**Fair Value : Jurnal Ilmiah Akuntansi dan Keuangan**
Volume 5, Number 5, 2022
P-ISSN: 2622-2191 E-ISSN : 2622-2205
Open Access: https://journal.ikopin.ac.id/index.php/fairvalue

# Covid-19 and firm performance in relation to level of income and investment - a study in Indonesia and Singapore

**Ursula. M. R. Butar Butar[1], Erni Ekawati[2]**
[1.2]Universitas Kristen Duta Wacana
[1] chenaursula811@gmail.com [2]erniekawati@gmail.com

**Info Artikel**
**Sejarah artikel:**
Diterima 12 Agustus 2022
Disetujui 25 November 2022
Diterbitkan 25 Desember 2022

***Keywords :***
*Covid-19; Firm performance; Income level; Investment level; Company performance*

**ABSTRAK**
The purpose of this study is to empirically examine the impact of the covid-19 pandemic on firms' performance. The impacts are also observed on firms in different industries, income and investment levels. This study employed sample of all non-financial firms in Indonesia and Singapore during the 2018-2020 period. The ordinary least square, fixed effect, and random effect models are adopted to test the hypotheses using the panel data. The results of the study showed that, generally, Covid-19 had a negative effect on firms' performance in Indonesia and Singapore. The Indonesian firms with higher level of income got less severe Covid-19 effect on their performance. However, the level of investment strengthened the negative effect of Covid-19 on firm performance in both countries' sample. In addition, the study documented that the effects of covid-19 were varied across the industry sectors.



## INTRODUCTION

The Covid-19 first appeared in the city of Wuhan, China in late 2019 and spread to several provinces in the country. The high level of spread of the virus made the world health agency, the World Health Organization (WHO), announced the covid-19 virus as a global pandemic in March 2020 (Rusiadi et al., 2020). The virus that has spread to various regions required each country to take policies to reduce the level of spread of covid-19 such as lockdown policies by Singapore and several other countries that chose to temporarily close access to their countries. In addition, other policies such as Indonesia apply more social distancing, namely self-quarantine or better known as Large-Scale Social Restrictions (PSBB) (Juaningsih et al., 2020).However, the implementation of this policy has a negative effect, especially on the economy, causing a recession in several countries in the world. As a result, the level of public demand for goods has decreased dramatically and had an impact on reducing the firm's income, which in this case affects firm performance. Poor firm performance will also affect the firm's business continuity.

Several studies have tested the impact of covid on firm performance, such as research in China which shows that all firms listed in China experienced performance disruption due to the covid-19 pandemic ((Shen et al., 2020); (Rababah et al., 2020); (Fu & Shen, 2020)). The research uses Return on Assets (ROA) in measuring the firm's financial performance. The result of the research showed that almost all firms in China experienced a decrease in ROA levels, which reflected a decrease in firm performance due to the covid-19 pandemic. This makes many firms experience large losses because they are unable to generate the desired profit. This research also examines the impact of the covid-19 pandemic on the performance of firms in Indonesia and Singapore. In measuring firm performance, this research uses financial ratio analysis, namely ROA.

The industrial sector, which plays an important role in the national economy, has also been affected by the covid-19 pandemic. According to (Shen et al., 2020) conducted research to measure the severity of covid in various types of industries in China. The results showed that there were differences in the impact of covid on each industry. The industries that experienced the most severe impact were the tourism sector, the film industry, entertainment and TV as well as the retail and transportation industries. The decline occurred due to the implementation of covid policies such as quarantine which made people's mobility in China decrease (Fu & Shen, 2020). Besides China, there are many countries whose industries have been affected by covid, such as Indonesia. Sectors that were severely affected included the property sector which fell to minus 12.9 percent; the automotive industry minus up to 34.5

percent; and tourism and hospitality which fell drastically to minus 1.93 percent (Ramdani, 2020). However, there are several industrial sectors that have experienced an increase or growth such as the consumer and pharmaceutical industries, trade and agriculture (Ramdani, 2020). The impact of covid-19 is different for each type of industry. Industries engaged in major fields such as medicine, food and beverages tend to have low covid severity on firm performance than sectors engaged in other industries. This research also examines the impact of covid on each industrial sector in Indonesia and Singapore. Research by (Utami & Kafabih, 2021) explained that the covid-19 pandemic had a negative impact on the Indonesian tourism sector, causing this sector to decline dramatically by 73.60 percent.

Income is a fundamental aspect for the firms (Sajekti & Priyadi, 2019). Each firm has a different level of income. A research by (Shen et al., 2020) used income as a moderating variable to assess how strong the effect of income is on the impact of covid on firm performance. The results of this research explain that there are differences in the impact of covid on firms with different levels of income. Firms with high income level have a low covid impact on firm performance, on the other hand, firms that have low levels of income generally have a high covid impact on firm performance. Therefore, firms with low income are more vulnerable to covid impact on firm performance. This research also examines the level of income on the impact of covid on the performance of firms in Indonesia and Singapore, in which case income becomes a moderating variable between the independent variable, namely the impact of covid and the dependent variable, namely firm performance.

The investment level in each firm is different. The investment level reflects the phase or life cycle of the firm (Corporate Life Cycle) starting from the start-up, growth, maturity to declining phase. In the start-up and growth phases, the firm's investment opportunities are still relatively high, in contrast to the maturity phase where investment opportunities are low, while the declining phase has not invested anymore. Research by (Rizvi et al., 2020) examined the level of corporate investment in Europe during the covid-19 pandemic. The research concluded that the different investment levels owned by each firm had a different effect on the impact of covid on firm performance. Firms that have high investment generally have a high covid impact on firm performance because it makes the firm have a high level of uncertainty risk, on the other hand, firms with low investment levels have a low covid impact on performance. In relation to the firm's life cycle, it can be seen that covid-19 has a different effect on the firm's cycle. Firms that have high investment opportunities, such as in the start-up and growth stages, have a large covid impact on firm performance, while firms with low investment opportunities, such as in the maturity stage, have a low covid impact on firm performance. This research also examines the investment level as moderating the effect of covid-19 on the ROA of firms in Indonesia and Singapore.

Until now, research related to the covid-19 pandemic is still being researched and related to various aspects of life. From the description above, researchers are interested in testing the impact of covid on firm performance. Firm performance testing is carried out using one of the financial ratios, namely Return on Assets (ROA). The research also examines the impact on each industry, while the income level and investment level will also be tested as moderating variables. According to ((Shen et al., 2020); (Rababah et al., 2020); (Fu & Shen, 2020)) explain that ROA, which is a description of firm performance, shows that every firm in China has experienced a drastic decrease in ROA due to the covid-19 pandemic, so the study concluded that the covid-19 pandemic has a negative effect on firm performance.

Researchers conducted tests on two different countries, namely Indonesia and Singapore, because the two countries have differences in the size of the country and its economic conditions. Indonesia has a large population, so handling covid is more complicated than Singapore because the scale of distribution faced by Indonesia is greater. In contrast, Singapore, which has a smaller population, will make handling covid easier because the scale of distribution faced is smaller. Another difference can be seen from the economic conditions of the country, in this case that the Gross Domestic Product (GDP) owned by Singapore is much higher than Indonesia, so Singapore is superior in economic resilience than Indonesia. Because Singapore is very different from Indonesia, researchers want to test the impact of the covid-19 pandemic on firm performance in these two countries by including income level and investment level as moderating variables in examining the impact of covid on firm performance.

## RESEARCH METHODS

The method used in this study is a quantitative approach which according to (Sugiyono, 2016) that the method is quantitative because research data is in the form of numbers and analysis uses statistics. Researchers conducted tests on secondary data in the form of firm's annual financial reports that have been published by firms listed in Indonesia and also Singapore obtained from the Osiris database. The sample selection uses a purposive sampling method which aims to filter the sample according to the desired criteria, namely: firms that are still active from 2018-2020, testing all types of industries except the finance sector, and firms that have complete data for the purposes of this study.

### Variable Measurements

### Dependent Variable

The dependent variable used in this study is Return on Assets (ROA) which measures the firm's ability to generate profits in the past to be projected in the future (Sudaryo et al., 2020). The level of effectiveness refers to that the greater the ROA value in a firm, the higher the firm performance level, on the other hand, a decreased ROA will make the firm's performance low.

$$\textbf{ROA} = \frac{\boldsymbol{NI}}{\boldsymbol{TA}} \qquad (1)$$

Where:
ROA = *Return On Assets*
NI = *Net Income*
TA = *Total Asset*

### Independent Variables

The independent variable in this study is Covid Year (CY), which is the time of the covid-19 pandemic outbreak and is divided into two periods, namely before and after the pandemic. This variable is useful to see the different conditions faced by firms after and before covid emerged. In its measurement, this variable is measured using a dummy variable, namely 1, which is after the covid pandemic, and 0 which is before the covid pandemic.

**CY= 0: Before covid pandemic, before 2020**
**1: After covid pandemic, year 2020**

Where:
CY = Covid Year (the time of the covid-19 pandemic outbreak, starting in 2020)

### Industry

Differences in the impact of covid are also experienced by various types of industrial sectors in many countries. Industry variables are the result of classifying several types of industrial sectors based on the GICS classification (MSCI, 2020), namely:

i. Energy (E)
ii. Industrial (I)
iii. Consumer Discretionary (CD)
iv. Consumer Staples (CST)
v. Health Care (HC)
vi. Real Estate (RE)
vii. Information Technology dan Communication Services (IT dan CSR)
viii. Utilities dan Materials (U dan M)

### Moderating Varibles

This research uses moderating variables to determine the mechanism of covid's impact on firm performance. The moderating variables used are income level and investment level. The firm's income level can be used as an analysis in knowing the conditions on the firm's fundamentals (Dasrianti, 2018). The variable used to determine the firm's income level is the natural logarithm of total revenue.

$$\mathbf{REV = Ln\ (Rev)} \quad (2)$$

Where:
REV : Total revenue
Ln (Rev) : Natural logarithm of the total revenue

The firm's investment level is influenced by the cycle or phase faced by the firm. In calculating the investment level, this research applies the RCI ratio calculation. This ratio is used to calculate the expenses given by the firm in carrying out its investment.

$$\mathbf{RCI} = \frac{CE}{TA} \quad (3)$$

Where:
RCI : Rasio Capital Investment
CE : Capital Expenditure anual (Net cash flow from investing activities for each period)
TA : Total firm's assets

**Control Variables**

The control variables used in this research are control variables that can affect ROA and Covid Year. The control variables are Size, DER and Growth.

Size or firm size is a measuring tool in assessing how big/small the firm is seen from several aspects of the firm, one of which is total assets (Suwardika & Mustanda, 2017). The variable used to determine firm size in this research is the natural logarithm of total assets.

$$\mathbf{SIZE = Ln\ (TA)} \quad (4)$$

Where:
SIZE : Firm's Size
TA : Total Assets
Ln (TA) : Natural logarithm of total assets

Leverage can explain the size of the firm's use of debt in running its business. In measuring this ratio, this study uses DER analysis, namely the ratio of total debt to firm capital.

$$\boldsymbol{DER = \frac{Liab}{Eq}} \quad (5)$$

Where:
DER = Debt to Equity (debt-to-equity ratio)
Liab = Liabilities (total deby)
Eq = Equity

Growth (Firm Growth) is a change in total assets either due to an increase or decrease in firm assets during one period. The calculation for growth in this research is as follows:

$$\mathbf{GRWT} = \frac{(TA_t - TA_{t-1})}{TA_{t-1}} \quad (6)$$

Where:
GRWT : Growth (Firm Growth)
TA : Total Assets
t : Year

**Research Design**

This research uses panel data regression, which is a combination of time series data and cross section data. The use of this regression is done with three models, namely Ordinary Least Square (OLS), Fixed Effect Model (FEM) and Random Effect Model (REM). Each model has its own advantages and disadvantages. In determining the best model, several tests are carried out, namely the Chow test as the first test, then the second test, namely the Hausman test, and the LM test as the final test. Determination of the best model is based on the acquisition of the probability value in each test. The Chow test aims to test the best model between FEM and CEM. When the probability value obtained is smaller than the

level α=0.05, the selected model is the FEM model, otherwise when the probability value is greater than the level α, the selected model is the CEM. The second test is conducted to determine the best test between FEM and REM. The FEM model is selected when the probability obtained is smaller than the level α = 0.05, otherwise the REM model is selected when the probability is greater than the level α. The third test is the LM test which tests between the CEM and REM models. When the probability value obtained is smaller than α=0.05, the selected model is REM, while the probability value greater than α makes CEM the best model.

**Hypothesis**

H1: The covid-19 pandemic has a negative effect on firm performance
H2: The covid-19 pandemic affects firm performance differently for each industry.
H3: The higher the income level, the weaker the negative effect of the COVID-19 pandemic on firm performance.
H4: The higher the investment level, the stronger the negative effect of the covid-19 pandemic on firm performance.

**Statistical Model and Hypothesis Testing**

The hypotheses in this research are tested with the following statistical model:

***Statistical Model* 1:**

$$\boldsymbol{ROA = a_1 + b_1 CY + c_1 SIZE + c_2 DER + c_3 GRWT + e} \quad (7)$$

Hypothesis 1 is supported if b1<0 and significant

***Statistical Model 2:***

Similar to statistical model 1, except that it is performed on each different industry.

***Statistical Model 3:***

$$\boldsymbol{ROA = a_1 + b_1 CY + b_2 REV + b_3 CY * REV + c_1 SIZE + c_2 DER + c_3 GRWT + e} \quad (8)$$

Hypothesis 3 is supported if b3<0 and significant

***Statistical Model 4:***

$$\boldsymbol{ROA = a_1 + b_1 CY + b_2 RCI + b_3 CY * RCI + c_1 SIZE + c_2 DER + c_3 GRWT + e} \quad (9)$$

Hypothesis 4 is supported if b3<0 and significant

Where:

| | |
|---|---|
| ROA | : Return on Assets |
| a | : Constant |
| $b_1 b_2 b_3$ | : Regression coefficient |
| $c_1 c_2 c_3$ | : Control Variables |
| CY | : Covid Year |
| CY*REV | : Covid Year multiplied by Total Income |
| CY*RCI | : Covid Year multiplied by Rasio Capital Investment |
| SIZE | : Firm Size |
| DER | : Debt to Equity Ratio |
| GRWT | : Growth (Firm Growth) |
| e | : Error term |

## RESULT AND DISCUSSION

### Research Sample

In this reseach, the sample used is all industrial sectors except the finance sector which are listed in Indonesia and Singapore in 2018-2020. The total sample amounted to 338 firm with a total of 1,014 observations. The following is a table of the number of samples used in this research:

**Table 1 Sampling Results**

| Remarks | Firms |
|---|---|
| Firms in Indonesia | 220 |
| Firms in Singapore | 310 |
| Total firms | 530 |
| Number of firms that meet the research sample criteria | |
| Firms in Indonesia | 137 |
| Firms in Singapore | 201 |
| Total final sample firms (firms) | 338 |
| Years of observation 2018-2020 (years) | 3 |
| Total observation (firm-years) | 1,014 |

Source: Processed data

**Table 2 Descriptive Statistics for Indonesia**

| | N | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|---|
| **CE** | 411 | 0 | 37.636.597.000.000 | 1.498.504.619.436 | 3.968.904.497.563 |
| **TA** | 411 | 17.531.592.000 | 163.136.516.000.000 | 18.200.372.997.740 | 27.971.198.962.971 |
| **REV** | 411 | 0 | 114.477.311.000.000 | 11.547.586.399.833 | 17.763.202.509.035 |
| **LIAB** | 411 | 960.182.000 | 83.998.472.000.000 | 8.782.901.317.709 | 15.552.528.512.886 |
| **EQ** | 411 | 13.638.641.403 | 79.138.044.000.000 | 8.374.574.481.684 | 13.000.158.694.848 |

Remarks: CE, TA, REV, LIAB, EQ expressed in rupiah
N = 411 observations derived from 137 firms multiplied by 3 years (2018-2020).
Source: Processed data

**Table 3 Descriptive Statistics for Singapore**

| | N | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|---|
| **CE** | 603 | 0 | 2.588.596.000.000 | 11.121.800.885 | 149.262.918.811 |
| **TA** | 603 | 8.370.000 | 37.612.530.000.000 | 205.103.359.244 | 2.648.241.159.841 |
| **REV** | 603 | 73.000 | 14.560.417.000.000 | 92.201.583.717 | 1.032.613.644.628 |
| **LIAB** | 603 | 588.000 | 9.204.269.000.000 | 54.705.600.018 | 654.183.654.522 |
| **EQ** | 603 | 200.000 | 20.853.193.000.000 | 107.574.529.879 | 1.443.271.337.165 |

Remarks: CE, TA, REV, LIAB, EQ expressed in Singapore Dollar
N = 603 observations derived from 201 firms multiplied by 3 years (2018-2020)
Source: Processed data

Based on Tables 2 and 3, the number of observations in Indonesia amounted to 411 observations and Singapore amounted to 603 observations obtained from data collection for 3 years. Some of the variables used in this research are CE, TA, REV, LIAB, and EQ. In CE variable, it can be seen that the minimum value of the variable in both Indonesia and Singapore is 0, which means that there are firms with very low investment and even no investment, namely PT Akbar Indo Makmur Stimec Tbk in Indonesia in 2019 and 2020, and Metech International Limited in 2020 in Singapore.

**Table 4 Descriptive Statistics of Variables in Indonesia and Singapore**

| | Indonesia | | | | | Singapore | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Minimum | Maximum | Mean | Standard Deviation | N | Minimum | Maximum | Mean | Standard Deviation |
| **ROA** | 411 | -45.09 | 45.36 | 3.85 | 8.58 | 603 | -64.46 | 49.40 | 1.37 | 9.86 |
| **CY** | 411 | .00 | 1.00 | .33 | .471 | 603 | .00 | 1.00 | .33 | .47 |
| **RCI** | 411 | .00 | 890.68 | 8.36 | 43.95 | 603 | .00 | 94.48 | 5.61 | 8.36 |
| **LN REV** | 411 | .00 | 32.37 | 28.87 | 2.67 | 603 | 11.20 | 30.31 | 18.82 | 2.28 |
| **DER** | 411 | .01 | 3903.20 | 122.38 | 272.98 | 603 | 1.86 | 6485.00 | 89.67 | 318.49 |
| **LN SIZE** | 411 | 23.59 | 32.73 | 29.43 | 1.67 | 603 | 15.94 | 31.26 | 19.70 | 2.26 |
| **GRWT** | 411 | -70.75 | 585.67 | 9.37 | 34.39 | 603 | -74.78 | 231.29 | 8.89 | 28.40 |

ROA, RCI, LN REV, DER, LN SIZE, GRWT expressed in %

Source: Reprocessed

Table 4 shows the descriptive statistics of the research variables obtained from firms in Indonesia and Singapore. The value of ROA owned by firms in Indonesia ranged between -45.09% and 45.36% with an average of 3.85%, while in Singapore ROA ranged between -64.46% and 49.40% with an average of 1.37%. From the descriptive data, it appears that the firm performance in Indonesia is relatively better than in Singapore. Likewise for other variables such as RCI, LN REV, DER, LN SIZE, and GRWT on average Indonesia has a higher value than that of the Singapore.

**Table 5 ROA of Each Industry**

| Industrial Sectors | Indonesia | | | Singapore | | |
|---|---|---|---|---|---|---|
| | | ROA (Mean) | | | ROA (Mean) | |
| | N | Before Covid | After Covid | N | Before Covid | After Covid |
| **Energy** | 39 | 10.30% | 6.45% | 27 | -0.49% | 1.37% |
| **Industrial** | 75 | 4.98% | 2.44% | 174 | 0.81% | -1.11% |
| **Consumer Discretionary** | 39 | 4.32% | -2.03% | 66 | 2.06% | -0.23% |
| **Consumer Staples** | 75 | 6.25% | 3.70% | 48 | 3.85% | 4.98% |
| **Health Care** | 33 | 5.09% | 4.05% | 45 | 2.59% | 6.65% |
| **Real Estate** | 30 | 4.31% | -0.51% | 120 | 2.43% | -1.09% |
| **Information Technology & Communication Services** | 111 | 3.20% | 1.48% | 78 | 2.29% | 2.38% |
| **Utilities & Materials** | 81 | 3.28% | 0.27% | 45 | 0.77% | -0.92% |

Source: Reprocessed

Table 5 shows the ROA data for each industry in Indonesia and Singapore experienced both decrease and increase. All industrial sectors in Indonesia experienced a decrease from before and after Covid-19. The sectors that experienced an increase in ROA in Singapore were the energy, consumer staples, and health care sectors.

**Hypothesis Testing Results**

**Table 6 Regression Results of Statistical Model 1 in Indonesia**

| Variables | OLS | | | Fixed Effect | | | Random Effect | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | | t-test | Coefficient | | t-test | Coefficient | | t-test |
| **Constant** | 5.98 | | 0.82 | -404.83 | *** | -4.94 | **2.69** | | **0.27** |
| **CY** | -2.36 | *** | -2.70 | -3.32 | *** | -5.21 | **-2.51** | *** | **-4.04** |
| **DER** | -0.00 | *** | -4.57 | -0.00 | ** | -2.34 | **-0.00** | *** | **-3.22** |
| **LN SIZE** | -0.02 | | -0.10 | 13.93 | *** | 5.00 | **0.07** | | **0.23** |
| **GRWT** | 0.02 | ** | 2.03 | 0.00 | | 0.53 | **0.0** | ** | **2.02** |
| **Chow Test** | 3.99 (0.00) | | | | | | | | |
| **Hausman** | | | | 0.00 (1.00) | | | | | |
| **LM Test** | | | | | | | 78.84 **(0.00)** | | |
| **Selected Model: REM** | | | | | | | | | |

Remarks: ***Significant at level α= 1%; ** Significant at level α= 5%; * Significant at level α= 10%

Source: Reprocessed

Table 6 shows the results of panel data regression of firms in Indonesia. The test is carried out with three model tests, namely OLS, FEM and REM. From this test, the selected model is REM because the final test, namely the LM Test, has a probability value (0.00) smaller than the level α = 5%. The variable tested is CY (Covid Year) with a coefficient of -2.51 and significant at the level α = 1%. This shows that the average ROA in the year after covid is lower than the average ROA before covid for all samples tested in Indonesia. This test uses the control variables DER, LN SIZE, GRWT. The significant control variables are GRWT and DER, while LN SIZE is not significant.

**Tabel 7 Regression Results of Statistical Model 1 in Singapore**

| **Variables** | **OLS** | | | **Fixed Effect** | | | **Random Effect** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Coefficient** | | **t-test** | **Coefficient** | | **t-test** | **Coefficient** | | **t-test** |
| Constatnt | -10.93 | *** | -3.21 | **-138.81** | *** | **-3.55** | -12.41 | ** | -2.52 |
| CY | -0.75 | | -0.92 | **-1.32** | ** | **-2.35** | -0.80 | | -1.48 |
| DER | -0.00 | *** | -3.44 | **-0.00** | *** | **-3.47** | -0.00 | *** | -4.29 |
| LN SIZE | 0.62 | *** | 3.62 | **7.13** | *** | **3.59** | 0.69 | *** | 2.81 |
| GRWT | 0.08 | *** | 5.79 | **0.04** | *** | **3.52** | 0.07 | *** | 6.60 |
| N | = 603 | | | | | | | | |
| Adjusted R-square | = 0.60 | | | | | | | | |
| Chow Test | 4.96 (0.00) | | | | | | | | |
| Hausman | | | | 11.10 **(0.02)** | | | | | |
| LM Test | | | | | | | - | | |
| **Selected Model: FEM** | | | | | | | | | |

Remarks: ***Significant at level α= 1%
** Significant at level α= 5%
* Significant at level α= 10%

Source: Reprocessed

Table 7 shows the testing of panel data regression results of firms in Singapore with three model tests, namely OLS, FEM and REM. From these tests, the best model is the FEM model. This selection is based on the probability value of the FEM test as the final test which shows a probability value of (0.02) smaller than the level α = 5%. CY is a variable that is tested against ROA. The result can be seen that the coefficient is -1.32 and significant at the level α = 5%. This shows that the average ROA in the covid year is significantly smaller than the ROA before the covid year, besides this test uses the control variables DER, LN SIZE, GRWT. All of these variables are significant, which means that these variables can control the regression model well. Therefore hypothesis 1, which states that Covid-19 has a negative effect on firm performance, is supported, both in Indonesia and Singapore.

**Table 8 Regression Results of Statistical Model 1 on Each Industry in Indonesia and Singapore**

| **Industry** | **Indonesia** | | | | **Singapore** | | | |
|---|---|---|---|---|---|---|---|---|
| | **N** | **Coefficient** | | **t-test** | **Coefficient** | | **t-test** | **N** |
| Energy | 39 | -3.93 | | -0.10 | -27.57 | | -1.04 | 27 |
| **Industrial** | 75 | -2.63 | * | -1.08 | -0.65 | | -0.71 | 174 |
| **Consumer Discretionary** | 39 | -2.42 | | -1.67 | -2.48 | *** | -1.94 | 66 |
| **Consumer Staples** | 75 | -2.70 | * | -1.27 | 1.65 | *** | 1.38 | 48 |
| **Health Care** | 33 | 0.84 | | 0.63 | 2.61 | | 1.00 | 45 |
| **Real Estate** | 30 | -3.48 | ** | -3.55 | -3.57 | * | -6.24 | 120 |
| Information Technology & Communicatin Services | 111 | -2.44 | | -1.61 | 0.61 | | 0.39 | 78 |
| **Utilities & Materials** | 81 | -1.54 | *** | -2.05 | -1.50 | | -0.61 | 45 |

Remarks: ***Significant at level α= 1%
** Significant at level α= 5%
* Significant at level α= 10%

Source: Reprocessed

Table 8 shows the panel data regression results for each industry in Indonesia and Singapore. The majority of industrial sectors get the REM model as the best model because the probability level in the last LM test is below the level α = 5%, so the researchers make the gray color as a marker that the selected model in the industry is a model other than REM, namely OLS. The regression results show that different ROA before and after covid occurs in Indonesia and Singapore. The average ROA after covid is lower than before covid. In Indonesia, the only sector that has a positive regression coefficient is the Health Care sector, but it is not statistically significant. In Singapore, the Consumer Staples, Health Care, and Information Technology and Communication Services sectors have positive coefficients, but only the Health Care sector is statistically significant. Therefore Hypothesis 2, which states that the effect of Covid-19 on firm performance differs between industries, is supported. The results of this test are in accordance with research conducted by ((Shen et al., 2020); (Widyastuti & Nugroho, 2020)) who both concluded that the effect caused by covid in each industry is different.

**Table 9 Regression Results of Statistical Model 3 in Indonesia**

| **Variables** | **OLS** | | | ***Fixed Effect*** | | | ***Random Effect*** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Coefficient** | | **t-test** | **Coefficient** | | **t-test** | **Coefficient** | | **t-test** |
| Constant | 18.600 | ** | 2.24 | -395.14 | *** | -4.82 | **13.08** | | **1.29** |
| CY | -30.11 | ** | -2.26 | -17.13 | | -1.59 | **-23.40** | * | **-2.30** |
| REV | 0.79 | *** | 3.72 | 0.43 | | 1.43 | **0.67** | *** | **3.02** |
| CY*REV | 0.95 | ** | 2.08 | 0.47 | | 1.28 | **0.72** | * | **2.06** |
| LN SIZE | -1.23 | *** | -3.35 | 13.17 | *** | 4.68 | **-0.93** | ** | **-2.14** |
| DER | -0.00 | *** | -4.53 | -0.00 | ** | -2.27 | **-0.00** | *** | **-3.22** |
| GRWT | 0.02 | * | 1.84 | 0.00 | | 0.26 | **0.01** | * | **1.68** |
| N | = 411 | | | | | | | | |
| Adjusted R-square | = 0.11 | | | | | | | | |
| Chow Test | 3.75 (0.00) | | | | | | | | |
| Hausman | | | | 0.00 (1.00) | | | | | |
| LM Test | | | | | | | 70.14 **(0.00)** | | |
| **Model selected: REM** | | | | | | | | | |

Remarks: ***Significant at level α= 1%
** Significant at level α= 5%
* Significant at level α= 10%

Source: Reprocessed

Table 9 shows the test results of panel data regression of firms in Indonesia with three models, namely OLS, FEM and REM. From the test, the selected model is REM. Model selection is based on the probability value of the LM test as the final test which shows that the probability value in the test is (0.00) below the level α = 5%, making REM the selected model. This research variable is CY * REV which is an interaction variable between the CY and REV variables. From the test results, it can be seen that the variable has significance at the level α = 10% with a coefficient of 0.72. However, apart from the interaction variable, variables such as CY and REV are still significant. This shows that the income variable cannot really eliminate the significance between the CY and REV variables. The CY variable, which initially has a negative value, namely the average value of ROA is negative, changes when the income variable is included to 0.72 in the CY*REV interaction variable, so from these results it can be seen that income can actually weaken the influence of CY on ROA. High income can cause the effect of CY on ROA to decrease. In addition, this test uses control variables such as DER, LN SIZE, GRWT. All of these variables are significant, which means that these variables can control the regression model well. Therefore, Hypothesis 3, which states that income level weakens the negative effect of covid-19 on firm performance, is supported, in Indonesia.

**Table 10 Regression Results of Statistical Model 3 in Singapore**

| Variables | OLS | | | Fixed Effect | | | Random Effect | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | | t-test | Coefficient | | t-test | Coefficient | | t-test |
| Constant | -16.19 | *** | -4.11 | **-166.67** | *** | **-4.40** | -18.28 | *** | -3.70 |
| CY | 1.47 | | 0.22 | **0.70** | | **-0.16** | 0.81 | | 0.18 |
| REV | 2.38 | *** | 7.39 | **5.18** | *** | **5.90** | 2.77 | *** | 6.83 |
| CY*REV | -0.09 | | -0.28 | **0.00** | | **0.01** | -0.06 | | -0.27 |
| LN SIZE | -0.05 | *** | -4.36 | **-0.00** | *** | **-3.76** | -0.00 | *** | -4.91 |
| DER | -1.40 | *** | -4.55 | **3.58** | * | **1.79** | -1.65 | *** | -3.98 |
| GRWT | 0.09 | *** | 6.99 | **0.05** | *** | **3.72** | 0.08 | * | 7.45 |
| N | = 603 | | | | | | | | |
| Adjusted R-square | = 0.63 | | | | | | | | |
| Chow Test | 4.86 (0.00) | | | | | | | | |
| Hausman | | | | 24.75 **(0.00)** | | | | | |
| LM Test | | | | | | | | | |
| **Selected Model: FEM** | | | | | | | | | |

Remarks: ***Significant at level α= 1%
** Significant at level α= 5%
* Significant at level α= 10%

Source: Reprocessed

Table 10 is a test of the panel data regression results of firm in Singapore that test OLS, FEM and REM to get the best model. The test results of the three tests show that the selected model in this regression is FEM. Model selection is based on the probability value of the Hausman test as the final test which shows that the probability value of the test is (0.00) below the α = 5% level, making FEM the selected model. The research variable in this model is CY*REV which is an interaction variable between CY and REV variables. From the test results, it can be seen that the variable has no significance to ROA. This shows that the income variable can strengthen the effect of CY on ROA, but it is not statistically significant. From the regression results, it can be seen that the income level in Singapore does not affect the relationship between Covid Year and ROA, while the control variables owned by the firm show that all variables are significant, so that they can control the model well. Therefore, Hypothesis 3, which states that income level weakens the negative effect of covid-19 on firm performance, is not supported, in Singapore.

**Table 11 Regression Results of Statistical Model 4 in Indonesia**

| Variables | OLS | | | Fixed Effect | | | Random Effect | | |
|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | | t-test | Coefficient | | t-test | Coefficient | | t-test |
| Constant | 6.70 | | 0.92 | **-452.58** | *** | **-5.45** | 3.06 | | 0.31 |
| CY | -1.28 | | -1.18 | **-1.69** | * | **-1.91** | -1.46 | * | -1.75 |
| RCI | 0.15 | | 1.58 | **0.25** | ** | **2.58** | 0.15 | * | 1.81 |
| CY*RCI | -0.16 | * | -1.64 | **-0.26** | *** | **-2.64** | -0.16 | * | -1.85 |
| LN SIZE | -0.08 | | -0.33 | **15.50** | *** | **5.50** | 0.03 | | 0.10 |
| DER | -0.00 | *** | -4.50 | **-0.00** | ** | **-2.49** | -0.00 | *** | -3.23 |
| GRWT | 0.01 | | 1.35 | **-0.01** | | **-0.80** | 0.01 | | 1.11 |
| Chow Test | 4.07 (0.00) | | | | | | | | |
| Hausman | | | | 42.13 **(0.00)** | | | | | |
| LM Test | | | | | | | | | |
| **Selected Model: FEM** | | | | | | | | | |

Remarks: ***Significant at level α= 1%
** Significant at level α= 5%
* Significant at level α= 10%

Source: Reprocessed

Testing the results of panel data regression of firms in Indonesia in the fourth regression is shown in Table 11, which tests using several models, namely OLS, FEM and REM. From the test, the selected model is FEM because the final test result, namely the Hausman test, shows the probability value (0.00) is lower than the level α = 5%. The variable tested in this regression is CY*RCI which is an interaction variable. The variable has a coefficient of -0.26 and is significant at the α = 1% level. This shows that RCI affects the relationship between CY and ROA. Some non-interaction variables are also still significant such as CY and RCI, so it can be seen that the moderating effect cannot really eliminate the significance of CY and RCI. However, the significant moderation results show that RCI weakens the effect of covid year on ROA. Threfore, an increase in investment can weaken the effect of covid year on ROA. This test also uses control variables such as DER, LN SIZE, GRWT. The significant control variables are LN SIZE and DER, while GRWT is not significant. Therefore, Hypothesis 4, which states that the investment level weakens the negative effect of covid-19 on firm performance, is supported, in Indonesia.

**Table 12 Regression Results of Statistical Model 4 in Singapore**

| | **OLS** | | | **Fixed Effect** | | | **Random Effect** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Coefficient** | | **t-test** | **Coefficient** | | **t-test** | **Coefficient** | | **t-test** |
| Constant | -11.08 | *** | -3.22 | -149.94 | *** | -3.85 | **-12.93** | ******* | **-2.61** |
| CY | -0.43 | | -0.40 | 0.14 | | 0.19 | **0.26** | | **0.35** |
| RCI | 0.00 | | 0.11 | -0.00 | | -0.18 | **-0.00** | | **-0.18** |
| CY*RCI | -0.07 | | -0.46 | -0.39 | ******* | -3.07 | **-0.27** | ****** | **-2.25** |
| DER | -0.00 | *** | -3.45 | -0.00 | ******* | -3.51 | **-0.00** | ******* | **-4.40** |
| LN SIZE | 0.62 | *** | 3.64 | 7.69 | ******* | 3.89 | **0.72** | ******* | **2.92** |
| GRWT | 0.08 | *** | 5.74 | 0.05 | | 3.62 | **0.07** | ******* | **6.84** |
| N | = 603 | | | | | | | | |
| Adjusted R-square | = 0.07 | | | | | | | | |
| Chow Test | 5.11 (0.00) | | | | | | | | |
| Hausman | | | | 0.00 (1.00) | | | | | |
| LM Test | | | | | | | 190.21 **(0.00)** | | |
| **Selected Model: REM** | | | | | | | | | |

Remarks: ***Significant at level α= 1%
** Significant at level α= 5%
* Significant at level α= 10%

Source: Reprocessed

In Table 12 are the regression results of the four panel data in Singapore that conducted several model tests, namely OLS, FEM and REM. From the test, the selected model is REM. The selection of this model is based on the level of profitability obtained from the LM test results, which is (0.00) lower than the level α = 5%. Therefore, REM is the selected model. The variable tested in this regression is CY*RCI which is an interaction variable. The variable is significant at α = 5% with a coefficient of -0.27, so it appears that RCI affects the relationship of CY to ROA. An increase in RCI can weaken the negative effect of covid year on ROA. This regression has control variables, namely LN SIZE and DER, and GRWT, and all three are significant. Thus, Hypothesis 4, which states that the level of investment weakens the negative effect of covid-19 on firm performance, is supported, in Singapore.

## DISCUSSION

From the results of statistical hypothesis testing, it is found that the covid-19 pandemic has a negative and significant effect on firm performance in both Indonesia and Singapore. These results are consistent with research conducted by (Shen et al., 2020) and (Golubeva, 2021). It is undeniable that covid-19 has globally reduced the performance of companies, although there are some companies in certain industries that have actually experienced an increase in performance. From the statistical tests conducted on each industrial sector, it can be found that in Indonesia, the sector that is not affected by Covid-19 is the Health Care sector. In Singapore, the sectors that are not affected by the Covid-19

pandemic are Health Care and Information Technology and Communication Services, while the Consumer Staples sector has actually benefited positively from the pandemic. Sectors included in the Consumer Staples Sector are consumer staples and household goods, cigarettes, and oil palm plantations. The finding is in line with the lockdown policy which has become a major issue during the pandemic in every country. The lockdown policy encourages people to do panic buying and accumulate supplies of basic necessities with precautionary motivation.

Related to the income level that reflects the fundamental strength of the firm, the results obtained in this study are as follows; in Indonesia, the higher the income level, the weaker the negative effect of covid on frim performance. This result is in line with the research of (Shen et al., 2020). However, in Singapore the income level does not weaken the negative effect of covid on firm performance. The variation of income change (LN REV) in Singapore is not as large as in Indonesia. This shows that the income level of firms in Singapore is relatively more stable. Meanwhile, in Indonesia there are still several firms with low income levels, indicating that the firm's fundamentals are not too strong, so the negative impact of covid is more pronounced.

The investment level can be interpreted as the life phase of the firms, in this case, the firms with high investment levels are in the start-up and growth phases, while low investment level is already in the maturity phase. The statistical test results obtained in Indonesia and Singapore, the investment level strengthens the negative effect of covid-19 on firm performance. This result is in line with the research of (Rizvi et al., 2020) which states that the level of investment can affect the impact of covid on firm performance.

## CONCLUSION

This study has investigated the impact of the covid-19 pandemic on firm performance in all industrial sectors other than finance in Indonesia and Singapore in 2018-2020. The following are some of the conclusions that can be obtained from the statistical tests that have been carried out: (i) The covid-19 pandemic has a negative effect on firm performance in Indonesia and Singapore, but the negative effect is heavier in Indonesia; (ii) All industries in general are negatively affected by the covid pandemic. In Indonesia, the sector that is not affected by Covid-19 is the Health Care sector. In Singapore, the sectors that are not affected by the Covid-19 pandemic are Health Care and Information Technology and Communication Services, while the Consumer Staples sector actually benefits positively from the Covid-19 pandemic; (iii) High income levels weaken the negative effect of Covid-19 on firm performance in Indonesia, but not Singapore; (iv) Investment level strengthens the negative effect of Covid-19 on firm performance. The limitations in this research are as follows: (i) This research only includes short-term performance measurements because the effect of covid-19 on long-term performance cannot be studied. (ii) The performance measurement used only uses ROA which measures profitability, the measurement has not yet reached the measurement of market performance. (iii) The categories used for the industrial sector in this study are too general, using more specific categorization will obtain a more useful analysis related to the influence of Covid-19 on the industrial sector.

## REFERENCES

Dasrianti. (2018). Analisis Pendapatan Dan Beban Usaha Dalam Meningkatkan Laba Pada Pt. Jasa Marga (Persero) Tbk Cabang Belmera Medan. *Skripsi. Universitas Muhammadiyah Sumatera Utara.*

Fu, M., & Shen, H. (2020). COVID-19 and corporate performance in the energy industry. *Energy Research Letters*, *1*(1), 12967.

Golubeva, O. (2021). Firms' performance during the COVID-19 outbreak: International evidence from 13 countries. *Corporate Governance: The International Journal of Business in Society*.

Juaningsih, I. N., Consuello, Y., Tarmidzi, A., & NurIrfan, D. (2020). Optimalisasi Kebijakan Pemerintah dalam penanganan Covid-19 terhadap Masyarakat Indonesia. *SALAM: Jurnal Sosial Dan Budaya Syar-I*, *7*(6), 509–518.

Rababah, A., Al-Haddad, L., Sial, M. S., Chunmei, Z., & Cherian, J. (2020). Analyzing the effects of COVID-19 pandemic on the financial performance of Chinese listed companies. *Journal of Public Affairs*, *20*(4), e2440.

Ramdani, E. (2020). Formulasi Strategi Korporasi Dalam Ketidakpastian Masa Depan Pasca Covid-19. *Jurnal Akuntansi Barelang*, *4*(2), 17–28.

Rizvi, S., Mirza, N., Naqvi, B., & Rahat, B. (2020). *Covid-19 and asset management in EU: a preliminary assessment of performance and investment styles*. https://doi.org/https://doi.org/10.1057/s41260-020-00172-3 ORIGINAL ARTICLE Covid-19

Rusiadi, R., Aprilia, A., Adianti, V., & Verawati, V. (2020). Dampak Covid-19 Terhadap Stabilitas Ekonomi Dunia (Studi 14 Negara Berdampak Paling Parah). *Jepa*, *5*(2), 173–182.

Sajekti, E. M., & Priyadi, M. P. (2019). Pengaruh Faktor Fundamental dan Mekanisme Corporate Governance Terhadap Pengungkapan Corporate Social Responsibility. *Jurnal Ilmu Dan Riset Akuntansi (JIRA)*, *8*(4).

Shen, H., Fu, M., Pan, H., Yu, Z., & Chen, Y. (2020). The Impact of the COVID-19 Pandemic on Firm Performance. *Emerging Markets Finance and Trade*, *56*(10), 2213–2230. https://doi.org/10.1080/1540496X.2020.1785863

Sudaryo, Y., Purnamasari, D., Sofiati, N. A., & Kusumawardani, A. (2020). Pengaruh Sales Growth (SG), Current Ratio (CR), Debt To Equity Ratio (DER), Total Assets Turn Over (TATO), Return On Assets (ROA) Terhadap Price To Book Value (PBV)(Studi Pada PT Indofarma Tbk. Yang Terdaftar Di BEI Periode 2012-2019). *Ekonam: Jurnal Ekonomi, Akuntansi & Manajemen*, *2*(1), 19–31.

Sugiyono. (2016). *Metode penelitian kuantitatif, kualitatif, dan R & D*. Bandung: CV Alfabeta.

Suwardika, I. N. A., & Mustanda, I. K. (2017). Pengaruh Leverage, Ukuran Perusahaan, Pertumbuhan Perusahaan, dan Profitabilitas Terhadap Nilai Perusahaan Pada Perusahaan Properti. *E-Jurnal Manajemen Unud*, *6*(3), 1248–1277.

Utami, B. A., & Kafabih, A. (2021). Sektor pariwisata Indonesia di tengah pandemi COVID 19. *JDEP (Jurnal Dinamika Ekonomi Pembangunan)*, *4*(1), 8–14.

Widyastuti, N., & Nugroho, H. (2020). Dampak Covid-19 terhadap Industri Minyak dan Gas Bumi: Rekomendasi Kebijakan untuk Indonesia. *Jurnal Perencanaan Pembangunan: The Indonesian Journal of Development Planning*, *4*(2), 166–176. https://doi.org/10.36574/jpp.v4i2.116