the condition of financial system stability in banking, including Non-performing Loans

(NPL), Capital Adequacy Ratio (CAR), and Return On Assets (ROA). This is reinforced by Sere-Ejembi et al. (2014) which states that financial stability is strongly influenced by the financial performance of banks, the financial sector, the real sector, and the economic climate. Supporting this opinion, Nurfalah et al. (2018) argues that financial system stability, especially in the banking sector, is not only influenced by internal factors which are reflected in financial performance such as Loan to Deposit Ratio (LDR), Financing to Deposit Ratio (FDR), Cash Ratio (CR) , Bank Deposits (BD), or Capital Adequacy Ratio (CAR), but are also influenced by external factors such as inflation, interest rates, exchange rates, money markets and capital markets, domestic credit, and current accounts. Several other studies use the financial performance of financial institutions (especially banking) and factors from other sectors such as the real sector, corporate sector, financial sector, government sector; and financial markets as indicators to assess the condition and stability of the financial system (Albulescu, 2010; Dhiman, 2018; Gadanecz & Jayaram, 2008; Gustiana & Nasrudin, 2021; Kondratovs, 2014; Morales & Estrada, 2010; Morris, 2010).

Along with the development of increasingly advanced technology, it also has an impact on the advancement of financial technology, which is reflected in increasingly advanced financial infrastructure in various financial institutions. Currently, technology and financial infrastructure have emerged, such as fintech peer to peer lending, payment instruments using cards, electronic money, or automated teller machines (ATMs), which make it easier for people to access financial services at financial institutions. This risks increasing the number of problem loans in the financial sector and disrupting financial system stability (Azarenkova et al., 2018; Endiana & Merawati, 2022; Ozili, 2018; Risman et al., 2021). On the other hand, according to Volz (2015), even though the financial sector in Indonesia is dominated by banking, it does not rule out the possibility that non-bank financial institutions such as insurance, leasing, pawnshops, and pension funds can contribute to influencing the stability of the financial sector in Indonesia.

In previous studies, most of the studies only focused on banking sector that could affect the stability of the financial system in Indonesia, so that they could not fully accommodate other sectors that could potentially disrupt the financial system in Indonesia (Nugroho et al., 2021). Financial Services Authority (OJK) is of the view that the detection of financial system stability must be forward looking or see conditions in the future so that potential triggers can be identified in the future. This is due to the rapid and increasingly dynamic development of technology that can become another trigger for financial system instability. When the pandemic hit Indonesia, almost all economic sectors were paralyzed as a result of the pandemic. Therefore, this research develops a more comprehensive economic sub-sector with the hope that it will better describe the condition of financial system stability in Indonesia, especially during a pandemic situation.

In line with previous studies which stated that general banking, money markets and capital markets, macroprudential factors, and central government are important sub-sectors that determine the condition of the financial system in a country. Therefore, these subsectors are also analyzed in this study. This study developed 6 indicators to assess the financial condition of banks, namely NPL, CASA, CAR, LDR, ROA, and BOPO, while the money market and capital market sub-sectors were represented by the average daily volume of interbank money market transactions and the Composite Stock Price Index (IHSG) at the end of the period (Albulescu, 2010; Dhiman, 2018; Gadanecz & Jayaram, 2008; Gustiana & Nasrudin, 2021; Kondratovs, 2014; Morales & Estrada, 2010; Morris, 2010). The macroprudential factor is represented by indicators of interest rates and the rupiah exchange rate against the US dollar, while the central government sub-sector is represented by the indicator of government debt to Gross Domestic Product (GDP) (Nurfalah et al., 2018; Sere-Ejembi et al., 2014).

Other non-bank financial institutions (NBFI) such as pawnshops, savings and loan cooperatives, venture capital companies, and insurance companies also deserve to be considered as one of the triggering factors for disrupting the financial system because they have the same function, namely growing the national economy and expediting the financial system other than banking institutions (Volz, 2015). In addition, as a result of technological developments in the financial sector, other non-bank financial technologies are currently emerging, such as fintech peer to peer lending which is growing rapidly (Azarenkova et al., 2018; Endiana & Merawati, 2022; Ozili, 2018; Risman et al., 2021).

Table 1. Indicators of Financial System Instability (FSI) in this Research

Indicators	Definition	Effect	Meaning
Commercial bank			
1) NPL	Non-performing credit levels at commercial banks	(+)	The higher the NPL, the higher the pressure on the financial condition
2) CASA	Comparison of total current accounts and savings with the total amount of Third Party Funds (TPF)	(-)	The higher the CASA, the lower the pressure on the financial condition
3) CAR	The ratio of capital to risk-weighted assets	(-)	The higher the CAR, the lower the pressure on the financial condition
4) LDR	The ratio of loans disbursed to TPF	(+)	The higher the LDR, the higher the pressure on the financial condition
5) ROA	Ratio of net income to total assets	(-)	The higher the ROA, the lower the pressure on the financial condition
6) BOPO	Ratio of operating expenses to operating income	(+)	The higher the BOPO, the higher the pressure on the financial condition
Non-bank financial institutions (NBFI)			
1) ASS	The ratio of total assets of NBFI to total assets of the financial sector	(+)	The higher the ASS, the higher the pressure on the financial condition
Money market			
2) PUAB	Daily average transaction volume of the Interbank Money Market	(-)	The higher the PUAB, the lower the pressure on financial conditions
Capital market			
3) IHSG	Composite Stock Price Index (IHSG) at the end of the period	(-)	The higher the IHSG, the lower the pressure on the financial condition
Government			
4) LOAN	Ratio of central government debt to GDP	(+)	The higher the LOAN, the higher the pressure on the financial condition
Corporation			
5) DER	Ratio of total debt to equity	(+)	The higher the DER, the higher the pressure on the financial condition
6) ROA	Ratio of net income to total assets	(-)	The higher the ROA, the lower the pressure on the financial condition
Household			
7) NPL	The ratio of the number of household non-performing loans	(+)	The higher the NPL, the higher the pressure on the financial condition
Property			
8) NPL	The ratio of the number of non-performing loans to property	(+)	The higher the NPL, the higher the pressure on the financial condition
Inclusive finance			
9) Credit account	Number of bank credit accounts per 1,000 residents	(+)	The higher the credit account, the higher the financial condition pressure
MSMEs			
10) MSME credit	MSME Credit Ratio to GDP	(+)	The higher the MSME credit, the higher the pressure on financial conditions
Financial infrastructure			
11) CBPI and EM	Transaction value of Card-Based Payment Instruments (CBPI) and Electronic Money (EM)	(-)	The higher the CBPI and the EM, the lower the pressure on financial conditions

Indicators	Definition	Effect	Meaning
Domestic economy			
12) Interest rate	BI 7-day (Reverse) Repo Rate	(+)	The higher the interest rate, the higher the pressure on the financial condition
13) Exchange rate	IDR Exchange Rate against USD	(+)	The weaker the IDR exchange rate, the higher the pressure on financial conditions

Source: Albulescu, 2010; Arzamasov & Penikas, 2014; Azarenkova et al., 2018; Dhiman, 2018; Dumičić, 2016; Endiana & Merawati, 2022; Gadanecz & Jayaram, 2008; Gustiana & Nasrudin, 2021; Morales & Estrada, 2010; Morris, 2010; Noerhidajati et al., 2021; Nugroho et al., 2021; Nurfalah et al., 2018; Ozili, 2018; Risman et al., 2021; Sere-Ejembi et al., 2014; Swamy, 2014; Volz, 2015 - Modified by the author, 2023

Table 2. Sub-sector groups in FSI

Sector	Subsector
Financial institutions	1) Commercial banks
	2) Non-bank financial institutions (NBFI)
Financial market	1) Money market
	2) Capital market
Economy agents	1) Government
	2) Household
	3) Corporation
	4) Property
Financial inclusion	1) Inclusive finance
	2) MSMEs
Financial insfrastructure	1) Financial insfrastructure
Domestic economy	1) Domestic macro conditions

Source: Albulescu, 2010; Arzamasov & Penikas, 2014; Azarenkova et al., 2018; Dhiman, 2018; Dumičić, 2016; Endiana & Merawati, 2022; Gadanecz & Jayaram, 2008; Gustiana & Nasrudin, 2021; Morales & Estrada, 2010; Morris, 2010; Noerhidajati et al., 2021; Nugroho et al., 2021; Nurfalah et al., 2018; Ozili, 2018; Risman et al., 2021; Sere-Ejembi et al., 2014; Swamy, 2014; Volz, 2015 - Modified by the author, 2023

In addition, other sub-sectors such as households, corporations, property, financial infrastructure, and inclusive finance & micro, small, and medium enterprises (MSMEs) can also potentially affect the financial system. In general, this sub-sector has the potential to impact the financial system because the proportion of credit is too large, causing excessive financial stress. Previously research has found evidence that these sub-sectors can disrupt the financial system in a country such as corporations and property studied by Arzamasov & Penikas (2014) and households by Dumičić (2016) and Noerhidajati et al. (2021). Therefore, these sub-sectors are also studied in this study. In this study, indicators for assessing the corporate subsector are determined by the Debt to Equity Ratio (DER) and corporate ROA, while the household and property subsectors are proxied by the level of household NPL and property NPL. Meanwhile, the financial inclusion and MSME sub-sectors are proxied by the number of bank credit accounts per 1,000 residents and MSME credit to GDP. The list of indicators of financial system instability in Indonesia in this study can be seen in Table 1. Meanwhile, to see the effect of each sub-sector on the condition of financial system stability in Indonesia, this study categorizes indicators of financial system instability into 6 sub-sector groups on Table 2.

Research Methods

Data

This study uses quarterly data covering 19 indicators set for financial system stability from the first quarter of 2016 to the second quarter of 2022. The research period covers the economic crisis caused by the Covid-19 pandemic that occurred in early 2020 to mid 2022. Data is sourced from the Indonesian Financial System Statistics (IFSS) issued by Bank Indonesia. All indicators of Financial

System Instability (FSI) are presented in ratios or percent except the Daily Average Overnight Rupiah PUAB in transaction volume (IDR billion), Composite Stock Price Index (IHSG) in the end of period (points), Number of Banking Credit Accounts per 1,000 adult population (account), Rupiah Exchange Rate (IDR/USD) and CBPI & EM in transaction value (IDR billion). The data list of 19 indicators of financial system stability in this study is presented in Table 3.

Table 3. Data on Indicators of Financial System Instability (FSI) in Indonesia

Indicator	Mean	Std. Deviation	Maximum	Minimum
NPL (%)	2.936566	0.236417	3.35	2.551116
CASA (%)	56.19561	2.529969	62.56726	53.12435
CAR (%)	23.36971	0.956326	25.51933	21.8946
LDR (%)	88.28796	5.502987	95.13954	77.70628
ROA (%)	2.294354	0.26721	2.586849	1.644567
BOPO (%)	82.00139	2.621822	86.29745	78.2025
Assets NFI (%)	22.66372	0.801937	24.56761	21.71558
PUAB (IDR billion)	8420.617	2953.393	13261.33	4562.803
IHSG (Point)	5866.877	622.9729	7096.489	4743.83
Govrn Loan (%)	32.85308	5.079901	41.62	27.58
DER (%)	1.006611	0.327165	1.24	0.355698
ROA (%)	3.295926	1.395434	5.12	1.193231
NPL Household (%)	1.849129	0.161681	2.294511	1.63
NPL Property (%)	2.79052	0.216974	3.396527	2.492574
Credit Account (Amount)	265.0387	94.37736	602.8904	218.901
MSME Credit (%)	6.940769	0.131177	7.21	6.71
CBPI & EM (IDR billion)	626058.9	88652.25	769989.9	456636.4
BI Rate (%)	4.740385	1.026679	7	3.5
Exchange Rate (IDR/USD)	14052.1	534.6276	14754.34	13130.67

Source: Secondary data processed, 2023.

Methodology

Formation of index numbers for each indicator

The research begins by establishing an index number for each indicator. Due to each indicator has quite a variety of values with different units, the formation of index numbers for each indicator is carried out by an adjustment process, namely by using the max-min method according to research (Al-Rjoub, 2021). In this study, the index number for each indicator is calculated using the following formula:

$$X_{i,t} = \frac{I_{it} - \text{Min}\ (I_i)}{Max\ (I_i) - \text{Min}\ (I_i)} \quad (1)$$

Note:
$X_{i,t}$ represents the adjusted index of indicator (i) in period (t)
I_{it} is the value of the indicator (i) in the period (t)
$Min\ (I_i)$ is the smallest value of indicator (i)
$Max\ (I_i)$ is the largest value of the indicator (i)

The higher the composite index number indicates that the higher the level of pressure faced by the financial system, while the lower the composite index value indicates that the pressure on the financial system tends to be low.

Scheme of weighting and formation of FSI index numbers

Basically, there is no best way to determine the correct weighting scheme for each indicator, even though the weight actually has a significant influence on the overall composite index. A variety of methods and practices are used to weigh variables. For example, sometimes central banks use expert judgment and do not consider potential correlations between individual partial indicators. In this study, weighting was carried out using the variance-equal weight approach, namely by giving equal weight to each indicator (Al-Rjoub, 2021). In this way, the weighting of each indicator is calculated by dividing 1 by n, where n is the total number of indicators in certain factor groups that have previously been formed. Meanwhile, to form the FSI index number, this study uses a composite index, which is a combined index of all variables that have been formed in one factor. The formula used to form the FSI index is as follows:

$$FSI\ index = \frac{1}{n}(X_{i,t} + X_{j,t} + \cdots + X_{n,t}) \quad (2)$$

Note:
The FSI index is a composite index of financial system instability
$X_{i,t}$ represents the adjusted index value of indicator (i) in period (t)
$X_{j,t}$ represents the adjusted index value of the indicator (j) in period (t)
$X_{n,t}$ represents the adjusted index value of the indicator (n) in the period (t)
n is the number of FSI indicators (n = 1, 2, 3, ..., 19)
t is the research period in quarters (t = 1, 2, 3, …, 26)

Assessing the relationship between the FSI index and economic conditions

After the FSI index has been formed, the last step is to relate the index to GDP growth, investment, FDI, and export-import performance to find out how the index relates to economic growth. In this study, the assessment was carried out by Pearson correlation analysis. Pearson correlation analysis is an analysis that assesses the strength of the relationship between two or more different variables. Pearson correlation values range from 0 to 1 or -1 to 0. If the Pearson correlation number is negative then the relationship between two or more variables is reversed, and vice versa if the Pearson correlation number is positive then there is a linear or unidirectional relationship between two or more variables. A Pearson correlation number that is close to 1 or -1 indicates that the relationship between two or more variables is getting stronger, while if the Pearson correlation number is close to 0, the relationship is getting weaker.

Results and Discussion

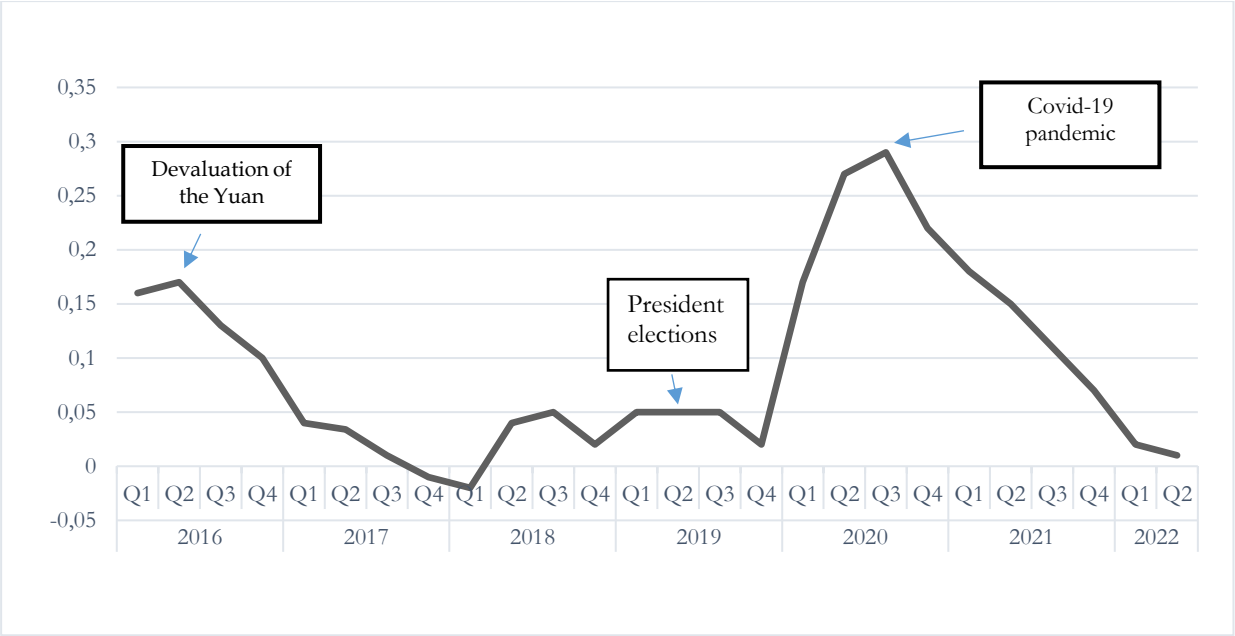
Results of Financial System Instability Conditions in Indonesia

The results of Indonesia's financial system instability (FSI) are presented in the form of graphs and tables which contain the overall FSI index and the FSI index for each sub-sector group. The condition of the overall FSI index can be seen in Graph 1, while for the FSI index of each group is presented in Graph 2. It should be noted that the higher the graphic pattern indicates the higher the level of pressure faced in financial conditions, and vice versa.

Table 4. Conditions of Instability in the Indonesian Financial System

Sectors	Mean	Std.Deviation	Maximum	Minimum
FSI Index	0.091466	0.085836	0.286454	-0.02164
Financial institution	0.065181	0.122732	0.253642	-0.21722
Financial market	-0.45866	0.232469	-0.10889	-0.83011
Economy agents	0.248613	0.191118	0.699319	0.002541
Financial inclusive	0.291384	0.227403	0.91	7.35E-05
Financial infrastructure	-0.54094	0.28305	0	-1
Domestic economy	0.457002	0.175493	0.823066	0.222307

Source: Secondary data processed, 2023



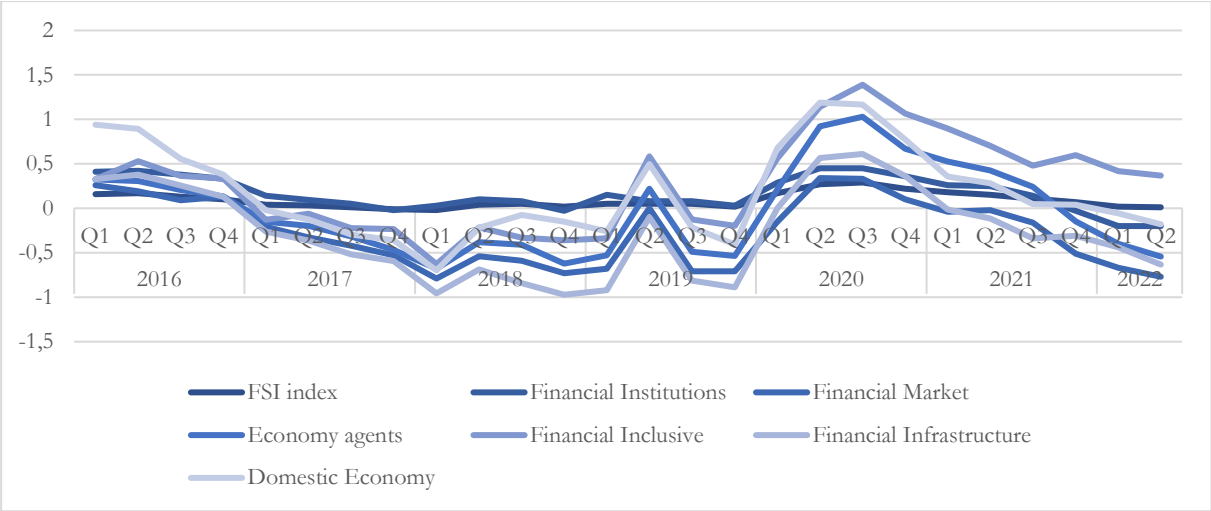
Source: Secondary data processed, 2023

Graph 1. Conditions of Instability in the Indonesian Financial System Q1 2016 – Q2 2022

Based on Graph 1, it can be seen that there were quite clear differences in Indonesia's financial conditions before and during the Covid-19 pandemic. In addition, during the last 6.5 years, the condition of Indonesia's financial system experienced several disturbances, especially during the Covid-19 pandemic situation that occurred in early 2020. Indonesia's financial condition experienced significant pressure to reach 0.17 index points in the second quarter of 2016 in which is higher than the average index which is only 0.09. This is inseparable from the Chinese Government's policy of devaluing its currency or reducing the value of the Yuan currency against foreign currencies in early 2016. This policy was chosen because of the problem of falling world oil prices and stock prices. Due to China is a country that has quite strong economic influence and is also a partner in economic cooperation with Indonesia, especially in trade and investment, the depreciation of the Yuan currency has also had an impact on financial and economic stability in Indonesia, especially on the macro side. The decline in the value of the Yuan currency and world oil caused the prices of goods to decline due to the increase in the value of imports from China so that the economy slowed down (Azizatunnishak, 2018).

This research proves that the Covid-19 pandemic has had a significant impact on the high pressure on financial system stability in Indonesia. The index number was recorded at 0.27 in the second quarter of 2020 or almost 3 times the average index (0.9) and more than 5 times the pre-pandemic situation, namely in the same quarter in 2019 (0.5). Almost all sectors examined in this study were significantly affected by the pandemic. In general, the NPL ratio in all sectors has increased on average during the pandemic, which has the potential to destabilize the stability of the financial system in Indonesia. This was due to the increasing number of credit restructuring during the pandemic (Disemadi & Shaleh, 2020). In addition, banking and financial market performance also worsened during the pandemic which was marked by a decline in ROA (Rahmi & Sumirat, 2021).

In April 2019, Indonesia held president elections which were held simultaneously in Indonesia. Unusual events that occur in a country such as holding elections are events that can potentially disrupt the stability of the financial system in Indonesia (Olorogun, 2021). This study found that the condition of financial system stability during the holding of elections in Indonesia was still quite under control. This is shown by the index number which tends to be lower than the average index, which is 0.05 in the second quarter of 2019. Nonetheless, preventive measures need to be taken by the government in anticipating disruptions to the financial system, especially in events that are not normal.



Note: chart lines are adjusted using stacked lines
Source: Secondary data processed, 2023

Graph 2. Financial System Instability Index in Indonesia Q1 2016 – Q2 2022 Per Sector

Graph 2 describes the conditions of financial system instability in Indonesia from 2016 to mid 2020 for each group. It can be seen that almost all FSI groups experienced a significant increase in pressure when the Covid-19 Pandemic first occurred in early 2020, except for FSI in the financial infrastructure subsector which was actually relatively stable during the pandemic. This happened because most people switched from conventional payments to digital payments including CBPI and EM during the pandemic which resulted in smooth payment systems, especially non-cash payments (Pambudi & Rahadi, 2021). The smoothness of the payment system is one of the indicators that determines the stability of the financial system in a country.

Due to financial infrastructure contributes a negative number to the index, this interprets that financial infrastructure is capable of reducing pressure on the financial system during a pandemic. When the Covid-19 Pandemic occurred in Indonesia in the second quarter of 2020, the FSI index in the financial infrastructure group was recorded at -0.58 where the contribution to the decline in the FSI index was recorded to be greater than the normal situation. In addition, the index number in the second quarter of 2020 is still higher than the average (-0.54). The contribution of the financial infrastructure index in reducing financial pressure during the pandemic also showed an increase. In the second quarter of 2021 the financial infrastructure FSI index was recorded at -0.82, and in the second quarter of 2021 it was -1.

Financial institutions are one of the groups that have received the negative impact of the pandemic. In the second quarter of 2020 or when the pandemic occurred in Indonesia, the FSI index for financial institutions was recorded at 0.18, which is higher than normal situations, for example in the same quarter in the previous year which was only 0.08 and 3 times higher than the average index is only 0.06. The increase in the FSI index for financial institutions was due to an increase in NPLs, a decline in bank profitability performance and an increase in loans disbursed by NBFI during the pandemic, which pushed excessive pressure on financial institutions.

Financial market groups have also experienced a financial depression during the pandemic. The lower the FSI index number in the financial market group, the more stable the financial condition will be. When the pandemic occurred, the FSI index on the financial market was recorded at -0.11 or higher compared to the same quarter in 2019 which reached -0.8 and was higher than the average which reached -0.46. The increase in the index number was due to the fact that stock prices declined during the pandemic, which prompted investors to panic to withdraw their shares from the capital market (Indrayono, 2021). In addition, it was also caused by a decrease in PUAB transactions in the money market.

The economic actor group is one of the groups most affected by the pandemic. The FSI index number for the group of economic actors recorded a significant increase in the second quarter of 2020, reaching 0.58 or higher compared to the normal situation which was only 0.22 in

the second quarter of 2019 and two times higher than the average index which only 0.25 resulting in significant financial pressure. Most of the financial pressure on groups of economic actors was generally caused by the number of non-performing loans that had increased during the pandemic (Kryzanowski et al., 2023).

The pandemic has also had an impact on the domestic macroeconomic group. When the pandemic occurred in the second quarter of 2020, the index number reached 0.62 or higher compared to the average index which was only 0.58. This was due to the weakening of the rupiah exchange rate against the USD. In the financial inclusion group, when the pandemic occurred in early 2020, the impact did not directly affect the financial condition of that group. This is evidenced by the index number of 0.22 in the second quarter of 2020 or lower than the average index of 0.29 and lower than the same quarter in 2019 which reached 0.36. However, in subsequent quarters during the pandemic, the index number for the financial inclusion group continued to increase, even reaching 0.91 in the second quarter of 2022. This was due to an increase in the amount of credit to MSMEs and the public during the pandemic. A significant increase in the number of loans to the public can put pressure on the financial condition due to the potential for an increase in the number of non-performing loans (Tatarici et al., 2020).

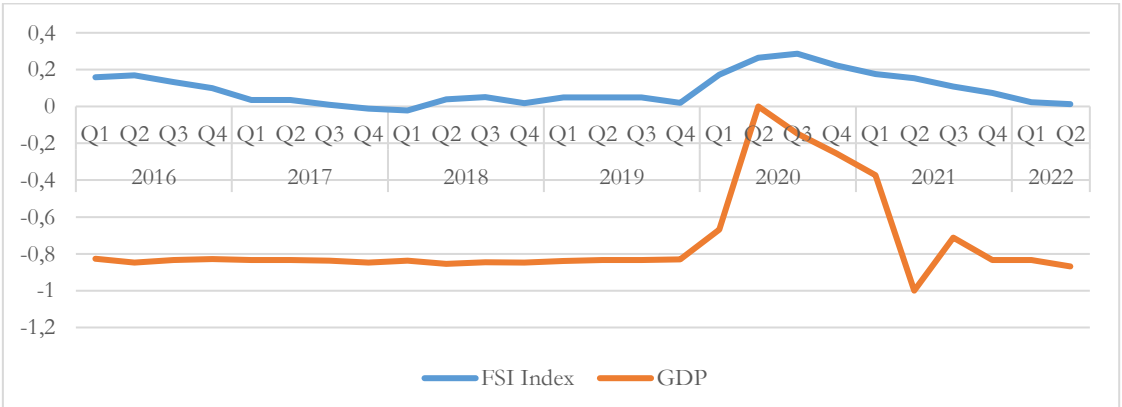
The Relationship between Financial System Instability in Indonesia and Pressure on Economic Growth

In order to determine the accuracy of the FSI index in measuring financial conditions in Indonesia, a correlation analysis was performed between the FSI index and the FSI index in each group with economic growth representing real sector economic conditions. Because the financial sector and the real sector cannot be separated and are one unit, a correlation analysis was carried out by comparing the six groups of the FSI index and the overall FSI index with economic growth variables with the aim of knowing the relationship between the two variables.

Table 5. FSI Index Correlation Test Results with Economic Growth

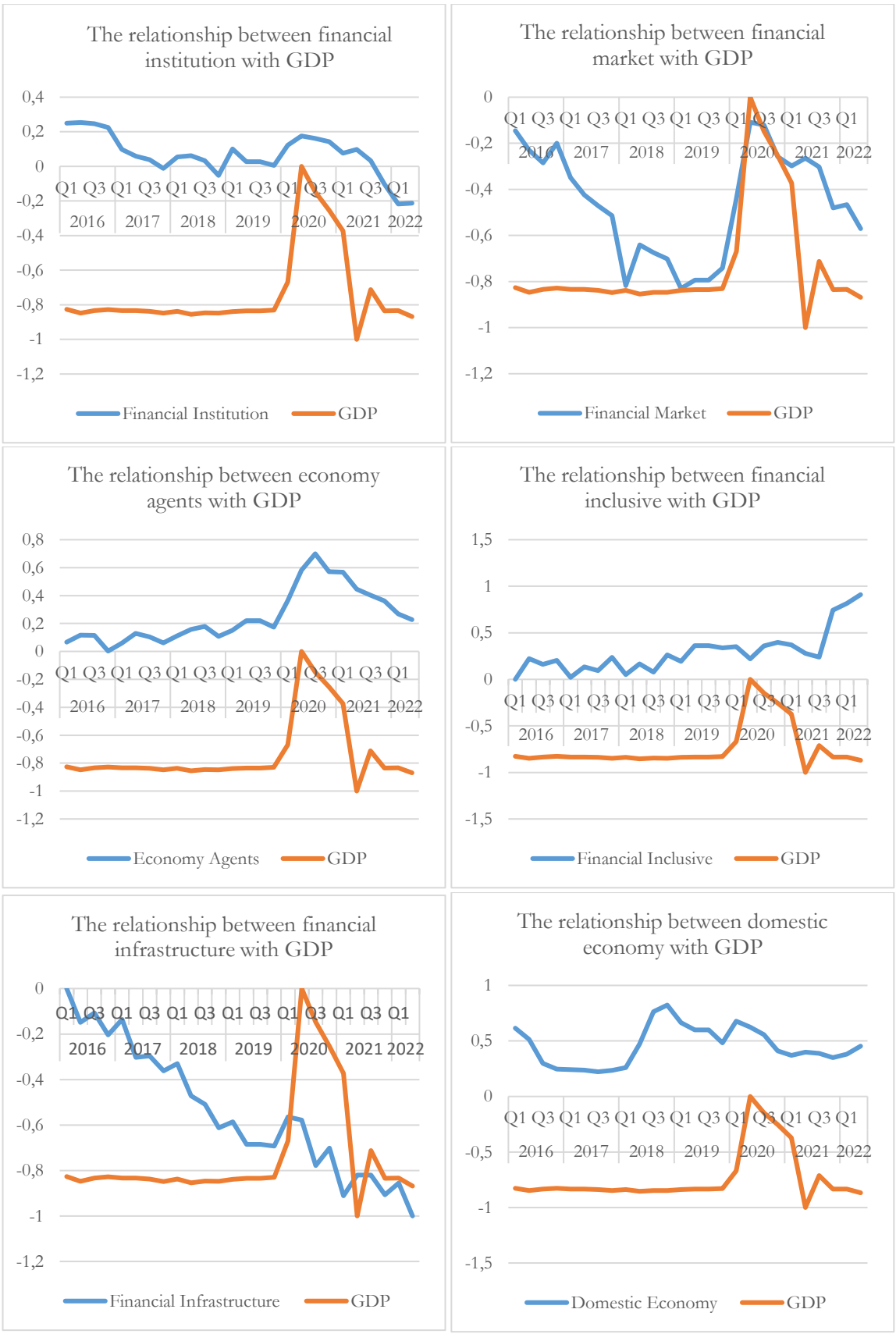
	GDP*****	FSI****	Insti**	Market***	Agent****	Inclusi*	Infras**	Macro**
GDP*****	1.000000	0.774113	0.290972	0.450884	0.789934	0.054443	-0.250073	0.158790
FSI****	0.774113	1.000000	0.618167	0.699348	0.733586	-0.043340	-0.076831	0.237707
Insti.**	0.290972	0.618167	1.000000	0.493122	0.018199	-0.693729	0.636440	0.026863
Market***	0.450884	0.699348	0.493122	1.000000	0.387827	-0.041981	0.129620	-0.141077
Agents****	0.789934	0.733586	0.018199	0.387827	1.000000	0.356660	-0.663812	0.178586
Inclusi*	0.054443	-0.043340	-0.693729	-0.041981	0.356660	1.000000	-0.758785	0.021571
Infras**	-0.250073	-0.076831	0.636440	0.129620	-0.663812	-0.758785	1.000000	-0.221568
Macro*	0.158790	0.237707	0.026863	-0.141077	0.178586	0.021571	-0.221568	1.000000

Note: *)0 – 0.2 (Very Weak); **)0.21 – 0.4 (Weak); ***)0.41-0.60 (Enough); ****)0.61-0.8 (Strong); *****) 0.81 - 1.00 (Very Strong)
Source: Secondary data processed, 2023



Source: Secondary data processed, 2023

Graph 3. The Relationship between the FSI Index and Economic Growth



Source: Secondary data processed, 2023

Graph 4. The Relationship between FSI Index per Group and Economic Growth

Based on the results of the correlation analysis in Table 5, the relationship between the FSI index and economic growth is in the strong category, which is equal to 0.77. These results indicate that the FSI index built in this study is considered quite capable of predicting real economic

conditions in Indonesia, particularly economic growth. When pressure on the financial system increases, it can lead to increased pressure on GDP growth, and vice versa. Based on Graph 3, the FSI index pattern tends to follow the economic growth index pattern. Before the pandemic occurred in early 2020, the decline in the Yuan currency in early 2016 was enough to pressure financial system conditions, resulting in a decline in economic growth which was only recorded at 4.92 in the first quarter of 2016. The relationship between the FSI index and economic growth is more clearly seen when the pandemic occurred in early 2020, where it resulted in increased pressure on the condition of the financial system followed by increased pressure on GDP.

The correlation analysis show that two groups of FSI are noted to have a weak relationship with economic growth, namely financial institutions and financial infrastructure. Meanwhile, the other two groups of FSI, namely domestic macroeconomic conditions and financial inclusion, have a very weak relationship. Financial institutions, financial inclusion and macroeconomic conditions have a positive relationship with a correlation coefficient of 0.29, 0.05 and 0.16 respectively, while financial infrastructure has a negative correlation relationship of -0.25.

The FSI group is recorded as having a strong relationship with economic growth, namely the group of economic actors with a correlation coefficient of 0.79 or greater when compared to the overall FSI Index. This is because groups of economic actors such as the government, households, corporations and property are economic groups that are directly related to the real sector, thereby influencing GDP growth. It can be seen that the graph showing the index of economic actors has almost the same movement as economic growth. When the situation is normal, the movement of financial conditions in groups of economic actors tends to be stable, as well as economic growth. However, when a pandemic occurred, there was significant pressure from the index of economic actors followed by pressure on the economic growth index. The disrupted financial conditions for groups of economic actors during the pandemic were caused by an increase in the number of non-performing loans and debts, while people's incomes decreased so that this group of economic actors was not productive in producing goods and services which are indicators of economic growth (Susilawati et al., 2020).

The financial market group index has a fairly strong relationship with economic growth with a correlation coefficient of 0.45. From the results of the graphical development analysis of the two variables, it is clear that this quite strong relationship was more clearly caused when the pandemic occurred. During the pandemic, the financial market indices faced strong financial pressure, especially in terms of the weakening of the IHSG due to investor panic due to the pandemic. The decline in stock prices indicates that the level of investor confidence in investing in the company is decreasing (Indrayono, 2021). In the theory of economic growth, investment is one of the most important elements that determine economic growth in a country (Almfraji & Almsafir, 2014). With capital and funds invested through investment, companies can be more productive in producing goods and services, conversely if investment decreases, economic growth will also decrease.

Implication and Conclusion

Overall, this research concludes that the financial system in Indonesia faces more significant pressures during the pandemic than before the pandemic. The FSI index in the second quarter of 2020 was recorded at 0.27 or three times the average of only 0.09, although in the following quarter the pressure on the financial system in Indonesia began to improve as the pandemic began to recover. The trigger for financial system instability during the pandemic was the increase in the number of non-performing loans in almost all sectors, the declining performance of financial institutions and markets.

The results of the correlation analysis show that the financial condition index in Indonesia has a strong relationship with economic growth as evidenced by the correlation coefficient on both variables which reaches 0.77. The disruption of the financial system during the pandemic to various sub-sectors of the financial system resulted in an inefficient distribution of funds which could affect the real sector and GDP growth. Two groups of sub-sectors are recorded as having a strong and quite strong relationship with economic growth, namely the group of economic actors and the

financial market. The number of non-performing loans in the group of economic actors has recorded an increase, especially during the pandemic, resulting in pressure on financial system conditions. In addition, financial market performance has also recorded a decline during the pandemic, which was marked by declining share prices and the value of PUAB transactions.

Suggestions and policy recommendations that can be implemented are as follows: 1) Even though the credit restructuring policy, especially during a pandemic, has indirectly had a positive impact on the economy, the magnitude must always be controlled. Bearing in mind, the number of credit restructuring greatly affects the number of non-performing loans which triggers disruption of the financial system. 2) In order to strengthen the performance of financial institutions, especially when there is an unexpected economic crisis such as a pandemic, financial institutions can carry out mergers or consolidations, both between financial institutions such as banks, and with non-bank financial institutions (NBFI). Increasing financing through NBFIs, especially those based on financial technology such as fintech, should be a great opportunity for both types of financial institutions to work together in order to strengthen financial institutions going forward. Therefore, the government can compile regulations that regulate the integration between financial institutions such as banks and non-bank financial institutions based on financial technology.

References

Al-Rjoub, S. A. (2021). A financial stability index for Jordan. *Journal of Central Banking Theory and Practice*, *10*(2), 157–178. https://doi.org/10.2478/jcbtp-2021-0018

Albulescu, C. T. (2010). Forecasting the Romanian financial system stability using a stochastic simulation model. *Romanian Journal of Economic Forecasting*, *13*(1), 81–98. https://ipe.ro/rjef/rjef1_10/rjef1_10_6.pdf

Almfraji, M. A., & Almsafir, M. K. (2014). Foreign direct investment and economic growth literature review from 1994 to 2012. *Procedia-Social and Behavioral Sciences*, *12*(9), 206–213. https://doi.org/10.1016/j.sbspro.2014.03.668

Arzamasov, V., & Penikas, H. (2014). A financial stability index for Israel. *Procedia Computer Science*, *3*(1), 985–994. https://doi.org/10.1016/j.procs.2014.05.351

Azarenkova, G., Shkodina, I., Samorodov, B., & Babenko, M. (2018). The influence of financial technologies on the global financial system stability. *Investment Management & Financial Innovations*, *15*(4), 229. https://www.ceeol.com/search/article-detail?id=741960

Azizatunnishak, K. (2018). Impact shock policy China exchange rate (Devaluation of Yuan) to Indonesian economic fluctuation. *Economics Development Analysis Journal*, *7*(1), 78–88. https://doi.org/10.15294/edaj.v7i1.21933

Bank Indonesia (2021). *Inflasi IHK 2020 Tercatat Rendah*. https://www.bi.go.id/id/publikasi/laporan/Documents/Analisis_Inflasi_Desember_2020.pdf

del Rio-Chanona, R. M., Mealy, P., Pichler, A., Lafond, F., & Farmer, J. D. (2020). Supply and demand shocks in the COVID-19 pandemic: An industry and occupation perspective. *Oxford Review of Economic Policy*, *36*(1), 94–137. https://doi.org/10.1093/oxrep/graa033

Dhiman, R. (2018). Identifying the key indicators of financial stability and financial development: a review of financial service sector. *Asian Journal of Management Science and Applications*, *3*(4), 302–320. https://doi.org/10.1504/AJMSA.2018.098902

Disemadi, H. S., & Shaleh, A. I. (2020). Banking credit restructuring policy amid COVID-19 pandemic in Indonesia. *Jurnal Inovasi Ekonomi*, *5*(2), 63–70. https://doi.org/10.22219/jiko.v5i02.11790

Dumičić, M. (2016). Financial stability indicators–The case of Croatia. *Journal of Central Banking Theory and Practice*, *5*(1), 113–140. https://doi.org/10.1515/jcbtp-2016-0006

Endiana, I. D. M., & Merawati, L. K. (2022). Financial inclusion on Indonesia's financial system stability: The role intervening of financial technology. *Jurnal Keuangan Dan Perbankan*, *26*(2), 405–415. https://doi.org/10.26905/jkdp.v2i2.6914

Eze, O. R., & Ogiji, F. O. (2016). Impact of deficit financing on economic stability in Nigeria: Analysis of economic growth. *Journal of Applied Finance and Banking*, *6*(1), 111–125. http://www.scienpress.com/upload/jafb/vol 6_1_7.pdf

Fung, D. W., Lee, W. Y., Yeh, J. J., & Yuen, F. L. (2020). Friend or foe: The divergent effects of FinTech on financial stability. *Emerging Markets Review*, *4*(5), 100727. https://doi.org/10.1016/j.ememar.2020.100727

Gadanecz, B., & Jayaram, K. (2008, August). Measures of financial stability-a review. In *Measuring Financial Innovation and Its Impact: Proceedings of the IFC Conference, Basel* (Vol. 31, pp. 365–383). https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=171888e66888906b686ba865bc2940e7b5f464db#page=371

Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of Management Information Systems, 35*(1), 220–265. https://doi.org/10.1080/07421222.2018.1440766

Gunadi, N. L. D. S., Ardhya, S. N., & Setianto, M. J. (2022). Tinjauan yuridis pertanggungjawaban ganti rugi terhadap kerugian investor di pasar modal Indonesia. *Jurnal Komunitas Yustisia*, *5*(2), 558–574. https://garuda.kemdikbud.go.id/documents/detail/3077803

Gustiana, A., & Nasrudin, N. (2021). Evaluating financial system stability using heatmap from aggregate financial stability index with change point analysis approach. *Asia-Pacific Financial Markets*, *28*(3), 367–396. https://doi.org/10.1007/s10690-020-09326-0

Indrayono, Y. (2021). What factors affect stocks' abnormal return during the COVID-19 pandemic: Data from the Indonesia stock exchange. *European Journal of Business and Management Research*, *6*(6), 1–11. https://doi.org/10.24018/ejbmr.2021.6.6.1139

Karanovic, G., & Karanovic, B. (2015). Developing an aggregate index for measuring financial stability in the Balkans. *Procedia Economics and Finance*, *3*(3), 3–17. https://doi.org/10.1016/S2212-5671(15)01690-1

Kondratovs, K. (2014). Modelling financial stability index for Latvian financial system. *Regional Formation and Development Studies*, *8*(3), 118–129. https://doi.org/10.15181/rfds.v7i2.2368

Kryzanowski, L., Liu, J., & Zhang, J. (2023). Effect of COVID-19 on non-performing loans in China. *Finance Research Letters*, *5*(2), 103372. https://doi.org/10.1016/j.frl.2022.103372

Marcu, M. R. (2021). The impact of the COVID-19 pandemic on the banking sector. *Management Dynamics in the Knowledge Economy*, *9*(2), 205–223. https://intapi.sciendo.com/pdf/10.2478/mdke-2021-0015

Morales, M. A., & Estrada, D. (2010). A financial stability index for Colombia. *Annals of Finance*, *6*(4), 555–581. https://doi.org/10.1007/s10436-010-0161-7

Morris, V. C. (2010). Measuring and forecasting financial stability: The composition of an aggregate financial stability index for Jamaica. *Bank of Jamaica*, *6*(2), 34–51. https://www.boj.org.jm/uploads/pdf/papers_pamphlets/papers_pamphlets_Measuring_and_Forecasting_Financial_Stability__The_Composition_of_an_Aggregate_Financial_Stability_Index_for_Jamaica.pdf

Noerhidajati, S., Purwoko, A. B., Werdaningtyas, H., Kamil, A. I., & Dartanto, T. (2021). Household financial vulnerability in Indonesia: Measurement and determinants. *Economic Modelling*, *9*(6), 433–444. https://doi.org/10.1016/j.econmod.2020.03.028

Nugroho, A. W., Adam, M., Widiyanti, M., & Sulastri, S. (2021). Analysis of financial stability

determinants in Indonesia. *Journal of Social Science*, *2*(2), 99–106. https://doi.org/10.46799/jss.v2i2.105

Nurfalah, I., Rusydiana, A. S., Laila, N., & Cahyono, E. F. (2018). Early warning to banking crises in the dual financial system in Indonesia: The markov switching approach. *Journal of King Abdulaziz University: Islamic Economic*, *31*(2), 133–156. https://journals.kau.edu.sa/index.php/JKAUIE

Olorogun, L. (2021). Political economy and financial sustainability in the 21st century: US election spillover into the global financial system. *Academia Letters*. https://doi.org/10.20935/AL2051

Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, *18*(4), 329–340. https://doi.org/10.1016/j.bir.2017.12.003

Pambudi, T., & Rahadi, R. A. (2021). The impact of pandemic covid-19 on digital payment: Case study on electronic money in Indonesia. *International Journal of Advanced Research in Economics and Finance*, *3*(1), 70–79. http://myjms.mohe.gov.my/index.php/ijaref

Qi, X. Z., Ning, Z., & Qin, M. (2022). Economic policy uncertainty, investor sentiment and financial stability—an empirical study based on the time varying parameter-vector autoregression model. *Journal of Economic Interaction and Coordination*, *1*(7), 779–799. https://doi.org/10.1007/s11403-021-00342-5

Rahmi, Y., & Sumirat, E. (2021). A study of the impact of alma to profitability during the covid-19 pandemic. *International Journal of Business, Economics, and Law*, *24*(3), 54–65. https://ijbel.com/wp-content/uploads/2021/04/IJBEL24-036.pdf

Risman, A., Mulyana, B., Silvatika, B., & Sulaeman, A. (2021). The effect of digital finance on financial stability. *Management Science Letters*, *11*(7), 1979–1984. https://doi.org/10.5267/j.msl.2021.3.012

Sere-Ejembi, A., Udom, I. S., Salihu, A., Atoi, N. V., & Yaaba, B. N. (2014). Developing banking system stability index for Nigeria. *Journal of Applied Statistics (JAS)*, *5*(1), 49–77. https://dc.cbn.gov.ng/jas/vol5/iss1/4

Susilawati, S., Falefi, R., & Purwoko, A. (2020). Impact of COVID-19's pandemic on the economy of Indonesia. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*, *3*(2), 1147–1156. https://doi.org/10.33258/birci.v3i2.954

Swamy, V. (2014). Testing the interrelatedness of banking stability measures. *Journal of Financial Economic Policy*, *6*(1), 25–45. https://doi.org/10.1108/JFEP-01-2013-0002

Tatarici, L. R., Kubinschi, M. N., & Barnea, D. (2020). Determinants of non-performing loans for the EEC region: A financial stability perspective. *Management & Marketing. Challenges for the Knowledge Society*, *15*(4), 621–642. https://doi.org/10.2478/mmcks-2020-0036

Volz, U. (2015). *Towards a Sustainable Financial System in Indonesia*. http://www.unep.org/inquiry

Wójcik, D., & Ioannou, S. (2020). COVID-19 and finance: Market developments so far and potential impacts on the financial sector and centres. *Tijdschrift Voor Economische En Sociale Geografie*, *111*(3), 387–400. https://doi.org/10.1111/tesg.12434