COVID-19 CRISIS AND FINANCIAL MARKETS: A STUDY OF THE INDONESIAN STOCK EXCHANGE AND BANKING STOCKS

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Abstract

We employ a macroeconomic and specific industry model to investigate the impact of the COVID-19 pandemic on the stock market in Indonesia and banking stock performance. The macroeconomic model analyses the effects of the exchange rate (Rp to US$), bond yield difference (Government Securities and US Treasury Bond 10 years), gold price, and dummy variable (covid =1 and non-covid = 0) on Indonesia Composite Index (ICI) applying an Error Correction Model. We collected the daily data from July 1, 2019, to November 23, 2020. The results revealed that the exchange rate, bond yield difference, and the crisis significantly impacted ICI, whereas the exchange rate and gold price were insignificant. Using a random-effect model, the specific banking industry model examined the impact of CAR, NPL, ROE, NIM, LCR, and LDR on 19 commercial banking stocks from 2019:Q1 to 2020:Q2. The estimation result concluded that only CAR has significantly impacted the commercial bank stock price, suggesting the importance of capital adequacy for the banks to function in the recent period.

Keywords: stock market, composite index, macroeconomic, bank specifics, Covid-19 pandemic

JEL classification: E44, G12, I15

I. INTRODUCTION

The COVID-19 pandemic pressures various countries' economies and threatens the global economy and financial markets (Barro et al. 2020; Ramelli & Wagner 2020). The implications of global economic growth continue to decline and raise issues such as the surge in unemployment and poverty (Boone et al. 2020). The financial sector's collapse (particularly in the stock market) in the early days of COVID-19 is almost equivalent to the case in the global financial crisis of 2008 (Aldasoro et al. 2021). The spike in cases led to a decline in economic activities that ultimately depressed corporate profitability. Activity restriction measures cause demand and supply to decrease, affecting the company's performance. Apart from that, the subsequent impact of economic shocks in a country will impact the financial sector (Chen et al. 2018). Pressure on share prices occurred due to panic selling, profit-taking, and the search for safer assets in times of crisis (Li & Lucey 2017).

Changes in investor sentiment in capital and bond markets are the most dominant factors that suppress the financial sector's performance, especially in the stock market. When the market tends to move downward, investor sentiment is getting pessimistic. The implications are that investors must *wait* until the market shows positive trends (Lu & Lai 2012). Global investors shift their portfolios from financial to commodity markets, especially gold. Gold is considered a *safe-haven* asset. Gold is a highly liquid asset, a *counter-cyclical* asset, and also an asset whose value tends to increase. With these characteristics, gold is considered valuable regarding security, liquidity, and return facets (World Bank 2020).

Pressure on the stock market and bond market affects the performance of the real sector or the economy as a whole. In addition, pressure on both markets affected the flow of portfolio investment to a country and ultimately lowered the domestic liquidity source of development funds (Crockett, 1997). The stock market is a place for corporations to raise funds for long-term investments (OECD 2013). For the banking sector, for example, financial sector stocks will affect the liquidity condition of banks. This is due to the significant role of the capital market in the availability of funds for the banking sector amidst the limitations of third-party funds (TPF). The decrease in bank liquidity ultimately affects the availability of funds for lending. In countries where banks dominate the financial sector, the decline in lending of commercial banks has caused economic growth to slow. Therefore, it is necessary to keep the banking sector stocks moving positively to maintain liquidity well-maintained.

Several studies related to the impact of the crisis on financial markets have been conducted previously. The object of financial market study becomes an interesting topic because of its pivotal role in maintaining the availability of development funds. In addition, the financial sector is very vulnerable to risks because its business is strongly linked to the trust of fund owners. Concerning the impact of COVID-19 on financial markets, some academics have conducted some studies, including Takyi and Bentum-Ennin (2020), who examine the impact of COVID-19 on the stock market in 13 African countries. Their study concluded a significant negative relationship between COVID-19 and the stock market in eight countries, while the other five were unaffected. Further explained, the stock market in Mauritius fell by 21 percent, Morocco by 17 percent, Kenya by 15 percent, Nigeria by 13 percent, Tanzania by 11 percent, Tunisia by 9.1 percent, Ghana by 6.5 percent, Zambia and Botswana by 3.6 percent and 2.7 percent.

Moreover, the study of Trisnowati and Muditomo (2021) found that the COVID-19 pandemic caused a shock to non-financial impacts, particularly on sectoral index movements in Indonesia. Additionally, financial sector indexes are included in the sectors that responded quite strongly. Only the manufacturing and mining sectors responded less than the indexes of other sectors, such as agriculture, primary chemical industries, consumer goods, property and real estate, transportation and infrastructure, financial institutions, trade, services, and investments. The study related to the impact of COVID-19 on the stock market was also conducted by other researchers, including the study of He et al. (2020). Their study concluded that the impact of the COVID-19 pandemic on the stock market in China differs from one company/sector to another.

In this study, we estimate the economic macro model and the bank's specific factor model, which indicates an added value of this study. First, we investigate the impact of macroeconomic variables on the composite stock price index (ICI) in Indonesia. We tested the impact of domestic macroeconomic variables in exchange rates and global macroeconomic variables in the form of world gold prices and variable bond yield differences between Indonesia and the United States. These variables can describe the interaction between domestic and global macroeconomic variables and simultaneously show the relationship between the stock and bond markets. To assess the impact of the COVID-19 pandemic, we use dummy variables. The data is derived from daily data collected from July 2019 to November 2020. *Second,* we analyze the impact of bank-specific variables (risk, profitability, capital, and liquidity) and dummy variable crises on 19 banks whose IPOs from 2019:Q1 until 2020:Q2.

After presenting the research motivation discussed above, we will present the literature review and previous research in the next section, followed by the estimated results. Discussion is drawn in the next section. This paper will end with a conclusion.

II.   LITERATURE REVIEW

There are several indicators associated with the financial crisis, namely: (i) failure in financial markets; (ii) the condition in which a financial institution loses most of its assets; (iii) *banking panic,* credit failure, and recession; (iv) the stock market collapsed, and the exchange rate depreciated significantly (Nezky 2013). There are three types of crises according to their causes and characteristics. The first generation of crises related to monetary and fiscal issues began with the Mexican crisis in 1973-1982. Then Krugman (2007 in Nezky 2013) assessed that the cause of the first-generation crisis also arises from macroeconomic instability. The second-generation crisis was caused by conflicts between the fixed exchange rate regime and the government's desire for monetary expansion. The third-generation crisis combines Generation One and Generation Two crises, commonly called *twin crises.* Previous studies on the impact of the crisis on various macroeconomic variables have been conducted. The impact of the financial crisis is often attributed to stock prices, exchange rates, and trading volumes.

Meanwhile, the impact of the crisis on the health sector has yet to be fully recorded in previous studies. The impact of the COVID-19 pandemic on the financial system depends on three things: (i) the extent to which the virus spreads and affects economic activity, (ii) the monetary and financial authority's response to shock, and (iii) actions taken by regulators to avoid a fragile banking system (Asean Policy Brief 2020).

A. Factors Affecting Stock Market

The exchange rate is one factor that plays an essential role in the economy (Siregar & Ward 2002). This variable also determines the stock price movement (Bagh et al. 2017). When economic conditions are normal, it is believed that the appreciation and depreciation of the domestic currency determines the value of the company's shares. When asset prices increase, domestic investors will invest more in the domestic market, ultimately driving domestic currency demand. The behavior of selling foreign portfolios follows these conditions. As demand for foreign currencies increases,

the benchmark interest rate is higher. It ultimately encourages foreign and domestic investors to enter the capital market to gain capital gains.

The traditional approach explains a positive relationship between the stock market and the exchange rate and the causality relationship of the exchange rate to the stock market. When the exchange rate is depreciated, local companies become more competitive because of the increased exports. Thus, the performance of the share price is increasing. Meanwhile, the asset market approach explains that there is no interaction or weak relationship between the exchange rate and the stock market. The underlying reason is that other factors dominate the factors that affect both. The study of Muhammad and Rasheed (2002) concluded that there was no causality relationship between the share price and the exchange rate. Their study is similar to the study conducted by Bhattacharya and Mukherjee (2003).

In addition, Ong and Izan (1999) found a weak relationship between the share price and the exchange rate in the US. Falianty and Budimanta (2020) examined the impact of transmission, exchange rates, and financial sector volatility caused by global turbulence and the Argentina-Turkey crisis 2018. Their study concluded that the potential transmission from the Argentine and Turkish financial crises to the Indonesian economy, especially in the stock market and exchange rates. Kim (2003) explained that exchange rates and stock indices greatly impact the economy and influence investor decisions in investing. The exchange rate affects international companies both in terms of exports and imports. According to Kurihara (2006), factors of exchange rate, interest rate, number of companies listed in the capital market, unemployment rate, and policies of government-owned banks have a significant impact on fluctuations in the stock market.

The difference in domestic and international interest rates determines the liquidity movements that enter a country, including the stock market. The global financial crisis illustrated how the world's liquidity shifted. The crisis was responded differently between groups of countries. Developed countries adopt expansive monetary policies by rectifying the benchmark of interest rates. Lower benchmark interest rates in developed countries cause interest rate differences, which tend to increase. This led to soaring *capital inflows* to developing countries that boosted domestic currency appreciation (Acharya & Bengui 2006; Zoega 2016 in Maketha-Kosi et al. 2016). The capital flow is moving into portfolio investments in the stock and bond markets. On the other hand, capital inflows to developing countries tend to decrease as the economic conditions of developed countries begin to recover. The surge in capital inflows during the crisis was due to low savings rates in developing countries.

Previous studies on the relationship between interest rate differences and capital inflows have only partially led to a consensus. Grubel (1968 in Makhetha-Kosi et al. 2016) explains that interest rate differences are not a problem with capital flows, even when the difference is close to zero or negative. The difference in interest rates is a proxy for global liquidity movements. Liquidity tends to move from low-interest rates to high interest rates. Bems et al. (2018) explained that capital movements are not always due to a country's marginal higher capital productivity. Bems et al. (2018) also emphasized that the role of interest rate differences between countries is a factor that encourages capital inflow reversals that can be dangerous.

Lower global interest rates make certain countries an optimal demand for capital. This means that capital will flow from low-interest countries to countries with high-interest rates and only sometimes to countries with higher marginal capital productivity. In addition, Bems et al. (2018) recognize the role of interest rate differences as a driving factor in capital inflow reversal; however, the analysis shows that this is mitigated in the economy with greater exchange flexibility. Furthermore, portfolio allocation theory confirms that capital flows are driven fundamentally by returns and risk factors (Devereux & Saito 2006).

The perception of the relationship between the stock and bond markets refers to two things. According to perspective theory, the relationship between stocks and bonds can be seen from the point of view of present value. Future discounted rate increases result in a decrease in the present value of stocks and bonds, causing the price of both assets to fall. This theory believes that the stock market and bond market are positively related. Another argument found a positive relationship between the two markets when macroeconomic variables (e.g., inflation) may affect both similarly, resulting in positively correlated movements in both assets. From different viewpoints, the two markets can be negatively correlated. For example, there is a flight argument to quality where investors enter and exit the market in line with the latest market conditions and risk assessment conditions. It is generally said that stocks and bonds complement each other and that investors must combine two types of assets to form a portfolio corresponding to the desired risk exposure level. Stocks show higher levels of volatility and are expected to yield relatively higher returns to bonds. The results of this study are related to the results of Shiller and Beltratti's research (1992), which concluded a negative relationship between stocks and bonds in the perception of the present value of assets.

Gold is one of the most critical assets in the money market and the rill sector as a policy design. Gold is used as one of the investment instruments because of its value that is not affected by inflation. In addition, gold is used for hedging purposes. With such characteristics, gold becomes a haven asset in financial markets (Baur & Lucey 2010) as well as in the energy market (Reboredo 2013) and during inflation growth (Aye et al. 2017). Gold is also an important asset for the central bank, a component of foreign exchange reserves.

Analysis of investment decisions on the price of gold in the economy is a key point based on behavioral finance theory. In a state of uncertainty, the price of gold is influenced by investor's sentiment. Ichev and Marinč (2018) explained that from 2014 to 2016, during ebola conditions, investor investment decisions were influenced by a combination of ebola outbreak events and media coverage. Wang et al. (2010) explained that commodity market vulnerability is a matter of demand and supply and a problem of macroeconomic variables such as exchange rates, inflation, and political events. Ichev and Marinč (2018) added another factor, which is pandemics. The movement of the price of gold is quite often associated with inflation. When inflation rises, the price of gold tends to rise. Gold is also an important part of the financial portfolio in some countries, especially in oil-producing countries. Mensi et al. (2020) explained that if various economic shocks enforce the price of gold, the expected future price will increase.

Areal et al. (2015) examine the relationship between the US stock market and gold, US gold stocks, and US gold mutual funds under different market conditions. The study concluded that gold is a safe asset used for hedging because it always shows a negative correlation with a depressed stock market. Hillier et al. (2006) explain that the most important part of gold's role as a hedge asset is its attractiveness when the economy or market is down. Jaffe (1989) also highlighted that gold has a low correlation with traditional financial assets (such as stocks) and is suitable for asset diversification.

Additionally, Baur and Lucey (2010) investigate whether gold is a haven asset in the money market. The category of haven assets is distinguished into two things, namely, as a hedge and as a diversified asset. The study concluded that gold is a haven for stocks but not bonds. Gold serves as a haven in the short term only, for about 15 trading days. In the long run, gold is no longer a haven asset. Investors who place their funds in gold over 15 trading days after extreme negative shock potentially lose money. It concludes that gold only makes a profit when it is purchased in the extreme negative returns occur and sells when volatility and confidence improve.

B. Bank Specific Factors

Research related to bank performance usually pays attention to three factors: (i) *bank-specific* factors such as capital liquidity conditions, (ii) industrial structure, and (iii) macroeconomic factors, as stated by Rashid and Jabeen (2016), who examined all three factors on the performance of sharia and conventional banks in Pakistan during 2006-2012.

Concerning bank-specific factors, some variables that affect the movement of bank stocks are as follows—*first,* liquidity conditions. During the crisis, two things pressured bank liquidity: (i) customer withdrawals for cash needs and (ii) borrowing costs from other banks tended to increase due to increasingly scarce liquidity in the money market. The increasing liquidation of a bank indicates that the availability of funds and its current and future sources of funds occurs. Thus, those banks are not problematic. Generally, there are three sources of liquidity of banks, namely internal banks, the wider community, or other financial institutions (Yuliani 2007 in Junaidi et al. 2019). Vazquez and Federico (2015) investigated the relationship between liquidity structure and debt and its impact on bank stability during the crisis. Their study revealed that banks with low liquidity structures (high liquidity risk levels) and high debt before the crisis had the potential to become *bankrupt.* Bank liquidity demonstrates the bank's ability to meet short-term obligations. Liquidity conditions are also affected by the stalled payment of customer loans (Cecchetti & Schoenholtz 2011). Referring to the above, the better the bank's liquidity, the lower the bank's risk, ultimately affecting the investor's perception of the share price.

In addition to liquidity, bank capital was necessary during the crisis because it became a risk absorber (Repullo 2004; Von Thadden 2004). Even under normal conditions, banks need more capital to support their expansion or to meet regulatory requirements. To meet these capital needs, banks can perform internally by enhancing retained earnings or shareholder deposits. However, the fulfillment of capital internally could be improved due to the limitations of the company's ability to generate profit and the limitations of individual shareholders in depositing the required capital. To solve this problem, many banks conduct *Initial Public Offering* (IPO) to meet their

capital through investors by selling shares in the capital market. For individual banks, the crisis led to fundamental problems such as capital. Bank capital could be significantly eroded if the COVID-19 pandemic crisis deepens and is long-term. Thus, when the bank's condition deteriorates, so does the bank's capital (PWC Indonesia 2020).

Berger and Bouwman (2012) pointed out that the global financial crisis conveyed the importance of bank capital. Meanwhile, Holmstrom and Tirole (1997) believe that bank capital increases incentives to monitor financing to impact return on equity (ROE) positively. Demirguc-Kunt et al. (2010) stated that more outstanding capital allows banks to absorb losses with their resources without being insolvent or bailout needs from public funds (taxes). A study conducted by Berger and Bouwman (2012) in the US revealed that (i) capital helped banks survive the financial crisis; Higher bank capital helps them to survive the crisis, increase market share, to profitability; (ii) more outstanding capital increases performance in three facets (persisting, *market share,* profitability) of small banks both in normal and crisis conditions but for medium and large banks, the impact is not so noticeable. Their study concluded that capital is pivotal for small banks in normal conditions and crises, while in medium and large banks, the capital is pivotal during a crisis.

Additionally, capital is essential in obtaining capital incentive effect for banks *(incentive effect of capital).* Theories related to the incentive *effect of capital*, for example, monitoring theory, were discussed by Holmstrom and Tirole (1997). It is believed that the greater the bank's capital is, the greater the monitoring of customer loans. It reduces the potential for credit failure. Thus, banks will be able to get higher incomes. Large capital significantly impacts the surplus generated from bank-borrower relationships, increasing profitability.

The bank's capital condition is one of the aspects that customers pay attention to during the crisis, including in the capital market. There is a tendency to migrate consumers from large capital banks to small capital banks. Demirguc-Kunt et al. (2010) conducted a study that adopted data derived from a panel of banks from several countries to investigate if banks with reliable capital impacted higher stock returns during the financial crisis. The study also seeks to answer whether capital is more relevant in increasing stock valuations during a crisis. Berger and Bouwman (2009) explored the relationship between bank capital and aspects of bank performance during the crisis and normal times in US banking. The crises under consideration were the banking crisis and the stock market crisis. Their study concluded that banks with better capital performed better in the early 1990s but not during the recent crisis.

Alaagam (2019) employed Net Profit Margin (NPM), Return on Assets (ROA), and Return on Equity (ROE) as probability ratio proxy to investigate their impacts on banking share prices in Saudi Arabia from 2011 to 2018 by adopting panel data analysis techniques. Profitability factors are essential for shareholders because they are related to capital gained and stock value. Ferrer and Tang (2016) highlighted that profitability ratios become proxies for investors collecting shares of certain companies.

Further, Alaagam (2019) explains that factors that affect the share price are divided into several groups. The leading group of the study discussed internal performance factors, including

internal performance such as net income margin, earnings per share, dividend price-earnings ratio per share, asset return, return on equity, book value per share, debt-equity ratio, total asset turnover ratio, and dividend yield (Bayrakdaroglu et al. 2017). At the same time, another group focused on macroeconomic factors that affect stock prices, such as gross domestic product, inflation, interest rates, consumer price indexes, exchange rates, and the amount of money in circulation.

The relationship between profitability ratio and share price is examined by (Bayrakdaroglu et al. 2017). Regression panel data is adopted between the share prices of 87 companies in ISE100 and their profitability ratios such as gross profit margin (GPM), operating profit margin (OPM), net profit margin (NPM), return on assets (ROA) and return on equity (ROE). The results showed a positive linear relationship between the company's net profit margin and share price. Their study recommends taking into account net profit margins when making investment decisions. Susilowati (2015) also conducted similar exercises on the Indonesia Stock Exchange, adopting different internal factors such as Return on Asset, Return on Equity, Net Profit Margin, and Earnings per share throughout 2008-2011 and using regression analysis. The results of her analysis indicate that return on asset had a significant adverse effect on the share price, while return on equity, Net profit margin, and earnings per share positively influenced the share price. Therefore, Return on Asset, Return on Equity, Net Profit Margin, and Earnings per Share simultaneously significantly impact the share price.

Al-Majali and Al-Assraf (2014) studied the factors affecting stock indices in Jordan. In addition to macroeconomic factors, their study included crisis factors in 1992:Q1-2014:Q1 with quarterly data. Moreover, Rahmayani and Oktavilia (2020) reviewed the impact of the COVID-19 pandemic on the stock market in the long and short term in Indonesia using the error correction model (ECM) as the research method. The Endogenous variables are inflation, interest rates, overseas stock markets, and commodity prices. In contrast, pandemics act as exogenous variables. Pandemic indicators are measured by Indonesia's total accumulation of COVID-19 cases per day. Their study concluded that foreign interest rates and commodity prices positively affected the stock market.

On the contrary, the exchange rate negatively affects the stock market. However, these estimations do not reflect the significant impact of the COVID-19 pandemic in the short term, but they negatively impact the stock market in the long run. Khatatbeh et al. (2020) examine the impact of the COVID-19 pandemic on global stock markets with event study techniques. Their study concluded that 11 global stock markets were negatively affected by the announcement of the first COVID-19 case. The impact was even more material when WHO announced COVID-19 as a global pandemic on March 11, 2020.

III. PANDEMIC COVID-19 AND FACTORS AFFECTING THE INDONESIA FINANCIAL MARKET

A. Factors Affeting Composite Stock Price Index

We use two models that utilises daily secondary data, sources of which are derived from the Indonesia Stock Exchange and Bank Indonesia, to estimate factors affecting the Indonesia financial market. The first is a macroeconomi model for determining effects of the Covid-19 and other factors on the Indonesia Stock Market (IDX) as in equation (1), and the second is bank specific factors model as presented in section B (equation (3)).

$$(1) \ logICI_t = \alpha_0 + \beta_1 logER_t + \beta_2 IRD_t + \beta_3 logGP_t + \beta_4 D_t + e_t$$

where:

logICI	=	Logarithm of the daily composite stock price index
logER	=	Logarithm of rupiah exchange rate to US\$ (Rp/US\$) daily
IRD	=	Daily differential yield rate (projected from the difference between the yield of Government Securities and the yield of US Treasury Bills) (%)
logGP	=	Logarithm of the daily gold price
D	=	dummy variable of the pandemic crisis, where 0 = no Pancemic era or not crisis; and 1 = pandemic era suggesting crisis.

The error correction model (ECM) representation of this model is as follows:
$$(2) \ \Delta logICI_t = \alpha_0 + \beta_1 \Delta logER_t + \beta_2 \Delta IRD_t + \beta_3 \Delta logGP_t + \beta_4 D_t - \gamma e_{t-1} + v_t$$

Where: v_t is the "white noise" error term for the short-term, and e_{t-1} is the error correction term (ECT), within which all the variables are in their lagged format depicting long-term relations between the dependent and independent variables. The beta's are short-run parameters of the model, the gamma is error correction parameter, and parameters within the ECT (not shown) are long-term parameters.

The estimation results of the unit root test show that the testing of all variables in the research is stationary at level 1 (Table 1). Cointegration test results show that independent and dependent variables have short- and long-term relationships (Table 2). The conclusion refers to the probability of an Eigenvalue below 5 percent.

Table 1. Stationary Test Results

Variables	t-Statistic	Prob
logICI	-20.21227	0.000
logER	-16.45951	0.000
IRD	-17.75620	0.000
logGP	-15.65643	0.000

D	-17.60682	0.000

Table 2. Cointegration Test Results

Unrestricted Cointegration Rank Test	Hypothesized No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.
Trace	None *	0.11524	95.5623	69.8189	0.0001
	At most 1 *	0.10130	57.9730	47.8561	0.0042
Maximum Eigenvalue	None *	0.11524	37.5893	33.8769	0.0172
	At most 1 *	0.10130	32.7885	27.5843	0.0098

Table 3 depicts the estimated results of short-term and long-term relations obtained from the ECM. In the short term, the only insignificant variable is *logGP* for the usual significance level. Meanwhile, *logER*, *IRD*, and *D* significantly influence *logICI* negatively. The goodness of fit reached 51.6 percent. Meanwhile, *IRD* and *the crisis* significantly influence *logICI* in the long term, while *logER* and *logGP* have no significant effect on *logICI*.

Table 3. Estimation Results of the Error Correction Model

Long Term Relations			Short Term Relations		
Variable	Coefficient	Prob	Variable	Coefficient	Prob
logER	0.039012	0.5121	d(logER)	-0.528417	0.0000*
IRD	-10.11432	0.0000*	d(IRD)	-5.408728	0.0000*
logGP	0.019278	0.4688	d(logGP)	0.069841	0.3072
D	-0.079048	0.0000*	d(D)	-0.054360	0.0000*
			ECT(-1)	-0.154317	0.0000*
C	8.778344	0.0000	C	-0.000162	0.7958

Adj R^2	0.970070	Adj R^2	0.516051
Prob (F-Stat)	0.000000	Prob (F-Stat)	0.000000

*Significant at 1% level.

Classic assumption test results concluded that the research data was not distributed normally. This is reasonable because the research uses daily data, most of which is used to record crisis conditions. The multicollinearity test concluded that all Variance Inflation Factors (VIF) values are below ten so that independent variables do not influence each other. For the Autocorrelation test, the results showed that the estimation results were free from the problem. This is reflected in the Prob. Chi-square (2) above 0.05 in the Breusch-Godfrey Serial Correlation LM Test. In the heteroscedasticity test, the results showed that the value of Prob. Chi-Square (5) is above 0.05, so the estimated result suggests the absence of heteroscedasticity problems.

B. Econometric Model for Bank Specific Factors

The bank-specific model aims to investigate the determinant of banking stock prices from the internal side of the bank. The dependent variable used is the stock price of the 19 banks that go public in Indonesia (*logSP*). Independent variables are capital adequacy ratio (*CAR*), non-performing loan (*NPL*), net interest margin (*NIM*), loan-to-deposit Ratio (*LDR*), liquidity coverage ratio (*LCR*), and return on equity (*ROE*) and dummy crisis (*crisis*)—data period used in bank-specific models throughout 2019:I until 2020:II.

The specifications of the models used are as follows:

$$(3)\ logSP_{it} = \beta_0 + \beta_1 CAR_{1it} + \beta_2 NPL_{2it} + \beta_3 NIM_{3it} + \beta_4 LDR_{4it} + \beta_5 LCR_{5it} + \beta_6 ROE_{6it} + e_{it}$$

Based on the Chow test, it can be concluded that the best estimation method is fixed effect. Meanwhile, the Hausman test results concluded that the random effect model (REM) is the best method. Thus, this study uses the rem estimation method. The test investigates whether the estimation results met the requirements of classic best, linear, unbiased estimator (BLUE) assumptions to be conducted in multicollinearity, normality, heteroscedasticity, and autocorrelation testing. In multicollinearity tests, independent variables do not influence each other. It can be seen from the correlation value, which is below 0,8. The results of the heteroscedasticity test estimate with the park test showed that all independent variables have a probability below 0.05 percent. In these tests, the residual value is squared, making it a dependent variable, and tests it with all independent variables. To treat violations of autocorrelation assumptions, this study uses the Generalized Least Squares (GLS) method. The results showed that the statistical Durbin-Watson value was 2.86 in the negative autocorrelation area (with k = 6 and number of observations = 95).
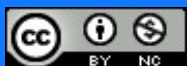
Estimation results of the above model using the GLS method are presented in Table 4. We tried to include a dummy variable depicting the pandemic crisis in the model, but the results (not presented) could be better in economic and statistical senses. So, we exclude the dummy variable, by which it is assumed that the effects of the pandemic crisis on the dependent variable come through the error term. The model's goodness of fit is 11.7 percent. The capital adequacy ratio is the only significant variable affecting the banks' stock prices. This suggests the importance of capital adequacy for the banks to function during the pre-and-crisis.

Table 4. REM Estimation Result with GLS

Independent Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CAR)	0.023477	0.008441	2.781438	0.0066*
D(NPL)	-0.015833	0.023729	-0.667236	0.5064
D(ROE)	-0.002159	0.001879	-1.149235	0.2536
D(NIM)	0.005086	0.028016	0.181533	0.8564
D(LCR)	-1.28E-05	0.000205	-0.062534	0.9503
D(LDR)	-0.000263	0.001714	-0.153120	0.8787
C	-0.028057	0.011375	-2.466616	0.0156
R-squared	0.117157			
Adjusted R-squared	0.056963			
S.E. of regression	0.101900			
F-statistic	1.946330			
Prob(F-statistic)	0.082091			

IV.   DISCUSSION

The COVID-19 pandemic outbreak in 2020 has a multidimensional impact on the Indonesian economy. In financial markets, the impact of COVID-19 led to a significant decline in ICI. ICI reached a low of 3,937 on March 24, 2020 (see Figure 1). At that time, confirmation of positive cases continued to increase. During March 2020, ICI decreased by 16.76 percent (*mom*).

Meanwhile, the rupiah exchange rate against the US reached its lowest level on April 2, 2020, at Rp16,741. At the end of March 2020, the Rupiah depreciated to US$ depreciation of up to 15

percent (*yoy*). Rupiah depreciation is depressed due to the huge capital outflow from the stock and bond markets. According to the Ministry of Finance (2020) data, foreign funds decreased to Rp121 trillion from February to March 2020. The share of foreign ownership fell from 37 percent in February to 32 percent in March and 25 percent in December 2020.

This study revealed that exchange rates significantly influenced ICI during the research period. Some transmission lines of exchange rate influence on ICI are as follows—*first,* the real sector path. Corporations going public engaged in the real sector are pretty significant. The corporation does business in industries that still depend on imported materials, including energy imports. When Rupiah depreciation occurs, import costs tend to rise so that the industry performance slows down. This certainly influences the profits of the share price. The opposite perspective, such as Aviliani et al. (2014) and others explaining that a depreciated exchange rate leads to more competitive domestic companies and increased exports, does not apply to this study. This is because the imported content in Indonesian industrial export products is so significant that the price in the global market is relatively high.

Second, the impact of exchange rates can also be referred to through corporate debt obligations. Although it already has funds from the stock market, corporations in Indonesia also access debt from abroad because interest rates are relatively lower than domestic interest rates. If the Rupiah depreciates, the cost of debt and principal interest installments increases and affects the corporate performance. *Third,* non-financial factors or more to sentiment. During the crisis, the exchange rate was sharply depressed due to market participants' sentiment towards financial markets in developing countries. Previous studies have shown that investors tend to leave financial markets (stocks and bonds) in developing countries when there is a shock that suppresses the performance of ICI (flight to *quality).*

In the case of intense pressure on Rupiah, particularly in March 2020, Bank Indonesia conducted *a triple intervention.* The policy is carried out through selling interventions in the spot market, the Domestic Non-Deliverable Forward (DNDF) market, or the foreign exchange futures market, as well as the purchase of Government Securities (SBN) in the secondary market (Figure 2). Meanwhile, the Indonesia Stock Exchange adopted several policies to maintain the correction of ICI: (i) limiting auto rejection below the maximum of 10 percent for each price group; (ii) temporarily suspending short shelling activities to alleviate stock exchange declines. The Financial Services Authority adopted a policy that loosens the *buyback* of shares without obtaining the approval of the general meeting of shareholders (GMS).
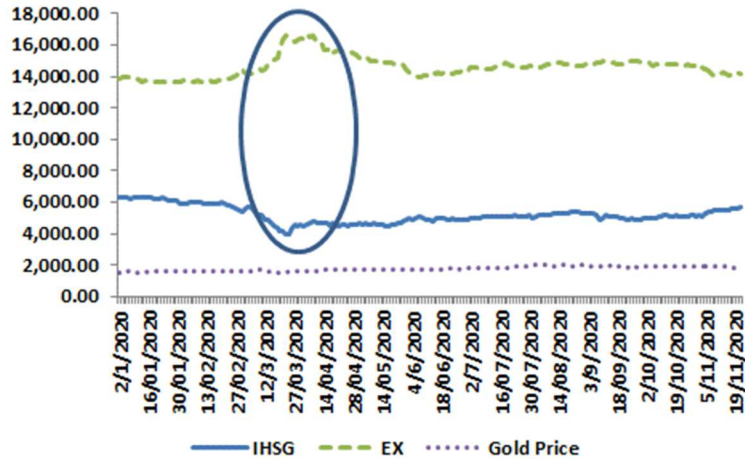
Figure 1. ICI (IHSG) Growth, Exchange Rate (EX), and World Gold Price

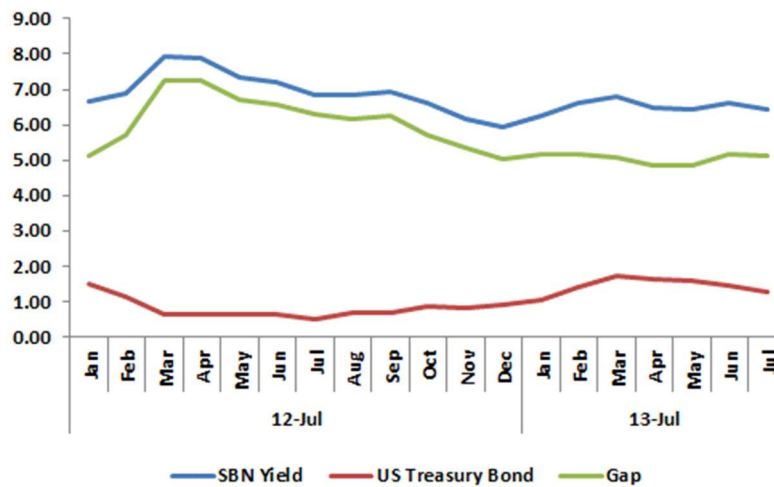Source: Indonesia Stock Exchange and Bank Indonesia (2021)

Figure 2. 10-Year SBN and US Treasury Bond Yield Growth

Source: Investing.com (2021)

At the start of the COVID-19 pandemic, Turmoil in the money market prompted investors to move into commodity markets, especially gold. In April 2020, the world gold price rose 6.69 percent (MOM) to US$1,709 per oz. Even in July 2020, the price of gold reached US$2,017 per oz, which rose by 10 percent (YOY). This study revealed that gold did not affect the movement of ICI during the research period. Some factors that affect these conditions are as follows: (i) The Indonesian gold market is shallow because the ownership of gold is only for jewelry or other personal needs.

Meanwhile, trading activity on gold commodity exchanges is relatively low. Indeed, during the COVID-19 pandemic activity in *PT. Bursa Berjangka Jakarta* increased especially for gold,

but investors are relatively small, (ii) low literacy in the market in Indonesia. The OJK survey (2020) concluded that capital market literacy in Indonesia is only 4.92 percent, up slightly from 4.4 percent in the 2016 survey.

The estimation results show that the variable *IRD* significantly influenced the negative direction of the ICI movement in Indonesia during the research period. This is in line with others of Aviliani et al. (2015). During the research period, *yield* differences between Indonesia and the US tend to widen. Bond yields in Indonesia tend to increase to finance the government's budget deficit. Meanwhile, US government bond yields tend to decline due to expectations for inflation and economic recovery. When IDR widens, IHGS tends to decline because investors can divert their funds from the stock market to the bond market with a fixed *return*. Rising bond yields cause the price of risky assets such as stocks to rise. High bond yields in Indonesia are partly influenced by Indonesia's relatively higher inflation than US inflation. Thus, the actual yield could be higher in Indonesia.

This study concluded that only CAR variables significantly develop the same bank price regarding individual bank data estimation results. Several things support that conclusion. *First,* this study only focuses on banks that go public so that their financial condition is relatively good because shareholders continue monitor*ing it. Second, as a micro-prudential regulator,* the Financial Services Authority continues to monitor the development of bank capital ratios to absorb the risks that occur. Generally, the capital-to-activity ratio is weighted according to the risk of 19 banks well above the minimum level set by the authority of 8 percent. During the period 2020:I to 2020:II, there was a decrease in CAR of 19 banks that became the object of research, but its value is still far above the provisions of the authority (Figure 3).
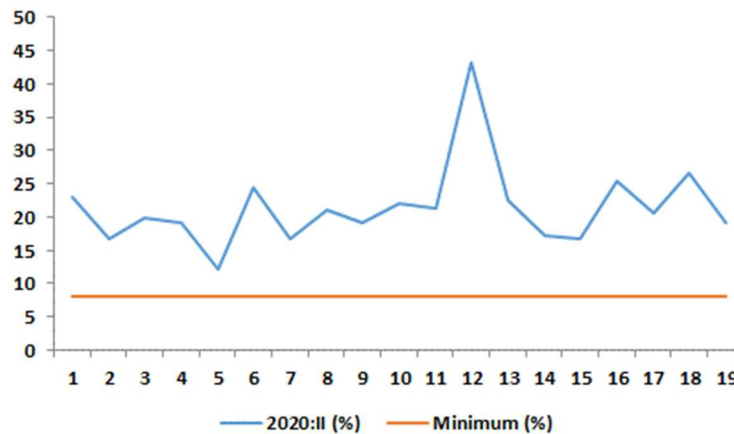

Figure 3. CAR of 19-Banks 2020:II

Source: OJK (2020) processed

Third, the experience of the 1997/98 crisis provides an important lesson to learn for Indonesian banks in dealing with other crises. This is followed by strengthening capital to maintain the bank's strength in absorbing risk. Most recently, OJK raised the minimum capital of commercial banks by Rp1 trillion. *Fourth,* the Financial Services Authority (OJK) proposed a credit restructuring

program during the COVID-19 pandemic to keep CAR safe. The program is beneficial to hold NPL so that the banks' CAR is well-maintained.

V. CONCLUSION

In conclusion, this study reveals that the exchange rate is a critical component in driving the movement of ICI during the research period. Therefore, monetary authority is increasingly important to stabilize the value of the Rupiah by maintaining the demand and supply side of the foreign exchange. Meanwhile, differences in the US and Indonesian bond yields also influenced the ICI movement. Thus, the wider yield difference will be counterproductive to the stock price movement. Some points to consider are how to lower SBN yields in Indonesia. In addition, measures can be taken, including increasing the role of domestic investors and the government's efforts to reduce the fiscal deficit. Concerning the specific factors of the bank, the bank's CAR is currently quite robust to absorb business risks in normal and crisis conditions. However, CAR's potential slump comes as NPL increases following the end of the credit restructuring program.

We offer some recommendations for subsequent research as follows. *First,* in the macroeconomic model, the price of gold can adopt Indonesian data to have the study results align with real conditions. The price of gold is referred to in the futures market and from institutions that might sell physical gold, such as Aneka Tambang (Antam). In addition, the macroeconomic model needs to consider the fiscal aspect because, during COVID-19, the fiscal aspect is very depressed and is expected to affect the movement of ICI, mainly state-owned stocks.

Regarding the bank specific model, we suggest that the next research considers the object of study in the form of bank groups based on assets and reviewing the banks by ownership. This is important since the difference in the bank profile determines the movement of stocks, particularly during the pandemic or another crisis.

REFERENCES

Al-Majali, A. A. – Assaf, G. I. (2014): Long-run and Short-run Relationship between Stock Market Index and Main Macroeconomic Variables Performance in Jordan. *European Scientific Journal* 10(10): 156–171.

Acharya, S. – Bengui, J. (2018): Liquidity Traps, Capital Flows. *Journal of International Economics* 114: 276–298. https://doi.org/10.1016/j.jinteco.2018.06.005

Alaagam, A. (2019): The Relationship between Profitability and Stock Prices: Evidence from the Saudi Banking Sector. *Research Journal of Finance and Accounting* 10(14): 90-100. https://doi.org/10.7176/RJFA/10-14-09

Aldasoro, I. – Frost, J. – Gambacorta, L. – Whyte, D. (2021): Covid-19 and Cyber Risk in the Financial Sector. *BIS Bulletin* No. 37, January 2021.

Areal, N. – Oliveira, B. – Sampaio, R. (2015): When Times get Tough, Gold is Golden. *The European Journal of Finance* 21(6): 507–526. https://doi.org/10.1080/1351847X.2013.854821.

Asean Policy Brief. (2020): Economic Impact of Covid-19 Outbreak on ASEAN. April 2020, https://asean.org/?static_post=asean-policy-briefbah

Aviliani – Siregar, H. – Maulana, T. N. A. – Hasanah, H. (2015): The Impact of Macroeconomic Condition on the Banks Performance in Indonesia. *Buletin Ekonomi Moneter dan Perbankan* 17(4): 379–402. https://doi.org/10.21098/bemp.v17i4.503

Aviliani – Siregar, H. – Hasanah, H. (2014): Addressing the Middle-Income Trap: Experience of Indonesia. *Asian Social Science* 10(7): 163–172. https://doi.org/10.5539/ass.v10n7p163

Aye, G. C. – Edoja, P. E. (2017): Effect of Economic Growth on CO_2 Emission in Developing Countries: Evidence from a Dynamic Panel Threshold Model. *Cogent Economics & Finance* 5: 1379239. https://doi.org/10.1080/23322039.2017.1379239

Bagh, T. – Azad, T. – Razzaq, S. – Liaqat, I. – Khan, M. A. (2017): The Impact of Exchange Rate Volatility on Stock Index: Evidence from Pakistan Stock Exchange (PSX). *International Journal of Academic Res earch in Accounting, Finance and Management Sciences* 7: 70–86. http://dx.doi.org/10.6007/IJARAFMS/v7-i3/3150

Barro, R. J. – Ursúa, J. F. – Weng, J. (2020): The Coronavirus and the Great Influenza Pandemic: Lessons from the "Spanish Flu" for the Coronavirus's Potential Effects on Mortality and Economic Activity. *NBER Working Paper, No 26866.*

Baur, D. G. – Lucey, B. M. (2010): Is Gold a Hedge or a Safe Haven? An Analysis of Stocks, Bonds and Gold. *The Financial Review* 45(2): 217–229. https://doi.org/10.1111/j.1540-6288.2010.00244.x.

Bayrakdaroglu, A. – Ersoy, E. – Çitak, L. (2012): Is There a Relationship Between Corporate Governance and Value-based Financial Performance Measures? A Study of Turkey as an Emerging Market. *Asia-Pacific Journal of Financial Studies* 41(2): 224–239. https://doi.org/10.1111/j.2041-6156.2012.01071.x

Bems, R. – Caselli, F. G. – Grigoli, F. – Gruss, B. – Lian W. (2018): Expectations' Anchoring and Inflation Persistence. *IMF Working Papers* 2018(280): 31. https://doi.org/10.5089/9781484388846.001

Berger, A. N. – Bouwman, C. H. S. (2013): How does Capital Affect Bank Performance during Financial Crises? *Journal of Financial Economics* 109(1): 146-176. https://doi.org/10.1016/j.jfineco.2013.02.008

Berger, A. N. – Bouwman, C. H. S. (2009): Bank Liquidity Creation. *The Review of Financial Studies* 22(9): 3779-3837. https://doi.org/10.1093/rfs/hhn104

Bhattacharya, B. – Mukherjee, J. (2003): Causal Relationship between Stock Market and Exchange Rate, Foreign Exchange Reserves and Value of Trade Balance: A Case Study for India. Paper Presented at *the Fifth Annual Conference on Money and Finance in the Indian Economy*, January 2003.

Boone, L. – Haugh, D. – Pain, N. – Salins, V (2020): Tackling the Fallout from COVID-19. In: Baldwin R., di Mauro B.W., editors. Economics in the time of COVID-19, a VoxEU.org eBook, CEPR Press.

Cecchetti, S. – Schoenholtz, K. (2011): *Money, Banking, and Financial Markets (3rd)*. New York: McGraw-Hill Education.

Chen, K. – Ren, J. – Zha, T. (2018): The Nexus of Monetary Policy and Shadow Banking in China. *American Economic Review* 108(12): 3891–3936. https://doi.org/10.1257/aer.20170133

Crockett, A. D. (1997): Why is Financial Stability a Goal of Public Policy? *Economic Review* 82: 5–22.

Demirguc-Kunt, A. – Detragiache, E. – Merrouche, O. (2010): Bank Capital: Lessons from the Financial Ccrisis. *IMF Working Paper WP/10/286.*

Devereux, M. – Saito, M. (2006): A portfolio Theory of International Capital Flows. *IIIS Discussion Paper* No. 124 March 2006.

Falianty, T. – Budimanta, A. (2020): Contagion, exchange rate, and financial volatility: Indonesian case in global financial turbulence. In *Public Sector Crisis Management*. Edited by Edited by Alexander Rozanov, Alexander Barannikov, Olga Belyaeva and Mikhail Smirnov. Rusia, IntechOpen: 1–26. http://dx.doi.org/10.5772/intechopen.92275.

Ferrer, R. C. – Tang, A. (2016): An Empirical Investigation of the Impact of Financial Ratios and Business Combination on Stock Price among the Service Firms in the Philippines. *Academy of Accounting and Financial Studies Journal* 20(2): 104–116.

He, P. – Sun, Y. – Zhang, Y. – Li, T. (2020): Covid-19's Impact on Stock Prices Across Different Sectors: An Event Study Based on the Chinese Stock Market. *Emerging Markets Finance and Trade* 56(10): 2198-2212. https://doi.org/10.1080/1540496X.2020.1785865

Hillier, D. – Draper, P. – Faff, R. (2006): Do Precious Metals Shine? An Investment Perspective. *Financial Analysts Journal* 62(2): 98–106. https://doi.org/10.2469/faj.v62.n2.4085.

Holmstrom, B. – Tirole, J. (1997): Financial Intermediation, Loanable Funds, and the Real Sector. *The Quarterly Journal of Economics* 112(3): 663-691.

Ichev, R. – Marinč, M. (2018): Stock Prices and Geographic Proximity of Information: Evidence from the Ebola Outbreak. *International Review of Financial Analysis* 56: 153–166. https://doi.org/10.1016/j.irfa.2017.12.004

Jaffe, J. F. (1989): Gold and Gold Stocks as Investments for Institutional Portfolios. *Financial Analysts Journal* 45(2): 53-59. https://www.jstor.org/stable/4479205.

Junaidi, S. – Sulastri – Isnurhadi – Adam, M. (2019): Liquidity, Asset Quality, and Efficiency to Ssustainable Growth Rrate for Banking at Indonesia Stock Exchange. *Journal of Finance and Banking* 23(2): 308–319. http://dx.doi.org/10.26905/jkdp.v23i2.2699

Khatatbeh, I. N. – Hani, M. B. – Abu-Alfoul, M. N. (2020): The Impact of COVID-19 Pandemic on Global Stock Markets: An Event Study. *International Journal of Economics and Business Administration* 8(4): 505–514. https://doi.org/10.35808/ijeba/602

Kim, K. (2003): Dollar exchange rate and stock price: Evidence from multivariate cointegration and error correction model. *Review of Financial Economics* 12(3): 301–313. https://doi.org/10.1016/S1058-3300(03)00026-0.

Kurihara, Y. (2006): The relationship between exchange rate and stock prices during the quantitative easing policy in Japan. *International Journal of Business* 11: 375–386.

Li, S. – Lucey, B. M. (2017): Reassessing the Role of Precious Metals as Safe Havens–What Colour is Your Haven and Why? *Journal of Commodity Markets* 7: 1–14. https://doi.org/10.1016/j.jcomm.2017.05.003

Lu, X-F. – Lai, K-K. (2012): Relationship Between Stock Indices and Investors' Sentiment Index in Chinese Financial Market. *Xitong Gongcheng Lilun yu Shijian/System Engineering Theory and Practice* 32(3): 621–629.

Makhetha-Kosi, P. – Mishi, S. – Ngonyama, N. (2016): The Response of Capital Flows to Interest Rate Differentials: The Case of South Africa. *Journal of Economics* 7(2-3). 119-129. https://doi.org/10.1080/09765239.2016.11907827

Mensi, W. – Sensoy, A. – Vo, X. V. – Kang, S. H. (2020): Impact of Covid-19 Outbreak on Asymmetric Multifractality of Gold and Oil Prices. *Resources Policy* 69: 101829. https://doi.org/10.1016/j.resourpol.2020.101829.

Muhammad, N – Rasheed, A. (2002): Stock Prices and Exchange Rates: Are They Related? Evidence from South Asian Countries. *The Pakistan Development Review* 41(4): 535–550. https://doi.org/10.30541/v41i4IIpp.535-550.

Nezky, M. (2013): The Impact of US Crisis on Trade and Stock Market in Indonesia. *Bulletin of Monetary, Economics and Banking* 15(3): 83–96. https://doi.org/10.21098/bemp.v15i3.428

OECD (2013): Role of Banks, Equity Markets and Institutional Investors in Long-Term Financing for Growth and Development. http://www.oecd.org/daf/fin/.

OJK (2020): *Survei Nasional Literasi dan Inklusi Keuangan 2019*. https://ojk.go.id/id/berita-dan-kegiatan/publikasi/Pages/Survei-Nasional-Literasi-dan-Inklusi-Keuangan-2019.aspx

Ong, L. L. – Izan, H. Y. (1999): Stocks and Currencies: Are They Related? *Applied Financial Economics* 9(5): 523-532. https://doi.org/10.1080/096031099332186

Pagano, M. – Panetta, F. – Zingales, L. (1998): Why do companies go public? An empirical analysis. *The Journal of Finance* 53(1): 27–64. https://doi.org/10.1111/0022-1082.25448.

PWC Indonesia (2020): Covid-19 and the Indonesian Banking Industry: Issues and actions to consider. https://www.pwc.com/id/en/crisis-centre/covid-19-and-the-indonesian-banking-industry.pdf.

Rahmayani, D. – Oktavilia, S. (2020): Does the Covid-19 Pandemic Affect the Stock Market in Indonesia? *Journal of Social and Political Sciences* 24(1): 33-47. https://doi.org/10.22146/jsp.56432

Reboredo, J. C. (2013): Is Gold a Safe Haven or a Hedge for the US Dollar? Implications for Risk Management. *Journal of Banking & Finance* 37(8): 2665–2676. https://doi.org/10.1016/j.jbankfin.2013.03.020.

Repullo, R. (2004): Capital Requirements, Market Power, and Risk-Taking in Banking. *Journal of Financial Intermediation* 13(2): 156-182. https://doi.org/10.1016/j.jfi.2003.08.005

Ramelli, S – Wagner, A. F. (2020): Feverish Stock Price Reactions to COVID-19. *The Review of Corporate Finance Studies* 9(3): 622–655. https://doi.org/10.1093/rcfs/cfaa012

Rashid, A. – Jabeen, S. (2016): Analyzing Performance Determinants: Conventional versus Islamic Banks in Pakistan. *Borsa Istanbul Review* 16(2): 92-107. https://doi.org/10.1016/j.bir.2016.03.002

Shiller, R. J. – Beltratti, A. E. (1992): Stock prices and bond yields: Can their comovements be explained in terms of present value models? *Journal of Monetary Economics* 30(1): 25–46. https://doi.org/10.1016/0304-3932(92)90042-Z.

Siregar, H. – Ward, B. D. (2002): Were Aggregate Demand Shocks Important in Explaining Indonesian Macroeconomic Fluctuations? *Journal of the Asia Pacific Economy* 7(1): 35–60. https://doi.org/10.1080/13547860120110461.

Susilowati, E. M. (2015): The Effect of Return on Asset, Return on Equity, Net Profit Margin, and Earning per Share on Stock Price. *Eksplorasi* 28(1): 181–195.

Takyi, P. O. – Bentum-Ennin, I. (2021): The Impact of Covid-19 on Stock Market Performance in Africa: A Bayesian Structural Time Series Approach. *Journal of Economics and Business* 115:105968. https://doi.org/10.1016/j.jeconbus.2020.105968.

Trisnowati, Y. – Muditomo, A. (2021): Covid-19 and Stock Market Reaction in Indonesia. *Journal of Accounting and Investment*, 22(1): 23-36. https://doi.org/10.18196/jai.v22i1.8859

Vazquez, F. – Federico, P. (2015): Bank Funding Structures and Risk: Evidence from the Global Financial Crisis. *Journal of Banking & Finance* 61: 1-14. https://doi.org/10.1016/j.jbankfin.2015.08.023

Von Thadden, E-L. (2004): Asymmetric Information, Bank Lending and Implicit Contracts: The Winner's Curse. *Finance Research Letters* 1(1): 11–23. https://doi.org/10.1016/S1544-6123(03)00006-0

Wang, M., L. – Wang, C., P. – Huang, T. Y. (2010): Relationships among Oil Price, Gold Price, Exchange Rate, and International Stock Markets. *International Research Journal of Finance and Economics* 47(47): 1450-2887.

World Bank (2020): A shock like no other: The Impact of Covid-19 on Commodity Markets: Special Focus. In *Commodity Outlook April 2020*.