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# **Market Makers in Global Stock Markets: Proposing a Model for Egypt**

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## **Abstract**

This study identifies market maker activity where is the activity that is essentially dependent to provide continuous prices for the purchase and sale of certain securities for the purpose to increase the liquidity of this security, which the market maker provides with this activity. Also, a market maker is the reverse party of the customer, does not act as intermediary or a trustee, but performs the financial hedging of its customer transactions.

There are three main models of market maker in the developed economies; they are New York model, NASDAQ model, and the model of the "electronic market measured by decentralized order". The study analysed the three models and it recommends imitating one of the most advanced models due to the lack of experience. Finally, the study believes that the best model for the Egyptian stock market is the electronic market measured by decentralized order.

## **Introduction:**

It is well known that capital markets in developing countries are suffering from two basic problems; the first is the shortage of capital supply, and the second is lack of liquidity. Several research papers proved that developing countries can use the implementation of market making activity in order to increase the overall level of liquidity Venkataraman and Waisburd (2007). Moreover, market making activity can be combined with other restructuring policies to raise market quality Majnoni and Massa (2001).

From this perspective, it is investigated that the implementation of a market making system will raise liquidity levels in the market, lowers transaction costs, reduces volatility and improves daily turnover of listed securities Nimalendran and Petrella (2003).

Consequently, it is important to make an assessment to the existed types of market making systems in developed capital markets in order to specify the factors that enable market makers to succeed in achieving these targets.

This study will examine the design of markets in the developed capital markets that succeeded in using market makers to achieve the goals of increasing liquidity, efficiency, and lowering transaction costs.

It is noted that the Egyptian Stock Market is not deep enough (Omran, 2003). One of the main reasons causing this problem is the lack of liquidity in the Egyptian Capital Markets Nimalendran and Petrella (2003). Several global stock markets use market makers in order to provide more liquidity to their markets. From this perspective, promoting market makers activities can be considered a solution to provide additional liquidity to the Egyptian Stock Market. Moreover, recent economic situation in Egypt and the crucial problems that the Egyptian Economy

suffers from nowadays assure the need to add more market makers to the Egyptian Capital Market. Despite the importance of market making activities, there is no research papers dealing with this issue in Egypt. This research paper is considered the first trial to examine and propose the best model of market making to the Egyptian stock market. Moreover, the study will fill the gap in this literature in case of Egypt.

The main objective for this study is to survey the literature of market makers in global stock markets in order to investigate and evaluate the different market making systems found in most developed capital markets and to provide guidance to Egyptian regulators in order to implement an excellent system for market makers in the Egyptian Stock Market. Also, the study will compare between models available to market making in order to choose the best for Egypt. Moreover, the study will determine the most important obligations and privileges of market makers in the successful global stock markets

This study is asking the following questions:

- What are the main models to design market makers activities in the developed stock markets?
- What are the most important obligations and privileges of market makers in the successful global stock markets?
- What is the most suitable model of market makers activities for the Egyptian Stock Market?
- What are the essential recommendations for the Egyptian regulators with regard to market makers' activities?

## **Literature Review:**

Research on this topic started with a number of theoretical papers such as Garman (1976), Amihud and Mendelson (1980), Kyle (1985), Glosten (1989) and Hasbrouck (1991) that discussed the importance of market makers and the vital role that it plays in the formulation of prices.

According to the most recent literature, there exist two different approaches to analysis the effect of market makers. The first approach is a cross-sectional comparison of market quality either in existence of market maker or in absence of it. The other approach that tests the market quality changes after the introduction of market makers activity.

Nimalendran and Petrella (2003) used the second approach and looked at the introduction of the market making system in the Italian Stock Exchange equity trading process. It investigated several market quality measures before and after the implementation of the system, it found that the market has become more efficient. In addition, with regard to the volume, spread and liquidity (depth of the market), this study found that the introduction of market makers has substantially improved liquidity, increased trading volume and lowered the bid-ask spread (cost of trading) of each individual instrument. Evidence showed that this improvement is greater for low trading (illiquid) stocks.

Also, there is Anand and Weaver (2006) that tested the introduction of the specialist system for equity options on the Chicago Board of Options Exchange (CBOE). It concluded that this new “specialist system” improved the spread (both quoted and effective) and the depth of the market. Moreover, the CBOE was able to attract market share from the other major competitor, the AMEX option exchange.

## **Methodology:**

This study assumes that a suitable model of market making has a positive impact on the liquidity and performance of the stock market in Egypt.

This study will use a descriptive methodology in order to survey the literature of market makers in global stock markets. The study will hold a comparison between the most advanced models of market making applied in developed economies and the model applied in Egypt so far.

Therefore, the study will analyse the advantages and disadvantages of every system of market making. In addition, the analysis will be extended to include the determinants and constraints that are related to such systems. Also, the analysis will cover the factors that explain the differences appeared in these systems of market making. The paper will concentrate on the market design of every system since it is considered one of the most important factors that formulate foreign investors' decisions to invest at any market.

Finally, all findings of this analysis will be used altogether to determine the optimal model of market making to be applied in Egypt.

## **Definition of Market Maker:**

Market making is the activity that is essentially dependent to provide continuous prices for the purchase and sale of certain securities for the purpose to increase the liquidity of this security, which the market maker provides with this activity. Also, a market maker is the reverse party of the customer, does not act as intermediary or a trustee, but performs the financial hedging of its customer transactions. Its policy includes balancing client transactions and hedging by providing liquidity and capital, according to the relationship between the market maker and customers is based mainly on the supply and demand forces. The market maker shall be a bank, financial



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institution or group of banks Institutions and governors with huge financial potential. It enables it to maintain balance in the markets by intervening in the purchase Stock prices have fallen to unjustified levels, or sold in case prices have reached excessive price levels.

The importance of market makers lies in maintaining balance in financial market, especially on selected stocks that has a direct impact on the prices and indicators of financial markets. Market making leads to non-vulnerability to financial crises, especially those arising from the intensity of speculations Rumours and manipulation of stock prices, and the most important channels Tanker, which increases the likelihood of price volatility between The decline and rise without real justification, especially during the absence of justice in Pricing, and the imbalance of the relationship between corporate stock prices and the level Performance. This situation underlines the need for market makers to create a manufacturer inside the market that is always keeping a balance between Supply and demand to narrow the gap between the selling and buying prices.

These market makers achieve the most important function: the ability to liquidate Stock quickly and easily, finding a constant balance between Supply and demand, limiting price fluctuations up or down which leads to stability and proximity to the fair price. Also, ensuring the continuity of the market in carrying out its duties and achieving its objectives. Fluctuations in the Arab stock markets raised many questions regarding the impact of the lack to a market maker. A lot of trading in the Arab capital markets is focused on speculation on very limited number of stocks, which confirms that speculations dominate the performance of Arab stock markets. Because of this volatility in prices, individual investors are exposed to Great losses. Consequently, the need is urgent to market maker, not necessarily be formal or

government. The need to market makers should be sensed by Arab securities bodies and should be accelerated through Enacting laws and regulations.

### **Establishing Market Makers:**

Most market makers are established in global and regional markets through either:

- A public shareholding company whose shareholders are all Brokerage companies, investment banks and joint stock companies that are listed for trading in the financial market.
- Establishment of an investment fund that works only as a mutual fund that makes a market for selected shares or approved as a financial intermediary in the global financial markets. Market makers are licensed from financial markets regulator.

### **Market Makers in International Stock Markets:**

According to (Westerholm et al., 2003; Jain, 2003), market maker systems can be divided into four categories based on market makers' characteristics and trading design.

#### **1. New York Stock Market Model:**

This system is characterized by the centralized market maker with its broad powers of access to sales and purchase orders. In this type, the market maker is largely decide information regarding sales and purchase orders issued by investors and should be shown to the public. A clear advantage of this model is the satisfaction of institutional investors because they are convinced by the expertise and skills of the hall's mediators and their abilities in exchanging information faster and thus getting prices Good. There is a hall in the market for middlemen. They give their orders in the language of common signs, and then send orders to the market makers - and their

number is seven - who in turn will sell and buy if the need arises based on these information, as well as information received electronically. They are keen to maintain liquidity in circulation. Fixes the maker according to this system is the opening price of the share which is not necessarily the previous day's closing price as mentioned above, and the market maker is duty-free when he trades for his benefit.

## **2. NASDAQ Model:**

All forms of trades, in this model, are electronic. The number of market makers for each company is not concentrated on only one as in the model NYSE. Each listed company has many makers in the market who are competing which has a positive impact in increasing the market efficiency and liquidity. Investors are not trading Ordinary in this type of stock exchanges directly among themselves. But through the market makers who are registered in the NASDAQ market, they are around 500 market makers.

## **3. The model of the "electronic market measured by decentralized order":**

This system is available in Euronext, Italy and the Greek Stock Exchange. There can be more than only one market maker for one company and they are competing with each other. Also, they are competing with ordinary investors without a monopoly of information as the case in the New York Stock Exchange.

The main task of the market maker in this model is to increase liquidity available for trading transactions which is done through an agreement between the market maker and the company that issued the listed share. The market maker makes their market for a certain fee, within mechanisms and conditions of the stock market.

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### **Possible Options for Creating a Market Maker in Egypt:**

In fact, talking about the best model For the Egyptian Stock Exchange in the absence of a real system of market making puts policy makers in a critical situation. The governing bodies have two main options;

- Imitating and selecting one of the leading global models and adopting them after standing the advantages and disadvantages of the trade-offs between them, which is the most likely option; or
- while the second option is represented in the formulation of a new model for the market maker which is a difficult option due to the lack to experience in this field.

### **The Most Optimal Model for Egypt:**

In general, there are deep discussions among experts in developed markets about the advantages and disadvantages of each system of market maker. Of course, some of the controversial elements in this regard include; liquidity, transparency and non-monopoly of the information, the difference between the bid prices and the ask prices, factors of integrity and distance from manipulations powers. On the other hand, the Egyptian stock markets are characterized by high volatility, tight liquidity, and a lack of systems needed to operate Markets with efficient and sophisticated transactions accompanied with weak implementation In addition, many manipulations, contradictions, and the weakness in investment awareness, lack of specialized calibres, weak institutional investment and shy progress in corporate governance.

For the above reasons, the study believes that the best model for the Egyptian stock market is the electronic market measured by decentralized order. At the current primary stage, there will not be a sudden coup in the market to a centralized system

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or system depends on the prices set by the market maker. However the trading systems will remain in its general form as it is with some modifications that require the market maker to increase liquidity and comply with trading regulations defined by markets and regulators. It is assumed that markets are considering adopting other models if this stage is successful and the feeling that adopting another model may be appropriate at the time. In this model, the market makers will compete with other market makers for the same the listed company agrees with them, as well as will compete with the market of ordinary investors including institutional investors. For some risk, the market maker takes risks such as a total or partial exemption from the trading fees that the market imposes on the listed company's shares, and fees it gets for its own benefit from the listed company by making its own market, and it may also be given certain privileges such as short selling and margin trading.

The company is expected to be a market maker in the Egyptian stock market for this model and doing its best because it can generate guaranteed income from the listed company concerned and for their revenues or losses as a result of trading. They are assumed to depend on experienced people who are able to manage trading matters to their companies with high professionalism.

### **Features of the Proposed Model of Market Making in Egyptian Stock Market:**

The proposed model to operate in the Egyptian Stock Market requires the participation of financial institutions, banks, and joint stock companies or companies and investment funds called "market makers". Licensing and monitoring are done through the Egyptian Financial Supervisory Authority, the latter can also grant licenses to flirt an industry career. In all cases, the licensees are required to satisfy a set of conditions determined by the Securities Commission to perform their duties. After obtaining the license, the market makers compete in pricing to reach the best

selling and buying prices. It should be noted that the implementation of orders to buy and sell investors through only intermediaries who have direct contact with the system of trading, with the need to coordination between intermediaries and market makers.

### **Conclusion:**

From the previous explanation, the study concluded some results that are evident from which the importance of a market maker in the Egyptian stock market appears. The market maker can be a bank, financial institution or group of banks Institutions and investment funds with huge financial potential. It enables to maintain balance in the stock market through intervening with the purchase of stocks when prices have fallen to unjustified levels, or sell in case prices have reached excessive price levels. The volatility of the performance of the Egyptian stock markets, the limited role of the institutional investor in trading operations and leadership in the market increases the urgency to the establishment of the market maker activity. Finally, the study believes that the best model for the Egyptian stock market is the electronic market measured by decentralized order.

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# **Economic impact of Slums: Problems and Solutions**

## **A Comparative Study: Egypt and India**

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### **Abstract**

This research paper assumes negative effects of the widespread slums areas in the Egyptian society that has to be solved. Based on the methodology proposed by Habib (2017), this study uses qualitative and comparative methodology to describe the definition of slums. The study discussed the reasons behind the existence and expansion of slums in Egypt. Then, the study monitors the map of slums in the 27 Egyptian Governorates and the percentages of slums compared to the urban areas in these governorates according to CAPMAS study published in 2018. The study investigated the international experience in developing slums. Indian experience to modernize slums was presented and several lessons were taken to the Egyptian Government. Lessons for developing slums can be summarized in political and institutional support from the government to all involved partners.

For implementation, the role of local authorities is crucial in each phase. Another important step on the part of the Egyptian government is that it should take necessary actions to encourage community participation as seen in the Indian experience.

Keywords: Slums in Egypt, Economic Development.

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## **Introduction**

The challenge of slums is accounted to become a global phenomenon since it is shown in most of developing countries. For several decades, several developing countries spent many attempts in order to solve the dilemma of the accelerated expansion of informal and slum settlements. Most of these trials have relatively succeeded. Unfortunately, others are still searching and fighting to get real solutions (Pieterse, 2011). Around 32 per cent of the world's urban population (about 1 billion people) lives in informal areas, especially slums. Of course, the overwhelming majority of them are living in the developing world (UN-Habitat, 2003). Moreover, 'urbanization of poverty' or the fact that poverty is moving to cities with no tangible actions taken by governments is blazing the trail to a massive increase in the number of slum dwellers worldwide (Arnott, 2009).

In Egypt, treating Slums is considered one of the most important challenges facing Egypt today. Slums areas have witnessed a vast widespread during the last thirty years, especially inside Great Cairo and Alexandria governorates. Problems emerged as results and consequences of large spread of slums have threaten several issues in the Egyptian society varying among economic, social, and political affairs. From this perspective, the Egyptian government has started to deal with this challenge seriously since 2015.

Consequently, the Egyptian government has divided areas of slums into two categories based on their physical conditions and legal positions. The first category, that constitutes around 85 per cent of slums in Egypt, is categorized as unplanned with good conditions. The second category with around 15 per cent of slums areas in Egypt is classified as slum with deteriorated living conditions (ISDF, 2008).

This study follows the rationale of learning from international successful experiences in dealing with slums through analyzing their success factors and then transferring them to the Egyptian case. The study will concentrate on conveying the Indian experience in solving the problem of slums.

Studying slums phenomenon in Egypt is characterized to be limited. It is noted that there exists a wide gap in analyzing the challenge of spreading slums in the Egyptian case. In addition, the literature of this topic is lacking describing, analyzing, and proposing solutions to the problem of slums in Egypt.

Therefore, this research study could provide awareness to the Egyptian officials who are seen to be responsible for policy making related to dealing with slums. Also, the study will clarify and describe the successful trials to treat slums and informal areas in India in order to propose solutions for this serious problem in the Egyptian society.

This study is trying to discuss and analyze the challenge of slums spreading inside the Egyptian society, and monitor the most serious impacts of this dangerous phenomenon. Therefore, it will be accounted as one of a very few research papers that treats slums problems and propose solutions in the Egyptian context. Moreover, it will put a wide scope on the slums' situation in Egypt to help the policy makers to put an end to this harmful phenomenon.

Slums problem is considered one of the most serious problems most countries suffer, and in Egypt it results in negative impacts on the Egyptian society. Therefore, the study will ask the following questions;

- What is the current state of slums in Egypt?
- What is the current Egyptian government approach/strategy for dealing with slums, and what is its effectiveness and success?

- How does Egypt's current position vis-à-vis slums compare to other global practices?
- What are the international experiences' factors of success?
- How applicable are these success factors in Egypt?
- What could be learned to enhance the current policies and implementation measures towards declaring Cairo as "a city free from slums"?

### **Literature review:**

According to the literature, several research papers investigated slums problem for several developing countries. The literature starts with (Frankenhoff, 1967) and (Turner, 1969) and their analysis were extended to the research papers (World Bank, 2009) and (Glaeser, 2011) that suggested a "modernization" theory of slums. According to this theory, slums are a transitory phenomenon characteristic of fast-growing economies.

One of the best international papers is (Marx et al., 2013) that analyzed the economics of slums in developing countries. It provided historical and contemporary facts to argue that the type of poverty observed in contemporary slums of the developing world is characteristic of that described in the literature on "poverty traps". Finally, it discussed the reasons behind the failure of standard policy approaches to mitigate the expansion of slums in the developing world.

With regard to this literature in Egypt, Khalifa (2011) addressed the crucial need to revisit the criteria for defining 'slums' in order to present a more precise image of existing slums and categorize them according to the severity of risk they pose to human life and to property, as a means of prioritizing interventions. Finally, it concluded that substantial discrepancies between previous statistics concerning the size of slums and the more recently produced ones. Areas which are considered

unsafe are estimated to contain 1.1 million inhabitants, represents the number of people in great need of immediate action to improve their living conditions. Such statistics would change the position of Egypt on the world map of slums.

Another literature for Egypt is Habib (2017) that aimed to compile, analyze and present information on the current Egyptian government's approaches for dealing with slums to enable the assessment of their success and sustainability. In addition, it discussed the international experiences in developing slums and proposed several policies for the Egyptian government to benefit from.

### **Describing Slums Phenomenon in Egypt:**

#### **Defining Slums:**

There is a uniform definition of the Slums pattern which are autonomous, whether or not they are minorities, more or less in the absence of the law and not planned in urban areas. They are built on land not designated for construction as well as in the planned areas for construction where the state of the city may be good. However, it can be found with unsuitable environmental conditions or with no social security and lacking to basic services and resources.

Slums are one of the biggest problems that Egypt has suffered for years, so that the Egyptian Economy has a lot of problems that disturb the Egyptian society, which the Egyptian government cannot tolerate more. Therefore, Slums are irregular and unplanned housing for the people living under the poverty line. Persons displaced from villages to major cities such as Cairo and Alexandria.

#### **Problems Resulted From Slums:**

The slums produce a wide range of negative phenomena that spread among the population. For example, poverty, high rates of unemployment, low educational

services, neglect in the enrollment of children in schools, the rise of the percentage of child labor and their involvement in early work such as workshops and peddlers in the streets, abuse of the majority of its inhabitants by theft and illegal acts, the spread of addiction among children and adolescents for drugs and even trafficking and the use of children in trafficking of drugs.

Several Studies have shown that there is a close relationship between the phenomenon of slums, terrorism and crime, and the high rates of violence and quarrels. Moreover, the spread of vices and low ethics since the slums constitute safe haven for criminals and outlaws to hide away from the eyes of the police. In slums, the streets are characterized by narrow, tortuous, alleys and many of the dens of drug trafficking. Therefore, life inside the slums do not provide good people for the Egyptian society which now needs a young well educated generation to push the wheel of production and work on the progress of the state. Consequently, government should work to develop a quick strategic plans to wake the country from the dangers of slums.

### **Research Methodology**

This study assumes negative effects of the widespread slums settlements in the Egyptian society that has to be solved.

Based on the methodology proposed by Habib (2017), this study will use qualitative and comparative analysis technique referring to a number of secondary resources and based on getting findings through logical and integrated thinking. The data mainly consists of information on the current Egyptian government's interventions and data on the experiences in the developing world. Resources of data will be mainly publications of international organizations, books, country reports and journal articles. The research will focus on analyzing the success factors of



international experiences in developing countries, especially in India, to find out the possibility of applying the measures taken there in Egypt. This study will compare policies that have been taken in India in order to convey the most suitable for Egypt.

### **Reasons behind the Formation of Slums in Egypt:**

According to several research papers that were prepared based on the latest methods of scientific research and advanced research methodology causes the spread of slums in Egypt to the presence of a number of administrative and organizational problems. These problems are related to the management of cities. In addition, the heavily centralized focus of all government services in major cities that causes the migration of a large number of citizens to live in the capital and neighbouring cities. Also, the lack of legal recognition of these cities and residents due to their establishment away from legal control. Therefore, the study summarizes reasons behind the formation of slums in Egypt to the following reasons;

1. Internal migration from villages to major cities such as Cairo, so that a large number of villages in search of work and livelihood due to the high prices of housing in Cairo led to the acquisition of land and construction in a random way.
2. In most cases, land owners tend not to develop and plan the land they own since they almost search for keeping the land until its price increases.
3. The expansion of poverty and poor segmentations in the Egyptian society due to poor economic conditions and low level of government support for the housing sectors.
4. Weakness of the government systems regulating land acquisition and registration which gave the incentive to seizure on agricultural and industrial lands and construct slums.

## **Monitoring the Map of Slums Areas in Egypt:**

A study prepared by the Central Agency for Public Mobilization and Statistics (CAPMAS, 2018) on slums in Egypt for the 27 Egyptian governorates revealed the size of these areas in each governorate compared to the urban blocs. According to this study, the area of random areas in each governorate and the proportion of their spread related to the total urban mass, according to the most governorates contain the least slums, came as follows;

### **1- Sohag Governorate:**

Sohag occupied the first rank among the governorates in Egypt in terms of high prevalence of slums. The percentage of slums in the governorate reached 71.1% of the total urban mass.

### **2- Sharkia Governorate:**

The "Eastern" ranked second among the governorates of the Republic in terms of high prevalence of slums, where the proportion of slums in the province is 69.5% of the total urban mass.

### **3- Beni Suef Governorate:**

Beni Suef ranked third among the governorates of Egypt in terms of high prevalence of slums. The percentage of slums in this governorate reached 65.3% of the total urban area.

### **4- Menoufia Governorate:**

Menoufia occupied the fourth place among the governorates of the Republic in terms of high prevalence of slums. The percentage of slums in the governorate reached 64.6% of the total urban area.

### **5 - Matrouh Governorate:**

"Matrouh" came in the fifth place among the governorates of the Republic in terms of high prevalence of slums, where the proportion of slums in the province 63.1% of the total urban mass.

### **6- Governorate of Luxor:**

Luxor ranked in the 6th place among the governorates of the Republic in terms of high prevalence of slums. The percentage of slums in the governorate reached 62.5% of the total urban area.

### **7- Qalyoubia Governorate:**

Qalubia ranked in the 7th place among the governorates of the Republic in terms of high prevalence of slums. The percentage of slums in the governorate reached 62% of the total urban area.

### **8. Fayoum Governorate:**

Fayoum occupied the eighth place among the governorates of the Republic in terms of high prevalence of slums, where the percentage of slums in the governorate was 61.7% of the total urban mass.

### **9. Gharbia Governorate:**

Occupied the "Western" ninth place among the governorates of the Republic in terms of high prevalence of slums, where the proportion of informal settlements in the province of 61% of the total urban mass.

## **10- North Sinai Governorate:**

The "North Sinai" came in the tenth place among the governorates of the Republic in terms of high prevalence of slums, where the proportion of slums in the province of 60.8% of the total urban mass.

The remaining 10 governorates were considered to be among the highest in the governorates. The lowest governorates were in Port Said governorate, which accounted for only 3.6% of the total urban area of the governorate, followed by Suez governorate with 12% and South Sinai with 13.6%.

As for the rest of the governorates of the Republic came the prevalence of slums as follows;

- Governorate of Giza, slums are spread by 58.9% of the total size of the urban block of the province.
- Aswan Governorate, with slums of 58.2% of the total urban area of the governorate.
- Al-Buhaira Governorate, with slums of 56.8% of the total urban area of the governorate.
- Qena Governorate, with slums of 54.5% of the total urban area of the governorate.
- Asyut Governorate, slums are distributed by 54.4% of the total size of the urban area of the governorate.
- Al-Minya Governorate, where slums are distributed by 53.4% of the total size of the urban area of the governorate.
- Damietta Governorate, where slums are distributed by 50.7% of the total size of the governorate's urban area.

- Dakahlia Governorate, slums are spread by 49.9% of the total size of the urban block of the province.
- Kafr El-Sheikh Governorate, slums are spread by 49.9% of the total size of the urban block of the province.
- New Valley Governorate, slums are distributed by 38.3% of the total size of the urban block of the province.
- Ismailia Governorate, with slums of 34.7% of the total urban area of the governorate.
- Governorate of Alexandria, slums are spread by 27.5% of the total size of the urban block of the province.
- Governorate of Cairo, slums are spread by 20.9% of the total size of the urban block of the province.
- The Red Sea Governorate, with slums of 16.8% of the total urban area of the governorate.

The Central Agency for Public Mobilization and Statistics (CAPMAS) prepared this study on the size of slums in Egypt according to the monitoring of areas of slums in Egypt during the year 2016.

Therefore, the study presents in the coming section the Indian experience in developing slums in order to get the most valid measures to develop slums in Egypt.

### **Indian Experience in Developing Slums:**

Jadebengar is a slum in the western part of the city of Ahmedabad, in the state of Gujarat in India where 84 families live below the poverty line in homes deprived of drinking water, sewage pipes and latrines. The streets themselves are unpaved and lack lighting and garbage collection services. About 40 percent of the 5 million people in Ahmedabad are poor, living in slums that lack their infrastructure. The

state government has embarked on a major project aimed at completing infrastructure work in these slums called SNP.

In 1995, the development of the Sangbar area was followed by a number of other areas. In this first phase of the project, which lasted up to 2003, infrastructure works were completed in 18 random areas containing 3843 houses with 19215 inhabitants. Development of the private contractors for where the development of any random area take between a 1.5 to two years.

### **Partnership of the poor**

The second stage of the project began in 2003 with a new approach based on the community partnership of the residents of the neighbourhood, contributing to the budget of the project, individual and collective efforts with the civil society institutions, the private sector and the government administration in the framework of an integrated project aimed at establishing infrastructure as well as community development in order to improve environmental conditions. The project included the following tasks:

### **Laying Infrastructure:**

In terms of the introduction of clean water for drinking and supply of houses with sanitation and private toilets where the system was widespread public toilets for all residents of the area, paving roads, lighting and the removal of solid waste and planting trees.

### **Community Development:**

Through activities aimed at supporting the implementation of the project and improving the standard of living of the population through the formation of community institutions based on the efforts of the community members themselves,

while providing the population with basic community development services such as education, health, vocational training, capacity building, skills and income generation.

### **Connecting the neighbourhood to city services:**

By linking all neighbourhoods to each other as part of an integrated plan to improve the development process by bringing together scattered efforts to reach a better level of service for all residents of Ahmedabad.

### **Results:**

By the end of December 2005, the project had completed the development of 28 random areas with 24,340 inhabitants. The development of 13 other areas with 19,175 inhabitants will be completed in 2006, bringing the total number of informal settlements to 41, thus improving the living standards of at least 43,515 inhabitants. The population contributed 1.35.72.00 Indian Rupees to the equivalent of 3.01.600 US dollars.

### **Lessons for Egypt:**

In general, for any upgrading process or intervention to be strategic and successful, there are a number of necessary prerequisites that need to be present within any project. As a start, any government should recognize the existence of slums and that upgrading is a necessary means of intervention to address the poor living conditions in such places. In light of the Indian case demonstrated in this study; any project should be endorsed by political and institutional support from the government to all involved partners. It is crucial that the program gets the political will and obligation of the government and the participating local entities. For implementation, the role of local authorities is crucial in each phase.

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On this road, political and institutional commitment were shown in the fact that the development program was exclusively instituted according to a local government policy decision, and implemented by personnel from the local government. The government commitment was also represented in allocating a considerable portion of the city's budget to the Housing Department and allowing it to play a central role (Magalhães, 2012).

Therefore, Egypt needs to provide the necessary political will and institutional support that can be reflected in setting a national strategy for dealing with slums which, in turn, necessitates that the government employs strategic actions at the national, local and governorate levels. Since slum upgrading projects are managed and coordinated at the local level, thus interventions are necessary not only at the local or program level, but also at the level of local government as well as at the central government level where policies and legislations are made and budgets are allocated. The interventions on these levels need to be consistent and complementary to achieve the best results.

In this respect, supportive institutional reforms are necessary to include a special budget for slum development within the annual budget of the state. It is also important to encourage governorates to manage their own slum upgrading funds.

### **Community participation**

Another important step on the part of the Egyptian government is that it should take necessary actions to encourage community participation as seen in the Indian experience. Adopting a participatory process and starting with the people not the physical improvement as well as establishing a dialogue for negotiating different options and including dwellers in decision making is essential. In other words, enabling slum dwellers to actively take part in improving their own conditions



should be implemented on the grounds. Implementing slum development programs should be relying on a people-centered approach where tools to consult and involve the inhabitants is incorporated throughout the whole process.

### **Conclusion:**

This study is conducted in order to define the problem of spreading slums in the Egyptian society during the last thirty years. The study discussed the reasons behind the existence and expansion of slums in Egypt. Then, the study monitors the map of slums in the 27 Egyptian Governorates and the percentages of slums compared to the urban areas in these governorates according to CAPMAS study published in 2018. The study investigated the international experience in developing slums. Indian experience to modernize slums was presented and several lessons were taken to the Egyptian Government. Lessons for developing slums can be summarized in political and institutional support from the government to all involved partners. It is crucial that the program gets the political will and obligation of the government and the participating local entities. For implementation, the role of local authorities is crucial in each phase. Another important step on the part of the Egyptian government is that it should take necessary actions to encourage community participation as seen in the Indian experience.

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## Oil Price and Macroeconomic Variables Nexus in GCC Countries

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### Abstract

Is a country's oil resource a benefit or a curse? After the oil price shocks of 1973, the subject of oil prices and economic performance has taken on a great deal of significance. It is an essential component of the contemporary economy, and changes in it have an impact on every sector of the economy (Qianqin 2011). The intension of this paper is to assess how macroeconomic variables (Gross Domestic Product, Inflation, and Trade Openness) are affected by fluctuations in oil price in Gulf cooperation council countries using balanced panel data for six countries – Oman, Bahrain, United Arab Emirates, Saudi Arabia, and Kuwait – covering the period from 1995 to 2020, and adopting panel vector autoregressive model (PVAR). The results showed that most of the variables examined, namely: Gross Domestic Product, and Trade Openness have strong positive correlation to oil prices. On the contrary it was found that inflation has significant and negative association with oil prices.

**Keywords:** Oil Price, Macroeconomic Variables, GCC Countries, Co-integration, and PVAR.

## **1. Introduction:**

It is difficult to pinpoint some element other than oil price that has had a bigger impact on an economy since the 1970s. Due to the oil embargo imposed by OPEC in 1974 and the subsequent rise in oil prices, the majority of economies experienced an economic downturn. As a result, the relationship between the price of oil and the economy is of considerable interest to both laypeople and economists. A significant benchmark for all countries globally, the price of oil serves as a result of the importance of oil to the international economy.

Theoretically, countries that import oil profit from low oil prices since they can create more at a lower cost. It quickens the economic growth and boosts consumer spending. On the other hand, countries that export oil profit from high oil prices since export revenue increases as oil prices rise. Additionally, this can be used to invest in more infrastructure, which will improve the welfare of the people living in these states. Additionally, the research has noted that variations in the price of oil are a major cause of shocks to macroeconomic variables, such as: Ahmed (2013), Akinsola and Odhiambo (2020), Brown and Yucel (2002). However, depending on whether a country exports or imports, the macroeconomic effects of oil price shocks vary (Krugman, 1983). For instance, a rise in oil prices results in a wealth transfer from oil-importing nations to those that export oil. Furthermore, policymakers in countries that produce oil face major obstacles as a result of oil price shocks (Kilian, 2009). According to the US Energy Information Agency, the Gulf Cooperation Council (GCC) nations own more than 40% of the world's proven crude oil reserves. This indicates the proportional significance of the GCC nations in the world oil market. According to Fasanya et al. (2021), the GCC nations experienced a larger surplus in 2012–2013 than either Germany or Japan due to rising oil prices.

The impact of oil prices on economic growth in this group of countries is particularly important for a number of reasons. The GCC countries play a significant role in the global oil market since they generate around 22134,000 barrels per day, or about 23.4% of the global oil output. Additionally, oil and gas income serve as the primary means of financing government spending in the GCC oil-producing countries. The economy is mostly affected by fiscal policy when there are oil shocks. It is vital to examine how the economy of these countries react to changes in oil prices. This study aims to investigate how changes in oil prices affect key macroeconomic indicators. Using a panel of unbalanced data for the Gulf Cooperation Council countries from 1995 to 2020, a vector auto regressive model is used. Thus, in order to address the issues raised by this paper, the following research problems will be looked at.

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The main motive for this paper is to assess the examination of oil price variations and their impacts on macroeconomic variables in the GCC countries is motivated by the significance of oil to the economic development. In addition, the economies of the GCC countries have changed significantly in recent years due to efforts to diversify away from oil and gas exports. Therefore, studying the impact of oil price fluctuations on these countries' macroeconomic variables can help policymakers to design appropriate policies to minimize the negative effects of oil price fluctuations and promote economic stability and sustainability.

This paper is structured as follows. In Section 2, we review the literature on how changes in the price of oil affect macroeconomic variables. Section 3 describes the data, the main variables, and the methodology. Section 4 presents and discusses the results, while Section 5 concludes.

## **2. Literature Review:**

### **2.1 Transmission Mechanisms**

The transmission mechanisms through which changes in the price of oil affect macroeconomic variables are reviewed and discussed in this section. In-depth analyses of the mechanisms by which changes in the price of oil affect macroeconomic variables have been conducted by researchers such as Davis & Haltiwanger (2001), Mignon & Lardic (2008), Al-Zeaud & Bauchaour (2012), and Oluwaseyi (2018).

#### **2.1.1 Supply-Side Effect Channel**

The supply-side effect, which is a result of rising oil prices, is one way that variations in the price of oil connect to macroeconomic issues (Kilian 2009). The marginal cost of production rises as a result of rising oil prices, which reduces productivity and slows GDP growth (Soytas & Dorul 2010; Ahmed 2013; Kocaarslan et al. 2020). Due to rising production costs, businesses may find it difficult to maintain output at present levels or at full capacity (Nabiyev & González 2009), which slows down and downsizes economic growth (Kocaarslan et al., 2020).). Because it could be difficult and expensive to reallocate capital and specialised people from one industry to another, labourers might have to wait for better employment chances (Ahmed 2013; Dogrul and Soytaş 2010). Additionally, this can have a negative effect on overall economic activity and growth.

Furthermore, rising oil prices may cause supply shocks, which typically reduce potential output (Kilian 2009). The increase in oil prices is a sign of a shortage of crude oil. Oil

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is a vital component of production (Kilian 2014), hence a scarcity could result in a decline in productivity and output growth. Additionally, a slowdown in productivity and growth may have an impact on wages, disposable income, and perhaps even purchasing power (Ahmed 2013). If consumers think the rise in oil prices is only transitory, they may borrow more instead of saving more money, which could increase the equilibrium real rate of interest (Brown and Yucel 2002). When the real rate of interest increases and output growth slows, the demand for real cash balances may decrease (Kilian and Zhou 2019). The inflation rate rises together with the level of monetary aggregate growth. As a result, the real interest rate and measured inflation rate rise, and the GDP growth rate slows down (Ratti and Vespignani 2015).

### 2.1.2 Demand-Side Effect Channel

The demand-side effects of changes in the price of oil on macroeconomic variables are channelled through consumption and investment (Kilian and Zhou 2019). Consumers may try to smooth out their consumption by saving less or taking on more debt if the oil price increase is anticipated to be short-lived or if the consequences of output that were anticipated to be temporary turn out to have long-term implications. The entire demand and supply curves would change as a result (Kilian 2014; Kilian and Zhou 2019). A change in supply and demand of this kind could accelerate a slowdown in GDP growth as investment falls. Academics agree, nonetheless, that exogenous shocks to the price of oil cause recessionary and inflationary impacts (Hamilton 1996).

In the absence of real wage rigidities, Kilian (2014) asserted that even if an exogenous shock to the price of oil resulted in a negative shift in the entire supply curve and an increase in price level, it would not be predicted to lead to persistent inflation. According to Bruno and Sachs (1982), this interpretation is at odds with his theories. In assessing the transmission of oil price shocks to inflation, Brown, and Yucel (2002) suggested that as interest rates rise in response to monetary policy, demand for real cash balances decreases. Falling investment and consumption rates because of higher borrowing costs brought on by rising interest rates cause a decline in the pace of output growth.

## 2.2 Theoretical Background

Examining the asymmetric relationship between the price of oil and macroeconomic factors in the context of the GCC, a net oil exporter, is the aim of this paper's study of pertinent concepts. In order to comprehend the relationship between the price of oil and macroeconomics



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better, a few significant existing theories will also be examined. These include the theories of economic growth, linear/symmetric relationships, the reallocation effect, income transfer, and the real business cycle (George, 1994; Gnonzalez and Nabiyevev, 2009; Davis, 1986; Hamilton, 1988; Loungani, 1992). The analysis of how these five theories' dynamics aided in the investigation of the relationship between oil prices and macroeconomic factors frequently makes use of their own foci and characteristics (Trang et al. 2017).

### 2.2.1 Theory of economic growth:

According to economic theory, changes in the price of oil have an impact on the economy through the supply and demand channels (that were previously described). Supply side effects could be explained by the fact that oil is a crucial production input. Because of this, a decline in oil demand caused by increased oil prices affects the productivity of other inputs and lowers corporate production. Demand is also impacted by variations in oil prices through investment and consumption.

The positive relationship between disposable income and consumption has an indirect impact on consumption. Oil-importing countries send money transfers to oil-exporting countries as the price of oil rises (Ahmed, 2018). As a result, consumption declines, lengthening the apparent duration of shocks in oil-importing nations due to the extent of this effect. Additionally, a company's expenses go up as a result of increased oil prices, which is unfavorable for investment. In addition to these effects of supply and demand, changes in oil prices may also have an impact on the economy through changes in inflation and the foreign exchange markets. The importance of oil is typically underestimated in favor of traditional production inputs like land, labor, and capital by common economic growth models (Ahmed, 2018).

It is important to keep in mind that numerous academics have updated the conventional knowledge to consider the problem of oil prices and its influence on economic growth. Production is also the most important component of economic growth, according to Cobb and Douglas' (1928) production theory. Capital, land, and labor are introduced during the beginning stages of production; however, these factors of production can only degrade and cannot be exhausted. Additionally, a few examples of intermediate inputs that are added around halfway through the production process and are fully utilized during the process include electricity, coal, oil, and gas. Additionally, crude oil's marginal product is what gives it its intrinsic value. The marginal product should serve as the basis for any oil price. The theory does stress the

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need to additionally consider other features of the oil being utilized, such as efficiency, sturdiness, storage ability, safety, and conversion costs. The state of the land, labor, and other resources that are used in combination with the oil must also be evaluated.

### 2.2.2 Real business cycle

Real business cycle theory holds that oil price shocks, which have an impact on the dynamics of the global market, are the primary cause of business cycle fluctuations (Yucel & Brown 2002; Su et. al. 2021). According to proponents of the real business cycle, exogenous shocks like technological shocks are mostly caused by economic crises and fluctuations (González and Nabiyev 2009). A previous study indicated that a model driven solely by technological shocks cannot adequately explain various cyclical events (Dixit and Pindyck 1994).

Because of this, other disruption models like environmental laws, oil shocks, natural disasters, and pandemics like the coronavirus 2019 were urged to remain uncorrupted (George 1994; González and Nabiyev 2009; Su et al. 2021). George (1994) also claimed that the most significant variables influencing the cycle can be identified by identifying whether they are effects of supply shock or demand shock in the economy. According to several authors, like Baffes et al. (2015) and Prest (2017), the 2014–2015 oil price shocks were mostly brought on by supply shocks as opposed to demand shocks, technical shocks, and the strengthening US currency. Real business cycle theory's central tenet, according to Baffes et al. (2015) and Chen et al. (2015), is that if an external shock occurred that directly affected the efficiency and changes of labor and capital, it might have an impact on employers' and employees' decisions, changing their consumption and production patterns and, ultimately, negatively affecting output. According to this argument, the volatility of oil prices may have an effect on economic expansion. The effects of business cycles fluctuate in strength and duration, making them look inconsistent (González and Nabiyev 2009).

### 2.2.3 Linear/Symmetric Relationship Theory

The econometric component of the linear/symmetric theory describes the mechanisms through which variations in the price of oil affect economic growth. Additionally, according to the Linear/Symmetric Relationship Theory of Growth, which includes supporters like (Hamilton 1983; Hooker 1986; Laser 1987), it is important to take into account the volatility and unpredictability of oil prices when estimating economic growth. Furthermore, this idea was largely based on what transpired in the oil market between 1948 and 1972 and how that affected the nations that import or export oil. Hamilton also looked into the macroeconomic

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implications of oil price volatility in the US in 1983. He concluded that variations in oil prices have influenced different economic downturns in the United States. Thus, he concluded that the macroeconomic indicators are significantly impacted by the fluctuation of oil prices. The volatility of the oil price and its impact on GNI growth from 1948 to 1972 were both significant variables, according to Hooker's extensive empirical analysis from 2002. Laser (1987) provided evidence of the symmetric relationship between economic growth and oil price volatility. She discovered through her econometric research that an increase in oil prices would produce a reduction in GDP; nevertheless, the effect of an increase in oil prices on GDP is debatable because they had varied effects in other nations.

### 2.3 Previous Empirical Studies

The effect of oil price shocks on macroeconomic indicators will be shown in this section using empirical data. This is important since it describes the main goal of the paper. Examining various studies in this area will also help to identify the various ways that oil price shocks may impact the economy. Additionally, there haven't been many empirical studies that have sought to investigate how changes in oil prices may affect the macroeconomics of the GCC nations.

Using an error correction approach and co-integration, Fasano and Wang (2002) sought to investigate the causal relationship between total government spending and revenue for the GCC from 1980 to 2000. Thus, a boost in revenue for GCC countries in the first period automatically translates into an increase in government spending, according to their findings.

Berument et al. (2010) examined the effects of oil price volatility on economic growth in 16 MENA countries using annual data from 1952 to 2005. They used the SVAR model to illustrate the dynamics of the global oil price shocks on output growth by utilizing the exchange rate and inflation as their measuring sticks. The expansion of net oil exporting nations Oman, Qatar, Kuwait, and UAE was found to be positively and statistically impacted by oil price shocks of one standard deviation. Contrarily, based on their findings, Bahrain's economy does not appear to be much impacted by fluctuations in the price of oil.

Al-mulali et al. (2011) used data from 1970 to 2000 to investigate how the oil price shock affected Qatar's economy. This study primarily employed the VAR model to examine four indicators: investments, GDP, exchange rate, and inflation. The authors discovered that oil price shocks had a favorable long- and short-term impact on the GDP. They have discovered that the oil price shock has a negative influence on inflation, nevertheless.

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With annual data for six OPEC members, including Kuwait and Saudi Arabia, from 1979 to 2009, Moshiri and Banijashem (2012) used a VAR model. Despite assuming a linear relationship, the authors find no conclusive correlation between oil price shocks and economic growth. However, when asymmetries are taken into account, they find that positive and negative shocks have different and robust relationships. They find that higher oil prices do not lead to long-term economic growth, whereas lower oil prices result in large income reductions and economic stagnation. The authors find that negative oil price shocks have little effect on economic growth in Saudi Arabia and Kuwait.

Al Obaid (2017) examined the effects of oil price volatility on government spending in Saudi Arabia using data from 1981 to 2016 that spanned the primary period of oscillations. Consequently, the VAR (vector autoregressive) model was used to investigate the long-term relationships between the variables. The results suggest that there is a significant and significantly positive relationship between changes in oil prices and government investment in the targeted industries over the long run.

According to research by Alkhateeb et al. (2017) into the asymmetrical impact of oil prices on job growth in Saudi Arabia, both rising and dropping oil prices have a favorable and inelastic impact on employment in the country. The variance in the coefficients' magnitudes further supported the asymmetry. As opposed to dropping oil prices, rising oil prices had a greater impact on employment. Growth in the economy also helped the job market in the Kingdom.

Ahmed (2018) aimed to objectively analyse whether there is a correlation between changes in crude oil prices and Oman's inflation patterns between 1990 and 2017. The results demonstrated that the fluctuations in the price of crude oil only had a long-term direct and significant impact on inflation in Oman by utilizing the bound test of ARDL. Utilizing the ARDL bound test. The results show that Oman's inflation was only directly and significantly affected by crude oil price changes over the long term.

Koseolgu et al. (2019) employed asymmetric causation to analyse the relationship between the price of oil and the GCC nations from 1996 to 2018. The results of the usual bootstrap causality test indicate a bidirectional causal relationship between the OP and the GDP per capita of Saudi Arabia and Qatar. The asymmetric causality tests yielded different results for other countries, demonstrating that OP+ and GDP+ are causally associated in a single

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direction in Oman and Saudi Arabia. While there is a one-way association between OP and GDP per capita in Bahrain, Qatar, and the United Arab Emirates, there is a bidirectional causal relationship between GDP and OP in Kuwait and Oman. The findings are consistent with the Real Business Cycle Theory, which holds that the GDP per capita is significantly impacted by external positive or negative shocks through channels related to consumption and investment.

Examining the asymmetric and symmetric effects of oil price fluctuations on inflation (CPI) in GCC countries from 1970 to 2016 is the goal of Nusair (2019). This study employs the pooled mean group method, the linear autoregressive distributed lag model, and the asymmetric nonlinear ARDL model. The author discovered that the variables are co-integrated and that there is substantial evidence of long-run asymmetry. As a result, this suggests that there are variations in how rising and dropping oil prices affect inflation. Additionally, whereas an increase in the price of oil regularly has a considerable beneficial impact on inflation, an increase in the price of oil either has no impact at all or a negative impact.

Additionally, the PMG model asserts that the sole factor positively and significantly affecting inflation is an increase in oil prices. Last but not least, the findings imply that positive changes in the price of oil have a greater influence than negative ones, that an oil price shock has a greater long-term effect than a short-term one, and that the effect of the oil price on domestic inflation only has a partial spill over.

### **3. Methodology and Data:**

#### **3.1 Data collection**

This study is focused on the nations of the GCC. They are major producers and exporters of oil, where their economies are strongly reliant on their exports of oil. Hence, to reduce the negative effects of oil price variations and to promote economic stability and sustainability, policy makers can be assisted by research into the effects of oil price changes on these countries' macroeconomic variables. Further, the research utilized a panel data analysis. Most importantly panel data approach was chosen to provide a more comprehensive and robust analysis of the impact of oil price fluctuations on macroeconomic variables on the GCC.

The paper decided to use a sample period that spanned 25 years, from 1995 to 2020. Moreover, while developing the model, a few years were missing; however, these years were estimated by using the average mean. And that's because the period of 1995 until 2020 is a long enough period to capture the long-term effects of oil price fluctuations on macroeconomic variables in

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the GCC. Additionally, Statista and the World Bank were also used as sources of secondary data.

### 3.2 Variables of Study

**Crude oil price** represents, on the world market, the average annual price of oil. **GDP growth rate** denotes annual GDP growth rate. **Inflation** is measured by the index of consumer price and **Trade openness** tests how much the country is integrated with the world economy.

### 3.3 Methodology

Descriptive statistics is mainly used in this study to identify the study prime characteristics. Hence, the mean depicts the value that is in the middle of the variables in the data, whereas the standard displays the average distance between the mean value and the observation. Furthermore, a variable's behavior across time—whether at its peaks or bottoms—is determined by both the maximum and minimum values.

Correlation analysis is mostly carried out to assess the strength and direction of a linear correlation between each pair of variables. Additionally, the correlation coefficient value can be used to gauge how strong the association is—whether it is weak, high, or even moderate. Additionally, the correlation coefficient's significance tells whether there is a linear relationship. The null hypothesis is that there is no linear relationship between two variables.

For the purpose of unit root, co-integration and proposed model to be well-established, the ideal number of lags is needed. However, for our model theory of economics is silent on what's the appropriate number of lags that should be applied. The ideal lag duration for our VAR model is chosen using a variety of lag selection factors. These comprise the Schwarz Information Criterion; Akaike Information Criterion; and the ratio of likelihood. Further, The Akaike information criterion (AIC) and the Schwartz information criterion (SIC) are notable scenarios, though which of the lag lengths generated by them is chosen depends on the model and is usually determined by which of the two criteria is the least.

Due to the inclusion of time dimension, testing for unit root is a prerequisite for dynamic models. The panel data under consideration is non-stationary around a deterministic trend in case of the presence of unit root. For this purpose, the study uses the Augmented-Dickey Fuller (ADF) (Dickey & Fuller, 1979), (Dickey & Fuller, 1981), (M. Hashem Pesaran & Shin, 1999) and (M. H. Pesaran, Shin, & Smith, 2001) tests to evaluate the presence of unit roots. The

decision is made using the P-value, and the null hypothesis assumes that the data set has a unit root issue. Additionally, this test is carried out since the econometric model cannot be created without first checking the stationarity of the provided variables.

To evaluate the existence of co-integration between the variables this paper implied the KOA co-integration test. The KOA identifies homogeneous coefficients on the first stage regressors and cross-section individual intercepts (Suleman, 2013). Moreover, to ascertain whether one or more equations in the multivariate panel data system are co-integrated. Therefore, the main objective of this test is to lay a strong foundation for the planning process. Under the null hypothesis the variables of study are not co-integrated.

The concept of Granger-causality test was introduced by (Granger, 1969), (Granger, 1981), (Granger, 1988), (Granger & Lin, 1995) and Sims (1972) which is widely used to determine the importance of the interaction between two series. Further, Granger's original work in 1969 of the definition of non-causality Granger (1969) has attracted an attention in economics that it hardly needs any introduction. Under the null hypothesis a certain variable does not cause the other.

The model of Vector Auto-Regressive (VAR) is chosen to be applied. VAR model includes the lags terms for both the independent and dependent variables. Hence, we expect to have the problem of endogeneity during the expected correlation between the independent variables in terms of error term observations and the lags. As a result, this paper will use the instrumental lags variable in order to minimize/ handle the problem of endogeneity. Further, the VAR model also does not impose illogical or arbitrary assumptions or limits on economic data and is an independently expanded macro econometric model of economic variable interconnection. Following authors such as Boheman and Maxen (2015), Akinleye and Ekpo (2013), this study specifies a vector autoregressive model to study the interaction among oil price and macroeconomic variables in GCC.

#### 4. Results

**Table (1):** shows descriptive statistics for variables of study.

Variable	Obs	Mean	Std. Dev.	Min	Max
Oil price	182	54.66231	31.22596	12.76	111.63
GDP	182	1.52e+11	1.79e+11	5.85e+09	8.17e+11
Inflation	182	10.42106	39.61785	-16.11733	387.3108
Trade of GDP	182	102.4834	32.24766	.0209992	191.8726

As per table (1), provides a detailed statistics of the variables in the model. Furthermore, the study number of observations is equal to (182). Adding to that, for each of the model's chosen variables, the descriptive statistics table displays the mean, standard deviation, minimum and maximum values. And it is used to explain the behavior of the variables study. The min for oil price is equal to 12.76 with a percentage of max equal to 111.63. Further, the min for GDP as shown is 5.85 billion, while the percentage of the maximum is equal to 8.17. Further, the min value for inflation is -16.11733 while the percentage of the max is equal to 387.31. Finally, the min value for trade is equal to 0.020992 and the percentage of maximum is equal to 191.87.

**Table (2):** shows correlation coefficients among variables of study.

Variables	IOilprice	IGDPCurrents	linfa	ITradeofGDP
IOilprice	1.000			
IGDPCurrents	0.563	1.000		
linfa	-0.171	-0.200	1.000	
ITradeofGDP	0.181	0.062	-0.045	1.000

\*, \*\*, \*\*\* denote 1%, 5% and 10% levels of significance respectively

The correlation matrix will look at the direction and magnitude of the linear relationship between the explanatory and dependent variables. Additionally, the correlation coefficient value



determines the strength of the relationship, which can be (Weak, Moderate, and Strong). Table (2) shows the correlation matrix of study variables. Hence, there is a linear/ positive and strong relationship between the oil price and the gross domestic product. While inflation have a negative nonlinear and weak relationship with oil price. Finally, trade has a linear positive however, weak association with oil price.

**Table (3): shows lag length criteria**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-351.0470	NA	0.001472	4.830572	4.911944	4.863634
1	321.2100	1298.782	1.95e-07	-4.098095	-3.691233*	-3.932782*
2	333.6491	23.35508	2.05e-07*	-4.049647*	-3.317296*	-3.752085*
3	351.8653	33.21053	1.99e-07	-4.079800	-3.021960	-3.649988
4	366.7715	26.36477	2.03e-07	-4.064919	-2.681590	-3.502857
5	403.2370	62.51218*	1.54e-07*	-4.343360*	-2.634542	-3.649049

After conducting the lag-length selection it can be determined that at lags (2) the HQ and SC which are the most appropriate criteria are significant and at lags (2) there are less problem of co-integration (LR & Logl) therefore, this study will adopt the model at lags (2). Since at lags 3,4,5 there is a problem of co-integration.

**Table (4): Kao co-integration Test**

ADF	t-Statistic	Prob.
	-1.435895	0.0755
Residual variance	0.012630	
HAC variance	0.019004	

In table (4), a co-integration association within the test variables was found through using KAO test. Further, it indicates the existence of a long-run relationship between and among the variables. And that's as shown in table (4) the p-value is less than level of significance (0.10) which means null hypothesis is rejected and accept alternative hypothesis. Hence, after finding that the variables are integrated at level, and that there's a co-integration between them. Thus, the model of VAR will be utilized.

**Table (5): Granger Causality Test**

	F-statistic	P-value
OP does not granger cause GDP	196.521	0.000
GDP does not granger cause OP	225.541	0.000
INFA does not granger cause OP	149.698	0.000
OP does not granger cause INFA	40.026	0.000
Trade does not granger cause OP	7.684	0.021
OP does not granger cause Trade	10.443	0.000
GDP does not granger cause INFA	24.417	0.004
INFA does not granger cause GDP	198.898	0.000
Trade does not granger cause GDP	31.492	0.000
GDP does not granger cause Trade	140.270	0.000
INFA does not granger cause Trade	32.239	0.000
Trade does not granger cause INFA	190.935	0.000

\*, \*\*, \*\*\* denote 1%, 5% and 10% levels of significance respectively

As it can be determined from the table (5) is that oil price volatility granger causes gross domestic product (GDP) and trade openness in these countries without feedback. Further, the positive sign of the sum of lagged coefficient for both variables indicates that oil price volatility increases both GDP and trade openness which in other words implies that positive oil price volatility is beneficial to the economic growth of the gulf cooperation council countries. Additionally, these findings support the view by both Olomola & Adjumo (2006) and Omojolaibi & Egwaikhide (2013).

On the contrary, the results showed that volatility of oil price does not cause granger to inflation. And that's make sense as other factors such as global economic conditions, also government policies and economic diversification efforts plays a crucial role in shaping inflation dynamics in these countries. Also, it is supported by Shukri (2016) who tends to test the relationship between oil price and inflation in these economies and found no evidence of a granger causal relationship between them.

**Table (6): Unit Root Tests**

Variable	LLC		IPS		ADF	
	t-stat	P-value	t-stat	P-value	t-stat	P-value
LOIL	-6.604	0.000	-350346	0.000	34.561	0.002
LGDP	-8.518	0.000	-3.4154	0.000	34.816	0.002
LINF	-3.381	0.001	-4.5379	0.000	48.503	0.000
LTRADE	-1.872	0.031	-2.7901	0.001	37.129	0.001

\*, \*\*, \*\*\* denote 1%, 5% and 10% levels of significance respectively

Further, a unit-root test will be used to assess if the variables are stationary or not. To avoid wrong specification of the model further, if any of the variables faces the problem of non-stationarity it will be solved by taking the first difference. Hence, this study implements three different unit root tests which are n (Levin, Lin and Chu test (2002), Im, Pesaran and Shin test (2003) and ADF Fisher-type (Dickey & Fuller, 1979) and (Dickey & Fuller, 1981) to examine whether the variables follow a stationarity procedure. The results from the three tests as shown in table (6) showed that (LOP, LGDP, LINF & ITRADE) are stationary at level with p-values less than Alva (0.05) therefore, the tested variables do not face the problem of unit-root. Hence, we will reject the null hypothesis and accept the alternative. Hence, there is no need to use 1<sup>st</sup> difference.

**Table (7): VAR models outputs**

	Model 1	Model 2	Model 3	Model 4
VARIABLES	IOilprice	IGDPCurrentus	linflation	ITradeofGDP
L.IOilprice	0.28* (0.15)	-0.72*** (0.10)	1.02*** (0.09)	0.06 (0.04)
L2.IOilprice	0.89*** (0.13)	0.85*** (0.08)	-0.65*** (0.07)	-0.00 (0.04)
L.IGDPCurrentus	0.65*** (0.25)	1.95*** (0.17)	-1.84*** (0.14)	-0.16** (0.07)
L2.IGDPCurrentus	-1.01*** (0.23)	-1.16*** (0.16)	1.50*** (0.13)	0.07 (0.06)
L.linfa	0.08 (0.05)	0.01 (0.04)	0.54*** (0.06)	0.01 (0.02)
L2.linfa	-0.13*** (0.03)	0.08*** (0.02)	-0.09*** (0.02)	-0.19*** (0.01)
L.ITradeofGDP	0.75*** (0.20)	0.82*** (0.16)	-1.04*** (0.19)	0.61*** (0.08)
L2.ITradeofGDP	-0.31 (0.20)	-1.28*** (0.12)	0.77*** (0.15)	0.51*** (0.07)
Observations	126	126	126	126

\*, \*\*, \*\*\* denote 1%, 5% and 10% levels of significance respectively

The empirical results section provides the generalized method of moments (GMM) regressions to estimate the association between oil price and macroeconomic variables.

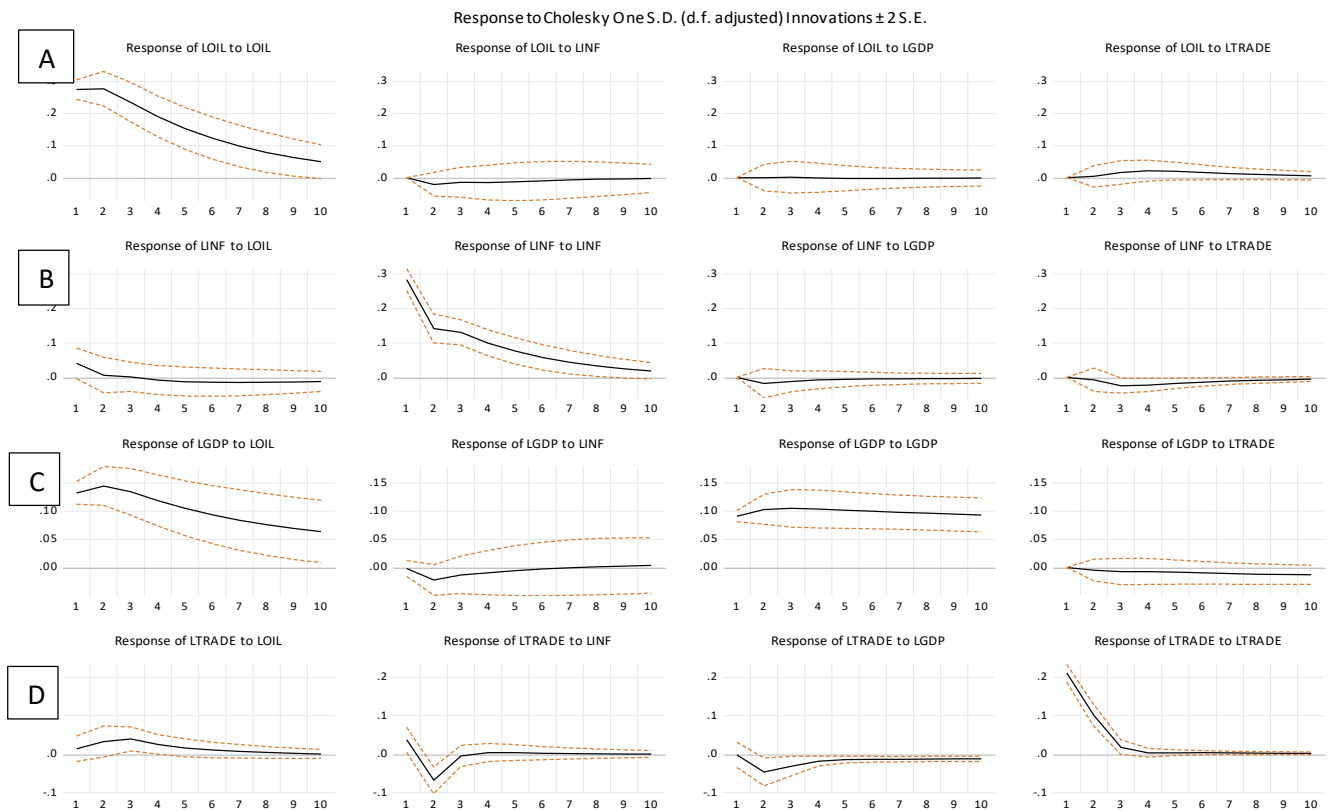
Hence, table (7) provides the impact of Loilprice on LGDP, Linfa and LTradeofGDP. Further, the table results indicate that all variables of the study are significant within lagged one and two.

Furthermore, the table indicates that 1% increase in oil price leads to 0.89% increase in oil price at 1 percent significant level.

Adding to that, 1% increase in LGDP causes 0.65% increase in oil price at 1% significant level. Furthermore, 1% increase in inflation (LINF) is equal to 0.13% fall in oil prices.

Moreover, 1 % increase in trade openness (LTradeofGDP) leads to 0.75 % increase in oil price at 1 percent significant level.

**Graph (1): shows Impulse response function**



To explain how unexpected immediate shocks to the price of oil affect the relevant macroeconomic study variables. The impulse response function is utilized. Further, the presented VAR test in Graph (1) serves as framework for this test. Hence, Graph (1) displays the IRF (IMPULSE RESPONSE FUNCTION) results and demonstrates how each indicator of macroeconomics responded to the shocks of oil price. Additionally, Graph. (1 A) findings show that from period 1 to period 3, a standard deviation shock to (LOILPRICE) has a significant upward trend. Afterwards, the price of oil steadily decreased in response to itself.

Moreover, Graph. (1 B) from period (1) to period (3), (LINF) responded favorably to shocks in the price of oil. Then, from period 4 to period 10, it starts to fall towards the negative zone. However, Graph. (1 C) from period (1) to period (4), a standard deviation to (LOP) results

in high GDP (Gross Domestic Product). Then, from period 5 to period 10, it began to rapidly decline. It is, nevertheless, still in the favorable area. The findings Graph. (1 D) also indicate that a standard deviation innovation of trade to oil exhibits a significant response beginning in the first period and gradually declining until the tenth period. The outcomes, however, were all favorable.

## 5. Discussion

This paper examined the impact of oil prices fluctuations on the macroeconomic variables and filled that gap by examining the relationship between oil price and the economy in gulf cooperation council countries (Kuwait, Bahrain, Qatar, Oman, UAE, and KSA). However, most of the literature studies mainly focused on the impacts of oil price on the macroeconomy either on single countries in GCC or using another indicator such as stock market. Hence, the study covers the period from 1995 to 2020 in the GCC nation, based on the authors' best knowledge, it is the first empirical work to adopt the latest data in GCC countries using these indicators.

Moreover, theoretical framework mainly consisted of theories which explains how fluctuations of oil price have an impact on the economy. Furthermore, the majority of earlier studies examined in section 2.3 that investigated the relationship between oil price and macroeconomy found a positive correlation between the price of oil and the macroeconomic indicators. As a result, this research main hypothesis is that fluctuations of oil price and macroeconomic indicators are related. Hence, using the secondary data from World Bank and Statista covering the period of 1995 until 2020.

The findings illustrate that oil price has a significant positively impact on both the gross domestic product ( $lgdp$ ) and trade openness ( $ltradeofgdp$ ) and this finding is in line with the previous empirical studies discussed earlier. See for instance (Jouini & Galoul, 2021: Chang et al., 2011).

In addition, the economies of the GCC are highly dependent on oil exports and mostly rely on procedures for setting oil prices that are driven by the market. As a result, the impact of crude oil prices on these economies is still substantial. On the other hand, the world economic performance is impacted heavily by global oil prices and its amount of production. Therefore, this phenomenon gives the GCC economies the ability to affect the global economic performance.

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However, it can be examined that unexpectedly, at lag 7, the effect of oil price on inflation rate (LINFA) was discovered to be negative and statistically significant. Which claims that it will almost take seven years for the price of oil to have an impact on the inflation of GCC (Gulf Cooperation Council) countries. These findings match Ahmed (2018) empirical study.

## 6. Conclusion

Even though economists' knowledge of the fluctuations of oil price has improved greatly recently. Oil prices however still remain an amazement for financial-market participants, decision makers and economists. Accordingly, this paper was conducted to ascertain how fluctuations of oil price affected the macro-economy of the gulf cooperation council countries (GCC).

Moreover, this paper used three vital macroeconomic indicators such as: (Gross domestic product, inflation, and trade openness). Therefore, for econometric analysis, models using a panel data analysis and using the (VAR) model has been applied. Further, this study used unit root in order to check for the variable stationarity and it has been showed that all the variables achieved stationarity at level I (0).

Furthermore, we applied the correlation matrix along with descriptive statistics and granger, co-integration and IRF. Furthermore, according to the system of GMM, the empirical results revealed that both gross domestic product as well as trade openness and inflation are impacted changes of oil price positively at 1% significance level. Thus, the study showed that oil price is an important variable in the macroeconomic stabilization of GCC as it significantly affects the GDP, inflation, and trade. As such, findings assured that economic growth is also impacted by oil price, a relationship that was established by earlier research.

In addition, the results of the impulse-response functions of the linear impact model show a positive correlation between the GDP of the GCC countries and global crude oil prices. The GDP growth in these oil exporting economies should have boosted as a result of higher public revenues brought on by higher crude oil prices.

Based on the findings, it is recommended that GCC countries adjust their economic policies to lessen their reliance on oil and to promote the use of renewable and green energy sources by providing incentives and basic information to relevant companies. This will aid the

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GCC economies in increasing both their profitability and environmental quality. Second, greater taxes should be levied on outdated technology to encourage enterprises to adopt newer technology while giving preference to new/advanced technology for industrial output. In the end, this will increase production effectiveness, decrease energy consumption, and promote overall economic growth.

The macro-economic effects of oil prices were the only factor that the present study concentrated on; however, future research can look into how the price of oil affects public health, life expectancy, and environmental degradation. It would be fascinating to theoretically and practically explain the odd phenomenon in future studies.

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