

CHAPTER I

INTRODUCTION

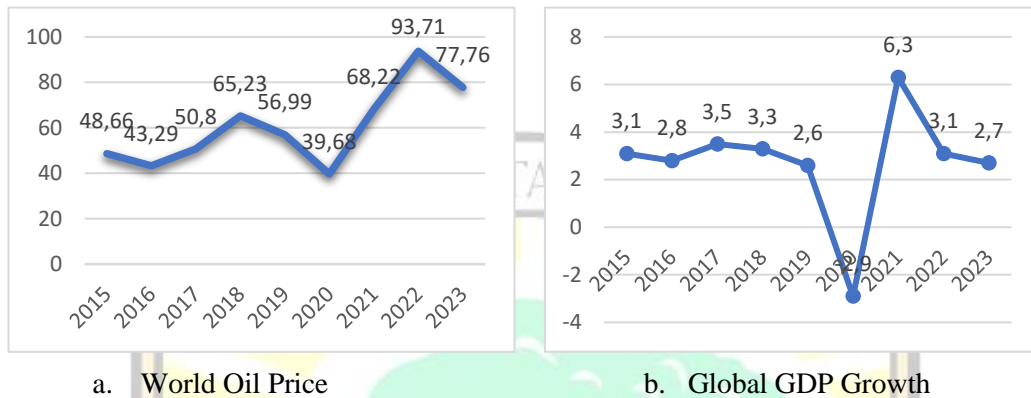
1.1 Background of Research

Crude oil is one of the main commodities that drives the global economy, therefore oil price fluctuations have a significant impact on economic growth and welfare. The large dependence on crude oil in industrial countries began to appear in the 1970s and 1980s, when several political tensions and geospatial conflicts, especially in Middle Eastern countries, disrupted security of supply and had a negative impact on the stability of world oil prices. Since then, oil price shocks have continued to increase in both size and frequency. Although oil demand will likely remain slow, driven primarily by economic growth and climate policy, supply will remain highly uncertain, especially given ongoing instability in exporting countries and uncertainty regarding the discovery of new resources. As a result of this uncertainty, and in the current very tight trading context, future oil prices are also expected to experience (increasingly) drastic fluctuations.

Theoretically, oil price shocks can be transmitted to the macroeconomy through various channels (Almaya et al., 2021; Septiawan et al., 2016). Energy-intensive industrial production will be more impacted than service-based industry. Prolonged increases in oil prices will require costly structural changes to production processes with potentially detrimental employment impacts. However, it is important to note that the frequency of oil price shocks (both positive and negative) increases perceptions of price uncertainty. In principle, changes in petroleum prices apart from having the potential to reduce export and import performance can also increase government revenues through oil and gas taxes, although on the other hand this means greater subsidy spending by the government (Purnomo et al., 2020). Falling oil prices also weakened the overall foreign earnings of oil-producing countries in Africa, resulting in increased inflation rates due to overseas demand for foreign products; in particular, demand for food ingredients has not fallen (Bala & Chin, 2018).

In some literature study that has been obtained, Oil price shocks have an indirect and direct impact on India's inflation rate and economic growth. This is because petroleum is the main source of energy used in the manufacturing, aviation,

mining, automotive, and transportation sectors (Sarmah et al., 2021). Accordingly, for developing countries, rising oil prices have anti-growth properties, by providing a negative response to economic growth (Liaqat et al., 2022). And in the capital market, oil price shocks also impact the development of alternative energy stock prices (Sadorsky & Henriques, 2008).



Source: World Bank Open Data, 2024

Figure 1. 1 Development of World Oil Price and Global GDP Growth from 2015 to 2023 (in percent)

From the two pictures above, we can see that movements in global oil prices affect the global economic conditions. When prices fell very significantly in 2020, causing the economies of all countries to spontaneously fall free from the previous year, after that in the following year there was an increase in oil prices and this led to economic recovery as evidenced by increased economic growth in various countries. This is evidence that shows the importance of oil prices in economic growth into economic conditions of the countries in the world.

As international environmental concern increases, the international community needs to increase investment in the renewable energy (RE) sector by approximately \$130 billion over the next fifteen years. This is to ensure carbon dioxide emissions peak in 2020 and global warming remains below 2°C which is a generally accepted figure and, if breached, would push global warming beyond acceptable limits. This means that investment in renewable energy needs to be increased rapidly, but it is still unclear what will facilitate this increase in renewable energy investment. The main factor considered here relates to whether oil prices significantly influence renewable energy investment and production. Oil prices have recently fallen by more than 60 percent, from a high of \$107 in June 2014 to

\$40 in November 2015. This has sparked major debate regarding the potential impact on investment in renewable energy. Clearly, there is no consensus on the impact of oil prices on renewable energy investment, as this depends on the extent to which changes in oil prices encourage investment in renewable energy, so if oil prices rise from current lows, as many analysts predict. If at all, what impact will this increase have on renewable energy investment.

The existence of two-way causality provides support for the feedback hypothesis which states that renewable energy consumption, non-renewable energy, and economic growth are interdependent. The existence of policies that increase renewable energy consumption can have a positive effect on economic growth, but we also cannot ignore non-renewable energy sources because renewable energy sources are generated from greenhouse gas emissions produced by non-renewable energy (Apergis & Payne, 2012; Apergis & Payne, 2014). Continuing that, there is an increase in the production and consumption of renewable energy in several countries because the development of renewable energy sources can encourage major economic growth because the application of renewable energy creates jobs and reduces adverse environmental impacts (Payne, 2012; Boyden et al, 2013; Bhattacharya et al, 2016).

Table 1. 1 Total Renewable Energy Production (GWh), Capacity (MW), and Renewable Shares in the World from 2013 to 2021

Year	Total Renewable Energy Production in the World (GWh)	Total Renewable Energy Capacity in the World (MW)	Renewable Energy Shares in the World (%)
2013	5,039,245	1,567,206	9.7
2014	5,315,183	1,699,477	9.8
2015	5,516,329	1,853,969	10
2016	5,884,328	2,016,606	10.4
2017	6,225,318	2,187,943	10.6
2018	6,627,719	2,363,042	11.1
2019	6,994,720	2,550,533	11.5
2020	7,455,905	2,824,989	12.5
2021	7,857,803	3,089,984	12.5

Source: International Renewable Energy Agency (IRENA), 2024

From the table above, we can conclude that over the past 9 years there has been an increase in the production and consumption of renewable energy in several countries. This is also in line with the increase in world renewable energy shares which increases over the years. This is in accordance with previous findings that show an increase in the dominance of renewable energy that will occur in the future because renewable energy sources are believed to be able to become alternative

energy and encourage economic growth and reduce adverse impacts on nature and the environment.

Following recent international agreements on the need to reduce greenhouse gases, such as the G8 statement aiming to reduce emissions by 50 percent by 2050, ways to achieve such reductions have become increasingly important. One of the most commonly used policies involves the use of renewable energy production as a replacement for fossil fuels. As international and European Union (EU) targets for reducing carbon dioxide emissions become increasingly important, governments around the world are seeking to expand energy production from renewable energy sources through the use of subsidies and indirectly through additional taxes on fossil fuels. Therefore, government intervention in the renewable energy market is the dominant factor in determining renewable energy investment in most of the analysis period (Shah et al., 2018). As government intervention in this market decreases, as the competitiveness of renewable energy technologies increases, and the degree of substitution between renewable energy and petroleum increases, the conclusions of this study suggest that the relationship between renewable energy and its substitute products will become more significant and stronger in several countries (Tiwari, 2011).

Despite the oil price shock and the increasing use of renewable energy around the world. Monetary policy seems to be one of the main milestones that are important in controlling the economy around the world. For example, interest rates affect the level of investment and consumption in the community. In addition, it turns out that the turmoil that occurs in world oil prices is also in line with fluctuations in interest rates that develop in each country.

For example, there was a shock that occurred in energy prices that occurred in 1970, at that time various countries used monetary policy to prevent a more severe economic upheaval in the future. In addition, the Asian financial crisis that occurred in 1997 made many countries experience depreciation and were hit hard by the crisis. This continued until the global financial crisis that occurred in 2008 which was responded to with expansionary economic policies to encourage consumption and stimulate credit and heal the economy. The recent phenomenon

of the Covid-19 pandemic has also disrupted the economy and affected many countries.

Empirical studies investigating the relationship between oil price, renewable energy, and monetary policy are still limited and still subject to debate. Among the research that analyzed the relationship between oil prices, renewable energy investment and interest rates conducted by Shah et al. (2018) found that GDP and interest rates have a significant impact on renewable energy investment, but each country has a different response, indicating different government policies in the country. Other research was also conducted by Irene Sadorsky & Henriques (2008) who found that oil price shocks did not have a big influence on renewable energy stock price shocks in the capital market, when compared to technology stock price shocks, renewable energy stock prices had a very big impact.

The author is interested in analyzing the relationship between oil prices, renewable energy and monetary policy in Indonesia, Italy and the United States. So, the title of this research is "Facing Change in the Future: Exploring the Relationship of Oil Price, Renewable Energy, and Monetary Policy. The selection of this country was conducted by purposive sampling. The data taken is based on annual data starting from 1990 to 2020. To find out how strong the relationship is between oil prices, renewable energy and monetary policy, several control variables are used, such as nominal average crude oil price, renewable shares of total energy consumption, and real interest rate. This research is expected to fill existing literature gaps and provide insight to policy makers and practitioners relating to oil prices, renewable energy, and monetary policy in various countries.

1.2 Problem Identification

Based on the background that has been presented, the relationship between oil prices, renewable energy investment, and monetary policy is still an important study to discuss. There are studies that find a positive influence between oil prices, renewable energy and monetary policy, but quite a few find the opposite relationship. There is research that finds contradictory conditions between oil prices, renewable energy and monetary policy. Therefore, the formulation of the research problem can be explain as follows:

- a. How does the relationship between oil prices, renewable energy and monetary policy compare in each of these countries?
- b. What is the relationship between oil prices, renewable energy and interest rates in the long term and short term in each country?

1.3 Research Objective

Based on the background and problem formulation above, the research objectives can be described in several points as follows:

- a. To see a comparison of the relationship between oil prices, renewable energy and monetary policy in each country
- b. To see the relationship that exists between oil prices, renewable energy, and monetary policy in both the short and long term in each country.

