# The Effect of COVID-19 Pandemic on Corporate Dividend Policy in Indonesia: The Static and Dynamic Panel Data Approaches

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# The Effect of COVID-19 Pandemic on Corporate Dividend Policy in Indonesia: The Static and Dynamic Panel Data Approaches

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**Abstract:** This research examines the effect of the crisis due to the COVID-19 pandemic on dividend policy in Indonesia. The purposive sampling method was used to collect data from corporates listed on the IDX from 2014 to 2020 and analyzed using static and dynamic panel data approaches. The fixed-effect models (FEM) were selected for the static panel data regression. Meanwhile, the first difference-generalized method of moments (FD-GMM) and system-generalized method of moments (SYS-GMM) were used for determine the robustness of the estimated dynamic panel data. The results showed that the crisis due to the pandemic led to higher dividend distribution on SYS-GMM. Furthermore, companies maintained the dividend level as a positive signal for investors which lifted the sluggish trade condition in the capital market. Profitability and previous year dividends positively affect dividend policy robustly. Furthermore, the results showed that age affects dividend policy on FD-GMM. Financial leverage has a robust effect, and firm size has an effect on FD-GMM in different directions, while investment opportunity does not affect dividend policy. Statistically, the FEM selected that violates the best linear unbiased estimation was proven to form parameters that were not much different from the estimates produced by the dynamic model, both from the coefficient of influence direction and significance, and the omitted variable bias occurs as evidenced in the robust test with dynamic model was solved. This research is also used as a reference for considering investors' investment decisions in the new normal condition. Therefore, dividend policy can be considered as a positive signal to investors with the ability to stock trading activities in the capital market.

**Keywords:** dividend policy; COVID-19 pandemic; crisis; static panel data regression; dynamic panel data regression

**JEL Classification:** C23; G01; G35

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## 1. Introduction

The COVID-19 pandemic is an extraordinary event (Altig et al. 2020), and regarding the increasing number of positive cases in Indonesia, the Large-Scale Social Restriction (PSBB) policy has been enforced regionally. The PSBB was first implemented in April 2020, with the issuance of Jakarta Governor Regulation Number 33 in this province, which was followed by other regions in the country. Generally, in areas where this policy is applied, restrictions are placed on tasks conducted outside the home, namely the educational sector, workplaces, worship houses, public facilities, socio-cultural activities, and the movement of people and goods using various transportation modes (DKI Jakarta Province

Governor Regulation Number 33 of 2020 Regarding PSBB 2020). This condition paralyzed the economy; meanwhile, the International Monetary Fund (IMF) predicts that by the end of the first quarter of 2020, there will be global economic recession (Liu et al. 2020).

The COVID-19 infection was initially recorded in the People's Republic of China (PRC), precisely in Wuhan. However, as the holder of the world's largest export activity, this country was economically affected. China's trading activities started moving in a negative direction, and it impacted world trade flows and systems (Yang and Ren 2020). Therefore, Indonesia also witnessed a decline in revenue because one of the second largest tax contributors comes from these activities. People tend not to spend due to restricted movement, which anticipates the uncertainty of economic conditions. Furthermore, it was also affected by the systemic impact of China's trade. As the world's largest importer of crude oil, it was economically affected by the pandemic, which negatively impacted other countries. Trading activities carried out in the PRC include electronic goods, computers, cellular phones, furniture, plastics, etc. (Liu et al. 2020).

In Indonesia, the inflation rate recorded in 2020 decreased to 1.68%, which was the lowest since the past seven years. This indicates that money was not in circulation due to the uncertainty caused by the pandemic. This strengthens the notion that people prefer to save their money in banks rather than spending it, thereby causing a decrease in its supply, leading to a poor inflation rate in that year (Blyth and Lonergan 2014). In 2020, the GDP decreased by 2.07%, while in 2019, there was an increase of 5.02%. Meanwhile, in 2018, 2017, and 2016, there was an increase of 5.17%, 5.07%, and 5.03%. Its declining value indicates that the economy is growing negatively.

The crisis caused by the pandemic had an impact on investment, especially in the capital market. The lowest value of the IDX composite and the imposed PSBB, which fell to IDR 4194.94, was recorded on 20 March 2020. This was compared to the value of IDR 6283.58, which was obtained at the beginning of 2 January 2020, which relatively fell by 33.25%. Economic conditions in Indonesia, even globally, led to uncertainties, and investors started to nurse negative sentiment regarding the implications of the fall in the IDX composite value (Altig et al. 2020). They tend not to invest because of the changing market assumptions and unclear supply chain mechanisms (Arianto 2021).

The return from investing in the capital market is known as dividends. Therefore, it is imperative to determine the ability of corporative to reduce the level of dividends in the perspective of pecking order theory. This is associated with questions, such as, "Does the corporate distribute dividends have a positive signal on its performance? Does it maintain the image of its performance by distributing dividends, or reducing the rate to increase further investment?"

The hampered economic activity at the corporate level faced a significant decline in cash flow. In the short term, this condition is expected to reduce the level of shareholders' dividends. This is suspected because the corporate sector is experiencing an uncertain economic situation; therefore, it needs to anticipate its survival (Krieger et al. 2021).

Renitia et al. (2020) stated that several Indonesian companies distribute dividends to investors, which indicates that it is in good condition. However, not a few companies cut or even limit the dividends distributed to shareholders. Restrictions on the activities of people and goods disrupt the industrial production chain, therefore, the business cycle is not fluent.

Reddemann et al. (2010) reported that crisis, such as the event that occurred from 2008 to 2009, negatively affect dividends. Hauser (2013) analyzed dividend policy in the USA from 2006–2009 and found that it was possible for companies to decreases dividend rates in 2008 and 2009, despite their financial conditions. This study shows a negative shift in the dividend policy of companies in the USA. Abdulkadir et al. (2015) stated that due to the reduction in cash flow experienced by the Nigerian corporate sector during crisis, dividend rates were decreased. However, experts argue that its reduction have a negative signal on the company's performance.

Lim (2016) stated that after the 2008 financial crisis in the USA, Germany, Australia, China, Japan, and South Korea the dividend payout ratios reduced. This condition is imperative to the theory of cash flow from dividends to maintain the stability of their business operations. Krieger et al. (2021) stated that companies in the USA reduced their dividend rates during the Covid-19 pandemic. Other predictors capable of affecting dividend rates are net income and debt levels.

Therefore, this research question is as follows, "does the COVID-19 pandemic negatively affect the dividend policy of companies in Indonesia?" The uncertainty of the end of the pandemic in 2020 forced company managers to formulate a dividend policy that ensured cash flow are well maintained during business operations.

This research investigates the impact of the crisis due to the COVID-19 pandemic on corporate dividend policies in Indonesia. The variable was measured with the most common dimension used to analyze economic conditions, such as the growth of Gross Domestic Product (Ariwinata and Badjra 2021; Romus et al. 2020). This research also carried out a robust check by measuring the crisis caused by the pandemic with a dummy variable and examines explanatory variables as other exogenous variables on dividend policy to test the consistency and resilience of the main attributes in the complex models. The tested exogenous variables were profitability, financial leverage, investment opportunity, firm size, and age, as well as dividends realized in the previous year (Hartono et al. 2021; Sharma and Bakshi 2019).

Statistical analysis instruments adopted static and dynamic panel data approaches (Biørn 2017). In addition, the static panel data regression includes endogenous variables realized in the previous period, while the exogenous ones cause bias due to the effect of residual error $(\varepsilon)$ on $Y_{i,t-1}$ (Arellano and Bover 1995). Dynamic panel data regression and robust analytical techniques are used to resolve this problem (Lai et al. 2008). This analytical instrument is used to estimate the condition of the endogenous variable, which is a combination of distributing and not distributing dividends.

This study examined all corporate organizations listed on the IDX that distributed dividends during the research period. However, it is necessary to eliminate those in the financial sector because they have different characteristics compared to the other industries. Therefore, it focuses on the non-financial corporate organizations listed on the Indonesia Stock Exchange.

## 2. Literature Review

Myers (1984) proposed the pecking order theory, which states that corporate organizations prioritize internal funding as an alternative investment, such as retained earnings. During the implementation of the dividend policy, there is a need to pay attention to investment opportunities to determine the proportion of distributed and retained earnings subsequently. In terms of meeting their financial needs, they prioritize the least risky funding sources, which are followed by the others. Whenever there is a need for monetary resources externally, they tend to go into debt first and then issue shares as equity funding (Damodaran 2015; Zutter and Smart 2019).

The COVID-19 pandemic is a global threat. In addition to its massive transmission, it forced Indonesia to implement Large-Scale Social Restrictions that regulate human movement as a preventive measure for spreading this virus. This paralyzed the economy, thereby having a systemic impact on the country and other corporations' business activities. The capital market experienced a fall in the IDX composite in mid-March 2020. This was due to uncertainty concerning the duration of the pandemic; however, toward the end of 2020, there was no specific medical treatment or vaccine as an effort to curb the virus transmission (Altig et al. 2020; Arianto 2021).

### 2.1. Impact of the COVID-19 Pandemic Crisis on Dividend Policy

The pandemic also has a negative effect on corporate profitability and low capital ratios. This condition affects the daily prices on the stock exchange and its index, which reacts negatively to both short and long-term information. According to the political news, the uncertainty of the ongoing pandemic causes instability, which also impacts the stock market returns and volatility (Krieger et al. 2021; Zainuri et al. 2021).

The corporate's external attributes that influence dividend policies are regarded as macroeconomic factors. One of the essential indicators used to measure this condition is the gross domestic product (GDP), which is an opportunity for economic growth. During crises, corporate firms are faced with declining cash flows due to reduced activities. Therefore, the uncertain economic situation is a tendency to suppress dividend rates. This is carried out to anticipate the continuity of corporate businesses during the pandemic.

Ariwinata and Badjra (2021), Ong et al. (2018), and Romus et al. (2020) reported that gross domestic product (GDP) has a positive effect on corporate dividend policy. The GDP measurement dimension ascertains the crisis caused by COVID-19, and this led to the following hypothesis:

**Hypothesis 1 (H1).** *Gross Domestic Product (GDP) growth positively affects dividend policy.*

During robust testing, it is necessary to carry out measurements using categorical or dummy variables, which are further developed into a binary form, namely crisis and non-crisis conditions. In accordance with logical thinking related to the GDP proxy, a second hypothesis was proposed as follows:

**Hypothesis 2 (H2).** *The COVID-19 Pandemic Crisis has a negative effect on dividend policy.*

### *2.2. Impact of Profitability on Dividend Policy*

Generally, the corporate's profitability has a positive and causal relationship with the dividends distributed to shareholders. Therefore, the higher the profit, the higher the level of dividend distributed (Singla and Samanta 2018; Yusof and Ismail 2016). Furthermore, the crisis condition due to the pandemic is also suspected of having an impact on the declining policy. This is because the cash flow decreases due to declining business activities, thereby resulting in reduced profitability and the suppression of dividends distributed to shareholders (Hauser 2013). Patra et al. (2012), Singla and Samanta (2018), as well as Yusof and Ismail (2016) reported that profitability affects dividend policy. This led to a third hypothesis, which is stated as follows:

**Hypothesis 3 (H3).** *Profitability has a positive effect on dividend policy.*

### *2.3. Impact of Financial Leverage on Dividend Policy*

Corporate organizations adopt financial leverage for liquidity or equity purposes (Hartono et al. 2021). The liability assets owned by corporate firms affect the profits obtained. The debt level causes the interest charged to reduce the cash flow, including the profit realized and dividends distributed. During crisis, corporate organizations are usually faced with a decrease in cash flow due to the declining business activities; therefore, they need to be supported, because these firms are increasingly burdened by debt interest that has to be met. Ranajee et al. (2018), Sharma and Bakshi (2019), and Wahjudi (2020) stated that financial leverage has a negative effect on dividend policy. Therefore, a fourth hypothesis was proposed as follows:

**Hypothesis 4 (H4).** *Financial leverage has a negative effect on dividend policy.*

### *2.4. Impact of Investment Opportunity on Dividend Policy*

Investment opportunity reveals that an increase causes the corporate organization to reduce the dividend rate for further investments (Mui and Mustapha 2016). A fairly common dimension adopted for its measurement is the market price to book value ratio. This supports the analysis, which states that the higher the stock price, the higher the investment opportunities. However, it is due to the fact that the market stock price is the corporate future cash flow (Damodaran 2015). These firms tend to suppress dividend rates during crisis conditions due to declining cash flows (Altig et al. 2020; Arianto 2021). Patra et al. (2012), Rehman and Takumi (2012), and Rizqia et al. (2013) reported that investment opportunity has a negative effect on dividend policy. Therefore, this led to the fifth hypothesis, which is stated as follows:

**Hypothesis 5 (H5).** *Investment opportunity has a negative effect on dividend policy.*

### *2.5. Impact of Firm Size on Dividend Policy*

The firm size represents the ability to carry out business activities. A more significant capability generates greater profits, which positively impacts dividend policy. This condition is relevant in times of crisis, because it tends to decline corporate activities due to the crippled economy, thereby leading to a decrease in cash flow. Therefore, the firm size is usually measured based on the assets owned. The research carried out by Alzomaia and Al-Khadhiri (2013), Ranajee et al. (2018), and Yusof and Ismail (2016) supported the logical thinking relating to the positive effect that the firm size has on dividend policy. This led to the proposition of the sixth hypothesis, which is stated as follows:

**Hypothesis 6 (H6).** *Firm size has a positive effect on dividend policy.*

### *2.6. Impact of Firm Age on Dividend Policy*

From the perspective of life cycle theory, the higher the firm's age, the more matured and established the business activities. The mature phase is characterized by the fact that it has a small investment opportunity, thereby tending to reduce the proportion of retained earnings and the possibility of increasing the dividend rate. Matured corporate organizations are likely to pay positive dividends during crisis conditions because of their properly established business capabilities and smaller investment opportunities. Badu (2019) and Ranajee et al. (2018) stated that firm age has a positive effect on dividend policy. Based on this explanation, the seventh hypothesis is reported as follows:

**Hypothesis 7 (H7).** *Firm age has a negative effect on dividend policy.*

### *2.7. Impact of Previous Year's Dividends on Dividend Policy*

Dividend signaling theory states that the amount distributed to shareholders signals investors to assess corporate performance. According to the general meeting of shareholders (GMS), the current year's dividend rate is greater than or the same as the previous year (Alzomaia and Al-Khadhiri 2013; Hartono and Matusin 2020). During the COVID-19 pandemic, these firms were suspected to distribute dividends to maintain their performance image through signals arising from the amount shared (Altig et al. 2020; Arianto 2021). Alzomaia and Al-Khadhiri (2013) as well as Hartono and Matusin (2020) reported that the previous year's dividend positively affects dividend policy. Therefore, the eighth and ninth hypothesis was proposed as follows:

**Hypothesis 8 (H8).** *The previous year's dividend has a positive effect on its policy.*

**Hypothesis 9 (H9).** *The lagged-1 of $DPS_{it}$ has a positive effect on its policy.*

## 3. Method

This research used secondary data obtained from www.idx.com in the form of corporate financial statements. It was collected from 2014 to 2020, which was justified by the COVID-19 pandemic in 2020. The purposive sampling technique was applied in accordance with several criteria, such as those firms that did not experience corporate action in the form of delisting or initial public offering during the research period. The second criterion is that they distributed dividends at least once during the investigation. However, of the

674 companies listed on IDX in 2020, 212 are sample corporates by the sector as shown in Table 1, therefore 1,484 observations were obtained.

**Table 1.** Number of sample corporates by sector.

| Corporate Sector | Total |
|---|---|
| Basic and Chemical Industry | 38 |
| Consumer Goods Industry | 19 |
| Miscellaneous Industry | 20 |
| Agriculture | 12 |
| Real Estate, Property, and Building Construction | 30 |
| Infrastructure, Utility, and Transportation | 22 |
| Mining | 17 |
| Trade and Service | 54 |

Source: www.idx.co.id (accessed on 26 August 2021).

This research utilized eight variables with 10 required proxies, as shown in Table 2 (Alzomaia and Al-Khadhiri 2013; Ariwinata and Badjra 2021; Fernald and Li 2019; Hartono and Matusin 2020; Hartono et al. 2021; Labhane and Das 2015; Lestari 2018; Patra et al. 2012; Ranajee et al. 2018; Rehman and Takumi 2012; Rizqia et al. 2013; Romus et al. 2020; Sharma and Bakshi 2019; Singla and Samanta 2018; Yusof and Ismail 2016).

**Table 2.** Variables and their dimension measurement formulations.

| Variable | Proxy | Formulation | Expected Sign |
|---|---|---|---|
| Dividend Policy | Dividend Per Share | $DPS = \frac{Total\ Dividends}{Outstanding\ Shares}$ | — |
| Crisis due to COVID-19 Pandemic | Gross Domestic Product Growth | $GDP\ Growth = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$ | (+) |
| | Dummy Variable | 1 = A Crisis Due to COVID-19 Pandemic<br>0 = No Crisis | (−) |
| Profitability | Earnings Per Share | $EPS = \frac{Net\ Income}{Outstanding\ Shares}$ | (+) |
| Financial Leverage | Debt to Equity Ratio | $DER = \frac{Total\ Liability}{Total\ Equity}$ | (−) |
| Investment Opportunity | Market Price to Book Value ratio | $PBR = \frac{Market\ Price\ per\ Share}{Book\ Value\ per\ Share}$ | (−) |
| Firm Size | Total Assets | $TA = natural\ logarithmic\ transformation\ of\ total\ assets$ | (+) |
| Company Age | Age | $AGE = company\ age\ since\ establishment$ | (+) |
| Previous Year Dividend | Previous Year's Dividend | $PYD = previous\ year's\ dividend$ | (+) |
| | Lagged-1 Dividend | $PYD = Lagged\ 1\ of\ DPS$ | (+) |

## 4. Panel Data Regression Analysis: Static and Dynamic Approaches

The statistical analysis instrument applied the panel data regression, which is stated as follows (Gujarati and Porter 2020):

$$Y_{it} = \alpha_{it} + \beta' X_{it} + \varepsilon_{it} \quad (1)$$

where

$Y_{it}$: The response of the $i$-th individual unit for the $t$-th time;
$\beta'$: $(\beta_1, \beta_2, \cdots, \beta_n)$ is the slope coefficient vector of size $1 \times n$, where $n$ is an exogenous variable;
$X_{it}$: Observation of exogenous variables from the $i$-th individual for the $t$-th time;
$\alpha_{it}$: Intercept coefficient of each $i$-th individual for $t$-th time;
$\varepsilon_{it}$: Residual in period of $t$, $\varepsilon_{it} \sim IIDN(0, \sigma^2)$.

It is necessary to select the best econometric model from three other alternatives. They include the common, fixed, and random effects, and the random effect model. The common effect model (CEM) utilizes the ordinary least square (OLS) technique. It involves the combination of all data without considering individuals and time. The fixed-effect model uses the least square dummy variable (LSDV) technique. FEM assumes that the intercept is different for each individual, although the slope coefficient is constant. This is indicated by index $i$ on intercept $(\alpha_i)$. The random effect model applies the generalized least square (GLS) technique. REM estimates panel data where disturbance variables (error terms) are related to time and the individuals (Biørn 2017).

Furthermore, the three types of likelihood tests were carried out to select the best econometric model. These include the Chow, Hausman, and Lagrange Multiplier tests. This analysis is started with the Chow test, which is used to select the best model between FEM and CEM. However, supposing the FEM is selected, the Hausman test is performed in order to select the best model between FEM and REM. In contrast, assuming the CEM model was selected with the Chow test, the Lagrange Multiplier test is performed. This was carried out to choose between the REM and CEM models (Gujarati and Porter 2020).

First, an error normality test was conducted Jarque-Bera with a $p$-value $\geq 5\%$, which indicates that the error distribution is normal. Second, the multicollinearity test was carried out by analyzing the bivariate Pearson correlation between the exogenous variables. The expected result is a bivariate correlation of no multicollinearity that is less than 0.8. Third, the autocorrelation test was conducted using Durbin-Watson with the expected result value between $dL$ and $(4 - dL)$. Fourth, the heteroscedasticity test was conducted using Gletsjer with the result used to determine the effect of exogenous variables on the absolute transformation of error $\geq 5\%$.

Subsequently, the static models tend to violate the best linear unbiased estimation (BLUE) by analyzing the inconsistent parameter estimates by testing the Previous Year's Dividend variable as an exogenous variable. An error was also detected because it predominantly contains elements of endogenous variables. This condition is described in Equation (3), where $\mu_i$ is a function of $Y_{it}$ and $Y_{it-1}$, because $Y_{it-1}$ is $Y_{it}$ in the previous period. It creates an omitted variable bias. In addition, robustness checking was carried out by estimating the dynamic panel data regression using two model approaches, namely first difference generalized method of moments (FD-GMM) and system generalized method of moments (SYS-GMM).

A problem of endogeneity was also detected in causality testing, which were discussed to determine the exogenous variable. Ongore and Kusa (2013) stated the effect of GDP on profitability. Bangun et al. (2017) analyzed the effect of financial leverage and firm size on profitability, while Akben-Selcuk (2016) found the effect of firm age on company profitability. The GMM methods, was used to overcome the endogeneity problem in the causality test, namely the FD-GMM and SYS-GMM models. According to Li (2016), GMM is the method with the best correction effect on the alleged bias. Li (2016) further stated that the process of overcoming the endogeneity issue is carried out using the GMM method in accordance with the research conducted by Dang et al. (2018).

The general form of dynamic panel data regression is:

$$Y_{it} = \alpha_{it} + \delta Y_{it-1} + \beta' X_{it} + u_{it} \quad (2)$$

where

$$u_{it} = \mu_i + v_{it} \quad (3)$$

Description:

$Y_{it}$: The response of the $i$-th individual unit for the $t$-th time;
$\delta$: Coefficient vector of $Y_{it-1}$;
$Y_{it-1}$: Observation of the exogenous variable lagged 1 of $Y_{it}$;
$\beta'$: $(\beta_1, \beta_2, \cdots, \beta_n)$ is the slope coefficient vector of size $1 \times n$, where $n$ is an exogenous variable;
$X_{it}$: Observations of exogenous variables from the $i$-th individual for the $t$-th time;
$\alpha_{it}$: Intercept coefficient of each $i$-th individual for $t$-th time;
$u_{it}$: Residual in individual period $i$-th and $t$-th time.

Dynamic panel data regression obtained with the first difference generalized method of moments (FD-GMM) proposed by Arellano and Bond (1991) overcomes the problem of habitual thought. FD-GMM was used to obtain parameter estimation $Y_{it-1}$ as lagged 1 of

$Y_{it}$, which is instrumental to overcome omitted variable bias. This model accommodates the lag value of an exogenous variable as an instrument variable by forming it from the first difference of the endogenous variable. FD-GMM has a weakness relating to the time series element, which is too small; therefore, there is an unbalance condition in the first difference transformation.

Arellano and Bover (1995) introduced a generalized system method of moments (SYS-GMM) to correct the deficiency of FD-GMM. It solves this problem using the orthogonal deviation method. Estimates carried out with SYS-GMM minimize data loss in terms of low time-series elements or unbalanced conditions. This model enforces equality between original and customized systems. Therefore, it is called a general system, because this parameter estimation technique combines differences and levels. It has the highest proportionality among the other GMM methods (Arellano and Bond 1991; Arellano and Bover 1995; Biørn 2017; Tinungki 2019). Estimates made with FD-GMM and SYS-GMM were carried out using a two-step estimator model.

It is necessary to test the model specifications to ensure that the estimates formed are consistent and unbiased to produce robust parameters. The model specification analyses for dynamic panel data regression are instrument validity, parameter consistency, and unbiased tests. The instrument validity was carried out with the Sargan test. This was performed to ensure the validity of the variables; besides, it was also discovered that there is no causal relationship between $u_{it}$ and $Y_{it-1}$. The consistency test was carried out with Arellano–Bond by ensuring no correlation between $\varepsilon_{it}$ and $\varepsilon_{it-2}$. An unusuality test was carried out by comparing the coefficient of influence $\delta$ of $Y_{it-1}$ with GMM, LSDV robust standard errors (RSE), and OLS robust standard errors (RSE).

The panel data regression models formed are as follows:

$$DPS_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 EPS_{it} + \beta_3 DER_{it} + \beta_4 PBR_{it} + \beta_5 TA_{it} + \beta_6 AGE_{it} + \beta_7 PYD_{it} + \varepsilon_{it} \tag{4}$$

$$DPS_{it} = \beta_0 + \beta_1 COV_{it} + \beta_2 EPS_{it} + \beta_3 DER_{it} + \beta_4 PBR_{it} + \beta_5 TA_{it} + \beta_6 AGE_{it} + \beta_7 PYD_{it} + \varepsilon_{it} \tag{5}$$

$$DPS_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 EPS_{it} + \beta_3 DER_{it} + \beta_4 PBR_{it} + \beta_5 TA_{it} + \beta_6 AGE_{it} + \beta_7 DPS_{it-1} + \varepsilon_{it} \tag{6}$$

$$DPS_{it} = \beta_0 + \beta_1 COV_{it} + \beta_2 EPS_{it} + \beta_3 DER_{it} + \beta_4 PBR_{it} + \beta_5 TA_{it} + \beta_6 AGE_{it} + \beta_7 DPS_{it-1} + \varepsilon_{it} \tag{7}$$

where $DPS_{it}$: dividend per share on individual $i$ at time $t$; $GDP_{it}$: gross domestic product growth in individual $i$ at time t; $COV_{it}$: binary dummy variable due to the crisis caused by the COVID-19 pandemic and no crisis in individual $i$ at time $t$; $EPS_{i,t}$: earnings per share on individual $i$ at time $t$; $DER_{i,t}$: debt to equity ratio for individual $i$ at time $t$; $PBR_{i,t}$: market price to book value ratio for individual $i$ at time $t$; $TA_{i,t}$: natural logarithm transformation of the total asset for individual $i$ at time $t$; $AGE_{i,t}$: the firm age in individual $i$ at time $t$; $PYD_{it}$: dividend of the previous year for individual $i$ at time $t$; $DPS_{it-1}$: lagged 1 year period of dividend per share on individual $i$ at time $t$; $\beta_0$: constant parameters; $\beta_{1 \ldots 7}$: coefficient of influence of exogenous variables on the endogenous ones; $\varepsilon_{i,t}$: regression error residue on individual $i$ at time $t$.

## 5. Result

Table 3 shows the Statistic Descriptive. DPS is over-dispersed because it includes corporate samples that distribute dividends both consistently and inconsistently during the research period. GDP shows a minimum value of −0.0207 or −2.07%, indicating negative growth. The minimum value of negative EPS is a condition that implies loss to a corporate firm. The minimum PYD is 0, including samples that distribute dividends both consistently and inconsistently during the research period, which is the same as DPS. Anomalous conditions are also included in determining the behavior of the sample as a whole.

**Table 3.** Statistic Descriptive.

| | DPS | GDP | COV | EPS | DER | PBR | SIZE | AGE | PYD |
|---|---|---|---|---|---|---|---|---|---|
| **N** | 1484 | 1484 | 1484 | 1484 | 1484 | 1484 | 1484 | 1484 | 1484 |
| **Mean** | 41.20614 | 0.040157 | 0.142857 | 122.6161 | 1.214568 | 2.055611 | 15.33299 | 35.95755 | 262,492.9 |
| **Maximum** | 750.0000 | 0.051700 | 1.000000 | 2915.996 | 35.46560 | 246.4597 | 19.67902 | 162.0000 | 16,608,751 |
| **Minimum** | 0.000000 | −0.020700 | 0.000000 | −1616.927 | 0.000320 | 0.049962 | 11.08373 | 5.000000 | 0.000000 |
| **Std.Dev.** | 87.86223 | 0.024866 | 0.350045 | 261.3724 | 1.646576 | 6.794951 | 1.512957 | 16.91732 | 1,124,672 |

Table 4 shows the likelihood test was conducted to obtain the best econometric model on panel data regression. The Chow test results for the GDP and COV models with $p$-value cross-section $\chi^2 = 0.000 \leq \alpha(5\%)$, led to the selection of the FEM model, which was continued with the Hausman test.

**Table 4.** Chow test and Hausman test.

| Proxy of Crisis Variable | Chow Test | | | Hausman Test | | |
|---|---|---|---|---|---|---|
| | Cross-Section $\chi^2$ (Statistics) | df | $p$-Value | Cross Section Random ($\chi^2$ Statistic) | $\chi^2$ | $p$-Value |
| GDP | 724.735 | 211 | 0.000 | 71.828 | 7 | 0.000 |
| COV | 724.268 | 211 | 0.000 | 72.037 | 7 | 0.000 |

The Hausman test results for the GDP and COV models produced a $p$-value of a random cross-section $= 0.000 \leq \alpha(5\%)$, which led to the selection of the FEM model. Therefore, it was concluded that the Fixed Effect Model is the best econometric type with the Least Square Dummy Variable technique. The Lagrange Multiplier test was not carried out because Chow and Hausman consistently selected FEM (Hartono et al. 2021).

Table 5 shows the results of the goodness of fit test carried out on both FEM models. The variability or coefficient of determination analyses performed on GDP-FEM and COV-FEM obtained $Adjusted\ R^2$ of 62%. Furthermore, simultaneous and F-tests carried out on GDP-FEM and COV-FEM resulted in a $p$-value of $F = 0.000 \leq 5\%$; therefore, it was proven that at least one exogenous variable significantly affected the others. Meanwhile, the partial analysis was carried out with the $T$-test.

The model specification test was conducted to ensure that the estimation did not violate the classical assumptions (Biørn 2017; Gujarati and Porter 2020; Hair et al. 2018). This procedure was also carried out to ascertain that it was free from habitual characteristics. The method was conducted by testing the classical assumptions of the fixed-effect model, as shown in Table 6.

The normality test performed on GDP-FEM and COV-FEM adopted the Jarque–Bera procedure. The results obtained for GDP-FEM and COV-FEM are $p$-value = $0.000 \leq 5\%$; therefore, it was concluded that the error is not normally distributed, and the normality assumption is violated. The multicollinearity test carried out by studying the Pearson bivariate correlation between exogenous variables showed no violation because all the realized values were less than 0.8 for both GDP-FEM and COV-FEM. The autocorrelation test performed with the Durbin–Watson (DW) analysis was used to obtain the following results: 2.159 and 2.160 for GDP-FEM and COV-FEM, respectively. In accordance with the values of $n = 1484$ and $k = 7$, $dL = 1.5922$ and $dU = 1.7582$. The autocorrelation-free area is located in the $dL - (4 - dL)$ region, namely within 1.7582 and 2.2418. GDP-FEM and COV-FEM are both free of autocorrelation problems. The heteroscedasticity test was carried out using Gletjser, and the results obtained stated that both GDP-FEM and COV-FEM violated the heteroscedasticity assumption.

**Table 5.** Static panel data regression.

| Proxy of Predictor | GDP-CEM | GDP-FEM | GDP-REM | COV-CEM | COV-FEM | COV-REM |
|---|---|---|---|---|---|---|
| Constant | −0.542<br>(18.702) | ** −221.886<br>(96.527) | 20.528<br>(26.823) | −3.632<br>(18.391) | ** −222.248<br>(96.483) | −20.528<br>(26.823) |
| GDP | −70.084<br>(63.787) | 26.810<br>(73.475) | −45.411<br>(58.196) | ——— | ——— | ——— |
| COV | ——— | ——— | ——— | * 6.374<br>(4.798) | −2.468<br>(5.170) | −45.411<br>(58.196) |
| EPS | *** 0.216<br>(0.007) | *** 0.164<br>(0.008) | *** 0.190<br>(0.007) | *** 0.216<br>(0.007) | *** 0.164<br>(0.008) | *** 0.190<br>(0.007) |
| DER | 0.875<br>(1.097) | * 1.785<br>(1.320) | *1.557<br>(1.144) | 0.862<br>(1.096) | * 1.791<br>(1.320) | * 1.557<br>(1.144) |
| PBR | *** 1.116<br>(0.260) | 0.135<br>(0.265) | ** 0.489<br>(0.247) | *** 1.118<br>(0.260) | 0.136<br>(0.265) | ** 0.489<br>(0.247) |
| SIZE | 0.923<br>(1.222) | ** 14.925<br>(7.548) | * 2.311<br>(1.754) | 0.909<br>(1.222) | ** 14.825<br>(7.538) | * 2.311<br>(0.014) |
| AGE | −0.062<br>(1.000) | 0.238<br>(1.100) | −0.022<br>(0.148) | −0.067<br>(0.100) | 0.328<br>(1.128) | −0.022<br>(0.148) |
| PYD | *** 0.000<br>(0.000) | ** 0.000<br>(0.000) | ***0.000<br>(0.00) | *** 0.000<br>(0.000) | ** 0.000<br>(0.000) | *** 0.000<br>(0.000) |
| $R^2$ | 0.471 | 0.675 | 0.356 | 0.471 | 0.676 | 0.356 |
| Adj-$R^2$ | 0.469 | 0.620 | 0.353 | 0.469 | 0.620 | 0.353 |
| F-statistics | *** 187.855 | *** 12.079 | *** 116.424 | *** 188.005 | *** 12.080 | *** 116.424 |
| Number of panel observations | 1484 | 1484 | 1484 | 1484 | 1484 | 1484 |

Description: the numbers in brackets are standard errors. With one-tailed statistics, (*) is significance $\alpha = 10\%$, (**) is significance $\alpha = 5\%$, (***) is significance $\alpha = 1\%$.

**Table 6.** Classical assumption test on fixed effect model.

| Proxy of Crisis Variable | Normality Test: *p*-Value of Jarque–Bera | Multicollinearity Test: Bivariate Pearson Correlation | Autocorrelation Test: Durbin–Watson Test | Heteroscedastricity Test: Glejser Test |
|---|---|---|---|---|
| GDP | 0.000 | No multicollinearity | 2.159 | Heteroscedasticity |
| COV | 0.000 | No multicollinearity | 2.160 | Heteroscedasticity |

The problem of violating the classical assumptions of the two selected FEM models is analyzed by estimating the dynamic panel data regression to form a robust parameter by including $Y_{it-1}$ as an instrumental variable. The violation was not refined by eliminating outliers, or transforming the data, rather it changes the estimation behavior by not including the company sample completely.

Table 7 shows the estimated results of dynamic panel data regression using the first difference generalized method of moments (FD-GMM) and the generalized system method of moments (SYS-GMM). The measurement dimension of the crisis variable due to the COVID-19 pandemic was determined with the GDP growth and COV. The dynamic panel data regression analysis was started with a model specification test. The first analysis involves determining the instrument validity test with the Sargan test, as shown in Table 8.

In the GDP crisis variable, the FD-GMM result obtained using the Sargan test are *p*-value $\chi^2 = 0.077$, while that of the SYS-GMM is *p*-value $\chi^2 = 0.060$. For the COV crisis variable, the FD-GMM result is *p*-value $\chi^2 = 0.079$, and that of SYS-GMM is *p*-value $\chi^2 = 0.060$. The results obtained from the four models is *p*-value > 5%. Based on these, it was concluded that the four models under the over-identifying restriction conditions are valid (instrument variables are not correlated with error).

The subsequent specification test is the parameter consistency analysis. This was carried out with the Arellano–Bond test, as shown in Table 9. In the GDP growth crisis variable, the *p*-value order 2 at FD-GMM = 0.669 and SYS-GMM = 0.632. In the COV crisis variable, the *p*-value order 2 for FD-GMM = 0.667 and SYS-GMM = 0.633. The Arellano–Bond test results for the four models are >5%. It was concluded that the overall GMM model has no serial correlation between $\Delta v_{i,t}$ and $\Delta v_{i,(t-2)}$; therefore, the parameters are consistent.

**Table 7.** Dynamic panel data regression and unbiased test.

| Proxy of Predictor | GDP LSDV-RSE | GDP FD-GMM | GDP SYS-GMM | GDP OLS-RSE | COV LSDV-RSE | COV FD-GMM | COV SYS-GMM | COV OLS-RSE |
|---|---|---|---|---|---|---|---|---|
| Constant | *** −295.437 (118.375) | * 208.794 (158.821) | −76.007 (83.786) | 2.420 (16.980) | *** −292.810 (117.716) | * 207.980 (159.421) | −80.625 (82.704) | −1.444 (16.536) |
| Lagged-1 DPS | −0.446 (0.063) | * 0.027 (0.021) | *** 0.049 (0.017) | *** 0.282 (0.058) | −0.446 (0.063) | * 0.027 (0.021) | *** 0.049 (0.017) | *** 0.282 (0.058) |
| GDP | * 46.056 (75.160) | −24.308 (43.989) | ** −76.599 (40.249) | * −78.078 (52.182) | ——— | ——— | ——— | ——— |
| COV | ——— | ——— | ——— | ——— | −2.718 (5.369) | 1.926 (3.155) | ** 5.569 (2.898) | * 6.031 (3.584) |
| EPS | *** 0.181 (0.032) | *** 0.227 (0.021) | *** 0.233 (0.016) | *** 0.185 (0.023) | *** 0.181 (0.032) | *** 0.227 (0.021) | *** 0.233 (0.016) | *** 0.185 (0.023) |
| DER | 3.078 (2.936) | *** 9.812 (2.556) | *** 9.472 (2.069) | 2.248 (2.349) | 3.073 (2.942) | *** 9.802 (2.570) | *** 9.450 (2.078) | 2.246 (2.351) |
| PBR | ** 3.652 (1.977) | −0.333 (0.819) | −0.659 (0.853) | *** 4.055 (0.996) | ** 3.647 (1.977) | −0.346 (0.819) | −0.662 (0.853) | *** 4.059 (0.996) |
| SIZE | ** 18.502 (8.739) | ** −21.485 (12.856) | 5.673 (5.745) | 0.027 (1.137) | ** 18.664 (8.747) | ** −21.395 (12.873) | 5.847 (5.713) | 0.018 (1.136) |
| AGE | 0.578 (1.429) | ** 3.289 (1.474) | −0.274 (0.593) | −0.061 (0.067) | 0.498 (1.444) | ** 3.239 (1.468) | −0.326 (0.593) | −0.061 (0.067) |
| Number of obs. | 1.272 | 1.060 | 1.272 | 1.272 | 1.272 | 1.060 | 1.272 | 1.272 |
| Number of groups | 212 | 212 | 212 | ——— | 212 | 212 | 212 | ——— |
| Number of instruments | ——— | 22 | 27 | ——— | ——— | 22 | 27 | ——— |
| Wald $\chi^2$ | ——— | *** 135.940 | *** 269.660 | ——— | ——— | *** 135.940 | *** 269.250 | ——— |
| $R^2$ | 0.359 | ——— | ——— | 0.555 | 0.361 | ——— | ——— | 0.555 |
| F-statistics | *** 9.440 | ——— | ——— | *** 60.190 | *** 9.400 | ——— | ——— | *** 58.842 |

Description: the numbers in brackets are standard errors or robust standard errors. With one-tailed statistics, (*) is significance $\alpha = 10\%$, (**) is significance $\alpha = 5\%$, (***) is significance $\alpha = 1\%$.

**Table 8.** Sargan test.

| Model | GDP | | COV | |
|---|---|---|---|---|
| | $\chi^2$ | *p*-Value | $\chi^2$ | *p*-Value |
| FD-GMM | 22.060 | 0.077 | 21.977 | 0.079 |
| SYS-GMM | 29.367 | 0.060 | 29.367 | 0.060 |

**Table 9.** Arellano–Bond test.

| Order | GDP | | | | COV | | | |
|---|---|---|---|---|---|---|---|---|
| | FD-GMM | | SYS-GMM | | FD-GMM | | SYS-GMM | |
| | z | *p*-Value | z | *p*-Value | z | *p*-Value | z | *p*-Value |
| $m(1)$ | −2.486 | 0.013 | −2.595 | 0.010 | −2.487 | 0.013 | −2.595 | 0.010 |
| $m(2)$ | 0.428 | 0.669 | 0.479 | 0.632 | 0.430 | 0.667 | 0.477 | 0.633 |

Table 7 shows the unbiased test results, which indicate that for the GDP growth crisis variable, FD-GMM obtained $\delta$*LSDV-RSE* < $\delta$*FD-GMM* < $\delta$*OLS-RSE*, while SYS-GMM realized $\delta$*LSDV-RSE* < $\delta$*SYS-GMM* < $\delta$*OLS-RSE*. In the COV crisis variable, FD-GMM obtained $\delta$*LSDV-RSE* < $\delta$*FD-GMM* < $\delta$*OLS-RSE*, while SYS-GMM realized $\delta$*LSDV-RSE* < $\delta$*SYS-GMM* < $\delta$*OLS-RSE*. Based on the unbiased test for the four models, it was discovered that the whole models were unbiased.

The parameter significance analysis started with the Wald test used for simultaneous testing. The *p*-value of $\chi^2$ for the GDP crisis variable in the FD-GMM model is 0.000, while the SYS-GMM is 0.000. The *p*-value of $\chi^2$ for the COV crisis variable in the FD-GMM model is 0.000, while the SYS-GMM is 0.000. Therefore, based on these results, the 4 models were declared fit simultaneously, and this proves that at least 1 exogenous variable has a significant effect on the endogenous ones. The second parameter significance test is the Z-test. Furthermore, the partial hypothesis tests were carried out.

## 6. Discussion

The crisis variable due to the COVID-19 pandemic as a proxy for GDP growth was not proven to have a positive effect on dividend policy; therefore, H1 was rejected. In contrast, the results obtained imply the existence of a negative effect, which the SYS-GMM model proved. This contradicts the research carried out by Abdulkadir et al. (2015), Hauser (2013), and Lim (2016), which stated that declining GDP growth leads to lower dividend rates. This result is robustly proven by the dummy variable, which stated that the crisis condition due to the COVID-19 pandemic positively affects the SYS-GMM model. The opposite tends to occur, which is increasing dividends, indicating that H2 is rejected. Dividend policy during the crisis due to the COVID-19 pandemic has proven to increase the given amount. This is presumably because the corporate sector is trying to give a positive signal concerning its performance in the form of dividends distributed. It is expected that this lifts the sluggish trade condition in the capital market (Altig et al. 2020; Krieger et al. 2021).

These results were supported by descriptive statistics carried out on 212 companies through observation. It showed that 21 companies previously did not distribute dividends in 2019 while in 2020 they distributed dividends, and 53 companies increased their dividend levels from 2019 to 2020. Furthermore, 23 companies previously paid dividends in 2019, and eliminated it in 2020, while 35 companies suppressed the dividend rate in 2020 as opposed to 2019. In contrast, 69 companies constantly did not distribute dividends between 2019 and 2020, and 11 constantly distributed in these two years. Relatively, these results showed that 34.91% of companies that increased the dividend rate and distributed it from the previous year did not distribute, while 27.36% of companies depressed it and did not pay dividends. Meanwhile, 37.73% of companies that distributed consistently did not share and continued to distribute at the same level between 2019 and 2020. This showed that the proportion of companies that tend to increase the dividend rate is more dominant than those that suppressed and eliminated the process.

An event study also supported the result to analyze the market reaction to dividend announcements during 2020 (Dasilas and Leventis 2011). Meanwhile, this study analyzed the possibility of having significant abnormal returns (AR) and cumulative abnormal returns (CAR) around the dividend announcement day. It also determines the difference in average abnormal returns before (AAR before) and after (AAR after) the dividend announcement. The objects of observation were 120 companies, and it was conducted for five days before the dividend announcement to five days afterwards. The Kolmogorov-Smirnov test was used to examine the normality of AR, CAR, AAR before and AAR after the dividend announcement. The results showed that AR on three to five days before the dividend announcements, CAR on five to four days before the dividend announcement, and CAR on the day of dividend announcement were normally distributed. Furthermore, AR on two to one days before dividend announcement, AR on the day of dividend announcement, AR on one to five days after dividend announcements, CAR on three to one days before dividend announcement, and CAR on one to five days after dividend announcement, as well as the AAR before and AAR after the dividend announcements were not normally distributed. Therefore, the first test is to analyze the significant abnormal return used on the one-sample t-test for normally distributed data, while the abnormally distributed ones used the one-sample Wilcoxon signed-rank test. Testing of significant abnormal returns was carried out by formulating the following hypothesis:

**Hypothesis 10 (H10).** *There is a significant abnormal return around the dividend announcement.*

Based on the results from Tables 10 and 11, there is a significant abnormal return around the dividend announcement two days before the dividend announcement and three days afterwards. The second test was conducted to analyze the possibility of a significant cumulative abnormal return using the one-sample t-test for normally distributed data. Meanwhile, the data that are not normally distributed were analyzed using the one-sample Wilcoxon signed-rank test. The significant cumulative abnormal return was carried out by formulating the following hypothesis:

**Hypothesis 11 (H11).** *There is a significant cumulative abnormal return around the dividend announcement.*

Based on the results from Tables 12 and 13, it was found that there is a significant cumulative abnormal return on the day of dividend announcement and one to five days afterwards.

**Table 10.** One sample T-test for abnormal return.

| Period | AAR | T-Stat | df | *p*-Value (Two-Tailed) | Decision |
|---|---|---|---|---|---|
| $T_{-5}$ | −0.0004 | −0.155 | 119 | 0.877 | H10 rejected |
| $T_{-4}$ | 0.0003 | 0.135 | 119 | 0.893 | H10 rejected |
| $T_{-3}$ | 0.0010 | 0.365 | 119 | 0.717 | H10 rejected |

**Table 11.** One sample Wilcoxon signed-rank test for abnormal return.

| Period | AAR | N | *p*-Value | Decision |
|---|---|---|---|---|
| $T_{-2}$ | 0.0067 | 120 | 0.050 | H10 accepted |
| $T_{-1}$ | 0.0106 | 120 | 0.053 | H10 rejected |
| T | 0.0075 | 120 | 0.201 | H10 rejected |
| $T_{+1}$ | 0.0010 | 120 | 0.330 | H10 rejected |
| $T_{+2}$ | 0.0052 | 120 | 0.931 | H10 rejected |
| $T_{+3}$ | 0.0162 | 120 | 0.000 | H10 accepted |
| $T_{+4}$ | 0.0113 | 120 | 0.146 | H10 rejected |
| $T_{+5}$ | 0.0067 | 120 | 0.370 | H10 rejected |

**Table 12.** One sample *T*-test for cumulative abnormal return.

| Period | CAAR | T-Stat | df | *p*-Value (Two-Tailed) | Decision |
|---|---|---|---|---|---|
| $T_{-5}$ | −0.0004 | −0.155 | 119 | 0.877 | H11 rejected |
| $T_{-4}$ | −0.0001 | 0.034 | 119 | 0.973 | H11 rejected |
| T | 0.0257 | 3.582 | 119 | 0.000 | H11 accepted |

**Table 13.** One sample Wilcoxon signed-rank test for cumulative abnormal return.

| Period | CAAR | N | *p*-Value | Decision |
|---|---|---|---|---|
| $T_{-3}$ | 0.0009 | 120 | 0.627 | H11 rejected |
| $T_{-2}$ | 0.0075 | 120 | 0.461 | H11 rejected |
| $T_{-1}$ | 0.0181 | 120 | 0.051 | H11 rejected |
| $T_{+1}$ | 0.0267 | 120 | 0.032 | H11 accepted |
| $T_{+2}$ | 0.0318 | 120 | 0.011 | H11 accepted |
| $T_{+3}$ | 0.0480 | 120 | 0.000 | H11 accepted |
| $T_{+4}$ | 0.0593 | 120 | 0.000 | H11 accepted |
| $T_{+5}$ | 0.0660 | 120 | 0.000 | H11 accepted |

Furthermore, the difference test of the average abnormal return before and after the announcement of dividends was determined. The test used the Paired Sample Wilcoxon signed-rank test by first formulating the hypothesis:

**Hypothesis 12 (H12).** *The average abnormal return before is less than after the dividend announcement.*

Based on the results from Table 14, H12 was rejected because there is no difference in the average abnormal return before and after the dividend announcement. The presence of significant abnormal return was on the second day before the dividend announcement and three days after, as well as the presence of significant cumulative abnormal return on the announcement day. This was also one to five days after dividend announcement, which indicated that it contains information on the emergence of market reactions. The cumulative average abnormal return calculated from the announcement day to the fifth day showed increases in values. These indicated that there were buying actions on the share that distributed dividends which responded rapidly with a positive direction of movement (Dasilas and Leventis 2011). It strengthened the result that dividend distribution gave a positive signal to the capital market in Indonesia, especially during crisis due to the COVID-19 pandemic.

**Table 14.** Paired sample Wilcoxon signed-rank test for average abnormal return at before and after of dividend announcement.

| Indicator | AAR before—AAR after |
|---|---|
| Z | −0.681 |
| Asym sig. (two-tailed) | 0.496 |
| Exact sig. (two tailed) | 0.498 |
| Exact sig. (one-tailed) | 0.249 |
| Point prob. | 0.000 |

Profitability has been proven to have a positive effect on dividend policy. It is the most robust, as evidenced by the parameter estimation for the static panel data regression model on FEM for the GDP or COV crisis variables. Accurate results are also evident in the dynamic panel data regression for FD-GMM and SYS-GMM both for GDP and COV crisis variables. Similar outcomes were obtained for the unselected and comparison models for the dynamic specification test, such as CEM, REM, OLS-RSE, and LSDV-RSE. These were used to consider the reasons H3 was accepted. This is consistent with the research carried out by Patra et al. (2012), Singla and Samanta (2018), and Yusof and Ismail (2016). Corporate firms increase the given dividends, which are in line with the profit earned. The higher level of company profitability, leads to greater dividends. Therefore, companies with high and stable profits are able to manage their cash, thereby setting higher dividend rates (Lestari 2018; Singla and Samanta 2018; Yusof and Ismail 2016). Related to H1 and H2, companies in crisis conditions tend to distribute dividends according to their profitability (Abdulkadir et al. 2015; Ranajee et al. 2018).

Financial leverage does not have a negative effect on dividends; therefore, H4 was rejected. The results obtained are inconsistent with the hypothesis, which stated that it has a positive effect on the robust dividend policy for FD-GMM and SYS-GMM, both for the GDP or COV crisis variables and FEM for the GDP or GDP COV crisis variables. This is supported by the research carried out by Hartono et al. (2021), Parsian and Koloukhi (2014), as well as Rehman and Takumi (2012). Corporate organizations, in terms of increasing debt levels, are expected to experience a tax shield. Therefore, the profits obtained are even greater, and it leads to the possibility of positively distributing dividends. This condition is supported by the trade-off theory (Lim 2016), which states that an increased debt level gets the tax shield up to a certain optimal point, which reduces profitability because it is no longer relevant. In crisis conditions, corporate firms experience a decrease in cash flow and capital ratios, which are perceived as sources of debt. This is because the shares and equity aspects are paralyzed in the capital market. Therefore, this condition is relevant when these organizations obtain finances from debt and experience the conditions described in the trade-off theory, thereby increasing the dividend rate (Krieger et al. 2021; Zainuri et al. 2021).

The investment opportunity is proven not to have a negative effect on dividend policy; therefore, H5 is rejected. These are consistent with the research carried out by Badu (2019), Hartono and Matusin (2020), and Parsian and Koloukhi (2014) as well as Pribadi and Sampurno (2012). Corporate organizations tend not to suppress the dividend rate to increase retained earnings for their policy. However, investments from external funding sources, such as debt or shares issuance, prioritize (Hartono and Matusin 2020; Pribadi and Sampurno 2012). This supports crisis conditions with H4, where increased debt is relevant.

Firm size does not positively affect dividend policy, therefore, H6 was rejected. The results indicate that the FEM and FD-GMM have significant positive and negative effects, respectively. Therefore, a robust result on the FD-GMM model is obtained, thereby indicating that firm size has a negative effect on dividend policy for the GDP and COV. These results are in line with research conducted by Hartono and Matusin (2020), Kaźmierska-Jóźwiak (2015), and Lestari (2018). They also indicated that the larger the company, the greater the burden, thereby leading to low dividend rate (Lestari 2018). In crisis conditions, the larger the company's size the higher the costs thereby leading to a negative effect on dividend policy.

It was proven that the firm's age has a positive effect on dividend policy; therefore, H7 was accepted. These results are obtained in the FD-GMM model for the GDP crisis variable as well as COV. Badu (2019) and Ranajee et al. (2018) stated that when corporate organizations are in the mature phase, the level of dividends tends to increase, thereby giving off a signal in the form of good performance to maintain the sustainability of the business being run. Furthermore, in a more mature condition, they had lesser investment opportunities due to continuous distribution even during the pandemic.

The dividend of the previous year was proven to have a positive effect on dividend policy; therefore, H8 and H9 were accepted. This was obtained robustly on FEM for the GDP and COV crisis variables. Analysis of dynamic panel data with the $DPS_{it-1}$ variable has been proven to positively affect FD-GMM and SYS-GMM for the GDP or COV crisis variables. This finding is consistent with the research carried out by Alzomaia and Al-Khadhiri (2013), Hartono and Matusin (2020), and Maladjian and El Khoury (2014). These indicate that the dividend signaling theory is relevant with this condition because it portrays a positive performance. It was proved that higher dividend rates increased the market demands during crisis due to the pandemic.

Statistically, the parameters formed are consistent and unbiased. This condition is proven by the coefficients of influence and significance between several models estimated to have similar values. The violation of best linear unbiased estimation proves that the results of the FEM model have a coefficient and direction of influence as well as parameter significance that is not really different from the FD-GMM and SYS-GMM; therefore, this behavior does not seem to occur. This is assumed to occur because the PYD proxy elements differ from $DPS_{it}$.

## 7. Conclusions

This research discovered different behaviors during crisis conditions due to the COVID-19 pandemic. Corporate firms tend to distribute dividends that are even higher compared to the previous year to maintain a positive signal to stock market. Profitability, age, and financial leverage have a positive effect on dividend policy, while firm size has an adverse effect on dividend policy. It was also affected positively by the previous year's dividend and lagged-1 from DPS. Based on the signaling theory premise, the factors that influence dividend policy support the crisis conditions due to the pandemic. The investment opportunity factor has an insignificant effect, proving that corporate firms tend to distribute dividends without considering retained earnings, funding from debt, or equity sources. Statistically, this research performs a robust test with sophisticated and relevant analytical instruments; therefore, it proved that the violation of BLUE is solved and the alleged omitted variable bias does not occur within the estimated parameter. However, those formed between the several models being compared are similar. Therefore, they are consistent in the direction of influence and significance.

This research contributes to practitioners, academics, and further analysis. Investors or shareholders tend to pay attention to the influencing factors to support investment decisions in the capital market, thereby getting optimal returns during crisis. Corporate management formulates the proposed dividend rate at the General Meeting of Shareholders during the crisis. Companies need to consider dividend policy as a positive signal to investors by effectively distributing dividend to increase the market share price. According to Renitia et al. (2020), the step can be taken to increase stock trading activities in the capital market.

The limitation research only analyzed the crisis conditions due to the emergence of COVID-19 in 2020 because the pandemic was still in existence until its completion. Further research needs to examine these conditions in subsequent periods and those developed within pre, during, and post-crisis periods (Abdulkadir et al. 2015; Hauser 2013). Further research tends to examine new issues to create high novelty, especially for crisis conditions and the new normal condition. It also has the ability to examine the economic conditions in 2021, specifically in Indonesia. This led to questions, such as, Will there still be an economic recession in 2021? Can the process needed to influence the economic conditions on the dividend policy of companies in Indonesia by influenced?

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