

CHAPTER I

INTRODUCTION

1.1 Object Overview

The stock market is the nerve centre of any functional economic system. Stock markets' primary role is to facilitate the transition of savings into useful capital. Theoretically, stock markets can hasten economic expansion by boosting the quantity and quality of investment and mobilising and increasing domestic savings. If stock markets are able to allocate savings to higher-yielding investment projects, the rate of return to savers will increase, which may increase the rate of saving. This means corporations will receive a greater share of consumers' savings. Companies can now compete on more even ground for investment capital thanks to efficient stock markets. As investors look for more and better information to compare the performance of various corporations, stock markets may also improve accounting and tax standards. Therefore, it is in the company's best interest to disclose such details, as doing so will allow for more accurate comparisons to be made between competing businesses. The stock market's sensitivity to policy changes, especially monetary policy, and its contribution to improving policy credibility make it one of the most valuable aspects of our economic system. The stock exchange facilitates the purchase and sale of stocks and other financial instruments in a controlled and transparent market setting.

In the modern era of digital technological technology such as internet trading, communication with overseas brokers, and the speed of news on a country's stock exchange make it easier for investors to get information and trade in the capital market. Economic globalization has an impact on national trade legislation, which must resemble an integration mechanism capable of balancing the nation's diverse internal, national, and international interests. Economically, there is an increase in competitive trade pressures, multi-nationalization of manufacturing, financial market integration, and an upsurge in global capital

investment. In dealing with the impact of economic globalization, the strategy is to participate actively in the negotiation process with globalization actors and the formation of national trade laws, particularly regarding foreign investment that accommodates the interests of global values that are appropriate for national economic development. The amount of goods and services a country exports and imports is also heavily influenced by globalisation, with both positive and negative results. (Hasan, 2020). Research focus on stock market in several countries in Asia Pacific which are as follows:

Table 1. 1 Stock Market List

No	Country	Ticker	Founded	Company listed
1	Australia	ASX	1987	2144
2	Canada	TSX	1861	1649
3	China	SSE	1990	1644
4	Japan	JPX	1949	3852
5	South Korea	KRX	1956	2356
6	New Zealand	NZX	2002	184

Source: Stock Market of each above countries, 2023

Each countries have their own stock market, and it will show the stock of changes price per sector every day. One of the sectors that is available in each country is the energy sector. Changing energy costs are often cited as a major contributor to fluctuations in GDP. Companies involved in the generation or distribution of energy are grouped together in the energy sector of the stock market. The energy sector or industry encompasses businesses engaged in coal combustion and refining, oil and gas exploration and development, and oil and gas drilling. In the energy sector, integrated power utility companies like those that focus on renewable energy are one example. Fuel combustion activities in the energy sector are grouped into three subcategories, namely power generation, oil refineries, solid fuel production and other energy industries. This category is consuming the most fuel to produce energy.

According to Credit & Kashi (2022), About 40% of the world's carbon dioxide emissions come from the energy industry. The vast majority of these emissions are produced by the combustion of fossil fuels for energy, and are thus referred to as point-source emissions of CO₂. The primary elements in fossil fuels

are carbon and hydrogen. Oxygen combines with carbon to produce carbon dioxide CO_2 and hydrogen to produce water (H_2O) during the combustion of fossil fuels. These reactions generate heat, which contributes to the overall warming of the planet.

1.2 Background of Study

The term "green growth" refers to economic expansion that prioritises conservation of natural resources, pollution abatement, the development of a more equitable and prosperous society, and the attainment of long-term sustainability objectives. A green economy strategy must prioritise the promotion of environmentally friendly technological advancements. Climate change, biodiversity loss, water scarcity, and other issues have prompted repeated calls over the past decade for a reform of conventional economic models. A green economy and sustainable development can make use of low carbon development as a stepping stone strategy. To protect the environment and stimulate the economy, low-carbon development is essential. Implementing the net zero emissions policy through low carbon development is possible by transitioning to a green economy. However, there are still many obstacles to implementing a green economy such as financial and technology. The green economy requires a significant initial investment to convert all tools that have the potential to harm the environment to eco-friendly technologies or to incorporate some technologies that can help production with less carbon. Furthermore, the green economy is to generate less profit than the traditional economy. The green economy has long-term advantages over the conventional economy, especially when disasters and environmental damage are taken into account.

Carbon neutrality through innovation is gaining momentum in the Asia Pacific region. Nippon Life Insurance (NLI), the largest private institutional investor in Japan, set a target of net-zero emissions from the businesses held in its stock and bond portfolios by the year 2050. Many cutting-edge innovations in environmentally friendly power sources have been pioneered in China. China has been the world's leading manufacturer of wind turbines and solar panels for the

past decade, and the country's solar and wind power plants have an installed capacity of about 570 GW. In order to facilitate the trading of renewable energy certificates and carbon credits, the Thai government has been working with Australian blockchain company power ledger. More companies will get to their goal of net-zero carbon emissions if they commit to using science-based technology. The corporate world may soon face a critical challenge in its efforts to mitigate climate change. A perception survey from the world economic forum global risk report by (Mundial. & Marsh & McLennan., 2022), states that climate change in the next 10 years is considered the riskiest long-run threat, factors cause is by CO₂ (carbondioxide). For decades, carbon markets have been seen as part of the solution to climate change. Carbon market refers to a market where each unit of carbon credits that represent emission reductions are exchanged within a defined framework.

Several nations have opened up global carbon markets in an effort to better connect investors with climate-related goods and services. In response to global climate change efforts, voluntary carbon markets have emerged, allowing emitters to counteract their emissions by purchasing carbon credits. Emissions reduction and elimination projects issue these credits. Carbon's stock price is monitored and traded by the S&P Dow Jones index, a financial service. The S&P Dow Jones Index is the most comprehensive database of its kind and the birthplace of many widely used financial and stock market indices around the globe. When it comes to creating indexes that can be used by investors for gauging and trading the markets, S&P DJI has been at the forefront of innovation and development. Stock market performance is important among these variables because it is an economic leading indicator. This market also provides resources for investment and production financing. Furthermore, understanding the stock market performance relevant factors is required to forecast the behavior of expectations in such markets broadly, in global and domestic economies. Stock price issues are one of the indicators used by investors to decide where to invest. The spread (the difference between the selling and purchasing prices of a stock) influences the stock's liquidity. The narrower the stock price spread, the more

liquid the stock will be, attempting to make it in demand by the market and potentially increasing the stock price in the following period.

According to (International Monetary Fund., 2022) Energy, consumer cyclicals, technology, basic materials, healthcare, infrastructure, industrials, finance, transport & logistics, consumer non-cyclicals, property & real estate, and listed investment products are just some of the economic sectors whose stocks are traded on the stock market. The energy industry will be the study's primary focus. The energy sector is being used primarily because it is now the single largest source of greenhouse gas emissions worldwide. One of the largest sources of carbon dioxide gas (CO₂) emissions comes from fossil power plants. Fossil fuels, such as petroleum and natural gas, release carbon when they are burned. To power the economy and enable the means of production and transportation, energy is produced and distributed by a wide variety of companies that make up the complex and interconnected network known as the energy sector. The energy sector includes businesses engaged in oil and gas exploration, with the extracted crude used in the manufacture of petrol, kerosene, heating oil, and other products.

Insights from (International Energy Agency, 2020) When the price of oil and gas is high, businesses that produce those commodities tend to do well. However, energy firms' bottom lines suffer when the price of energy commodities declines. In addition, oil refiners save money on feedstock costs to produce petroleum products like petrol when the price of crude oil drops. Additionally, political events have historically caused oil prices to be volatile or fluctuate wildly, putting the energy industry at risk. When oil prices rise, people's expectations for short-term economic growth and inflation tend to fall. As the outlook for economic growth worsens, businesses reduce their projected earnings. Additionally, as the price of oil rises, the cost of many business inputs also rises, putting pressure on profit margins. When oil prices are high, investors often become more nervous about the future of corporate earnings, which can increase equity risk and weigh on stock prices. Palm oil is second only to crude oil in Asia and the Pacific in terms of its use as a cooking oil. Palm oil is a key ingredient

in soap, detergent, pharmaceuticals, and cosmetics. Below is the Figure that indicate crude oil and palm oil return changes in 2016-2021:

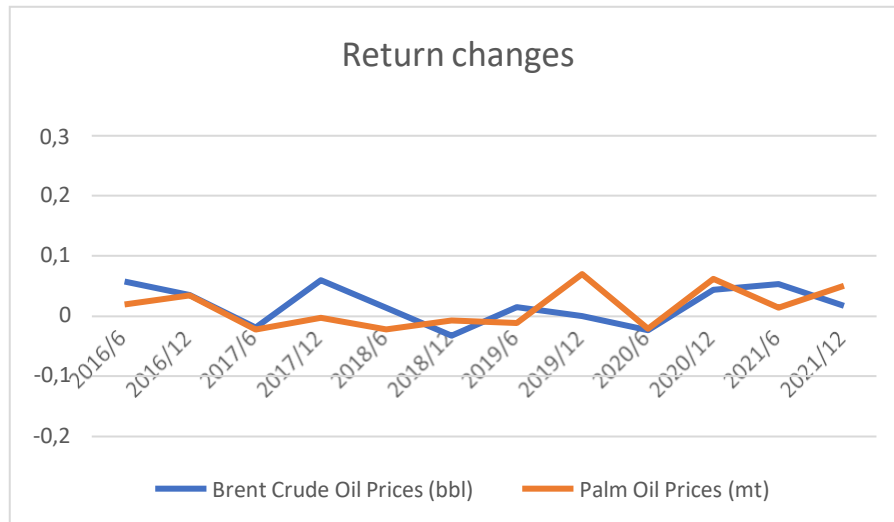


Figure 1. 1 Return Changes in Crude Oil and Palm

Source: World Bank Data, 2023

In Figure 1.1 it can be seen that fluctuations in price returns on Brent crude oil prices and palm oil prices have increased and decreased throughout the year, the highest price returns on Brent crude oil fell at the end of 2017 which achieved a return of 0.059 from the previous six months. Meanwhile, palm oil prices got the highest return at the end of 2019, which achieved a return of 0.07 from the previous. This study examines the effects of CO₂ price growth, interest rate growth, and exchange rate growth on energy sector stock market prices in six Asia Pacific countries, each of which has its own carbon price index from 2016 to 2021.

1. Australia

According to (Australia Government Geoscience, 2023), Australia ranks fifteenth in terms of per capita energy use and twenty-first in terms of total energy consumption. In 2021, wind power once again became Australia's primary source of renewable electricity. The Australian Carbon Credit Units (ACCUs) were also introduced to encourage the use of clean energy technologies while simultaneously lowering emissions in Australia.

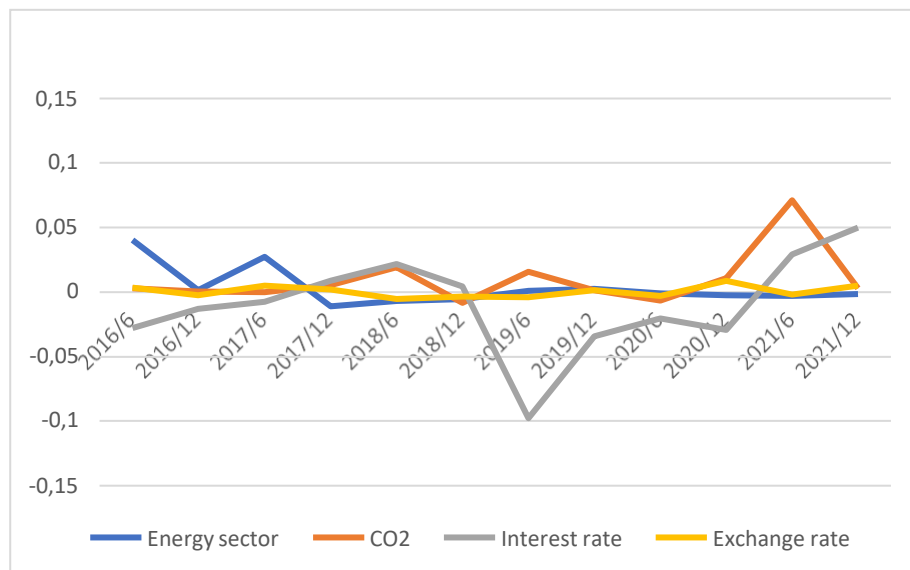


Figure 1. 2 Australia Changes of Return

Source: World Bank Data, Fred, YahooFinance and S&P Carbon Index, 2023

It can be seen in the Figure that the price of return between variables except interest rates is relatively stable with increasing years. Return fluctuations in the Australian interest rate are very significant compared to the energy sector, CO₂ prices and exchange rates can be seen from the drastic decline in mid-2019 to the end of 2019. To see in detail the percentage change of return prices in Australia, it can be seen in Figure 1.2.

2. Canada

Among the world's most economically advanced countries, according to (Canada Energy Regulator, 2021), Canada is the third largest consumer of oil per person. The transportation sector, which accounts for 60% of Canadian oil demand, is primarily to blame. Canada has a sizable mining, oil and gas extraction, and energy sector, all of which are oil intensive. These industries rely on oil-based fuels for heating and electricity, which are in high demand during Canada's relatively cold, dark winters.

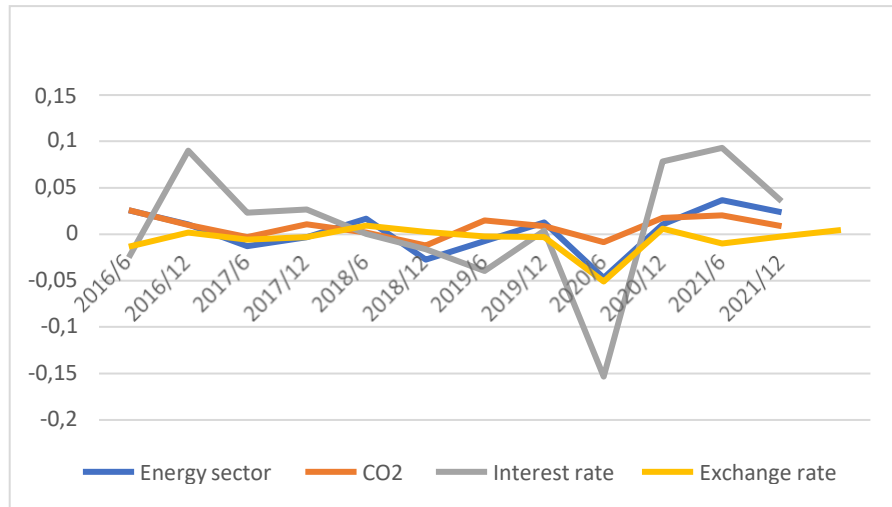


Figure 1. 3 Canada Changes of Return

Source: World Bank Data, Fred, YahooFinance and S&P Carbon Index, 2023

It can be seen from the graph that the growth in price returns on the energy sector, CO₂ prices, interest rates and exchange rates seem to have a relationship, for example in December 2019 to mid-2020 it experienced a mass decline and then rose again from mid- 2020 to the end of 2020. This phenomenon can be expected that the variable return prices above have a relationship with the energy sector return prices. To see in more detail the percentage change of return prices in Canada, it can be seen in Figure 1.3.

3. China

According to the (United States Energy Information Administration, 2022), China's economy is growing quickly and the country's population will surpass the United States' by 2020. After years of rapid growth beginning in the 1990s, China's electric power industry surpassed the United States as the world's largest in 2011. By 2021, 62% of China's electricity would be generated through the combustion of fossil fuels.China's greenhouse gas emissions are largely attributable to this.

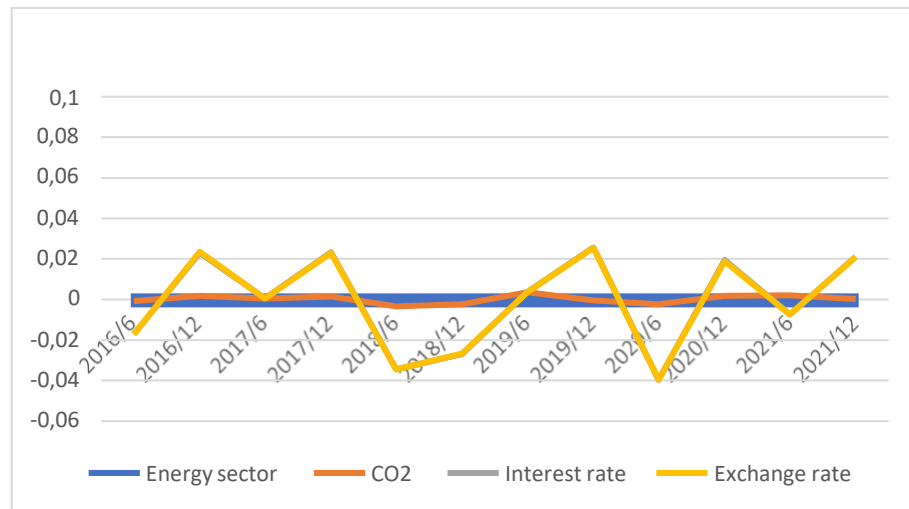


Figure 1. 4 China Changes of Return

Source: World Bank Data, Fred, YahooFinance and S&P Carbon Index, 2023

It can be seen in the Figure that the rise and fall of CO₂ prices and interest rates are the same as fluctuations in the energy prices of the sector, but exchange rate has experienced very significant fluctuations compared to others. It is expected that the variables above have a relationship with the prices of the energy sector in China. To see in more detail the percentage change of return prices in China it can be seen in Figure 1.4.

4. Japan

According to (Birol & Burce, 2021), This is because Japan has one of the largest oil stockpiles in the world, which protects the country from geopolitical risks and major global shocks. Japan's continued leadership in the global energy market is essential to maintaining a reliable supply at affordable prices.

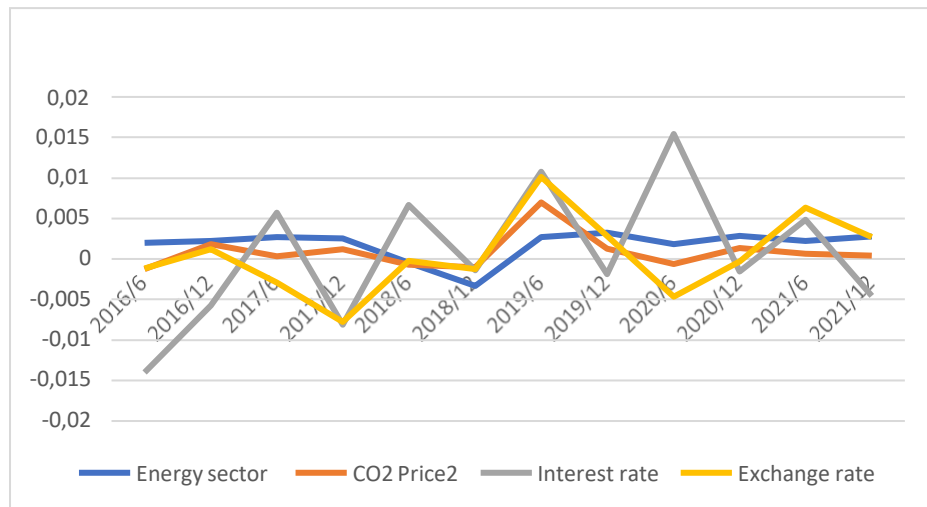


Figure 1. 5 Japan Changes of Return

Source: World Bank Data, Fred, YahooFinance and S&P Carbon Index, 2023

Figure 1.5 shows that the return on CO2 is very similar to the return on the energy sector, while the return on interest rates and the exchange rate is much more volatile. But the fluctuation equation is seen at the end of 2018 until the end of 2019, all variables have increased until mid- 2019 and then decreased again at the end of 2019.

5. Korea

According to (The Republic of Korea United Nations Framework Convention on Climate Change, n.d.), South Korean President Lee Myung-bak launched his plan for the country's long-term economic development in 2008, with the goal of reducing carbon emissions and energy use through measures such as increasing energy efficiency, bolstering a market-based pricing structure, and participating in international efforts to combat climate change. According to (Energy Agency, 2020), in 2015 Korea established a nationwide Emissions Trading System (ETS), making it the first country in Northeast Asia to do so and serving as a model for other nations in the region.

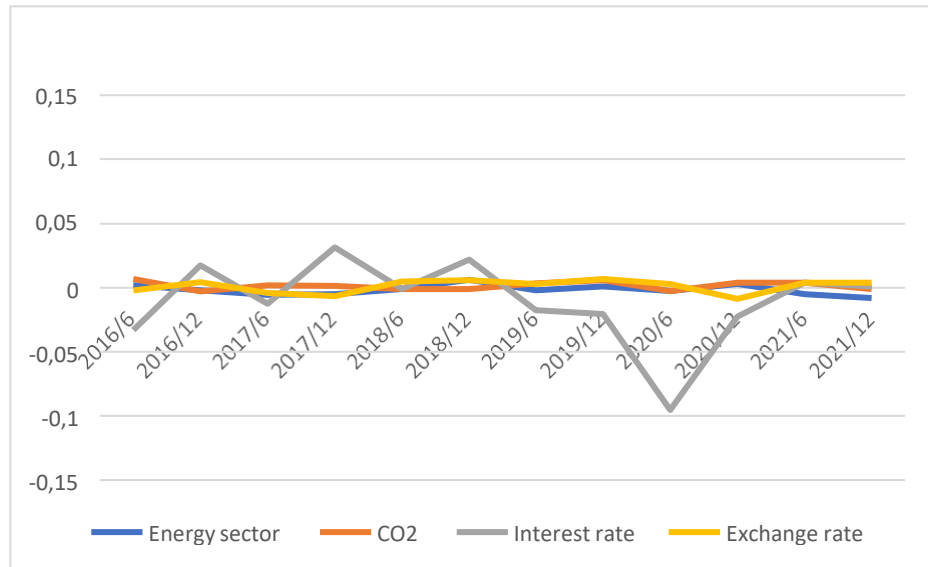


Figure 1. 6 Korea Changes of Return

Source: World Bank Data, Fred, YahooFinance and S&P Carbon Index, 2023

The price fluctuations in the return on the energy sector in the Figure above are relevant to the fluctuations in the return prices on CO₂ and the exchange rate. Meanwhile, interest rates have more fluctuation and it vivid on sharply decreased compared to other variables at the end of 2019 to mid-2020. To see in more detail the percentage change of return prices in Korea, it can be seen in Figure 1.6.

6. New Zealand

In development countries, New Zealand has the third highest rate of renewable energy as a percentage of primary supply (after Norway and Iceland). According to New Zealand has the third highest rate of renewable energy as a proportion of primary supply among developing nations, behind only Norway and Iceland. Trout (2021) claims that approximately 60% of New Zealand's industrial energy and 99% of the country's transport energy come from fossil fuels. Eighty-five percent or more of our electricity comes from renewable energy sources, which bodes well for future efforts to lessen our reliance on fossil fuels.

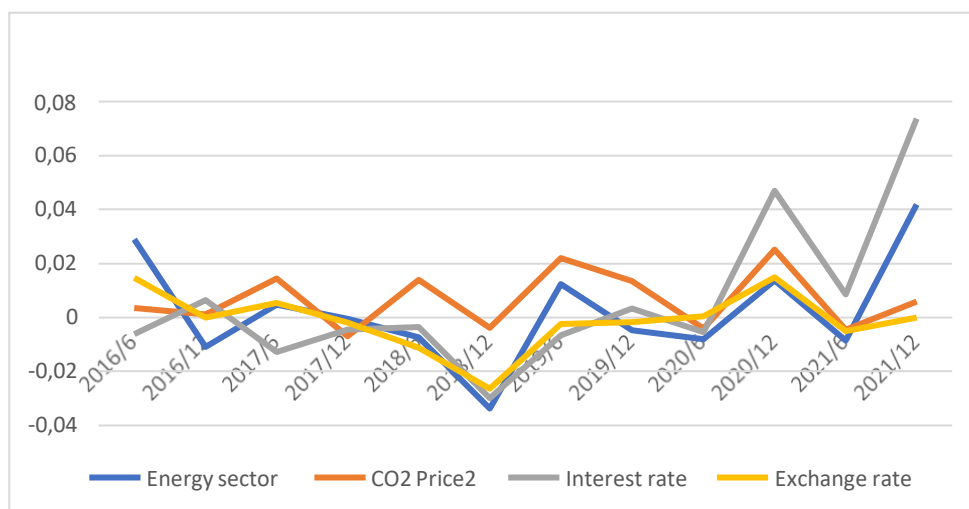


Figure 1. 7 New Zealand Changes of Return

Source: World Bank Data, Fred, YahooFinance and S&P Carbon Index, 2023

Data collected from 2016 to 2021 show that there are similarities in the energy sector with CO₂ return prices, interest rates, and exchange rates. It can be seen from mid-2018 to mid-2019, when all variables dropped significantly and continued to increase at the exact same time. This occurs afterwards between the middle of 2020 and the end of 2021. To see in more detail the percentage change of return prices in Newzealand, it can be seen in Figure 1.7.

From 1 to 1.7, it can be seen that the return of price fluctuations of CO₂prices, Brent crude oil, palm oil, interest rates, and exchange rates tend to change similarly along with the ups and downs of energy sector returns; however, this cannot be confirmed and has not been empirically tested.

Companies can access capital through the stock market by issuing shares of stock or bonds to investors, who can then share in the company's profits through capital gains and dividends (Rizal & Wiryono, 2015). There are many options for investors, from short-term to long-term bets. An investment with a long time horizon, often many years, is called a "long run investment." Short-term investments are those with a time horizon of a few months or less, such as a monthly dividend. Numerous studies have been conducted on investment portfolios; Rizal (2018), however, is the first to implement research in a dynamic

portfolio by connecting market risks between rates of return and inflation. Kusairi (2021), which controls for the effects of exports of goods and FDI on economic growth, also factors in the contribution of educational tourism to overall growth. The correlation between CO₂ prices, crude oil prices, palm oil prices, the exchange rate, interest rates, and stock market prices are just a few of the many findings in research pertaining to the portfolio. Research conducted by Tian (2011) shows a positive correlation between the carbon market and the stock price of electricity companies in the short run, but a negative correlation in the long run. Moreno (2017), citing the EU emissions trading system, looked into how fuel prices affected the stock market for the metallurgical industry. There is a negative, long-term relationship between fuel prices and movements in the metallurgy sector stock market, as well as firm-specific effects, as shown by the data. Wen (2020) provides additional support by demonstrating that the carbon emission trading market is significantly negatively correlated with the overall Chinese stock market both in the long and short term.

However, this study utilized the comprehensive stock market, which encompassed every industry represented on the Chinese stock exchange. Furthermore, Li (2022) reports that the energy price sector in the stock market has a negative effect on the green market in the short run but has a positive effect on the green market in the medium run. The results of the study are significantly impacted by the length of the run.

Countries in Asia that consume Brent crude oil make up Asia. Using a panel data approach, (Moreno ,2017) discovered strong evidence of a positive oil-price effect at the level of individual businesses. These findings are consistent with those of (Salisu, 2019), which demonstrated that stock returns are more sensitive to positive than negative changes in oil prices. This study also looked at palm oil in addition to crude Brent oil because Asia is a major producer of palm oil. This study was motivated by (Arintoko, 2021), which investigates the sensitivity of palm oil prices to fluctuations in the stock market index. The conclusion is that the stock price of the company is significantly correlated with the price of palm oil over the long term.

According to Moreno (2017), the analysis showed influence of exchange rate rise on the metallurgical industry stock market is positive. Different result is stated from reports that the analysis indicates a positive effect of an increase in the exchange rate on the stock market of companies involved in the metals industry. In contrast Suharyanto & Zaki (2021), state that the exchange rate has a sizeable negative effect on the stock price index, which is a different conclusion. Wong (2022), however, finds a result statement that agrees with Moreno (2017), arguing that the exchange rate has a significant impact on the real stock price. In addition to the foreign exchange market, Moreno (2017) found no correlation between interest rates and stock returns. Suharyanto & Zaki (2021), provide additional evidence that interest rates do not affect stock returns. The research, on the other hand, is consistent with Moreno (2017) in terms of its relevance to the stated purpose and the variables it employs. The results will be estimated using a data panel and the Vector Error Correction Model (VECM).

The purpose of this title is to investigate and analyze the relationship between carbon prices, oil prices, palm oil prices, exchange rates, and interest rates with return of energy sector in long and short run. Furthermore, the study concentrated on Asia Pacific.

1.3 Problem Formulation

The value of a company's stock can respond to both internal and external influences. The factors that influence stock price fluctuations have been studied by a number of experts. Moreno (2017) demonstrates how interest rates affect stock prices and states that this correlation is not statistically significant. Suharyanto & Zaki (2021) conducted research on the impact of currency exchange rates on stock market prices and found that they had a negative and statistically significant impact. (Wen, 2020), found a different conclusion, namely that the exchange rate significantly affects the real stock price. According to Tian (2011), carbon prices have a large impact on the stock market in the short run but have less of an impact on stock market prices in the long run. However, (Wen, 2020) found that stock market prices have a substantial negative effect on

carbon prices over both the long and short term. Salisu (2019) provided empirical evidence that the stock market's valuation was positively correlated with oil prices. Arintoko (2021) also found a positive and statistically significant relationship between stock market prices and palm oil prices over the long term. This finding also indicated by figure 1.2 until figure 1.6 that supported there is relationship between carbon price, Brent oil price, palm oil price, exchange price, and interest price with stock market prices, even though this finding has not instable or inconclusive because the results put forward by researchers above are still different, making the results even more ambiguous therefore it must be retested. In addition, research about carbon price and palm oil price on market price still limited. According to Moreno (2017), many investigations were carried out in European countries and used

Europe emission trading prices. Because Asian countries are new to carbon trading, research is still limited. Therefore, this research focuses on examining Asian countries that already own and determine carbon prices. The identification results above can be formulated in the form of a research question as follows:

1. How do the carbon price, crude Brent oil price, palm oil price, interest rate, and exchange rate affect the energy stock returns in Asia Pacific countries in short run and long run?
2. How do the carbon price, crude Brent oil price, palm oil price, interest rate, and exchange rate affect the energy stock returns in Asia Pacific countries in partial and simultaneous?

1.4. Research Objective

Stock prices forces by supply and demand. Supply caused by down prospects by industry made investors sell their stocks and demand occurs when the prospect by industry increases which causes therefore investors to buy stocks. Stock price describes the value of the company. There are factors that can affect price fluctuations in stocks. In this research analysis was carried out on 6 countries of stock market in sector energy prices (ASX, TSX, SSE, JPX,

KRX, and NZX), carbon prices, Brent oil prices, palm oil prices, exchange rates and interest rates. The purpose of this research is as follows:

1. To determine the carbon price, crude Brent oil price, palm oil price, interest rate, and exchange rate affect the energy stock returns in Asia Pacific countries in short run and long run.
2. To ascertain the carbon price, crude Brent oil price, palm oil price, interest rate, and exchange rate affect the energy stock returns in Asia Pacific countries in partial and simultaneous.

1.5 Research Benefit

The results of this study are expected to provide the following benefits:

1. For academics and researchers, hopefully it can be used as empirical evidence of knowledge and can add insight and references for further research on stock market.
2. For the general public, this research can provide an overview of the attitude of the important of reduce climate change by implementing zero-emission for industries.
3. For the investors, this research can give the knowledge about several factors that can influences the prices in stock market.

1.6. Writing Systematic

a. CHAPTER I: INTRODUCTION

This chapter contains the background of the problem, which shows the basic thinking in an outline both in theory and in fact, and is the reason for conducting this research. The problem formulation contains statements about circumstances, phenomena, and or concepts that require answers through research.

b. CHAPTER II: LITERATURE REVIEW

This chapter explain basic definitions and theories relating to the research's topics and variables to become the basis for compiling research. This chapter also describes previous studies similar to the issue discusses, which can be used as a reference in the study.

c. CHAPTER III: RESEARCH METHODOLOGY

This chapter describes the type of research and research approaches used, the types and sources of data (population and sample), data collection techniques, data analysis techniques, and hypothesis testing.

d. CHAPTER IV: ANALYSIS AND DISCUSSION

This chapter contains the results of data processing, and the author analyzes the results to conclude from the research.

e. CHAPTER V: CONCLUSION AND SUGGESTION

This chapter explains the research results, including conclusions in response to the problems raised in the study, as well as concrete interpretations of the research analysis results and suggestions for future steps in following up on answers to existing questions.