Oil Price and CO_2 Emission in GCC Countries

Subjects: Economics

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Oil prices, economic growth and rapidly increasing urbanization could have a long-lasting impact on the environment in oil-abundant Gulf Cooperation Council (GCC) countries. Moreover, the rising oil price has a positive impact on CO_2 emissions and shows a scale effect in Oman, Qatar, and Saudi Arabia. Lastly, urbanization positively affects CO_2 emissions in Bahrain, Oman, Qatar, and the UAE. Economic growth is found asymmetrical in all GCC countries, and the asymmetrical effect of oil price is also observed in all GCC countries except the UAE. Hence, these countries should impose a carbon tax on energy-intensive urban activities to discourage pollution emissions, and these tax revenues should be utilized to encourage the cleaner use of energy in the urban area. In summary, economic growth is responsible for increasing CO_2 emissions in 4 out of 6 GCC countries and increasing oil price is increasing CO_2 emissions in 3 out of 6 GCC countries. Overall, GCC countries should speed up the renewable energy transition process by installing renewable energy projects on an urgent basis, which would reduce the environmental consequences of rising oil price and economic growth.

Keywords: oil price ; economic growth ; urbanization ; CO2 emissions ; GCC countries ; asymmetry

1. Introduction

Oil, being one of the most valuable natural resources globally, can play a major role in regulating economic and other socioeconomic indicators in a Country. It is especially true for oil-exporting countries such as those in the Gulf Cooperation Council (GCC) region since a significant chunk of the region's income is from oil exports. Hence, an increase in Oil Price (OP) would naturally increase their revenue and bring economic prosperity. Nevertheless, the consequence of that for the energy industry and environmental indicators is not necessarily the same. Therefore, it is crucial to understand how oil prices impact the usage of energy resources and influence CO_2 emissions in a country. However, as the COVID-19 pandemic hit the global economy and growth in markets across the world plummeted, the impact of the pandemic on GCC's regional economy was not an anomaly. An 18% sharp decline was observed in the first quarter of 2020 in the global economy due to COVID-19. The global oil market was notably affected by the declined demand for fuel, and oil prices started sharply dropping. Accordingly, the oil industry in the GCC region has been facing a crisis. Due to this decline being a major source of income, economic activities in the region are also compromised. The sudden decline in global oil consumption, and the consequential drop in oil production and prices in 2020 undoubtedly affected the real income. The global economy was projected to grow from an estimated 2.9% in 2019 to a higher pace of 3.3% in 2020. However, the end result turned out to be a significant drop in the growth of a global economy that actually contracted by −3.5% in 2020 due to the impact of the COVID-19 pandemic [1][2]. Accordingly, due to social distancing and stay-at-home policies, the transportation and oil sector was affected the most due to a lack of mobility [3][4][5][6]. However, the global economy started recovering from the pandemic in 2021 and early 2022 where the growth of the global economy reached an estimated 5.9% in 2021 and is expected to grow at 4.4% in 2022 [7]. Respectively, oil prices have also started to recover, but it has been very volatile in the past decade. For instance, the OPEC basket price went from a high of USD109.45 per barrel in January 2012 to a low of USD14.31 on 24 April 2020, during the COVID-19 pandemic. Following the Russian war on Ukraine, the OPEC basket price reached the newest peak of USD128.46 per barrel on 9 March 2022 [8][9].

Hence, a policy question remains on how GCC countries can shape the oil price policies to cope with the revenues of the region to deal with the problem of changing demand for oil and its price and to control environmental indicators. Oil is a price-inelastic product due to its compulsory nature of demand in all types of industries including the transport sector, household use, manufacturing, etc. Hence, optimum oil pricing policies are needed for the GCC region to balance between oil revenues and environmental quality. Researchers aim to find the asymmetrical effects of oil price on CO_2 emissions because rising or falling oil price policy would not necessarily have the same environmental impact [10]. Hence, the estimated asymmetrical elasticity parameters of this research would support the oil pricing policies in both cases of rising and falling oil prices, considering their environmental impact.

Considering the substantial contribution of the oil sector to the GCC economy, the decline in both demand and price of oil has widespread implications for the economy and other socioeconomic factors in the region. The price of oil determines the economic growth metrics in GCC countries and also leads to understanding the direction of the region's environmental profile and carbon footprint. Since our planet is facing many environmental challenges, including biodiversity loss, high levels of pollution and CO_2 emissions, and desertion of plains. Indraganti and Boussaa [11] claimed that GCC's emissions have been higher than the global average. For instance, the global total ecological footprint was 1.8 hectares per person. For the UAE, this figure was as high as 11.9 hectares per person, and for Kuwait and Saudi Arabia, it was 7.6 and 4.6 hectares per person, respectively [12]. These high emissions are mainly due to activities in both production and consumption of petroleum-based products. Kanaboshi et al. [13] mentioned that the Paris Agreement has a robust implication for oil refineries worldwide and plays a significant role in reducing their CO_2 emissions by applying stricter policies and emission caps. Since oil refineries could play a substantial role in CO_2 emissions, all oil-exporting countries need to adhere to those rules [14][15]. To meet the Kyoto Protocol and Paris Agreement, the countries in the Middle East have to apply proactive environmental policies to curb the environmental impact of activities in the oil sector and implement appropriate emission control strategies to make the oil sector more environmentally friendly.

Being a hub of oil production, the GCC region is the focus of policymakers worldwide and can play important role in finding the solution to counter the environmental side effects of the oil sector. GCC economies carry a major percent of global oil reserves and production. Moreover, these economies also carry a significant portion of world natural gas reserves and production [16]. On the other hand, GCC had a renewable energy capacity that is lower than 1% of its total energy requirement in the year 2018 [17] while contributing more than 3% of global CO_2 emissions in the year 2019 [18]. Hence, GCC economies are carrying a significant chunk of world oil and gas reserves and production, which does have environmental consequences for GCC economies and the world as a whole. Increasing world oil prices motivates the GCC economies to produce more nonrenewable energy which is also responsible for energy depletion. For instance, Alkhateeb and Mahmood [19] found that increasing oil prices are increasing the energy depletion in the GCC economies, which is a threat to energy sustainability for future generations. In addition, rising oil prices would also have environmental consequences because most of the economic activities in the GCC region depend on the oil sector. Estimating the asymmetrical effects of oil prices on CO_2 emissions would pave the way to reducing environmental problems of the oil sector in the GCC region with the help of oil pricing policies. The asymmetrical analyses would be helpful in particular for policy decisions in case of any oil prices rise or decline. Moreover, the outcomes of this research would equally be helpful for meeting the challenges of global environmental agencies, would benefit the regional environment policymakers, and would also provide partial guidance on reducing the global warming problem. The research outcome would also help meet environmental challenges for other oil-producing countries and regions.

On the energy consumption side, Al-Maamary et al. [20] provided a theoretical context on the matter. They investigated the GCC region to analyze the role that oil prices play in using renewable and other energy sources. They mentioned that in terms of energy use, the GCC region has not been as efficient in the past, and even now, energy usage in the region is growing much faster than the economy's growth. In short, it indicates that there is a lot more energy being used than the benefits this use brings to the economy. It implies that the cost of energy consumption is higher, and the countries need to take some actions to make their energy profile more sustainable. Regulating the activities in the energy sector is also crucial because even with rising oil prices, if these countries earn higher revenue, that economic benefit would increase energy usage at a much faster pace which would eventually ruin the environment.

Due to excessive reliance on fossil fuels, especially oil as a primary export, it is harder for the GCC region to devise a more renewable-energy-focused policy [21]. Due to their high dependence on oil exports, all of the GCC countries are among the top 25 of per capita CO_2 emissions globally, which is an incredibly alarming fact. Understanding the role of OP and other factors in the CO_2 emissions of GCC is essential for the region to devise policies that would let it meet its 2030 renewable energy targets. Investing more in renewable energy could be the best solution to meet environmental goals [22]. While some countries in GCC are attempting to install more awareness about renewable energy and promote innovation in alternative energy, there is still a lot of room for improvement [23]. Moreover, those efforts are not at par with global standards and are not efficient enough for the region to meet its 2030 targets.

There is some interesting economic literature that analyses relations between growth, oil prices, urbanization, and CO_2 emissions in GCC countries. For instance, in an attempt to quantify the impact of oil-induced growth on the environment, Mahmood and Furqan [24] have conducted linear and quadratic analyses to verify the Environmental Kuznets Curve (EKC) in a GCC panel. Similarly, Majeed et al. [25] have examined the effect of urbanization on emissions in the GCC region. To the best of our knowledge, no study has explored the asymmetrical impact of growth on emissions in a GCC region yet. However, some studies in other developing countries such as Pakistan and India evidence the existence of such asymmetry [26][27]. Moreover, the literature also suggests that conducting an asymmetrical analysis of the relationship

between OP and emissions can be beneficial in the context of GCC [27][28][29]. Moreover, Mahmood and Furqan [16] did spatial analyses to find the aggregate impact of oil revenues on different greenhouse gas (GHG) emissions in the whole GCC region. Still, asymmetrical effects of oil price and economic growth on CO_2 emissions focusing on separate analyses of each GCC economy are missing. In the current environment of very volatile oil prices, as they dropped deep during the COVID-19 pandemic and have sharply risen during recovery and due to geopolitical tensions in Ukraine, it is vital to explore this matter in more detail.

The past literature has ignored the importance of asymmetry analyses in the relationship between oil price and CO_2 emissions in all GCC countries. Hence, the present research is highly motivated to conduct asymmetry analyses of oil price, economic growth, and CO_2 emissions relationships in each economy of the GCC region separately, which would help see where the GCC countries are headed in meeting their emission reduction targets. How much environmental targets can be achieved with increasing or decreasing oil price policies in each country of the GCC region because all GCC economies might not be responded equally to a similar change in oil price. Oil price would have a scale effect on the economy through increasing income and energy demand in GCC oil-dependent economies. On the other hand, increasing oil prices would also become a source of revenue for governments of GCC countries to finance the cleaner technologies in existing production processes or to shift the industry from dirty production processes to cleaner types of industries, which are termed as techniques and composition effects [30][31]. In times of increasing oil prices, there is a chance that technique and composition effects outweigh the scale effect and increasing oil prices become opportunities for a pleasant environment in some GCC economies. On the other hand, the inverse situation may also happen. In addition, it is not necessary that increasing oil price could have the same effect on any economic and environmental performance as decreasing oil price [32]. Therefore, the exact effect of increasing and decreasing oil prices on CO_2 emissions of each single GCC economy is a research question, which the present research is going to explore in all GCC countries. Malik et al. [33] have explored this research question in the case of the oil-importing country Pakistan. Still, the gap exists in GCC literature and the present research will fill it. In the same way, economic growth can also have an asymmetrical effect on CO_2 emissions due to the presence of scale, technique, and composition effects, which has been explored in the case of India and Pakistan [26][27]. However, the asymmetrical effect of economic growth on CO_2 emissions is missing in the case of GCC countries, which is a research question for these economies.

2. Impact of Oil Price, Economic Growth and Urbanization on CO_2 Emissions in GCC Countries

Theoretically speaking, when a country witnesses more economic growth, there is a chance of more economic and industrial activities, which can inevitably increase CO_2 emissions. Many studies have analyzed the role of macro- and micro-economic and socioeconomic aspects on CO_2 emissions and the environment. The most significant determinant of CO_2 emissions is economic growth as per the established literature. Many studies have investigated this issue in-depth. Some studies focus on testing the EKC in economic growth and pollution emissions relationships, while others test the symmetrical or asymmetrical effects of economic growth on pollution emissions. Moreover, different instruments have been utilized in testing such relationships as per the objectives of the studies and the most prominent drivers of pollution emissions in an economy or a group of economies. In a symmetry analysis, Namahoro et al. [34] found the differential effects of economic growth on emissions while analyzing countries with various income levels and found that energy intensity increases the emissions. Furthermore, their findings also confirm that increase in the use of renewable energy reduces emissions. In the causality analyses, Pejovic et al. [35] pointed out a two-way relationship between growth and emissions where those variables have affected each other. However, their research also found that extensive use of renewable energy helped reduce emissions. In addition, governance indicators of any economy would help to transform towards renewable sources [36]. Moreover, economic growth after a threshold level would help promote renewable consumption [37][38][39][40][41][42].

Mahmood [43] corroborated the EKC in GCC countries and an increase in exports accelerated emissions. Mahmood et al. [44] also documented the positive impact of exports on CO_2 emissions in North Africa. Adom et al. [45] corroborated that income accelerated emissions in Senegal and Morocco. Some literature has also been investigated which validates the existence of asymmetry between growth and emissions relationship [26][27]. The increasing economic growth was increasing emissions, and decreasing growth showed an insignificant effect on CO_2 emission, which signifies the importance of conducting asymmetry analyses in the relationship between economic growth and pollution emissions. Salahuddin and Gow [46] tested the association between income and emissions in GCC countries. The results of their analysis confirmed the existence of a positive relationship between growth and energy usage. However, no significant association was found between growth and emissions. It seems contradictory to many other studies on the topic, but such an outcome could be due to the lack of asymmetrical analysis. Nevertheless, their analysis supports the fact that the adoption of renewable energy and proactive energy conservation policies can reduce CO_2 emissions in the region.

Among the other important determinants, urbanization is also a crucial determinant of emissions, and some literature investigated the urbanization and pollution emissions nexus in symmetry analyses. Meng et al. [47] stated that both urbanization and industrialization increase carbon emissions. They also argued that urbanization increases emissions faster than industrial growth. Their results concluded that while focusing on industrial development and rapid urban activity, countries should estimate the potential benefit and environmental harm to the region since the cost can sometimes be higher than the benefit, and this might leave a permanent negative impact on the environment. The research results confirmed the findings of many other analyses conducted on a similar topic, which showed that industrialization and urbanization seem to harm the environment [48][49][50]. Wang et al. [51] discussed the effect of urbanization, income level, and other variables contributing to higher CO_2 emissions. They broke down the countries into various categories regarding their income levels, which provided another layer of context to their analysis. They suggest that CO_2 emissions are energy-led, and that is the case for all income levels. Therefore, whether it's a low-, middle- or high-income country, they should pay special attention to the speed of urbanization to protect the environment.

There is also some literature on GCC and the Middle East and North Africa (MENA) countries investigating the nexus between urbanization and emissions. For instance, Mahmood et al. [52] performed asymmetrical analyses on the role of urbanization in determining emissions. Their research was focused on Saudi Arabia, and they utilized data from 1968–2014. Urbanization and emissions have a positive relationship, and urbanization leads to more activity and higher emissions. They also found that the environmentally degrading effects of increasing industrialization have more impact on emissions than the benefits from declining industrialization. Abdallh and Abugamos [53] utilized the semi-parametric approach and explored a similar idea for the MENA region and mentioned that emissions increase with urbanization and rising income. They suggested policies to curb the negative impacts of growth and urbanization. According to them, it can be achieved through multiple channels, including stricter regulation on energy use and adopting more advanced and environment-friendly technology to achieve economic growth and urbanization while still keeping the environment clean and sustainable. Mahmood et al. [10] investigated urbanization, the oil sector, and CO_2 emissions and found a positive effect of urbanization and income on CO_2 emissions in Saudi Arabia. Being an oil-abundant country and the largest oil exporter in the Middle East, Saudi Arabia's oil sector has significant effects on its economy and other socioeconomic indicators. Therefore, there is no doubt that the oil sector in the country would have an inevitable level of CO_2 emissions and can have significant adverse environmental effects. Moreover, Majeed et al. [25] found that oil abundance improved and urbanization deteriorated the environment in the GCC region.

The oil sector and oil price could affect the CO_2 emission in both oil-importing and exporting countries. In their symmetrical analysis, Mensah et al. [54] explored the issue for the African continent using a panel cointegration approach. The panel data from 1990–2015 for 22 African countries were used, and the sample contained both oil-exporting and non-exporter countries. For both categories, a unilateral causal relationship was found between oil price (OP) and income, fossil fuel usage, and emissions. This causality between various proxies of OP and pollution was also found in other studies [55][56]. Sadorsky [57] stated that rising OP negatively affected renewable energy consumption in G7 countries. The result implies that higher oil prices and oil market volatility can lead to higher CO_2 emissions by reducing renewable consumption. The result has a strong implication, especially for oil-exporting countries, to control and regulate oil prices and ensure reduce fossil fuel usage so that the adverse effects on the environment are not irreversible.

Literature has also focused on the possible asymmetrical effect of the oil sector on pollution emissions. For instance, in their asymmetrical analysis, Zheng et al. [58] argued that oil shocks might significantly impact emissions, and oil supply can also impact carbon allowance prices. With a notable role of oil supply and prices in determining emissions and carbon allowance prices, there is a clear pathway and policy framework for countries to regulate and control their emissions and the oil market, including its supply and price, to meet their long-term environmental goals. There seems to be a substitute relationship between oil and gas prices, and if oil price distortions are controlled, CO_2 emissions can be reduced significantly. Regulating oil prices provides a better governance framework to prevent the use of oil, and as a result, CO_2 emission reduction targets can be met [59]. In spatial analysis, Li et al. [60] studied energy prices and their impact on CO_2 emissions in China. They showed that energy prices could have a significantly negative impact on CO_2 emissions both directly and indirectly, and these energy prices have spillover effects.

In the symmetrical analyses, Wang et al. [61] showed a cointegration between oil dependency, emissions, and income. The countries under analysis in the research, including China and India, have high oil demand and also have a high CO_2 emission rate. However, this cointegration is corroborated in countries such as France and the US. The results suggested oil-exporting high CO_2 emission countries to diversify their oil channels and devise more holistic energy policies that can design action plans for the long term and help maintain a balance between oil demand and CO_2 emissions. They also suggested supporting renewable energy market penetration so that the oil dependency of these countries can be reduced, and their economic and industrial activities can be cleaner. Bohringer et al. [62] argued that domestic CO_2 emissions could

be reduced through a uniform economywide emission-pricing policy, and CO_2 revenues can be recycled in Germany. To meet its environmental goals, Germany has set higher CO_2 emission prices, resulting in higher CO_2 revenue from households. In the asymmetrical analyses, Malik et al. [33] used a nonlinear Auto-Regressive Distributive Lag (NARDL) approach to analyze OP and income and their impact on emissions in Pakistan. They explored the relationship both from the symmetric and asymmetric perspectives. In the symmetric model, in the short-run, OP accelerated emissions. However, in the long-term, the relationship is the opposite, and oil prices reduce emissions. In the asymmetric model, rising oil prices were seen to reduce emissions, and a fall in these prices increased long-run emissions. Likewise, Shahbaz et al. [27] have documented a negative asymmetrical impact of OP on emissions in an oil-importing country, namely India.

Ignoring asymmetrical analysis in GCC countries, literature has probed the role of oil prices on CO_2 emissions. Aldubyan and Gasim [29] analyzed the role of energy price reforms in Saudi Arabia and explored demand response and environmental and economic impacts. Investigating the role of energy or oil prices is crucial for Saudi Arabia since a significant chunk of the country's income comes from the oil sector. They mentioned that lower energy prices lead to higher energy demand and consumption. However, it also has a caveat since there is an inevitable waste of energy and relevant resources with a rapid increase in demand. That dynamic leads to less focus on energy efficiency in general, let alone renewable or sustainable energy. Therefore, regulating energy prices can, in turn, lead to direct and indirect effects on emissions. If energy prices are kept at a competitive level, its usage can be efficient, ensuring that the environmental goals are also sustained. They also pointed out that with residential power and gas prices being income inelastic, a new policy complexity is added to the equation that needs to be considered while formulating energy prices and underlying policies in the country. Another study conducted on OP and emissions in the GCC region provides practical insights on the topic. Alkathery and Chaudhuri [28] studied the OP, emissions, and energy equities in the GGC region. They concluded the co-movement of oil prices, emissions, and global clean energy production. They confirmed the spillover effects of these variables and market volatilities and suggested revenue diversification policies.

Al-Maamary et al. [20] argued that with increasing oil prices and higher energy consumption, CO_2 emissions are rising much faster than economic growth, indicating that the GCC region is inefficient in its energy use. The results imply that the cost of higher energy prices, more economic activity, and higher energy consumption are higher than the benefit from all the economic activity and revenue generation. In a spatial analysis, Mahmood and Furqan [24] conducted a detailed study on the Gulf region from 1980–2014. The study was targeted at exploring the nonlinear impact of oil rents on emissions of various types, including CO_2, CH_4, N_2O, and GHG. The EKC was found to exist between income and emissions, and a similar trend of oil rents was seen with various investigated emissions. Oil rents were also seen to positively impact CO_2 emissions, indicating that with higher oil rent, CO_2 emissions tend to rise. For N_2O and oil rents, this relationship was U-shaped which means that as oil rents increase, N_2O initially declined but eventually started growing again. Moreover, urbanization was found to positively impact CO_2 and other emissions, and so did energy use. It implies that Gulf countries should find a better way to regulate energy use, urbanization, oil prices, and other socioeconomic and financial aspects to contain their environmentally degrading effects. Sadik-Zada and Gatto [63] discussed the scenario of oil abundance and high CO_2 emissions in oil-producing countries. They found a causality from OP to emissions. They suggested tertiarization for oil-abundant nations to eliminate these negative effects of OP and promote de-carbonization. Oil prices are expected to impact the stock market in the GCC region [64][65]. In turn, it can affect the economic and environmental health of the region. Considering the relationship between the variables in the available literature, it would be an insightful analysis to understand how economic growth, oil prices, and urbanization may impact CO_2 emissions in the GCC region. Considering oil prices is especially important in GCC economies since oil is their primary export and source of income. The analysis would add more color to the regional context and how oil pricing and other factors can be controlled to sustain its growth while ensuring a clean environment. After all, if the environment is being negatively impacted, this causes more harm than benefit to the region at the end of the day. The symmetric impact of growth, oil price, and urbanization in the GCC literature is conducted in the different studies in past literature [20][24][28][63]. However, a review of literature has signified the importance of asymmetrical analysis in the relationship between economic growth and pollution emissions [26][27] and the relationship between oil prices and pollution emissions [27][33][58]. These asymmetrical analyses are ignored in GCC economies, which researchers try to investigate.

3. Summary

The GCC region has a vast oil sector, which would affect the economies and environments of GCC countries. Moreover, rapidly increasing urbanization and economic growth in the GCC region would also contribute to environmental degradation. Some past research has been conducted on the issue, ignoring the asymmetry effects of oil prices and economic growth on CO_2 emissions. Hence, the present research aims at examining the asymmetrical effects of oil price

and economic growth on CO_2 emissions in oil abundant GCC countries using a nonlinear ARDL cointegration approach from 1980–2019, which would help in identifying the environmental effect of any rising or falling oil price and economic growth policies.

Results showed that cointegration is validated in all GCC countries' models. In the long run, increasing economic growth carries a positive impact on CO_2 emissions in all GCC countries except Bahrain and the UAE. Decreasing growth positively impacts CO_2 emissions in four out of six GCC economies. The effect of economic growth is found asymmetrical in all GCC countries. Increasing oil price positively impacts CO_2 emissions in Oman, Qatar, and Saudi Arabia and has a negative impact on CO_2 emissions in Kuwait and the UAE. Hence, it has a net scale effect in Oman, Qatar, and Saudi Arabia and has the net technique and composition effects in Kuwait and the UAE. On the other hand, decreasing oil price has a positive impact on CO_2 emissions in Bahrain and has a negative impact in Kuwait and the UAE. The effect of oil prices is asymmetrical in all GCC countries except the UAE. Urbanization has an average positive trend in all GCC countries and has a positive effect on CO_2 emissions in four out of six GCC economies. In the short run, both rising and declining trends of growth show a positive impact on CO_2 emissions in Kuwait, Qatar, and Saudi Arabia. Hence, increasing economic growth increases emissions, and declining growth is found helpful in reducing CO_2 emissions in these three GCC countries. Increasing oil price carries a positive impact on CO_2 emissions in Oman and Bahrain and negatively affects CO_2 emissions in Qatar and the UAE. On the other hand, decreasing oil prices reduces CO_2 emissions in the UAE, but it raises CO_2 emissions in Bahrain. Lastly, researchers found that urbanization deteriorates the environment in Bahrain, Oman, and Saudi Arabia. In the asymmetry analyses, in the long run, the research question of asymmetry is validated in all GCC countries in the relationship between economic growth and CO_2 emissions. Moreover, the research question of asymmetry in the relationship between oil prices and CO_2 emissions is also corroborated in all GCC countries except the UAE.

The long-run results suggest that increasing growth has environmental consequences in Kuwait, Oman, Qatar, and Saudi Arabia. So, these high fossil-fuel energy user countries should switch towards cleaner sources of energy and cleaner technologies to reduce the negative environmental consequences of economic growth. Moreover, increasing oil prices carry a positive long-run impact on CO_2 emissions in Oman, Qatar, and Saudi Arabia. Thus, these countries should invest their oil revenues in cleaner technologies and production processes in times of high oil prices, which would help them to control the environmental consequences of increasing oil price. In this way, the net scale effect of rising oil prices would be transformed into net technique and composition effects. Moreover, urbanization has negative environmental consequences in Oman, Bahrain, Qatar, and the UAE. Hence, these countries should impose a carbon tax on energy-intensive urban activities to discourage pollution emissions, and these tax revenues should be utilized to encourage the cleaner use of energy in the urban area. In summary, economic growth is responsible for increasing CO_2 emissions in 4 out of 6 GCC countries and increasing oil price is increasing CO_2 emissions in 3 out of 6 GCC countries. As per ARENA's [17] report, the GCC region is far away from renewable energy transition as less than 1% of energy is sourced from renewable sources. Hence, GCC countries should speed up the renewable energy transition process by installing renewable energy projects on an urgent basis, which would reduce the environmental consequences of rising oil price and economic growth.

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