Proceeding Book of ***The 6th ICMEM 2021****, 11-13 August 2021, Bandung, Indonesia*
ISBN*: 978-623-92201-2-9*

Effective and Efficient CGS Strategy to Mitigate NDC Unplanned Total Shutdown: A Case in PT. Capital Petroleum Indonesia

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Abstract - **Green stocks are shares from a company that has a positive environmental impact. In Indonesia, they are found within the green index. Even though the index has shown better performance than other major indices in Indonesia, it is still not yet entirely known how the green index holds up to an unprecedented crisis such as the COVID-19 pandemic. Using available data of 41 green constituents from 2015 to 2021 in Indonesia, this research uses panel data regression to determine how the COVID-19 pandemic affects the prices of green stocks and what factors significantly affect these stocks. The author found a significant and negative relationship between the presence of COVID-19 (COVID19) and also Net Profit Margin (NPM) toward stock prices within the green index (PRICE). There is also a significant and positive relationship between Earnings Per Share (EPS) towards stock prices within the green index (PRICE). Meanwhile, the variables that do not significantly affect the stock prices within the green index (PRICE) are Return On Equity (ROE), Debt to Equity Ratio (DER), and Firm Size (SIZE).**

Keywords - **green stocks, green index, COVID-19 pandemic**

INTRODUCTION

1.1 Problem Background

The first industrial revolution brought in many benefits for humanity, most notably technological advancements. However, it also resulted in one of the world's worst environmental degradation due to the sudden influx of greenhouse gases (especially Carbon Dioxide/CO_2) released into the atmosphere as a result of air pollutants such as those from factories' chimneys and ICE (Internal Combustion Engines) vehicles exhaust. Even if many argue that as a result of increasing environmental issues, CO_2 emissions will eventually decline, it may not be enough to undo the irreversible damage humankind has caused to the environment. Climate change and other environmental-related impacts such as heat-related sickness, cardiovascular and respiratory diseases, starvation due to inadequate food sources, and even the loss of coastal cities due to rising sea levels will inevitably take their toll on human life if CO_2 emissions do not slow down soon.

As illustrated in Fig. 1., since the start of the industrial revolution in 1750, both the world's amount of CO_2 in the atmosphere and CO_2 emitted by human activities rose sharply to more than 35 billion tonnes at the end of the 20th century, signifying horrific signals for environmental damage and climate change. Some actions can still be done to reduce climate change, where the ultimate goal would be to transition the world to be more 'green' or 'environmentally friendly.'

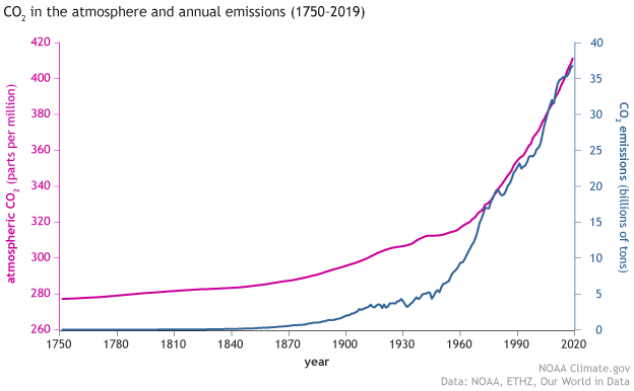

Fig. 1. World's Amount of CO_2 Emissions and Atmospheric CO_2 [1]

Though transitioning the world to become a 100% environmentally friendly place is challenging, the typical person can still enact a meaningful action by doing what is known as green investing. Green investing can be referred to as an "act of investing in companies that have a positive environmental impact" [2]. The term "investing" here can vary in many forms, from purchasing green bonds to buying green-focused ETF (Exchange Traded Funds) or an index such as the green index.

Investors usually become interested in green investing for two reasons: they want to align and assert their environmental values with their investment portfolio, or they believe the sector holds profit and growth potential for the future. Many, of course, believe both reasons are a sound rationale for including green investing in their financial plan. For philosophical reasons, the concept of green investing began several decades ago and is generally referred to now as Socially Responsible Investing (SRI). In this sense, green investing can be considered a sub-sector of SRI that focuses primarily on environmental issues rather than on social or human rights issues. For financial reasons, many investors are becoming interested in green investing because they believe that the potential growth of the green market, even in the current economic climate, looks as promising as ever. With the International Energy Agency from the United States projecting $36 trillion in needed investment in the energy sector over the next two decades and recent growth rates of 20 percent to 40 percent for solar and

wind energy companies, investors looking for the next "big thing" are increasingly looking to go green.

Moving on from the importance of green investing, an unprecedented event happened in 2020, bringing shock to the green investing community and all sectors around the world. The COVID-19 pandemic brings a multi-dimension problem that affects the livelihood of people around the world and the world's financial sector. Although the influence of the external environment or external events is not directly related, it does not mean that these events do not impact activities in the capital market. The COVID-19 pandemic hit not only the global stock market but also Indonesia. Investors and capital market analysts worry about a possible risk of a recession and an economic crisis due to an economic slowdown. Various businesses in the real sector have been hit hard by the COVID-19 pandemic, so that many business and production activities have experienced disruption, and even some have decided to stop. Of course, the impact of this is that many employees have to be laid off, which reduces the community's purchasing power. Because the pandemic brings about shocks across many stocks in Indonesia, it also affects indexes and ETFs, such as the green index, which houses stocks categorized as 'green.'

1.2 Problem Statement

The author is set to tackle this research because the act of green investing kept rising. However, it is still unknown how these green or environmental stocks will hold up towards a particular crisis such as the COVID-19 pandemic. Lately, environmentalism is on the rise and is drawing significant attention from many sides such as the government, media, and corporations, and is becoming more and more integrated into our society, where many companies are looking to "reduce energy use, improve their image, obtain governmental subsidies, and gain competitive edges" [3]. The trend of recent years also saw a substantial increase in the demand for socially responsible investments (SRI – a broader term for green investing) [4]. Nevertheless, the COVID-19 pandemic brought unprecedented impacts and reactions to green stocks such as those within the green index in Indonesia, in which the lack of research around this topic may cause many 'green investors' at unease and may bring the rising trend of green investing to decrease.

1.3 Research Objective

Following the problem statement that has been stated previously, the author set two research objectives:

1. To know what are the factors that significantly affect green stock prices within the green index.
2. To find the effect of the COVID-19 pandemic towards green stock prices within the green index.

1.4 Research Question

Following the research objective that has been stated previously, the author set two research questions:

1. What are the factors that significantly affect green stock prices within the green index?
2. What is the effect of the COVID-19 pandemic towards green stock prices within the green index?

1.5 Research Scope and Limitation

The author set several variables to narrow down the scope of research. In detail, the author conducts this research with the dependent variable of stock prices within the green index while having the independent variable of Earnings Per Share (EPS), Net Profit Margin (NPM), Return On Equity (ROE), Debt to Equity Ratio (DER), and Firm Size (SIZE) with the presence of COVID-19 in Indonesia as a dummy variable. Based on the research objective, the author only intends to know what factors significantly affect green stock prices within the green index and to find the effect of the COVID-19 pandemic towards these stocks' prices. Anything that falls outside the research's objective (i.e. how does the green index holds up during the COVID-19 pandemic in comparison to other indices) is not studied. The data are sourced from Thomson Reuters' Refinitiv Eikon and Stockbit Pro, with 41 green constituents from 2015 to 2021 as the sample and a total of 648 observations. The data collected are categorized as panel data since it includes both time-series (the year 2015 to 2021) and cross-sectional data (41 green constituents of publicly traded companies in Indonesia). Furthermore, the data is compiled via Microsoft Excel and is processed via Stata version 16.0.

LITERATURE REVIEW

2.1 Literature Review

2.1.1 Sustainable Development Goals (SDGs)

Sustainable Development Goals (SDGs) comprised of 17 goals and were established in 2015 for the period of 2016 until 2030 for members of the United Nations. It can be defined as an integrated and universal call to action to "end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity" [5][6]. It is the continuation of Millenium Development Goals (MDGs) that were employed from 2000 to 2015. MDGs comprised eight development goals at an international level, ranging from poverty and education to environmental sustainability and health [6].

Furthermore, it can be argued that there is a significant correlation between the creation of the UN's SDGs with the recent rise of sustainable investing. At the beginning of 2016, around $22.89 trillion – a 25% growth from 2014 – of assets were professionally managed using sustainable investing principles, representing 26% of all professionally managed assets (Martini, 2021). One of the reasons for this rise is due to increasing demand from both public and private organizations for a more coordinated effort at a global level to tackle climate change and depletion of natural resources, in which one of

the responses is the establishment of the United Nation's Sustainable Development Goals (SDGs) in 2015 [7].

2.1.2 Socially/Sustainable Responsible Investing (SRI)

Socially/Sustainable Responsible Investing or SRI can be defined as an investment strategy where investors align values of environmental, social, or governance (ESG) type with their investing activities [2]. In this paper, the 'S' within the abbreviation of SRI can stand for both 'socially' or 'sustainable,' and both terms are used interchangeably. SRI has been gaining more and more popularity in recent years as there is an increasing demand from investors, especially green investing, a subset of SRI [2][4].

There have been many discussions among researchers on whether or not socially responsible stocks have higher performance than their non-SRI counterparts. Some authors have documented that firms with outstanding environmental stewardship also have significant financial performance, reflected in their stock performance [8][9]. However, other authors cast doubt regarding this matter, in which they found out that SRI does not always generate better returns for investors [10][11].

2.1.3 Green stocks

Referring to what is stated in [2], green or environmental stocks can be defined as stocks from a company that has a positive environmental impact, and green investing can be described as the act of investing in those companies. In Indonesia, these green stocks can be found within the green index. The index was launched by the xyz Foundation on June 8, 2009, with "a reference to the United Nations' Principles for Responsible Investment (PRI) and published in collaboration with the Indonesia Stock Exchange (IDX)" [12]. The 25 constituents within the index are carefully selected using principles of Sustainable Responsible Investment (SRI) and environmental, social, and governance (ESG). There are three selection stages regarding the company's core business practice, financial, and fundamental aspects. Since its launch, the green index has shown better performance than other major indices in Indonesia [12].

There have been several studies that researched the performance of environmentally-friendly stocks in comparison to their non-green counterparts. A study done by [13] found out that companies in their sector who score high on environmental performance also score higher on their financial performance when analyzing 652 US manufacturing firms from the year 1987-1996. Other studies also saw a correlation between stocks that have joined some form of environmentally-driven association and a higher return, such as the one analyzed by [14], which found out that firms who joined the Chicago Climate Exchange's emissions reduction program see around 8% higher stock performance in comparison to the overall market.

Furthermore, [15] found out that green firms perform at least as well as their non-green counterparts and outperform the S&P 500 energy index. The reason that green stocks outperform their non-green counterparts or the market portfolio would be due to investors paying more and more attention to the world's ecological environment and also climate change, which leads to investors increasingly investing in green-related stocks and other financial products [16].

Figure 2. Green investment pyramid

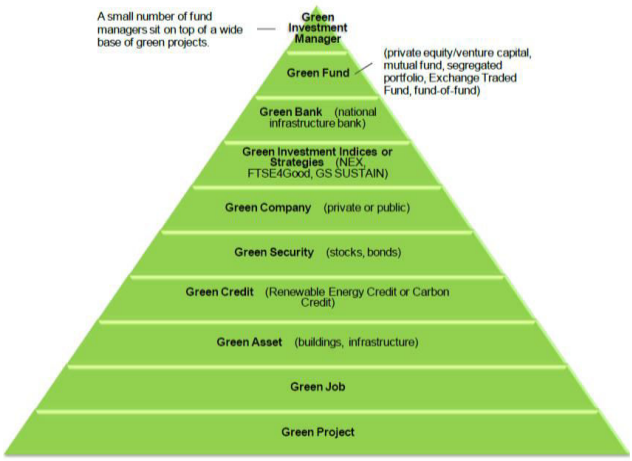

Fig. 2. Level of Green Investment
[16]

2.1.4 The impact of virus outbreaks on the stock markets

There have been many kinds of research that studied the impacts of virus outbreaks on stock markets worldwide. Besides the current COVID-19 pandemic, these researchers also study the effect of epidemics such as the avian influenza (H7N9) virus and the severe acute respiratory syndrome (SARS). Reference [17] analyzed the correlation between the H7N9 virus outbreak and stock performance in China, in which they found out that a significant increase in the daily number of cases negatively impacted stock prices in the overall market as well as some relevant sectors, including the biomedicine, traditional medicine, and biological production sectors. Other pieces of research studied the impact of the SARS virus outbreak. Reference [18] concluded that the SARS outbreak negatively impacted China's and Vietnam's stock markets. Furthermore, other authors revealed that there is a negative correlation between the outbreak of the SARS virus with the stock returns within the hotel business, tourism, wholesalers, and retail sector in the Taiwan stock market, while conversely biotechnology industries showed a significant positive relationship [19][20].

With the current COVID-19 pandemic, various studies have analyzed the impacts of the virus' outbreak on stock markets worldwide. When researching whether or not contagious infectious diseases such as the COVID-19 affect the outcome of the stock market, [21] found out

that both the daily increase of confirmed cases and daily increase of deaths due to COVID-19 negatively impact stock returns for all publicly listed companies in China's stock market. Other authors such as [22] analyzed the short-term impact of the virus' outbreak on 21 leading stock market indices in major affected countries such as Korea, the USA, Germany, Italy, Japan, Singapore, and Japan, in which the result concluded that stock markets in major affected countries were negatively impacted after the virus' outbreak.

2.2 Previous Studies

The author conducted a literature review from previous studies related to stock performance to determine the proper and relevant independent variables for this research. These variables are firm-specific characteristics that significantly affect stock prices. The sources are from domestic (Indonesian) or foreign journals.

TABLE I
PREVIOUS STUDIES

Previous Studies		Independent Variables					Regression Model Used
		EPS	NPM	ROE	DER	SIZE	
Author	[2]	✓					Panel Data Regression with Pooled OLS Model (Common-Effects Model)
Title	Green recovery: How are environmental stocks doing?						
Locus	United States, Germany, Australia, Britain, Spain, Canada, China, India, France						
Author	[23]				✓		Panel Data Regression with Pooled OLS Model (Common-Effects Model)
Title	Factors determine stock return of livestock feed Companies: common-effect model analysis						
Locus	Indonesia						
Author	[24]	✓					Panel Data Regression with Random-Effects Model
Title	The impact of capital structure on stock return: Empirical evidence from Amman Stock Exchange						
Locus	Jordan						
Author	[25]	✓	✓	✓		✓	Structural Equation Modelling with Partial Least Squares (SEM-PLS) Method
Title	Determinant of stock price: Evidence on food and beverage companies in Indonesia						
Locus	Indonesia						

ISBN*: 978-623-92201-2-9*

Author	[26]	✓					Panel Data Regression with Pooled OLS Model (Common-Effects Model)
Title	Determinants of American stock prices on a firm-specific level						
Locus	America						
Author	[27]		✓				Panel Data Regression with Pooled OLS Model (Common-Effects Model)
Title	Internal determinants of the stock price movements on sector basis						
Locus	Turkey						
Author	[28]	✓		✓		✓	Panel Data Regression with Pooled OLS Model (Common-Effects Model)
Title	Impact of company performances on the stock price: An empirical analysis on select companies in Serbia						
Locus	Serbia						
Author	[29]	✓		✓			Panel Data Regression with a comparison of various models: Pooled OLS Model (Common-Effects Model), Fixed-Effects Model, and Random-Effects Model
Title	Analysis of factors affecting share prices: the case of Bahrain Stock Exchange						
Locus	Bahrain						
Author	[30]			✓	✓	✓	Time-Series Regression
Title	The effect of financial performance and firm size on stock prices of manufactu-ring company in 2013-2016						
Locus	Indonesia						

Abbreviation notes
EPS : Earnings Per Share
NPM : Net Profit Margin
ROE : Return On Equity
DER : Debt to Equity Ratio
SIZE : Firm Size

Through TABLE I, it can be seen that some previous studies researched the relationship between some form of financial ratios (as variables) with stock performance. Because the majority of previous studies used panel data regression within their methodology, it is therefore deemed suitable for this research to also use panel data regression, in which the appropriate model for the said regression will be chosen through several tests that can be seen in Chapter 4. Furthermore, equipped with the knowledge being given by these studies, the author would like to research the relationship between Earnings Per

Share (EPS), Net Profit Margin (NPM), and Return On Equity (ROE), Debt to Equity Ratio (DER), and Firm Size (SIZE), which act as independent variables, and also the presence of COVID-19 pandemic, which act as a dummy variable, towards green stocks prices within the SRI-KEHATI index in Indonesia. Even though many other independent variables can be found, the author chose the ratios written above because they represent external factors that do not inherently affect the relationship of variables with stock prices. Variables such as Price to Earnings Ratio (PER), Price to Book Value (PBV), and Market Capitalization (MCAP) may create considerable confusion if chosen because the price of a particular stock is within the ratios themselves, thus creating a sort of "looped" feedback that inherently affects the relationship of the variables-stock prices themselves. Another reason would be the data and information availability of these ratios related to the specific public companies listed within the SRI-KEHATI index.

METHODOLOGY

3.1 Research Design

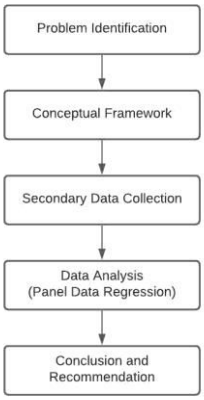

Fig. 3. Research Design
(Author's illustration)

Fig. 2. is an illustration of the author's overall process for research. First, problem identification is conducted in order to start the research process. Then, the research continues with a literature review that strengthens the arguments for the variable used. Furthermore, data collection is conducted using secondary data, which has a significant role in this research. Next, the data analysis uses panel data regression to acquire the necessary results. Finally, the conclusion and recommendation ends the research.

3.2 Operational Variables

This research has several types of operational variables within, the three of which are independent, dependent, and dummy variables. An independent variable can be defined as "a variable that is presumed to have an effect on another variable (a dependent variable)," whereas a dependent variable is a variable that is dependent on the independent variables [31]. A dummy variable is a type of independent variable that takes either the value of 0 or 1, in which it is a "numeric stand-in for a qualitative fact or a logical proposition" [32]. For more detail, each of the dependent, independent, and dummy variables used in this research is explained below.

3.2.1 Stock Price (Dependent Variable)

Stock price (PRICEi,t) is defined as the current price of the relevant share traded on a particular stock exchange that is determined by the supply and demand of market participants [33].

$$PRICE_{i,t} = Price\ of\ share\ traded\ for\ firm\ i\ at\ time\ t \quad (1)$$

3.2.2 Presence of COVID-19 (Dummy Variable)

The dummy variable used in this research would be regarding the presence of COVID-19 in Indonesia. The variable is employed to qualitatively differentiate between the year's quarters before any COVID-19 confirmed cases in Indonesia (2015Q1-2019Q4) and the year's quarters when there are COVID-19 confirmed cases in Indonesia (2020Q1-2021Q1). The use of a dummy variable as the statistic regressor in a regression model can indeed be done as it has been confirmed by [34] in their book 'Basic Econometrics', which asserted that "Dummy variables can be incorporated in regression models just as easily as quantitative variables", and that a regression model containing a mixture of quantitative and qualitative variables (such as this particular research) is called the analysis of covariance (ANCOVA) model. Moreover, the presence of COVID-19 and its relation with stock performance is in line with previous research done by [35] and also [36]. Therefore, the illustration for the dummy variable of this research can be seen below:

$$D = \{0\ if\ the\ year's\ quarter\ has\ no\ COVID\text{-}19\ confirmed\ cases\ in\ Indonesia\ \ 1\ if\ the\ year's\ quarter\ has\ COVID\text{-}19\ confirmed\ cases\ in\ Indonesia\} \quad (2)$$

3.2.3 Earnings Per Share (Independent Variable)

Earnings Per Share (EPS) is generally in the interest of stockholders and management and is closely watched by the investing public because it is indicative of the firm's success, in which the ratio is calculated as the amount of earnings available for common stockholders divided by the number of shares of common stock outstanding [37]. It is written algebraically as follows:

$$Earnings\ per\ share = \frac{Earnings\ available\ for\ common\ stockholders}{Number\ of\ shares\ of\ common\ stock\ outstanding} \quad (3)$$

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3.2.4 Net Profit Margin (Independent Variable)

Net Profit Margin (NPM) measures the percentage of each sales dollar remaining after it has been deducted from all expenses, including taxes, preferred stock dividends, and interest [37]. It is algebraically written as follows:

$$Net\ profit\ margin = \frac{Earnings\ available\ for\ common\ stockholders}{Net\ sales} \quad (4)$$

3.2.5 Return On Equity (Independent Variable)

Return On Equity (ROE) can be defined as "the return earned on the common stockholders' investment in the firm," in which the higher the return, the [37]. It is algebraically written as follows:

$$Return\ on\ equity = \frac{Earnings\ available\ for\ common\ stockholders}{Common\ stock\ equity} \quad (5)$$

3.2.6 Debt to Equity Ratio (Independent Variable)

Debt to Equity Ratio (DER) measures the proportion of a firm's total liabilities in relation to the common stock equity used to finance assets within the firm. A higher ratio indicates a more significant use of financial leverage [37]. It is algebraically written as follows:

$$Debt\ to\ equity\ ratio = \frac{Total\ Liabilities}{Common\ stock\ equity} \quad (6)$$

3.2.7 Firm Size (Independent Variable)

Firm size (SIZE) is measured by the natural logarithm of total assets, in which the bigger the firm's size, the more stable and risk-averse the firm is [28][38][39]. It is written algebraically as follows:

$$SIZE = Ln(Total\ assets) \quad (7)$$

3.3 Conceptual Framework and Hypotheses Development

Below is the conceptual research framework. It is in the form of a diagram that outlines this study's flow of logic.

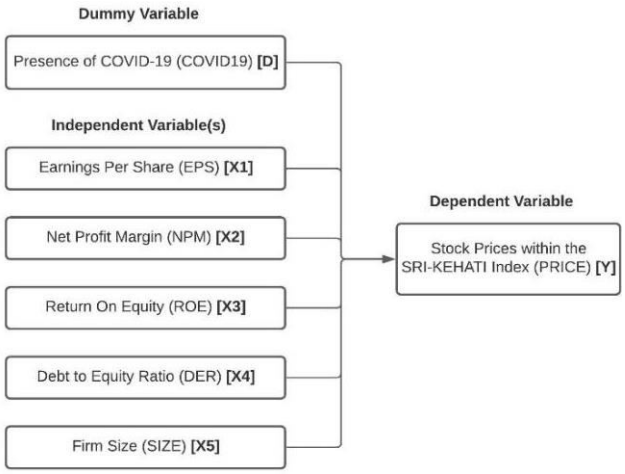

Fig. 3. Conceptual Framework
(Author's illustration)

The conceptual framework laid out above allows the author to create the research hypothesis. Hypotheses are temporary answers to the research's problem, theoretically considered to be the most possible and have the highest level of reality. The author stated that six hypotheses (Ha) are presented with the level of significance α=0.05. For more detail, each hypothesis is explained below.

3.3.1 The Effect of the Presence of COVID-19 on Stock Price

Even though classified as a dummy variable, the presence of COVID-19 can also be categorized as an independent variable because it regresses the model the same way as all of the other independent variables. Some previous research studies have analyzed the relationship between the presence of COVID-19 and stock performance. Reference [35] found out that there is a significant and negative relationship between the presence of COVID-19 with average stock returns of the world's top 10 stock indices (by GDP), namely: the S&P 500 (United States), SSE Composite (China), NIKKEI225 (Japan), DAX (Germany), SENSEX (India), FTSE100 (United Kingdom), CAC40 (France), FTSE Italia (Italy), IBX50 (Brazil), and SPTSX Composite (Canada). Another study by Shehzad et al. (2021) also concluded a significant and negative relationship concerning the existence of COVID-19 with stock performance indicated by the Dow Jones Industrial (DJI) index in the United States. Based on this explanation, the first hypothesis is stated below:

Ha1: There is a significant and negative relationship between the presence of COVID-19 towards stock prices within the green index.

3.3.2 The Effect of Earning Per Share (EPS) on Stock Price

Previous research journals have studied the relationship between a firm's earnings per share and its stock price.

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One research done by [2] found out that there is a significant and positive relationship between a firm's earnings per share and its stock price when researching for environmental firms in the United States and the stated reason being a high EPS means that the firm is performing exceptionally and thus reflected on the stock price itself. Another research was done by [40], which also found a significant and positive effect of earnings per share on stock return for stock within the manufacturing industry in the Istanbul Stock Exchange from 1994-2004. Based on this explanation, the second hypothesis is stated below:

Ha2: There is a significant and positive relationship between Earnings Per Share (EPS) towards stock prices within the green index.

3.3.3 The Effect of Net Profit Margin (NPM) on Stock Price

Some research studies have analyzed the relationship and significance between a company's net profit margin and its stock price. Reference [25] concluded that there is a significant and positive correlation between a firm's net profit margin and its stock price when researching the determinant of stock prices on food and beverage companies in Indonesia, in which a higher NPM ratio translates into a higher price of the traded shares. Reference [27] also found out that net profit margin significantly and positively influences stock prices in both industrial (food and petroleum) and service (electric) sectors in the Turkish Stock Exchange. Based on this explanation, the third hypothesis is stated below:

Ha3: There is a significant and positive relationship between Net Profit Margin (NPM) towards stock prices within the green index.

3.3.4 The Effect of Return On Equity (ROE) on Stock Price

Previous research journals have analyzed the relationship and significance of a firm's return on equity and its stock price. Reference [25] found that return on equity has a positive and significant impact on stock prices. Moreover, [29] also concluded that return on equity significantly and positively affects the price of stocks when researching the analysis of factors that affect share prices on the Bahrain Stock Exchange. Based on this explanation, the fourth hypothesis is stated below:

Ha4: There is a significant and positive relationship between Return On Equity (ROE) towards stock prices within the green index.

3.3.5 The Effect of Debt to Equity Ratio (DER) on Stock Price

Some research studies have analyzed the relationship between a company's debt to equity ratio and its stock price. Reference [41] concluded that there is a significant and negative relationship between a firm's debt to equity ratio and its stock price when researching publicly listed manufacturing companies in Indonesia from 2007 to 2011. Another study conducted by [42] also concluded a negative (although insignificant) relationship between a firm's debt to equity ratio and stock price when researching publicly listed retail companies in Indonesia from 2008 to 2017. Based on this explanation, the fifth hypothesis is stated below:

Ha5: There is a significant and negative relationship between Debt to Equity Ratio (DER) towards stock prices within the green index.

3.3.6 The Effect of Firm Size (SIZE) on Stock Price

Previous research journals have studied the effects between a firm's size and its stock price. A study conducted by [30] concluded that firm size has a significant and positive effect on its stock price when researching publicly listed manufacturing companies in Indonesia from 2013 to 2015. Another study conducted by [43] also concluded a significant and positive relationship between a firm's size and its stock price when researching publicly listed insurance companies in the Amman Stock Exchange. Based on this explanation, the sixth hypothesis is stated below:

Ha6: There is a significant and positive relationship between Firm Size (SIZE) towards stock prices within the green index.

3.4 Data Collection

For the data collection, the author uses secondary data as a way to collect the necessary data, and a quantitative approach is employed to acquire the needed results. For more detail, the variables and secondary data sources are explained below.

TABLE II
DATA COLLECTION TABLE

Variable	Unit of Scale	Data Period	Year	Source
Stock Price (PRICE)	Rupiah	Quarterly	2015-2021	[57] and [58]
Presence of COVID-19 (COVID19)	Binary dummy (0 or 1)	Quarterly	2020-2021	[59]

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Earnings Per Share (EPS)	Rupiah	Quarterly	2015-2021	[57] and [58]
Net Profit Margin (NPM)	Percentage	Quarterly	2015-2021	[57] and [58]
Return On Equity (ROE)	Percentage	Quarterly	2015-2021	[57] and [58]
Debt to Equity Ratio (DER)	Percentage	Quarterly	2015-2021	[57] and [58]
Firm Size (SIZE)	Natural logarithm number	Quarterly	2015-2021	[57] and [58]

3.5 Methodology Analysis

This research uses panel data regression as the methodology. Before the final data can be interpreted, there are many steps beforehand: panel data estimation method, panel regression model selection, classical assumption test, and significance test. The framework illustration and details can be seen Fig 4.

The author uses panel data analysis and regression for this research to examine the impact of the COVID-19 pandemic on green stock prices in Indonesia. Panel data analysis technique is preferred over the classical event study method due to several reasons. The first reason is that the spread of the COVID-19 pandemic evolves over a period of many days and is not a one-time-point event [45]. Second, panel data analysis allows for greater freedom, reduces data multicollinearity and estimation bias, and allows for control of individual heterogeneity [46]. Third, it can identify the time-varying relationship between independent and dependent variables and extracts for both cross-sectional and time-series variation [46].

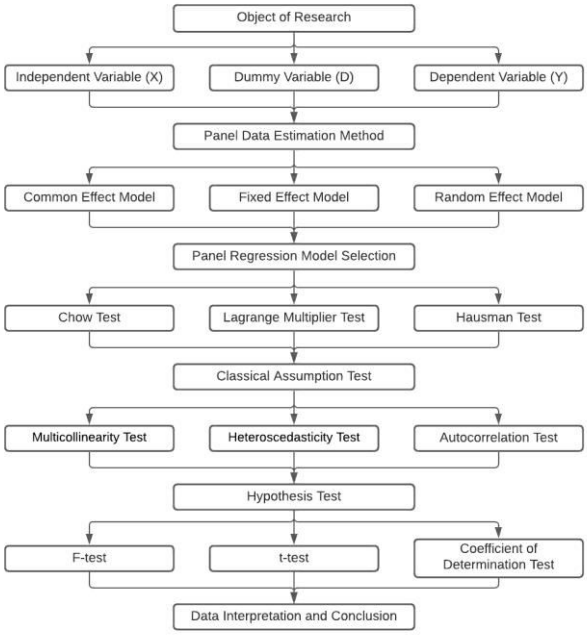

Fig. 4. Methodology Analysis Framework [34][44]

3.5.1 Panel Data Estimation Method

3.5.1.1 Common-Effect Model

The common-effect model is the most straightforward panel data approach because it only combines time-series and cross-sectional data. This model ignores the dimensions of time or individuals, so it is presumed that the behavior of cross-sectional data is the same in various time periods [44].

3.5.1.2 Fixed-Effect Model

The fixed-effect model is a type of panel data model where each of the model's entity intercept is time-invariant (does not vary over time). Within the realm of econometrics, the fixed-effect model refers to when a model's group means are fixed (non-random) [34]. Hence, the term "fixed-effect".

3.5.1.3 Random-Effect Model

The random-effect model is a type of panel data model in which the disturbance variables may be interrelated over time and between individual data. In this model, the differences in intercepts are adapted by the error terms of each cross-sectional data [44].

3.5.2 Panel Regression Model Selection

Reference [44] stated that in choosing the most suitable model to use in managing panel data, several tests need to be done, which are explained below:

ISBN*: 978-623-92201-2-9*

3.5.2.1 Chow Test

The Chow test is a test to establish whether the common-effect model or the fixed-effect model is the most suitable in the panel data estimation. If the P-value is > 0.05, choose the common-effect model. Otherwise, choose the fixed-effect model.

3.5.2.2 Hausman Test

The Hausman test is a test to establish whether the fixed-effect model or the random-effect model is the most suitable in the panel data estimation. If the P-value is > 0.05, choose the random-effect model. Otherwise, choose the fixed-effect model.

3.5.2.3 Breusch-Pagan Lagrange Multiplier Test

The Breusch-Pagan Lagrange Multiplier test is a test to establish whether the random-effect model or the common-effect model is the most suitable in the panel data estimation. If the P-value is > 0.05, choose the common-effect model. Otherwise, choose the random-effect model.

3.5.3 Classical Assumption Test

The analysis's results can only be understood correctly and minimally from errors and biases if there are no symptoms of classical assumptions. There are three parts of the classical assumption test used in this research: the multicollinearity test, heteroscedasticity test, and autocorrelation test. Note that there is no normality test because the author is working with panel data that have large data sets (648 total observations). This is because in data sets with large samples (at or over 100 observations), the "t and F statistics have approximately the t and F probability distributions so that the t and F tests that are based on the assumption that the error term is normally distributed can still be applied validly" [34]. In short, the statistical results of large enough data sets are still valid whether the data is normally distributed or not. The three classical assumption tests are explained below.

3.5.3.1 Multicollinearity Test

Multicollinearity can be defined as a situation that shows a strong correlation amongst two or more independent variables in a model. Non-multicollinearity is preferred for the regression results to be valid and free from biases [34]. This situation of multicollinearity can be seen from values within the correlation matrix and the Variance Inflation Factor (VIF). There is no multicollinearity amongst the independent variables if the values within the correlation matrix < 0.5 and Variance Inflation Factor (VIF) < 5.00.

3.5.3.2 Heteroscedasticity Test

A heteroscedasticity test can be defined as a test to investigate whether the error variance within the model is constant (homoscedastic) or non-constant (heteroscedastic). A homoscedastic model is preferred for the regression results to be valid and free from biases [34]. The analyzed data will have no heteroscedasticity if the P-value is greater than the significance coefficient of 0.05 and will have heteroscedasticity if otherwise. The test is conducted via the Breusch-Pagan / Cook-Weisberg method.

3.5.3.3 Autocorrelation Test

Autocorrelation can be defined as a set of correlations between observation series regarding time-series or cross-sectional data [34]. The null hypothesis is equal to zero if there is no autocorrelation and equal to one if otherwise. The test is conducted via the Breusch-Godfrey method for panel data autocorrelation.

3.5.4 Hypothesis Test

There are three parts of the hypothesis test, which are the t-test, F-test, and coefficient of determination (R^2) test, each explained below.

3.5.4.1 t-test

The t-test is done to show whether or not the individual independent variables influence the dependent variable, and is needed to accept or reject the research's hypotheses.

- A significant relationship exists between the independent variable and the dependent variable if the P-value is below (<) the predetermined level of significance of 0.05. In this case, we reject Ho and accept Ha.
- No significant relationship exists between the independent variable and the dependent variable if the P-value is above (>) the predetermined level of significance of 0.05. In this case, we accept Ho and reject Ha.

3.5.4.2 f-test

The f-test is done to show whether or not all of the independent variables that are used within the research's model have a simultaneous impact toward the dependent variable, with the criteria stated as the following:

- If the P-value is below (<) the predetermined level of significance of 0.05, then all of the independent variables have a simultaneous impact toward the dependent variable
- If the P-value is above (>) the predetermined level of significance of 0.05, then all of the independent variables have no simultaneous impact toward the dependent variable

3.5.4.3 The Coefficient of Determination Test (R2)

The coefficient of determination (R^2) test measures the amount of variance within the dependent variable that is explained by the independent variable. The closer to 1, the more significant the contribution of the independent variables to the dependent variable.

3.6 *Model*

This research applies panel testing to examine the impact of the COVID-19 pandemic on green stocks prices in Indonesia while controlling for firm-specific characteristics. The model to estimate stock price is as follows:

$$PRICE_{i,t} = \beta_0 + \beta_1 COVID19_{i,t} + \beta_2 EPS_{i,t} + \beta_3 NPM_{i,t} + \beta_4 ROE_{i,t} + \beta_5 DER_{i,t} + \beta_6 SIZE_{i,t} + \varepsilon_{i,t} \quad (8)$$

This function is derived from previous research by [21] and [47]. PRICEi,t is the stock price of company i in time t that acts as the dependent variable, regressed on the values of firm return predictors: β0 is a constant, β1COVID19i,t acts as a dummy variable that is equal to 0 if the year's quarter has no confirmed COVID-19 cases in Indonesia and equal to 1 if otherwise, β2EPSi,t until β6SIZEi,t acts as independent variables, and ε is an error term. Moreover, β1 to β6 acts as a coefficient from the regression results that are unique to each dummy and independent variable.

RESULTS

4.1 Panel Regression Model Selection

```
F( 40,   601) =   37.38
     Prob > F =    0.0000
```

Fig. 5. Chow Test
(Data processed)

Ho: Choose the common-effect model
Ha: Choose the fixed-effect model

Based on the figure above, the P-value is 0.0000, less than the predetermined significance value of 0.05. Therefore, we reject Ho and accept Ha. Hence, the winning model is the fixed-effect model, in which the next test (Hausman test) must also be conducted in order for the final model to be chosen.

TABLE III
HAUSMAN TEST
(DATA PROCESSED)

	Coefficients (b) FEM	(B) REM	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
COVID19	-812.0743	-550.4294	-261.645	123.841
EPS	11.61215	15.74784	-4.135696	.6479452
NPM	-4.221054	-5.730533	1.509479	.378024
ROE	-1.021961	2.076647	-3.098607	7.09592
DER	.3840917	-.1126239	.4967156	1.643486
SIZE	971.8406	439.4615	532.3791	452.0641

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 79.22
Prob>chi2 = 0.0000

Ho: Choose the random-effect model
Ha: Choose the fixed-effect model

Based on the table above, the P-value is 0.0000, less than the predetermined significance value of 0.05. Therefore, we reject Ho and accept Ha. Hence, the final chosen model is the fixed-effect model.

Because the previous Chow and Hausman test resulted in the fixed-effect model, the Breusch-Pagan Lagrange Multiplier test is not needed as it only compares the common-effect model with the random-effect model.

4.2 Classical Assumption Test

TABLE IV
MULTICOLLINEARITY-VARIANCE INFLATION FACTOR (VIF) TEST
(DATA PROCESSED)

Variable	VIF	1/VIF
EPS	1.24	0.806360
DER	1.19	0.838326
NPM	1.15	0.866873
SIZE	1.13	0.884999
ROE	1.09	0.917837
COVID19	1.05	0.952507
Mean VIF	1.14	

TABLE V
CORRELATION MATRIX OF ALL INDEPENDENT VARIABLES
(DATA PROCESSED)

	COVID19	EPS	NPM	ROE	DER	SIZE
COVID19	1.0000					
EPS	-0.0934	1.0000				
NPM	-0.1732	0.2465	1.0000			
ROE	-0.0991	0.0844	0.1860	1.0000		
DER	0.1376	-0.3010	-0.2278	-0.2379	1.0000	
SIZE	0.0188	0.3010	0.1808	0.0938	-0.0473	1.0000

Based on the tables above, each independent variable has a Variance Inflation Factor (VIF) < 5.00 and a

correlation value < 0.5. Hence, the presence of multicollinearity can be nullified.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of PRICE

         chi2(1)      =    188.99
         Prob > chi2  =    0.0000
```

Fig. 5. Heteroscedasticity Test
(Data processed)

Based on the figure above, it can be seen that the P-value of 0.0000 does not exceed the predetermined significance coefficient of 0.05. This means that the data is heteroscedastic, and remedial measures are needed.

```
================================================================================
*** Panel Data Autocorrelation Breusch-Godfrey Test
================================================================================
  Ho: No AR(1) Panel AutoCorrelation - Ha: AR(1) Panel AutoCorrelation

- Panel Rho Value                         =   0.6372
- Breusch-Godfrey LM Test (drop 1 cs obs) =  21.8691  P-Value > Chi2(1) 0.0000
- Breusch-Godfrey LM Test (keep 1 cs obs) =  21.5194  P-Value > Chi2(1) 0.0000
--------------------------------------------------------------------------------
```

Fig. 6. Autocorrelation Test
(Data processed)

Based on the figure above, it can be seen that both P-values of 0.0000 do not exceed the predetermined significance coefficient of 0.05. This means that the data is autocorrelated, and remedial measures are needed.

Because the test results indicate that the panel data is both heteroscedastic and autocorrelated, some remedial measures are needed in order for the panel regression to not be biased. The author employed White's heteroscedasticity-consistent variances and standard errors (or most commonly known as robust standard errors) while also employing standard errors clustering at the panel level to allow for both heteroscedasticity and serial correlation within the panel data [34][48][49]. The standard errors are clustered based on the ten sectors that exist within the constituents of the green index, ranging from consumer goods industry to property, real estate, and building construction. The reason why the clustering is based on sectors is due to the fact that the standard errors have to be clustered at the panel level, and since sectors are a group of clusters within the panel data that inherently exist at the panel level (exist across multiple observations), the standard errors clustering are based on it.

4.3 Panel Data Regression

Based on the Table VI, the summary statistics report for all of the variables can be seen. A total of 648 observations from 41 stock constituents within the green index are used as samples within this research. The dependent variable of stock price within the green index (PRICE) has an average of Rp5524.126, ranging from Rp50 to Rp35,400. Meanwhile, the dummy variable of the presence of COVID-19 (COVID19) is a binary dummy that only consists of 0s and 1s. The other independent variables of Earnings Per Share (EPS), Net Profit Margin (NPM), Return On Equity (ROE), DER (Debt to Equity Ratio), and Firm Size (SIZE) all have unique values that are compiled within the panel data. On a side note, the Debt to Equity Ratio (DER) has a minimum value of 0 because some company stated their debt (not liabilities) as 0 within their balance sheet, thus resulting in a ratio value of 0.

TABLE VI
DESCRIPTIVE STATISTICS
(DATA PROCESSED)

Variable	Obs	Mean	Std. Dev.	Min	Max
PRICE	648	5524.126	6548.699	50	35400
COVID19	648	.1990741	.3996123	0	1
EPS	648	80.3367	126.597	-326.5886	960.9192
NPM	648	10.45168	30.11889	-458.633	138.491
ROE	648	16.0436	22.99643	-58.06536	183.6854
DER	648	79.7914	83.10654	0	863.4024
SIZE	648	31.18145	2.739951	21.52851	34.99877

TABLE VII
PANEL DATA REGRESSION RESULTS
(DATA PROCESSED)

```
Fixed-effects (within) regression               Number of obs      =       648
Group variable: Ticker                          Number of groups   =        41

R-sq:  within  = 0.1325                         Obs per group: min =         2
       between = 0.2870                                        avg =      15.8
       overall = 0.3428                                        max =        25

                                                F(6,9)             =     13.81
corr(u_i, Xb)  = 0.0896                         Prob > F           =    0.0004

                                  (Std. Err. adjusted for 10 clusters in Sector)
```

PRICE	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
COVID19	-812.0743	324.634	-2.50	0.034	-1546.447	-77.70131
EPS	11.61215	3.430607	3.38	0.008	3.851574	19.37272
NPM	-4.221054	.8048134	-5.24	0.001	-6.041669	-2.40044
ROE	-1.021961	24.25184	-0.04	0.967	-55.88344	53.83952
DER	.3840917	6.545214	0.06	0.954	-14.42221	15.19039
SIZE	971.8406	1727.849	0.56	0.588	-2936.825	4880.506
_cons	-25520.63	53381.31	-0.48	0.644	-146277.5	95236.28
sigma_u	4876.1888					
sigma_e	2080.5291					
rho	.84598914	(fraction of variance due to u_i)				

Based on the results above, three out of six independent variables: COVID19, EPS, and NPM, are significant towards the dependent variable PRICE, as seen from each having a P-value of less than 0.05. Meanwhile, the rest of the independent variables: ROE, DER, and SIZE, are not significant towards the dependent variable PRICE, as seen from each having a P-value of more than 0.05. Therefore, the regression model is stated below.

$$PRICE = -25520.63 - 812.0743COVID19 + 11.61215EPS - 4.221054NPM - 1.021961ROE + 0.3840917DER + 971.8406SIZE + \varepsilon \quad (8)$$

ISBN*: 978-623-92201-2-9*

4.4 Hypothesis Test

TABLE VIII
T-TEST RESULTS

Hypotheses (Ha)	P > | t | (P-value)	Coefficient	Result
Ha1: There is a significant and negative relationship between the presence of COVID-19 (COVID19) towards stock prices within the green index	0.034	-	Ha is accepted (0.034 < 0.05) and is in line with the coefficient, meaning that there is a significant and negative relationship between the presence of COVID-19 (COVID19) towards stock prices within the green index. Furthermore, it also means that the presence of COVID-19 has become one of the factors that affect stock prices within the green index.
Ha2: There is a significant and positive relationship between Earnings Per Share (EPS) towards stock prices within the green index	0.008	+	Ha is accepted (0.008 < 0.05) and is in line with the coefficient, meaning that there is a significant and positive relationship between Earnings Per Share (EPS) towards stock prices within the green index. Furthermore, it also means that Earnings Per Share (EPS) has become one of the factors that affect stock prices within the green index.
Ha3: There is a significant and positive relationship between Net Profit Margin (NPM) towards stock prices within the green index	0.001	-	Ha is accepted (0.001 < 0.05) but is not in line with the coefficient, meaning that there is a significant and negative relationship between Net Profit Margin (NPM) towards stock prices within the green index. Furthermore, it also means that Net Profit Margin (NPM) has become one of the factors that affect stock prices within the green index.
Ha4: There is a significant and positive relationship between Return On Equity (ROE) towards stock prices within the green index	0.967	-	Ha is rejected (0.967 > 0.05), meaning that there is no significant relationship between Return On Equity (ROE) towards stock prices within the green index. Furthermore, it also means that Return On Equity (ROE) is not one of the factors that affect stock prices within the green index.
Ha5: There is a significant and negative relationship between Debt to Equity Ratio (DER) towards stock prices within the green index	0.954	+	Ha is rejected (0.954 > 0.05), meaning that there is no significant relationship between Debt to Equity Ratio (DER) towards stock prices within the green index. Furthermore, it also means that Debt to Equity Ratio (DER) is not one of the factors that affect stock prices within the green index.
Ha6: There is a significant and positive relationship between Firm Size (SIZE) towards stock prices within the green index	0.588	+	Ha is rejected (0.588 > 0.05), meaning that there is no significant relationship between Firm Size (SIZE) towards stock prices within the green index. Furthermore, it also means that Firm Size (SIZE) is not one of the factors that affect stock prices within the green index.

```
F(6,9)          =     13.81
Prob > F        =    0.0004
```

Fig. 7. F-test
(Data processed)

The figure above showed that the F-test has a P-value of 0.0004, less than the predetermined significance value of 0.05. Hence, it can be concluded that the dummy and independent variables: the presence of COVID-19 (COVID19), Earnings Per Share (EPS), Net Profit Margin (NPM), Return On Equity (ROE), Debt to Equity Ratio (DER), and Firm Size (SIZE) have a simultaneous effect on the dependent variable of stock price within the green index (PRICE).

```
R-sq:  within  = 0.1325
       between = 0.2870
       overall = 0.3428
```

Fig. 8. R^2 test
(Data processed)

Stata produced three different kinds of R^2, but because the regression model uses the fixed-effect model (a "within" estimator), the relevant R^2 would be the "within" one. The figure above showed that the value of the obtained within-R2 is 0.1325, or 13.25%. It means that there is a 13.25% variation within the clusters of variables. Even though the value of the R^2 seems "low" or "weak", that does not mean that the model is invalid. This is due to the limitations of the fixed-effect model, in which the value of R^2 only described the amount of variation within the clusters of variables, not the model as a whole. Because of this, if a research uses the fixed-effect model, its R^2 value is generally not the point of interest [34][50].

ISBN*: 978-623-92201-2-9*

DISCUSSION

Based on TABLE VII of the panel data regression results and TABLE VIII of the t-test results, it can be seen that the dummy variable of the presence of COVID-19 (COVID19) has a significant and negative relationship with the dependent variable of stock prices within the green index (PRICE). This is in line with the studies done by [21] and [47], which concluded that the COVID-19 pandemic significantly impaired stock performance. The reason why the stock prices within the green index react negatively towards the presence of COVID-19 is primarily due to investor's sentiment. Investor's pessimism may arise when a particular crisis hits the stock market due to fear of economic losses and worries of decreasing investment prospects. Thus, a sell-off of stocks within a given market happens, and stock prices dropped significantly [17][22] [47][51][52].

Furthermore, based on TABLE VII of the panel data regression results and TABLE VIII of the t-test results, the independent variable of Earnings Per Share (EPS) has a significant and positive relationship with the dependent variable of stock prices within the green index (PRICE). This is in line with the studies done by [2], [25], and [40], which concluded that Earnings Per Share (EPS) has a significant and positive correlation with stock performance. The reason for this positive correlation is because Earnings Per Share (EPS) is indicative of the firm's performance. A high and increasing Earnings Per Share (EPS) will attract more and more investors because it signifies that the firm is performing exceptionally. Hence, it is reflected in the stock price itself [2][53].

Moreover, based on TABLE VII of the panel data regression results and TABLE VIII of the t-test results, the independent variable of Net Profit Margin (NPM) has a significant and negative relationship with the dependent variable of stock prices within the green index (PRICE). This is in line with the studies done by [54], which stated that Net Profit Margin (NPM) has a significant and negative relationship with stock performance. Even though most studies found a significant and positive relationship between Net Profit Margin (NPM) and stock performance, the research done by [54] showed us that a significant and negative relationship is indeed possible and sometimes happen within this realm of research. To take a deeper look at why this inverse and seemingly illogical relationship exists, another variable must be used as a proxy for comparison. The variable used for this proxy is the Cost to Income Ratio (CIR), which is a firm's operating expense divided by its operating income [55]. It is algebraically written as follows:

$$Cost\ to\ income\ ratio = \frac{Operating\ expense}{Operating\ income} \qquad (9)$$

Typically being used for banks, the Cost to Income Ratio (CIR) measures the efficiency of banks by gauging its business output in relation to its input, in which the lower the ratio (but not negative) is, the higher the bank's efficiency when operating its business [56]. Even though this ratio is commonly used within the banking sector, it can also be used in other sectors as it serves as a rough proxy for a firm's efficiency in every other sector. That being said, a firm can be described as efficient not only by having a low Cost to Income Ratio (CIR) but also if it has an inverse relationship with its profitability – measured by ratios such as the Net Interest Margin (NIM) or the Net Profit Margin (NPM). This is because a highly efficient firm can generate more and more income without needing to increase too much operating expenses. On the other hand, a firm can be described as inefficient if the CIR has a positive correlation with its profitability, meaning that its operating expenses grew the more the firm generates its income [56]. Hence, to know whether or not the firms within the green index are efficient or not, a correlation matrix between the Net Profit Margin (NPM, as a measure of profitability) and the Cost to Income Ratio (CIR) is shown. The matrix can be seen below:

TABLE IX
CORRELATION MATRIX BETWEEN CIR AND NPM
(DATA PROCESSED)

	CIR	NPM
CIR	**1.0000**	
NPM	**0.0378**	**1.0000**

Based on the table above, it can be seen that the Net Profit Margin (NPM) and the Cost to Income Ratio (CIR) have a positive correlation value of 0.0378. Therefore, the empirical result suggests a positive correlation between Net Profit Margin (NPM) and Cost to Income Ratio (CIR) for firms within the green index. Hence, it can be concluded that firms within the green index are still inefficient in running their business. The possible explanation as to why this inefficiency exists is because the constituent firms have to meet certain financial, environmental, and regulatory standards employed by the green foundations, which led to an increase in operating expenses. This explains the inverse relationship between the stock price within the green index (PRICE) and the Net Profit Margin (NPM).

CONCLUSION

6.1 Conclusion

Green investing is on the rise due to a surge in global environmentalism, and investing in the green index (both for the stocks within or the index itself) is one of the many ways that investors can help support Indonesian companies with a positive environmental impact. However, the COVID-19 pandemic brings unprecedented impact to the stock markets worldwide, and the green stocks within the green index are no exception. The author intends to analyze how the stocks within the green

index hold up towards a particular crisis such as the COVID-19 pandemic and analyze what factors significantly affect these stocks. There are several variables used in this research: the dummy variable of the presence of COVID-19 – which equals 0 if the year's quarter has no COVID-19 confirmed cases in Indonesia and equals 1 if otherwise – and independent variables that include Earnings Per Share (EPS), Net Profit Margin (NPM), Return On Equity (ROE), Debt to Equity Ratio (DER), and Firm Size (SIZE). This research uses panel data regression because it involves both cross-sectional and time-series data. Based on the Chow test and the Hausman test, the appropriate model is the fixed-effect model. The data are sourced from Thomson Reuters' Refinitiv Eikon and Stockbit Pro, with 41 green constituents from 2015 to 2021 as the sample and a total of 648 observations. Even though the data does not pass all of the classical assumption tests, remedial measures are implemented in order for the analysis result to be valid and free from biases.

Empirical findings suggest that the factors that significantly affect stock prices within the green index (PRICE) are the presence of COVID-19 (COVID19), Earnings Per Share (EPS), and Net Profit Margin (NPM), while Return On Equity (ROE), Debt to Equity Ratio (DER), and Firm Size (SIZE) are not significant. From the t-test, it can be concluded that there is a significant and negative relationship between the presence of COVID-19 (COVID19) and Net Profit Margin (NPM) towards stock prices within the green index (PRICE). There is also a significant and positive relationship between Earnings Per Share (EPS) towards stock prices within the green index (PRICE). From the F-test, it can be concluded that all of the dummy and independent variables: the presence of COVID-19 (COVID19), Earnings Per Share (EPS), Net Profit Margin (NPM), Return On Equity (ROE), Debt to Equity Ratio (DER), and Firm Size (SIZE) have a simultaneous effect on the dependent variable of stock price within the green index (PRICE). From the coefficient of determination (R^2) test, there is a 13.25% variation within the clusters of variables.

6.2 Recommendations and Managerial Implications

Based on the findings within this research, there are some recommendations intended for investors and subsequent researchers on this topic. For investors who wish to invest in the stock market, it is wise to first take into account the fundamental aspects of a stock or an index to know the particular risk and reward of the investment vehicle. Furthermore, it is also wise to start doing green investing or Socially Responsible Investing (SRI) to help support and promote environmentalism within the investing community. Further research is also needed to confirm more significant variables related to the stock prices within the green index. Moreover, the possible subsequent research could be in measuring the significance and relationship between the number of COVID-19 confirmed cases or death towards stock prices within the green index to study the resiliency of this index in a more detailed manner. Although a panel data regression is recommended for various reasons, further research can also use other methods of study and types of data to explore more and take a deeper dive into this topic.

This research also has some managerial implications, especially from the perspective of investment managers who are tasked with selecting investment vehicles. First, the significant correlation between the presence of COVID-19 (COVID19), Earnings Per Share (EPS), and Net Profit Margin (NPM), towards stock prices within the SRI-KEHATI index (PRICE) indicates that investment managers should focus on these three indicators when analyzing and selecting green stocks. Second, the significant and negative correlation between the presence of COVID-19 (COVID19) and stock prices within the SRI-KEHATI index (PRICE) indicates that choosing only green stocks in one's portfolio is not a wise idea as it will hinder the portfolio's performance when a crisis (such as this COVID-19 pandemic) happens, in which other investment strategies such as diversification and hedging are needed to have an optimal portfolio performance.

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