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Analysis of the relationship between international trade and economic growth of Jordan

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THE TITLE OF THE DISSERTATION

ANALYSIS OF THE RELATIONSHIP BETWEEN INTERNATIONAL TRADE AND ECONOMIC GROWTH OF JORDAN

By
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Declaration

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

(Signature):
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(Date):

.....15/09/2022.....

Supervised by: **Professor Pierre Cariou**

Supervisor's affiliation**: WMU Adjunct Professor & KEDGE Business School Permanent Professor**

Dedication

I would like to dedicate this dissertation to the soul of my dear father, who would have been proud to receive this degree. I hoped to be with us today so that my delight would be fulfilled with this degree.

Acknowledgements

First and foremost, I want to express my gratitude to the Almighty Allah for blessing and guiding me with one of the most memorable years of my life. To my wife, thank you for your daily encouragement, love, commitment and patience. You are an inspiration to me and without you, this journey would not have been as amazing.

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I would like to give my sincere thanks to Uncle Dong Song, the Head of Shipping Management and Logistics (SML), and all WMU faculty for their efforts in academically nurturing me during my studies. I am truly grateful to my SML colleagues and the entire S22class, meeting you was a privilege and I will cherish the memories. And to all people who had help me directly or indirectly to reach this achievement and to make this dream to come true.

Abstract

Title of Dissertation: **Analysis of the relationship between international trade and economic growth of Jordan**

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This dissertation presents an outline of the international trade of commodities/goods for Jordan and patterns depending on data from the previous two decades includes the present decade. Additionally, it emphasizes GDP as the fundamental indicator of the national economy and how it is integrated with international trade within Jordan. Moreover, quantitative data offered by the world's best industry clusters and specialists were employed in this study. This study's primary objective is to examine the effects of international commerce of various commodities/goods on the Jordanian economy, even if it also includes import and export of items.

The primary goal of this study is to acquaint readers with the present state of Jordan's GDP and to highlight its relationship with the most important commodities for export and import trends. This was accomplished by performing OLS regression on the data by using SPSS software, deleting insignificant commodities, determining their correlation with one another, studying market pattern, and assessing Jordan's present growing commodities trade. There are various illustrations with numbers in the main body of the work and the appendices list to help readers perceive the information and identify forthcoming potential.

Ultimately, this study identifies four major industries that have a positive impact on the performance of the GDP indication. Performing quantitative studies within the context of the proposed methodological technique enables for the construction of opportunities for Jordan's overall international relations which in turn leads to the prosperity of international trade, represented by import and export; This may be utilized by governmental organizations in the formulation and revision of strategic plans, local and national economic development plans, and in formulating management decisions by transportation entities, industrial businesses, as well as other parties

KEYWORDS: Assessment, Competence, Performance, International Trade, Development, Jordan, GDP, Import, Export

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Abbreviation

AR	Autoregressive
ARMA	Autoregressive Moving Average
ARDL	Autoregressive Distributed Lag
ECM	Economics and Commerce Mathematics
EU	European Union
FDI	Foreign Direct Investment
FM-OLS	Fully Modified Ordinary Least Squares
FTA	Free Trade Agreement
GDP	Gross Domestic Product
JUSFTA	Jordan United States Free Trade Agreement
OEC	Observatory of Economic Complexity
OLS	Ordinary Least Squares
PA	Path Analysis
RE	Random Effect

SMEs	Small and Medium Size Enterprises
SPSS	Statistical Package for the Social Sciences
UNCTAD	United Nations Conference on Trade and Development
UN	United Nations
US	United States
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
WTO	World Trade Organization

Chapter 1

1.0. Introduction

The world's population has always benefited greatly from international trade in terms of economic integration. Over 80% of trade today is carried out by sea. There is a significant relationship between trade and GDP, as seen by the moderate expansion in global merchandise trade volumes that followed GDP growth. The history of urban development also shows that seaport cities are where economic growth is most noticeable.

The significance of seaports in the global supply chain has expanded as a result of the globalization of sophisticated industrial production processes. The provision of international logistics services has evolved into a key aspect of port operations beyond simple cargo handling. An important factor in a nation's development is economic growth. In recent years, and especially for the last two decades, international trade between countries has flourished due to a number of factors such as globalization, global value chain, the telecommunication boom, the information technology, and the economies of scale in maritime transportation. It is the most widespread means of transporting goods between countries due to the low cost and volume of goods. Over 80 percent of global commodity trade is carried out by ocean, and the figure is much higher in most impoverished countries (UNCTAD, 2021).

As a result of expanding in international trade and globalization, shipping plays a vital role in nations economic growth. Therefore, it has become crucial to analyze the markets and the flow of commodities between countries to understand the impact of importing and exporting goods on a specific country. According to Grossman and Helpman (1991) and Afonso (2001) international trade is also one of the primary engines of growth since it permitted technical transfers from industrialized to developing countries. Moreover, backing to the last century this relationship between trade and economic growth have been mentioned by Adam Smith and David Ricardo as they have discovered that trade had a favorable impact on economic prosperity since increased accumulation of technological advancement and wealth would boost productivity and lead

to larger welfare benefits as well as faster development. Figure 1 shows the world's major maritime routes.

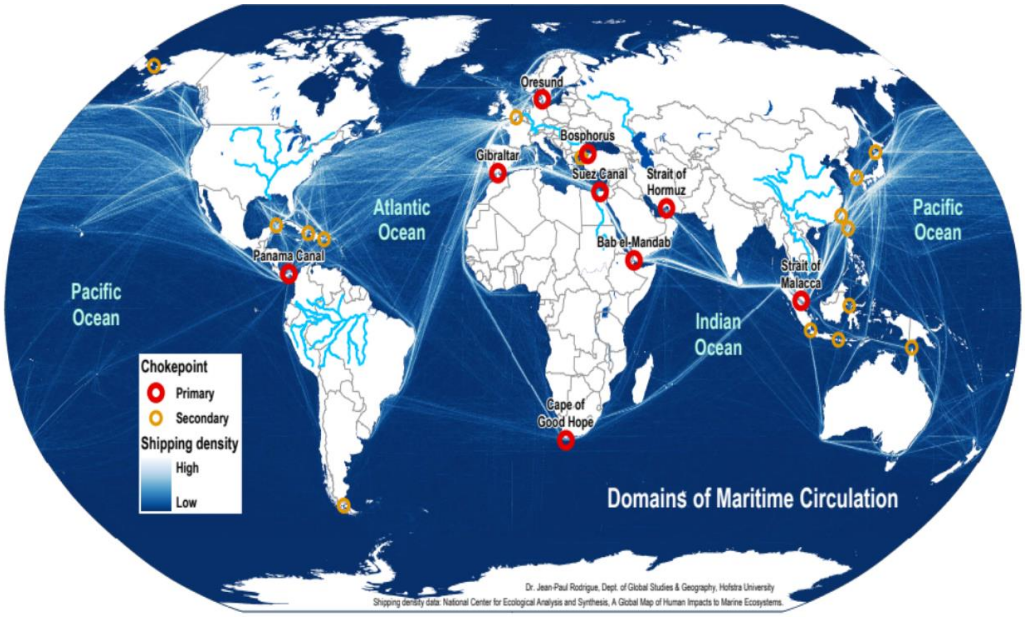

Figure 1: The main maritime Rout
Source: The Geography of Transport Systems. (2017, October 28). https://transportgeography.org

1.1. Background of the study

By considering that international trade and maritime trade are the same in concept, it is fundamental to realize the international trade aspects in order to perceive maritime trade (Blonigen & Wilson, 2013). Hence, one of the macroeconomic variables of the international trade that indicate the economic growth is the Gross Domestic Product GDP; It depicts the size of a country's economic growth for the reader, and estimation about the volume and the level of production for that country.

The GDP is defined as the stream that counts all final commodities and services produced at market prices during a specific time period (Mitchell et al., 2019). Moreover, the value of the total money of aggregation all goods and services is composed in the marketplace within a specific period of time for a specific country. However, the goods that coming in to or out of any state have an impact on the GDP. Considering the value of goods money wise, then the economic behavior of growing or shrinking should be evaluated. The import and export goods must be calculated trying to understand which of

them have a direct impact on economic growth in any nation. Figure 2 shows the volume of trade in goods globally.

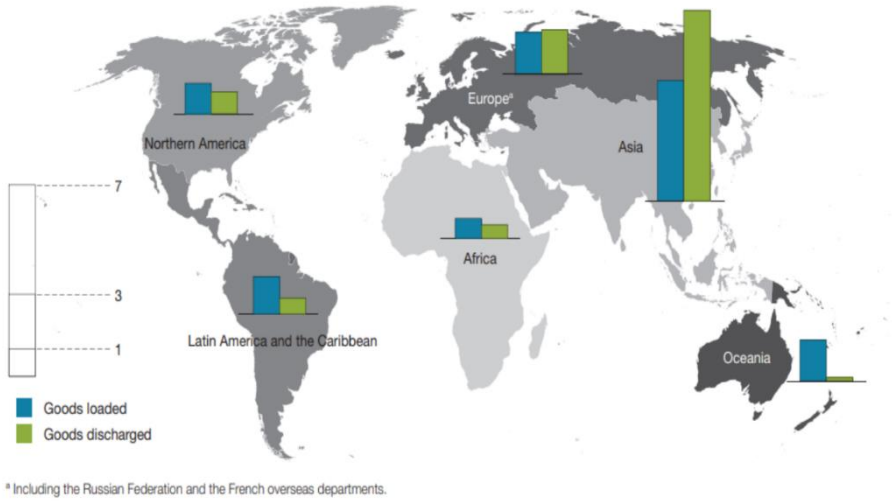

Figure 2: The goods loaded and Discharged Globally
Source: The Geography of Transport Systems. (2017, October 28). https://transportgeography.org

Furthermore, it is important to identifying the two concepts, i.e. the commodities and the goods. The first definition refers to commodities, which means the raw materials come from natural resources or agriculture and generally used as input for many industries, for instance crude oil, wheat, iron ore, coal, metals, minerals and grain. While the goods are defined as the final products that the end users can find in the markets in final use shapes. However, both of two whether commodities or goods at the end called cargo due to being a part in transportation operations, as well as, their position in the supply chain process (Song & Panyayides, 2012).

Regarding the Jordanian economy, the major exports and imports whether goods or commodities carried from or to this nation, will all be examined in this study. This dissertation will also illustrate the importance of being a relatively small size nation depending on their natural resources and how the international trade is a vital to economic growth by using international trade to market and sell its national natural resources. Furthermore, many scientific studies assure that the international trade is one of the vital drivers for any country. This study will focus on Jordan, as imports and exports are crucial to the national economy especially with its limited natural resources. The following

sections will discuss the main objectives of this study. First, a brief overview of Jordan's economy and impact of international commodity trades on its economic growth over the last two decades will be given. For doing so thee Gross Domestic Product (GDP) is considered as a dependent variable that is an important macroeconomic indicator to monitor the economic performance of a country. Furthermore, the top ten both exported and imported commodities are taken into consideration as independent variables by using the liner regression technique to understand which commodity has a major impact on the GDP of Jordan.

Following that, a comprehensive analysis will be made and the result of a series of tests that were performed will be shown. These resulted in the reduction of the number of goods or variables from 20 to 4. These are: imported work trucks, imported ethylene, exported natural calcium phosphates, and exported animal live stock. Every single one of these goods affects GDP either positively or negatively, which resulted from the work's final findings. The main purpose of this study is to come out with different industries that have a significant effect on GDP growth, especially the natural resources to Jordan's economy. The revenues from exporting phosphate and livestock are the highest contributors in Jordan's government budget that helps to its general expenditure; hence, the policy makers should focus more on these exporting items to helps to achieve the economic growth aspired to by successive governments.

1.2. Problem Statement

Jordan has more long-term development problems than it can handle on its own due to its high rates of population and labor force growth, scarcity of natural resources, particularly water, and economic issues left over from the 1980s, such as poverty, unemployment, and large foreign debt. However, Jordan possesses powerful assets that will enable its economy to effectively address these problems. These assets include a sound political system, a thriving private sector, a skilled labor force, and cordial connections with other nations across the world (Jaber, 1995).

This recent improvement in the Jordanian economy serves as strong proof that the country's historic economic dynamism has been revived and put back into operation.

However, this will not be a simple or straightforward procedure. Future economic growth rates for Jordan must be higher than those predicted by the Development Plan and the Economic Adjustment Program. This should and can be accomplished by further

economic policy liberalization, support for domestic and international investors, deregulation, privatization, and financial incentives for unconventional exports. Maintaining sound economic management, in particular ensuring ongoing monetary and fiscal stabilization, is crucial (Jaber, 1995).

Without a rapid and significant economic growth, the issues of unemployment, poverty, and external debt will not be adequately resolved. International economic and technological cooperation is still necessary for Jordan to properly address these difficulties and achieve a high rate of economic growth due to the unique challenges that it faces. Furthermore, it is interesting to observe the relationship between economic growth and international seaborne trade of Jordan.

1.3. Objectives of the Study

This dissertation aims to achieve both primary and secondary objectives that are discussed below:

A- The primary objective of this study is to identify the following:

1. The factors affecting the economic growth of Jordan;
2. The significant exported and imported commodities/goods;

B- The secondary objectives of this study is to explore and investigate the following:

1. Which commodities sector needs more focus;
2. The impact of export and import of commodities on the maritime trade, port, shipping and logistics services of Jordan.

1.4. Research Questions

In keeping in mind the above mentioned aims and objectives of this dissertation, the study will try to answer the following questions:

1. What are key exported and imported commodities/goods that are affecting the economic growth or GDP of Jordan?
2. what is the correlation between/among the exported and imported commodities?

3. Which commodities are affecting the economy of Jordan positively or negatively?
4. Which segment of commodities needs to be concentrated in the future?

1.5. Significance of the Study

The GDP of a nation is determined in large part by the balance of trade. When local manufacturers sell more products and services to overseas markets than domestic consumers buy from foreign producers, the country's gross domestic product (GDP) rises. A nation experiences a trade surplus when this occurs. A trade imbalance occurs when domestic consumers purchase more foreign goods than domestic manufacturers sell to overseas consumers, which lowers GDP. Given the foregoing, this study considerably contributes to the ongoing discussion of trade and growth and fills knowledge gaps.

1.6. Limitation of the Study

This dissertation takes into consideration all the top export and import commodities for Jordan but ignores some commodities such as gold that also contribute to the significant portion of the total trade but this dissertation only attempts to encompass economic growth of Jordan from the perspective of maritime trade.

Another potential problem is that the dissertation was encountered when conducting this study is that data collection was challenging. To incorporate all the export and import trade data was a difficult task because it was more disaggregated and not available in a timely manner in the trade statistics of Jordan. Besides, all the data sources are secondary sources. Moreover, due to limitation of time and fund collecting the data from primary sources has not been possible. Additionally, this study focuses only on the foreign seaborne trade of commodities or goods that has either positive or negative impact on the economic growth of Jordan but ignores other key factors such as agriculture, manufacturing, services, and some other precious metals i.e. gold that also affect the GDP significantly.

Furthermore, due to the practical constraints this dissertation cannot provide a comprehensive literature review from the perspective of maritime trade of Jordan because there a limited number of articles that discussed about the relationship between maritime trade and GDP of Jordan.

1.7. Structure of the Dissertation

The following flowchart outlines the key stages that were taken in this dissertation to arrive at the ultimate outcome:

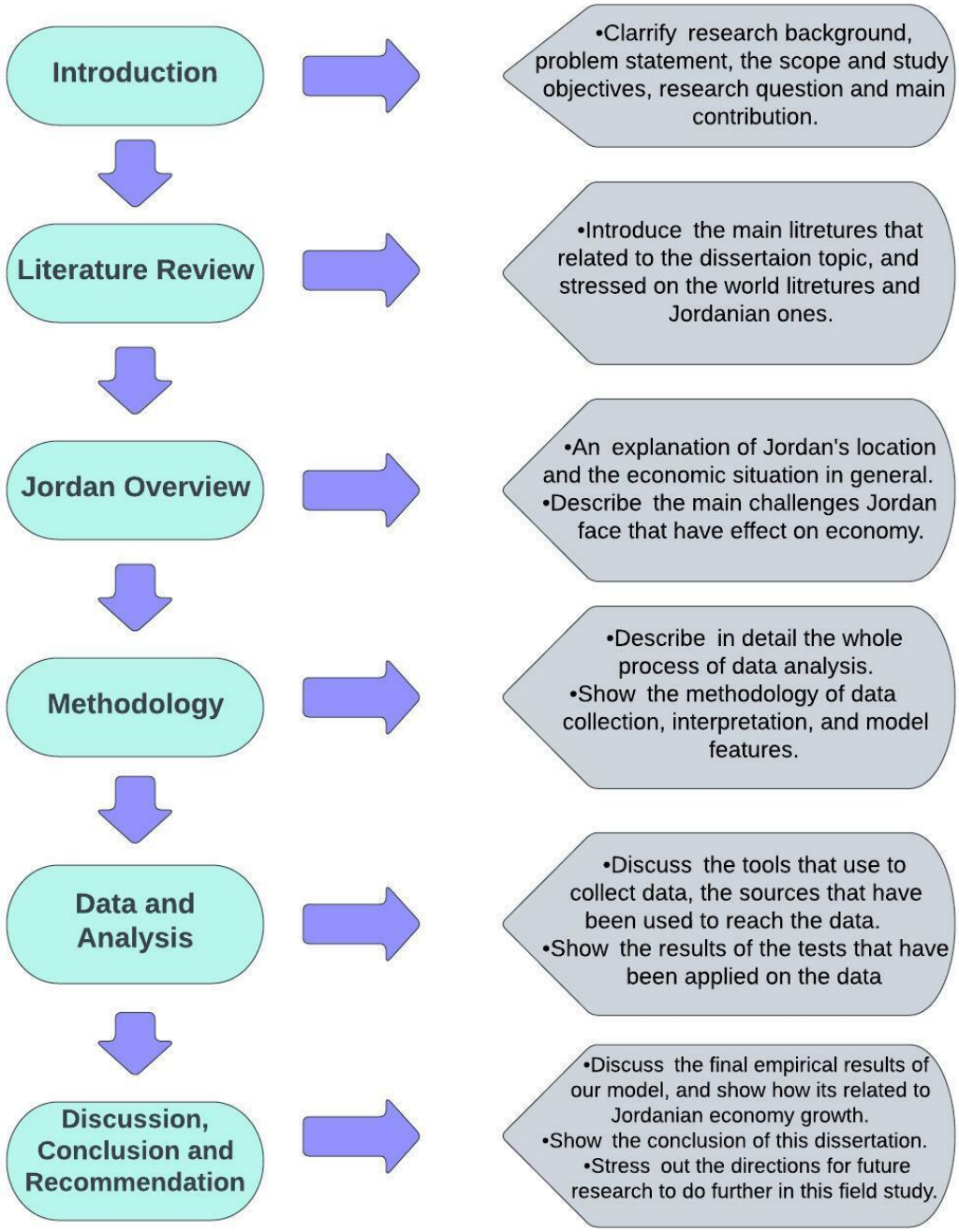

Figure 3: The Dissertation Flowchart

Chapter one will address the research background, problem statement and main motive of this dissertation with limitations. In chapter two, the reader will be familiar with the literature reviews that discuss the relationships between the international trade and economic growth, and the concept for international trade and related theories, and the vital

role that maritime transportation system plays in this industry and how it helps to flourished the international trade. The following chapter gives the reader a brief introduction about Jordan's location on the world map, the economic growth within the last decades, and the most significant challenges that face the Jordanian government. Moreover, the reader will be directed to the next section which is the methodology that exposes all details that will be followed to analyze the data. Then, which method will be use to achieve the objective will be described. The data and analysis part will show in detail the data collection process, followed by the analysis that will describe the analysis process of each test model, as a result of applying OLS regression on the data by using the proper software. Finally, the final part will provide discussion, conclusion, and recommendations. The last chapter will discuss the variables significantly affecting economic growth in Jordan. Each subject is discussed in detail, and then the reader is moved to the final conclusion of this research and some recommendations for further research in this same subject.

CHAPTER 2: LITERATURE REVIEW

2.0. Introduction

The purchasing and selling of products and services across national borders are referred to as international trade while real per capita income growth that is sustainable over time is referred to as economic growth. As a result, a causal relationship exists between international trade and the economic growth of a country. This chapter attempts to discuss the relevant literature with proper justification from both international and Jordanian trade perspectives to find the gap and that different economists have examined the importance of export growth to economic growth using various econometric methodologies. In addition, this chapter discusses the aim of this research by using previous research, articles, and books by reviewing the scientific methods and models that were used to evaluate the impact of international trade on economic development. The core objective of this study is to analyze the relationship between trade and economic development by providing a clear understanding of the findings by applying appropriate methodologies.

The following sections attempt to highlight international trade and how the patterns of international trade have changed over time. Then, it will show how

international trade contributes to the economic development of a country, especially Jordan, and finally the relationship between international trade and the economic development of Jordan over time. Moreover, some scholars' opinion has been discussed regarding the economic development of a country with proper justification. Finally, based on different existing literature the research gap has been identified in the field of international trade and economic development.

2.1. International Trade and economic development

International trade is defined as the process of importing goods and services from a specific country called (A) into another country called (B) and then, after being transformed, sending those processed goods or services to another state called (C) (Yeung,1967). According to Suranovic (2010), international trade is a segment of the economy that uses microeconomic concepts to help define the global economic system, along with supply and demand assessment of global markets, organization and customer attitudes, competition, and the impacts of market aberrations.

From the inception of civilization, there exists a linear relationship between international trade and economic growth, and historically, the relationship of international trade to the state's economic growth was already analyzed, back in the 17th century, when Adam Smith and David Ricardo emphasized the positive relationship between economic growth and trade. The trade theory developed and was divided into two main research streams, the classical theory which developed depending on a perfect competition market, and as Adam Smith stressed in his book (Wealth of Nation) about this theory

> every man, as long as he does not violate the laws of justice, is left perfectly free to pursue his own interests in his way and to bring both his industry and his capital into competition with those of any other man (Smith, p. 687).

While the Neoclassical trade theory was developed on the imperfect competition market, Robinson seemed quite clear in her book (The Economics of Imperfect Competition) about

the limitation of optimal competition and the generality of incomplete competition and she mentioned the necessity of using imperfect competition in the market:

> it is more proper to set out the analysis of monopoly treating perfect competition as a special case (Robinson, 1933, p. 250-251).

GDP is a common measure of the value added created by a country's output of goods and services over a given time period. As a result, it accounts for both the money created by such production and the total amount spent on end items and services. While GDP is the most important single indicator for measuring economic activity, it does not provide an adequate assessment of people's material well-being, for which alternative metrics may be more appropriate (OECD, 2022). A measure that can be used to determine the total value created of both goods and services produced annually for a specific state is Gross Domestic Product (GDP). The trade to GDP ratio is a dominant indicator of the significance of trade for a single country or for the rest of the whole world.

2.2. The relationship between economic growth and trade

While reviewing existing literature related to the relationship between economic growth and trade most of the authors provided different views from different perspectives. For instance, Osadume (2020) argued that the majority of scholars believe that the seaborne trade has a positive effect on economic growth for any country, while another scholar believes it is not necessary for economic growth. A critical factor to explain these different views is the seaborne trade openness that has a vital positive impact on economic improvement and development. The author applies the Granger causality test and Autoregressive Distributed Lag (ARDL) Bounds test to data extracted from the united nation development program and the central bank of Nigeria to stress the significant relationship between trade openness and economic development. In addition, Nektarios and Michai (2020) suggested that seaborne trade plays a vital role in determining the growth of GDP, and investigated this issue by categorizing the world into three categories of countries based on development in high, medium, and low-income states. The scholars use the Vector Error Correction Model (VECM) on the annual data on the quantity of crude oil, petroleum products, and dry cargo transported, and as a macroeconomic factor,

the GDP growth. Their findings suggest that the high and medium-ranked states have the high and medium-ranked countries, which have a positive relationship between changes in oil prices and the demand for seaborne trade while the low-income states have a negative impact on the demand for seaborne trade according to changes in oil prices.

Similarly, Fratila et al., (2021) stressed as well that seaborne trade is considered a blue economy and vital in the European Union. Moreover, the seaborne trade and developing port infrastructure have a significant positive impact on economic growth in the EU. The researcher applied the eight-panel data regression models from 2007 to 2018 to twenty European countries within the period between (2007-2018). Moreover, Awad (2009) claims that there is a positive static relationship between economic liberalization and real economic growth, by using Granger causality, and Static and Dynamic Regression analytical models. In addition, Awad indicated that there is a positive and vital effect on the industrial and construction industry by implying the open trade strategies. For the data collected to analyze the relationship between the variables, the period between 1970-2009 was covered (Awad, 2012).

Furthermore, Emikönel et al., (2022) believe that the improvement and growth in the Spanish economy has a positive impact on Portugal's economic growth, and also the impact of imports has a major positive effect on economic growth compared to exports. Moreover, the political agreement between countries also creates a suitable atmosphere for economic growth. Emikönel applied an Autoregressive Distributed Lag (ARDL) to data collected from the World Bank database, which was income per capita for each country Spain and Portugal and the import, export, and GDP growth rate covering the period between 1989 and 2018.

While Mutascu and Hegerty (2022) go further in their research to reveal the relation between the influx of refugees and their effects on economic growth, they assert that the influx of refugees to the EU creates an unemployment issue in the labor market. This is because of the low cost of refugees' labor according to domestic labor, and the international trade and economic growth have a vital role in shrinking the size of informal economic industry. The researchers applied non-linear analysis and a Threshold panel

approach to data related to the European countries during the period between 1998 and 2017.

On the other hand, Chong et al. (2019) claimed that small and medium-sized enterprises SMEs rely on imports less than large enterprises. Further, SMEs benefit from exports much more than large enterprises, which affects the economic growth as a result when the exports help countries economic growth more than imports. The researcher applied the descriptive methodology to prove his result by using data from different resources.

Likewise, Şeker, (2020) went further to conclude that economic growth and linear shipping connectivity have a significant positive impact on exports in the EU and Turkey. The researcher applied his research to the panel time series model and use the data of exports, liner shipping connectivity, and GDP for European countries and Turkey covering the period between 2004 and 2017.

Similarly, Gounaris (2014) examined that there is a relationship between the development of maritime shipping, seaborne trade, and advanced technologies. In addition, a vital role has been played by seaborne trade in enhancing the international trade according to low cost and huge volume. However, the policymakers should pay attention to the different types of costs, for instance, tariff costs, information costs, enforcement costs, and distribution costs, and try to reduce those costs in trying to maximize the international trade levels.

In the same vain, Cariou (2020) stated that with an R2 of 0.97 for total goods, 0.92 for petroleum products and gas, and 0.99 for dry cargo, there is still a substantial association between GDP per capita and marine transactions. In contrast, geopolitical tensions and future power transition routes have a major influence on crude oil transactions, explaining a large departure (R2=0.62) from GDP-based evolutions1. Within the long term, the overall marine trade-GDP per capita elasticity is about two and, as predicted, is greater for dry cargo (2.74), which includes container-based cargoes.

On the other hand, some authors found that there is a negative relationship between international trade and economic growth or GDP growth, Saeed et al. (2021) considered

that a relationship exists between the export values and GDP per capita, while there is no integrated relationship between import value and GDP per capita. Their findings are based on the application of non-recursive models and path analysis (PA) on the top ten maritime connected countries and their bilateral trade countries and the import and export effect on the GDP growth for those states. The authors show that the gravity variables have no impact on bilateral trade. The findings also imply that international, regional, and national economic and trade policies should recognize and promote stronger marine connectivity.

However, some authors concluded that there exists both positive and negative relationships based on the economy and trade patterns. For example, Jayathilaka et al. (2022) showed a significant and positive relationship between the net exports and logistics performance index, especially in Asian, European, and Oceanian countries. The researcher applied a panel regression technique and the random effect (RE) model, Hausman tests, and Breusch-Pagan Lagrange Multiplier test on data from 142 countries, 37, 41, and 3, Asian, European, and Oceania respectively. However, the authors stress that the GDP has a significant and negative impact on net exports especially in Asian countries, while the impact is positive for Oceanian, and Middle Eastern countries. In contrast, the African countries are showing a negative relationship between GDP and net exports.

2.3. The relationship between international trade and GDP growth in Jordan

While looking at the relationship between international trade and economic growth from a country's perspective then it is more specific. In this dissertation, Jordan is picked as the case country. In terms of Jordan, international trade and GDP growth go hand in hand. However, it is essential to quantify the relationship between them. While reviewing literature related to Jordan, numerous studies that looked at the connection between trade and economic growth emphasized the significance of maritime trade for global trade, wealth, and economic growth. For instance, Serena et al, (2016) argued that the trade in service industries has a substantial impact on Jordanian GDP growth, while the trade in goods insignificantly affects GDP growth in Jordan. Also, the international trade increased in services more than goods trade, and how it plays a vital role in developing states. The researcher used the Fully Modified Ordinary Least Squares (FM-OLS) method, based on Solow model growth, which takes into account data indigeneity

and serial correlation by applying this method to data of trade in goods and services in Jordan during the period from 1980 and 2014.

Moreover, Mohamed et al. (2022) highlighted that the ability of states to compete with other economic states is on their ability to use knowledge, education, and innovation which are the main indications of economic development. Moreover, the mobile phone and internet users, controlling corruption, FDI, and political stability also have a significant positive impact on a state's economic growth, while government expenditure on patents, education and trade openness have a negative impact on state economic development. The main issues facing the economy today are lack of information and scarcity and researchers applied three models to address this element, namely the regression model, the fixed-effects model, and the random-effects model on panel data of twenty developing countries within the period between 1996 and 2020. Their main findings are that the statistical analyses revealed that the fixed-effects model is the best, and also that the estimates of the suggested model variables do not reject economic theory assumptions or practical realities. Furthermore, the findings revealed that 93 percent of the changes in economic development in the developing nations under research are related to a reliance on the knowledge sector.

Additionally, Al-Zoubi (2019) emphasizes that the impact of small business enterprises is positive on the national economy of Jordan, and helps to enhance socio-economic development. In addition, international trade plays a role in changing the state's national policies as a result of globalization. The author agreed with the scholar's argument that globalization and international trade either affect positively or negatively the development of national policies for states. Moreover, Jordan relies on small business conducts as the main tool to improve the national economy, because Jordan's economy is facing high unemployment rates, inflation, foreign debts, a fiscal deficit, and an imbalance of the trade scale.

Alzyadat and Al-Nsour (2021) stressed that both public expenditure and tax revenue have a significant positive impact on economic growth in Jordan in the short run because the government uses the tax revenue as a finance resource for government expenses. The researcher applied the (VAR) model Vector Auto regression and the Vector

Error Correction Model (VECM), Granger casualty test, Impulse Response Function, and Variance Decomposition to the annual data of the Jordanian economy including the Government expenditure, tax revenue, and GDP growth rate during the period from 1970 and 2019. The main findings are that the taxes represent a limitation and heavy burden on populations in the long run as they minimize the purchasing power, and it has a negative impact on economic growth in Jordan. Furthermore, more reliance on the government for tax revenue in their expenditure will lead to tax evasion and inefficiency procedures.

According to Abu Al-Foul (2004), exports have a favorable influence on Jordan's economic growth. This conclusion was produced by using three analysis models, i.e. VAR-L, VAR-D, and ECM. These findings bolstered Jordan's export-oriented economic strategy. As a consequence, Abu Al-Foul encourages the Jordanian government to continue supporting and facilitating the existence of free zone corporations and government organizations that promote such type of investment in order to continue attracting international investments and expanding export operations.

Busse and Gröning (2012) examined the impact of Jordan's trade liberalization over the previous two decades, employing the gravity model, a large country sample, and a long time series to estimate the impacts of successive FTAs and WTO admission on Jordan's exports and imports. The authors discovered that multilateral or preferential trade liberalization has no statically relevant influence on exports and imports. However, the JUSFTA was an exception because it significantly increased Jordan's exports to the US.

El-Anis (2013) performed research on the Jordanian economy to assess the total volumes of bilateral commerce between Jordan and the United States before and during the Jordan-United States Free Trade Agreement (JUSFTA). Linear trend line estimations were used to compare actual trade levels to predicted trade levels based on pre-JUSFTA data. It was discovered that bilateral commerce between Jordan and the United States grew following the implementation of the JUSFTA in 2001, indicating a substantial association between bilateral trade volume and free trade agreement implementation. Furthermore, it can be seen that Jordanian exports to the US have expanded faster than imports. Moreover, Jordanian exports to the US have expanded faster than imports. Furthermore, Jordan has witnessed an overall trade surplus since the adoption of the JUSFTA, as opposed to a trade

deficit in the pre-JUSFTA period. Nonetheless, when the JUSFTA was fully implemented, Jordanian imports from the US surpassed exports, and the Jordanian trade imbalance is expected to persist in the future.

Finally, the debate over whether or not the performance of international trade has a substantial impact on a country's economic growth has been the focus of researchers' attention for some time, and it will likely continue to do so. It can be concluded that it is increasingly important for small economies such as Jordan to quantify the relationship between international trade and economic growth based on different commodities.

2.4. Analytical models and research gap

The literature review stresses that economists rely on different economic theories and models to investigate the connection and the relation between dependent and independent variables and to disclose if the relation was a negative or positive correlation, which they rely on to prove the arguments they present in their scientific theses. The following figure shows the main models that were used and when and by whom they were developed:

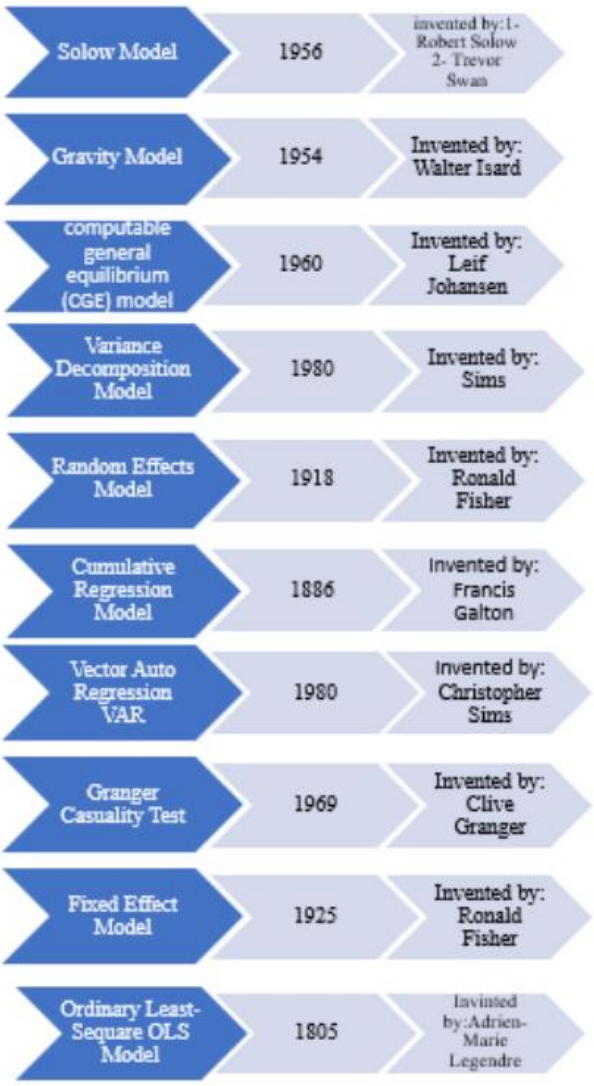

Figure 4: Analytical Models

To find out the relationship between international trade and economic growth the dependent variable should be determined. Thee dependent variable is an indicator of economic growth, and in this case the dependent variable it is the GDP, as well as the other factors that directly or indirectly affect GDP growth for any state. These should be considered as independent variables, by applying the appropriate economic analytical model with the data for a specific period of time. The correlation between those variables and GDP growth, and any change happening to those independent variables significantly

of insignificantly affect GDP should show results. However, this process is an indicator which commodities/goods significantly affect economic growth positively or negatively.

2.5. A brief overview of Jordan's economy

The Jordanian economy is considered a small open size economy, with many international trade relations. This criterion of being a small size economy gets linked with limited resources and scarcity of natural resources like natural gas and oil forces the Jordanian government to be hugely dependent on external fiscal aid, and internal and external borrowing. However, Jordan depends mainly on mining industries, for instance, phosphate and potassium, which place Jordan among the top ten countries in exporting this kind of fertilizers, as well as the service industries like both medical and leisure tourism. Moreover, the government relies on tax revenue as a source for government expenditure. Despite all of that, the Jordanian burden from the budget deficit is very extensive.

All these factors leads to suffering from low national income and small investment as a result of the high tax rate which ultimately leads to a low rate of GDP in Jordan. However, Jordan was keen to enter and sign many international agreements on a trade exchange, in an attempt to promote the Jordanian economy, for instance FTA free trade agreement between Jordan and the United States of America, the European Union, Canada, Singapore, Malaysia, Tunisia, Libya, Syria, and Turkey. Further, Jordan signed a free trade agreement with Palestine, Iraq, the Gulf Cooperation Council Countries, Lebanon, and Pakistan. Jordan also signed to be a member of the Euro-Mediterranean Free Trade Area and Arab Free Trade Agreement, and play a role as a member of the Agadir Agreement, not to mention the advanced relationship with the European Union Countries.

Pulling all these factors together, Jordan's economy is rather highly diversified, despite being small and facing several obstacles. Jordan's gross domestic product (GDP) is largely comprised of trade and finance. One-fifth of the GDP is made up of public utilities, transportation and communications, and construction; the remaining two-thirds are made up of mining and manufacturing. As a result, it is very important to quantify the relationship between international trade and the GDP growth of Jordan.

Chapter Three: Jordan overview

3.0. Background

This dissertation will examine the current state of the Jordanian economy in order to understand the opportunities and challenges it faces on the one hand, and propose solutions that decision makers can use to advance the economy or at least understand the impact of trade, both imports and exports, on Jordanian economic growth on the other.

Jordan is a small country with an area of about 90,000 km in the middle of each of the following countries in the north, Syria, south Saudi Arabia, east Iraq and west occupied Palestine. According to UNCTAD, the population census of Jordan reached in 2020 about 10.203.000. Moreover, the Jordanian economy is also considered modest, according to published figures and the rates of the GDP, which is a major indicator of a country's economic status. However, Jordan's strategic location, as well as its political and security stability, is among it is most important characteristics, as these advantages have enabled it to serve as a link between the countries of the region in this part of the world, which is considered unstable, either politically or in terms of security. The figure 5 shows the map of Jordan.

Figure 5: Jordan Map

On the maritime level, Jordan owns one single port, and it is located in its far south overlooking the Red Sea. This maritime corridor is critical to Jordan's economy since the majority of Jordan's exports and imports transit via this one port. Furthermore, the port,

which is called after the city in which the port of Aqaba is located, is the economic nerve and backbone of the Jordanian state.

Jordanian historical GDP records for the previous 20 years extending between 2000 and 2020 grew in average trend of around 6.5% yearly, but there are several years in which some incidents have negatively affected the GDP growth. Figure 6 shows the Jordanian GDP trends.

Figure 6: The Jordan GDP trends between (2000-2020)

Source: UNCTAD country profile 2020

The first drop point was in 2003, when the American invasion of Iraq was witnessed, which affected Jordan greatly in several respects. First, Iraqi oil supplies to Jordan stopped, on which it was highly dependent, because Jordan was getting oil from Iraq at very preferential prices. As a result, the energy bill for Jordan doubled, which was reflected in the budget that in turn led to a decline and a slowdown in the growth of the national gross product. The second reason, Jordan received a substantial influx of Iraqi refugees displaced from the scourge of wars, which in turn also caused the Jordanian government and the Jordanian economy many financial burdens.

The second deterioration to the GDP was in 2008 and in 2010. As a result of the global financial crisis happening in 2008, the Jordanian economy was affected by this crisis as well, which led to a decline in the growth of the GDP and also to a slowdown in its growth, i.e. the recovery period from that crisis took a long period of time to recover from the global financial crisis. However, the real crisis and the real challenge for Jordan, occurred in 2010, when in that year and the following years witnessed the Syrian war,

which led to the influx of Syrian refugees to Jordan, negatively affecting the economic performance of Jordan and consequently its impact on the GDP.

Jordan has had a lengthy period of fiscal imbalance and rising state debt, which was aggravated by the Covid 19 crisis, leading to a modest drop in GDP and substantial worsening in fiscal and external balances. As a result, the fiscal balance was influenced further by the government's attempts to protect the most vulnerable parts of the population from the worst impacts of the pandemic, while the external balance was marginally improved by decreased imported energy costs.

3.1. Challenges of Jordan economy

To form a clear picture of the Jordanian economy, it is necessary to mention the challenges facing the Jordanian economy and the most important problems that Jordan suffers from in general, which in turn directly affect economic growth.

3.1.1. The high poverty rate

Without any doubt, poverty is still a significant obstacles facing many emerging states. Economic growth and sustainable economic development are vital to minimizing global poverty and enhancing the livelihood of developing countries. Jordan's poverty evaluations are derived from data of the Family Income and Expenditure Survey. The domestic poverty percentage was 14.4 percent in 2010 to 2011. Jordan's government announced a new national poverty rate of 15.7% in 2019 (World Bank, 2020).

3.1.2. Unemployment

The unemployment is defined as the incapability of a state to deploy the human resources within related sovereignty. The shortage happens between the supply, which are the job applicants, and the demand which is the markets job opportunities. This rate gives an indicator to how effective and efficient the state economy is to engage the labor force in the market and in the economy as well. However, in Jordan, unemployment reached an all-time high in 2019 with about 19 %. It caused an economic recession due to a reduction in demand for goods and services, which resulted in a shrinking rate of production. Further, Jordan has a severe unemployment issue, with 35% of males and 40% of females who are unemployed. These alarming statistics reflect unemployment among degree holders and undergraduate people. Unfortunately, the economy in Jordan has not shown any development in this issue within the last five years to absorb the job seekers (Hjazeen et al. Futur Bus, 2021).

3.1.3. Inflation

Inflation is defined as

> is a process of continuously rising prices, or equivalently, of continuously falling value of money (Laidler & Parkin, 1975, p741)

In other words, inflation is the purchasing power of a state's currency. The majority of scholars agreed that inflation has a negative impact in both the long and short run on economic growth for any country and on financial sector performance as a whole. However, Jordan has experienced many inflation shocks during the past three decades. The first period extended between 1994 and 2003 in which the inflation rate was 2%. The second period was between 2003 and 2008, in which the inflation rate reached 6.7%, while the year of 2008 the inflation rate hits the heist percentage at 18%. Political and geopolitical reasons stand behind this great issue which harms the Jordanian economy and negatively affect economic development. Fortunately, after those years specifically during the years between 2009 and 2014 the inflation rate declined to reach 5%, and at the end of the year 2018 the rate reach 2% (Batayneh et al., 2021).

3.1.4. Large Budget deficit

Jordan has always suffered from budget deficit even from the state establishment in 1945, as a result of limited natural resources, However, the government has constantly solve this problem by relying on foreign financial aid, lending from internal and external sources to fill the deficit in its budget (Nimer et al., 2021). it is obvious that there is a deficit in Jordan's general budget, i.e. -727.6 million dinars, the total amount of general public expenditures for the year 2018 reach the ceiling of 8,567.3 million Jordan dinars. On the other hand, the amount of revenues for that year was 7,839.6 million Jordan dinars. Moreover, the (GDP) for Jordan in 2018 was 30 billion Jordan dinar, which is about 42 billion US dollars (Economic and Social Council Jordanian, 2018).

This heavy burden on the Jordanian government led to many significant crises like, unemployment, inflation, quality of education, and quality of health services, through its impact on government expenditures.

3.1.5. Water shortage

Jordan, which is suffering from water scarcity, is regarded as one of the most water-scarce countries in the world. In addition, Jordan is totally dependent on non-renewable groundwater as a main water source. Approximately 60% of Jordan's water

supply comes from groundwater (Al Naber & Molle, 2017). Because of the rapid population growth, there are almost no renewable water resources in Jordan, which is the main reason for the scarcity of water. This problem is also considered a major challenge for the Jordanian government to secure financial resources to meet Jordan's water needs, which is an additional burden on the state budget.

3.1.6. Limited natural resources

The energy is essential to communities' development, as a source of survival as a result of people's activities expanding and developing within the years, and the dependence on oil as a main resource in different aspect of human life. At the same time, the world is suffering from scarcity of oil. However, Jordan relies totally on imports to meet its needs for oil and gas as well. Jordan imports around 93-94% of its imports from gas and oil, which accounts for around 8% of its GDP. As a result, the Jordanian government is facing a vital issue to secure their needs in energy whereas securing Jordan's energy needs is a major concern for it (Winckler, 2022).

3.1.7. Financial foreign Aid

> of the seeming and real innovations which the modern age has introduced into the practice of foreign policy, none has proven more baffling to both understanding and action than foreign aid (Morgenthau, 1962, p301).

However, foreign aids can take several forms, namely fiscal, humanitarian, and military forms. This dissertation will focus on the fiscal aid Jordan received to remedy the imbalances in the budget deficit, which has always been considered as an unsolvable issue for the Jordanian economy. Moreover, improper use of this aid exacerbated the problem instead of solving it in Jordan. Instead of trying to reform its organizational weak points, such as the inefficient taxation riddled with loopholes, the government frequently commits to stopgap policies like spending foreign aid to supply the already overburdened persons in the government and security sectors, i.e. the vanguard of regime loyalists (Yom, 2015, pp. 296–298). Generally, the foreign aid is considered as role player in economic growth for developing countries as a result of fiscal resources scarcity (Azam & Feng, 2022).

Chapter Four: Methodology

4.0. Introduction

The purpose of a methodology in all research studies is to guide the scholar in identifying, observing, and selecting the several dependent and independent variables that the scholar tries to describe and prove (Bazeley, 2013). This third chapter on methodology aims at discussing data collection and processing, the source used to collect data and the way to collect data and the model that should be used to analyze data. Some of the limitations during the data collection process are also going to be presented.

The main objective of this dissertation is to identify the association between international trade and the economic growth and prosperity of Jordan. Moreover, this relationship will give the reader an indicator of how those independent variables will affect the dependent variable. Economic growth and prosperity for a given State will be captured by the GDP, which will consider the dependent variable. The independent variables which will affect the economic growth is imports and exports, as these variables affect economic growth in any state.

The model that will be used in this dissertation is Linear regression based on Ordinary Least Square OLS model, which is a complex modern model that measures the relationships between the dependent and independent variables. Imports may have a significant role in long-term economic development when positive export growth is regularly linked with fast-import expansion (Rodrik 1999). Moreover, if the model ignores imports, empirical data on the relationship between exports and economic development could be inaccurate, leading to incorrect conclusions (Esfahani 1991; Riezman et al. 1996; Thangavelu and Rajaguru 2004). As empirically proved, for more appropriate correct analytic results, both imports and exports should be considered to reach accurate desired results. However, this model will be used in this dissertation to find out in which way the import and export variables will affect GDP growth, which variables will have positive or negative impacts. In addition, the variables that will affect economic growth in Jordan will be given to provide decision-makers with the appropriate strategy they have to follow to help the economy to survive, especially in view of the burdens that the government currently bears.

4.1. Ordinary Least Square OLS model

Ordinary Least Square (OLS) regression is the identification of equations that minimize the total of squared deviations among the variables in the sample and the value forecasted by the equations. Some hypotheses must be encountered in OLS regression, such as (1) the linearity of regression coefficients, (2) all indicators must be strongly aligned with the residuals, and (3) residuals must not be strongly linked with each other (serial correlation), (4) residuals must have a steady difference, (5) no predictor variable is fully correlated with another predictor variable (avoidance of multicollinearity), and (6) residuals must be distributed normally. Only even when all the assumptions are achieved then OLS regression yield the best estimates (Todman & Dugard, 2007, Tabchinik & Fidell, 2003).

4.1.1. Linearity Regression Coefficients

This test aims at finding the independent variables which have a real link with the dependent variable. The t statistics and the P-value are taken into account in testing the hypothesis when the (β), which the population parameter assessed to be zero versus two-sided alternate at the 5% level of confidence. This is the percentage of the coefficient to its standard errors (Brooks, 2014).

This relation can be expressed by using the following symbols:

$H_0=0$,

$H1 \neq 0$

The rejection of the null hypothesis suggests that the independent variable is significant. If the null hypothesis is accepted, the coefficient is statistically indistinguishable from zero and contributes nothing to the explanation of the dependent variable, thus it must be deleted. By doing so, the variables left with the equation are those that have a cause and effect relationship with the independent variable.

4.1.2 Unit Root Test

Unit root test is defined as a random tendency in time-series data, which is frequently described as a "randomized walking with deviation" and in many cases the unit root test is named by the difference between stationery or unit root processes. For example, if the time series is expressed as a unit root, and if there is a unit root in a time series, then it demonstrates an unanticipated systematic pattern. Moreover, the time series described has a unit-roots that may mean that the analysis even has high r-squared values even if the

data is uncorrelated, or t-ratios will not follow a t-distribution. In other words, unit root tests look for stationarity in a set of time series. Stationarity exists in a time series when a change in time does not cause a change in the shape of the distribution; non-stationarity can be caused by unit roots. It is noteworthy that the founders of this model are Dickey and Fuller in 1979. The objective of this test is simply to test the null hypothesis $\varphi = 1$ which the:

H0: there is a unit root

H1: there is no unit root (stationary)

The decision to reject the null hypothesis is when the p-value < 0.05.

4.1.3. Cointegration Test

The concept of Cointegration was developed by Granger (1981) and defined as

> it is inherently multivariate, as a single time series cannot be cointegrated. It implies the co-movement of the two or more-unit root variables with similar stochastic trends. Cointegration provides a long-run equilibrium relationship between two or more-unit root variables. The long-run relationships are closely linked to the concepts of equilibrium relationships in economic theory and of persistent co-movements of economic time series in econometrics (Das, 2019, p370).

However, stationarity is a necessary condition for time series analysis to prevent the chosen statistical sample time series from non-stationary issues. One of the solutions is to use the integration. As a result, using the cointegration model is to build a stationary relationship between the chosen variables which have a non-stationary relationship between them to ensure there are no non-stationary among the variables within the sequences. In addition, the model is used to avoid false regression, and to differentiate between long-term stability and short-term volatility relationships among variables.

4.1.4. Multicollinearity / Correlation test

The Multicollinearity model was presented for the first time by Frisch (1934). A high degree of correlation between multiple independent variable is known as multi-collinearity. In other words, multi-collinearity arises when two or more repressors in a multiple linear regression model are significantly related. Multi-collinearity can also occur

when one variable in a formula is stated in terms of another variable (Das, 2019). Moreover, is known to raise the variance of the regression coefficients, leaving them volatile; therefore, making interpretation of the coefficients difficult (Shrestha,2020).

To find the correlation between the variables, the correlation coefficient equation is applied to discover if there is a relationship between a couple of variables or not. In other words, the relationship and correlation between couple variables are either positive or negative, which in positive correlation relationship between pair variables means both of them acting in the same direction, but the negative connection suggests that those pairings are moving in opposite directions if one variable increases and the other decreases.

4.1.5. t-test

The t-test criterion was developed for the first time in 1995 by Ng and Perron. This means according to Ng and Perron that when the p-value is less than 0.1, the ideal lag is found.

After applying the correlation test and ignoring the variables highly correlated to each other, then it is time to apply the t-test with those remaining variables that are suitable to conduct the t-test on them. While β stands for the coefficient variables, k stands for sample No., and the null hypothesis and variants are represented as:

H0: $\beta k=0$

H1: $\beta k \neq 0$.

The t-test is run as a two-tailed test with a 0.05 significance level, and the null hypothesis is rejected if the p-value is less than 0.05.

4.1.6. ARMA test

This test is a mix of two models that complete the abbreviation for ARMA, where AR stands for Autoregressive and MA stands for Moving Average. Moreover, the ARMA test is defined as when a time series is completely random, a subsequent series is produced by adding or subtracting the previous series which will generate cycles that serve as the foundation for the class of autoregressive moving average (ARMA) methods (Yule (1909, 1927) and Slutsky (1927). Furthermore, Brooks (2014, p268) defines the ARMA test as

> such a model states that the current value of some series y depends linearly on its previous values plus a combination of current and previous values of a white noise error term (Brooks, 2014, p268).

And the following equation describes how (AR) test processes the variables, which (p) stands for the order:

$$y_t = \mu + \phi_1 y_{t-1} + \phi_2 y_{t-2} + \cdots + \phi_p y_{t-p} + u_t$$

The following equation describes the (MA) process of the variables, which (q) stands for the order:

$$y_t = \mu + u_t + \theta_1 u_{t-1} + \theta_2 u_{t-2} + \cdots + \theta_q u_{t-q}$$

4.1.7. Normality test

By applying this test, it can be determined if the error in the test is normally distributed or not. H_0 stands for Errors terms normally distributed, and H_1 stands for Error terms not normally distributed. Furthermore, a P-value larger than 5% indicated that the model was normally distributed, while if the P-value was less than 5% that meant the model was not normally distributed. Then the terms for the dummy variables will take a place in the test and will be added to reduce the effect of not normally distributed variables.

4.1.8. Heteroscedasticity

This test prevents the variables from the ARCH effect, by applying the following equation:

$Y_t = \beta 1 + \beta_2 x_{2t} + \beta_3 x_{3t} + \mu_t$

Then, using mistakes from the main equation as an independent variable, an analysis is undertaken to determine whether they depend on any of the independent variables or the square root of the independent variable. This test is performed using the following equation:

$$\hat{u}_t^2 = \alpha_1 + \alpha_2 x_{2t} + \alpha_3 x_{3t} + \alpha_4 x_{2t}^2 + \alpha_5 x_{3t}^2 + \alpha_6 x_{2t} x_{3t} + v_t$$

The chia test is used to measure the importance of the coefficient of X in explaining the residual mean. Changing If X explains the residual, a change in X causes a change in the square of the residuals, affecting its variance, as shown by the hypothesis test:

H_0 = homoscedasticity

H_1 = heteroscedasticity

4.1.9. Serial Correlation

Serial correlation is defined as a series of predicted variables indicating the degree of correlation between a variable and its prior values as the lag duration grows (Brooks,

2014). However, the function of this test is defined as a systematic measurement of the amount to which the present value of a series is connected to its own prior values, with a value between 1 and +1 (Brooks, 2014).

This test will make sure that there is no correlation between errors in the model, and the errors that exist should be in a random form not in trend form. Further, to check the autocorrelation in the model the Durbin- Watson test will be employed by following this given formula:

$$u_t = \rho u_{t-1} + v_t \qquad v_t \sim N(0,\ \sigma_v^2).$$

Where the H_0: $P = 0$ and H_1: $P \neq 0$

The other test is the Breusch-Godfrey, which checks if the errors on the model are repeated in a number of delays by following the given equation:

$$u_t = \rho_1 u_{t-1} + \rho_2 u_{t-2} + \rho_3 u_{t-3} + \ldots + \rho_r u_{t-r} + v_t \quad , \quad v_t \sim N(0, \sigma_v^2)$$

The hypothesis was established as:

H_O: $P_1 = 0, P_2 = 0, \ldots . P_r = 0$ and H_1: $P_1 \neq 0, P_2 \neq 0, \ldots . . P_r \neq 0$

If the null hypothesis is accepted, it means there is no serial correlation.

4.1.10. Ramsey reset test

Because the OLS test model is used by trying to compose a straight line in the data, it can be established whether or not the data and model have a linear connection. It is accomplished by increasing the dependent variable to a higher ordering of 2, which is: Y Fit P2. In this example, the hypothesis is:

H_O: Linearity,

H_1: Non-linearity.

If the P-value is greater than 5% then it means the model is linear and it can proceed to run the regression, while if the P-value is less than 5% it means the model is nonlinear.

4.1.11. Structural Break Test

This test is defined as a condition in which the features of a time series or a model displays a significant long-term shift in conduct (Brooks, 2014). This test examines the model's stability in the case of a shock. The positions of breakpoints and also the highest breakpoint are identified. The null hypothesis, in this case, is as follows:

H_O: $\alpha_1 = \alpha_2$ and $\beta_1 = \beta_2$

Hence, the rejection of H_O at 5% at the significant level, then means the variable does not face any shock when the coefficients are the same in both periods.

Chapter Five: Data and Analysis

5.0. Data

This chapter presents the variables selected to assess the relationship between Y variable, which is in the empirical analysis the Jordan GDP, and the X variables which are the ten imports variables. Another set of ten X variables are corresponding to the exports goods.

The Gross Domestic Product GDP known as a basic indicator of the value added generated by a country's manufacturing of goods and services over a certain time period. Thus, it accounts for the money generated by such output, as well as the overall amount spent on final products and services (less imports).

While GDP is the most significant single indicator for capturing economic activity, it falls short of giving an adequate indicator of people's financial well-being, where other metrics may be more relevant (OECD, 2022). The GDP gives a platform for researchers and helps them to evaluate and analyze all productions and economic activities in a certain country. Figure 7 shows the changes in Jordanian GDP in billion US dollars, for the period extending from 2000 to 2020.

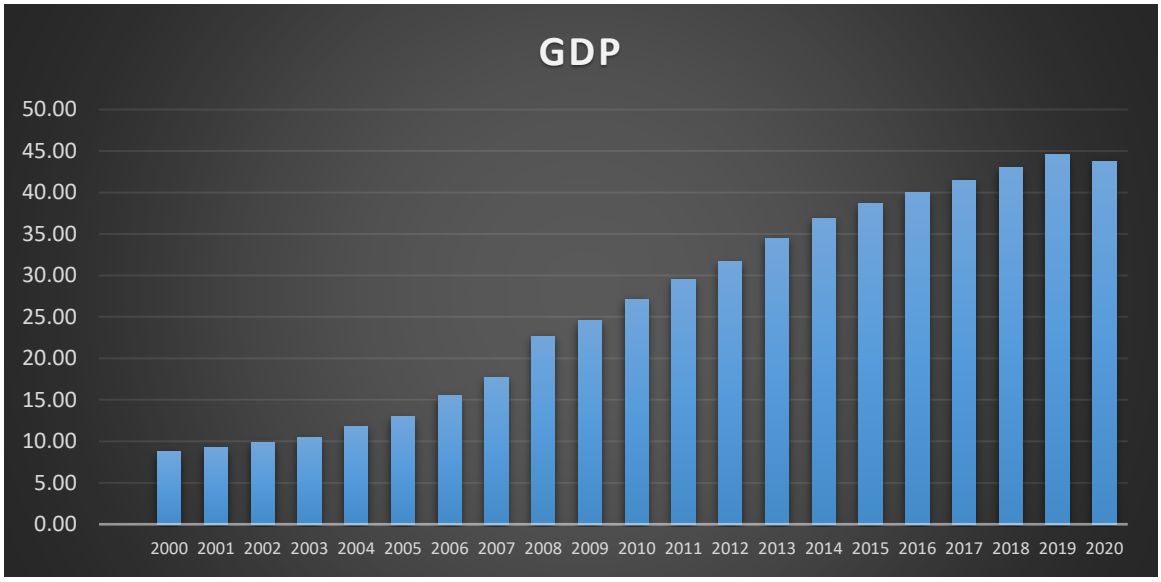

Figure 7: Jordan GDP trends (2000-2020)
Source: Statista, https://www.statista.com/statistics/385576/gross-domestic-product-gdp-in-jordan.

It is clear from Figure 7 that the Jordan GDP has increased over the years, which gives obvious evidence for continuous economic development, except for the year 2020 when Jordan faced the Covid19 pandemic, which slightly affected negatively on the GDP growth in that year.

5.1. Data sources

In order to select the most important goods imported to or exported from Jordan, secondary data was gathered from various reliable world economic data platforms. These include statistics from the United Nations Comtrade (UN Comtrade), the World Bank, the Observatory of Economic Complexity (OEC), and Statista. These websites offer data related to international trade and variables that directly affect the economic growth like GDP, imports and exports.

5.2. Data gathering approaches

The data gathering process starts from extracting the secondary data from the prior listed websites, by using the OEC website the top ten imported and exported goods were retrieved, as shown in the figure 8. OEC was utilized to discover the top 10 imports and exports to Jordan since it provides access to this information in a simple and structured manner with a breakdown of each substance's percentage. For Comtrade, acquiring this information is exceedingly challenging because it only gives users financial figures rather than percentages. Additionally, goods are not categorized based on the percentage of the 10 highest imports or exports. Instead, the items are inserted in the appropriate fields and the years are included. It presents the user with the entered data, but because they are enormous, it is challenging to provide a classification similar to the one provided by OEC.

After selecting the top ten imported and exported goods, the Comtrade data was used through which all data related to the quantities of these variables were extracted during the period from 2000 to 2020. Then came the extraction data related to the independent variable, which is the GDP, and to extract those data related to this variable, the World Bank website and the Statista website were used. The whole data related and mentioned are reflected by US dollars (USD) and on an annual basis.

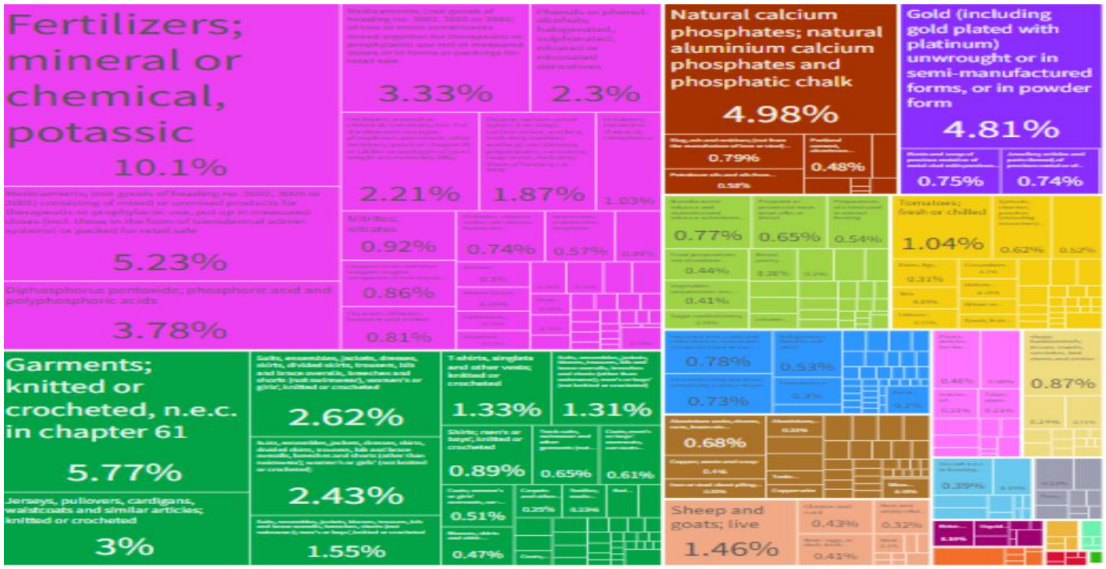

Figure 8: Tope ten Exported commodities in Jordan
Source: The Observatory of Economic Complexity 2022. https://oec.world/en/profile/country/jor?yearlyTradeFlowSelector=flow1

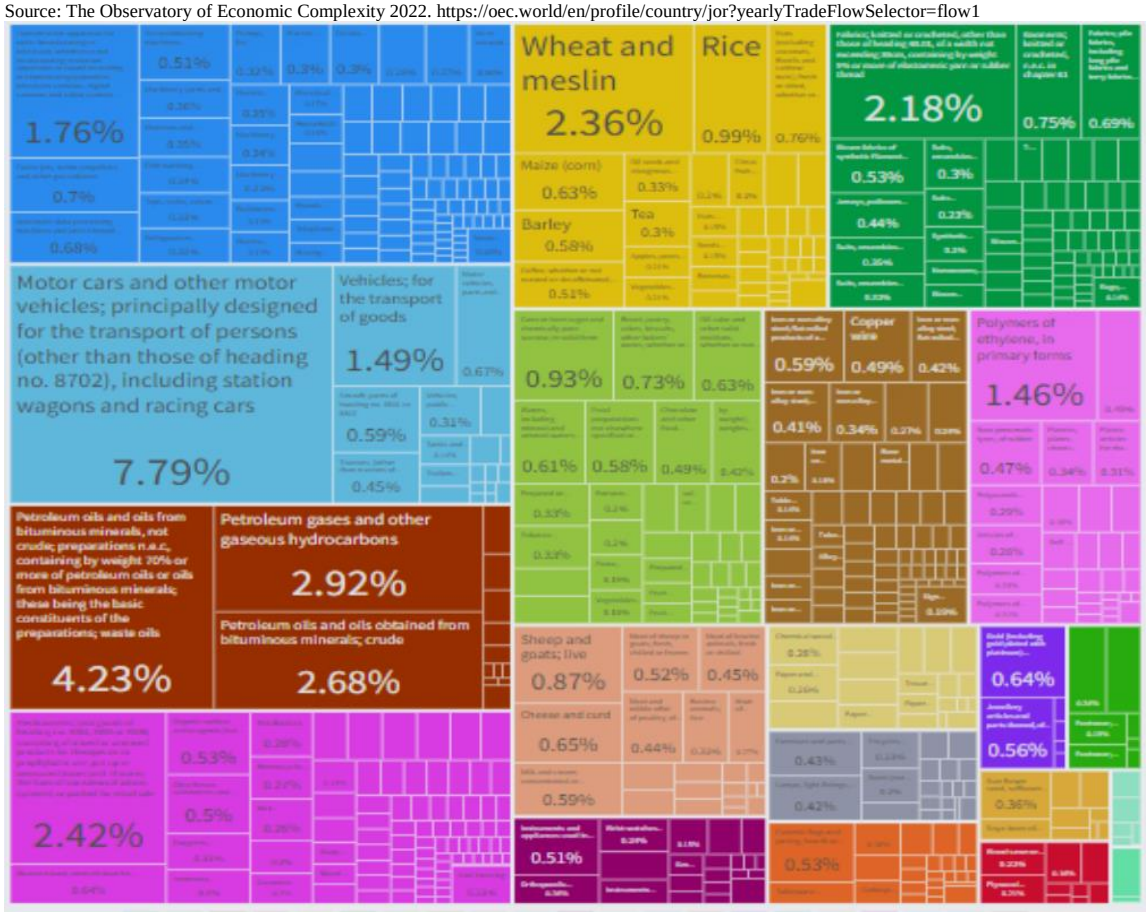

Figure 9: Top ten Imported Commodities in Jordan
Source: The Observatory of Economic Complexity 2022. https://oec.world/en/profile/country/jor?yearlyTradeFlowSelector=flow1

Top ten Imported goods				
	Variable Name	Goods Type	Trade Flow	Comtrade Code
1.	X1	Motor cars and other motor vehicles principally designed for the transport.	Import 7.79	8703
2.	X2	Petroleum oils, other than crude	Import 4.23	2710
3.	X3	Petroleum gases and other gaseous hydrocarbons.	Import 2.92	2711
4.	X4	Medicaments	Import 2.42	3003
5.	X5	Wheat or meslin flour.	Import 2.36	1101
6.	X6	Knitted or crocheted fabrics	Import 2.18	60
7.	X7	Transmission apparatus for radio-telephony, radio-broadcasting	Import 1.76	8525
8.	X8	Works trucks, self-propelled, not fitted with lifting or handling equipment	Import 1.49	8709
9.	X9	Ethylene-vinyl acetate copolymers, in primary forms	Import 1.46	3900130
10.	X10	Petroleum oils, crude	Import 2.68	2709

Table 1: Top ten Imported Goods

Top ten Exported goods				
	Variable Name	Goods Type	Trade Flow	Comtrade Code
11.	X11	Mineral or chemical fertilizers, potassic.	Export 10.1	3104
12.	X12	Women Suits, (not knitted or crocheted)	Export 2.43	6204
13.	X13	Women Suits, (knitted or crocheted)	Export 2.62	6104
14.	X14	Pile fabrics, including long pile fabrics and terry fabrics, knitted	Export 3	6001
15.	X15	Garments; knitted or crocheted	Export 5.77	6114
16.	X16	Medicaments;	Export 5.23	3003
17.	X17	Natural calcium phosphates; natural aluminum calcium phosphates and phosphatic chalk	Export 4.98	2510
18.	X18	Fabrics; knitted or crocheted	Export 1.55	60
19.	X19	Mineral or chemical fertilizers, nitrogenous.	Export 2.21	3102
20.	X20	Animal, Live	Export 1.46	1

Table 2: Top ten Exported Goods

5.3. Analysis

In this part, the OLS formula is applied on the data and the twelve tests to the data, which contain GDP, the Y variable and twenty imports and exports, the X variables, and

the results of each test are discussed. The analysis used is based on the SPSS (Statistical Package for the Social sciences) or (Statistical Product and Services Solutions), a software program that is commonly used for analyzing statistical social science data. This analysis is basically an interpretation of the output obtained from the SPSS program after conducting the OLS regression.

5.3.1. Multicollinearity / Correlation test

The Correlation test was applied, and the test exposes the correlation between the independent variables. The variables have more than 80% value, which have been highlighted in red color in the Table3. These should be excluded from the considerable variables and taking to account the rest of the variables. It was observed that there is a high correlation between the variables X1, which is stand for imported cars and vehicles, and X17, which stands for exported natural fertilizers phosphates. Thus, the imported highly correlation was excluded from the data instead of exported variables, because the significant positive impact for exporting goods on the economic growth. Then the rest of highly correlation variables were excluded in the same manner by excluding the imported goods from the data. Furthermore, there were two exported items that also have high correlation which are X11, which stands for mineral and chemical potassic fertilizers, and X16 which stands for medicaments. These were excluded from the data as well. Table 3 shows the correlation results.

Linear Regrresion

	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18	X19	X20
X1	1.00																			
X2	0.40	1.00																		
X3	0.85	0.24	1.00																	
X4	0.60	0.69	0.39	1.00																
X5	0.56	0.20	0.37	0.27	1.00															
X6	0.70	0.39	0.75	0.59	0.35	1.00														
X7	-0.39	-0.33	-0.34	-0.39	-0.21	-0.03	1.00													
X8	0.37	-0.14	0.22	0.06	0.00	0.23	0.26	1.00												
X9	0.45	0.23	0.77	0.28	0.13	0.61	-0.32	-0.14	1.00											
X10	0.18	0.60	0.02	0.26	0.04	0.24	0.04	0.07	-0.02	1.00										
X11	0.56	0.66	0.44	0.61	0.26	0.51	-0.49	0.03	0.44	0.65	1.00									
X12	-0.44	-0.41	-0.39	-0.48	-0.22	-0.08	0.81	0.16	-0.39	0.20	-0.46	1.00								
X13	-0.36	-0.26	-0.28	-0.33	-0.23	0.00	0.61	0.08	-0.19	-0.03	-0.37	0.60	1.00							
X14	-0.38	-0.50	-0.32	-0.56	-0.13	-0.21	0.32	-0.16	-0.20	0.15	-0.27	0.57	0.09	1.00						
X15	0.83	0.50	0.84	0.72	0.39	0.85	-0.44	0.12	0.70	0.08	0.62	-0.53	-0.41	-0.42	1.00					
X16	0.78	0.71	0.64	0.77	0.45	0.62	-0.47	0.21	0.37	0.17	0.52	-0.58	-0.33	-0.70	0.80	1.00				
X17	0.63	0.72	0.46	0.68	0.26	0.49	-0.50	0.12	0.34	0.60	0.93	-0.52	-0.37	-0.38	0.62	0.60	1.00			
X18	0.00	-0.20	-0.03	-0.18	0.05	0.27	0.29	0.19	-0.06	0.45	0.10	0.59	0.18	0.76	-0.03	-0.29	-0.02	1.00		
X19	0.28	0.46	0.16	0.36	0.00	0.34	-0.24	0.04	0.28	0.81	0.82	-0.04	-0.14	0.16	0.28	0.17	0.68	0.47	1.00	
X20	0.67	0.76	0.50	0.83	0.44	0.64	-0.34	0.08	0.29	0.20	0.55	-0.55	-0.34	-0.65	0.79	0.91	0.63	-0.26	0.15	1.00

Table 3: The Correlation test results

5.3.2. t-test

Then the t-test was run, which identifies the most significant regression results and eliminates those with P-values larger than 5%. (Insignificant values). The t-test results found that one of the variables has a value of more than 5%, which was X13, which stands for women Suits, (knitted or crocheted), and this variable is among the exported goods. Table 4 shows the t-test results.

One-Sample Test		
	Test Value = 0	
	t	Sig. (2-tailed)
X2	4.743	0.000
X5	18.974	0.000
X8	4.127	0.001
X9	3.857	0.001
X12	3.085	0.006
X13	1.791	0.090
X14	6.631	0.000
X16	11.290	0.000
X17	9.269	0.000
X18	10.770	0.000
X19	9.280	0.000
X20	5.103	0.000

Year	GDP 1	X2	X5	X8	X9	X12	X14	X16	X17	X18	X19	X20
2000	8.73	1.44E+08	2118226	111596	30248	50835247	3287067	98123450	1.28E+08	3744093	72578509	22278587
2001	9.26	1.13E+08	2682180	72915	47858	13003633	5570368	88377483	1.28E+08	6577448	72758835	6295729
2002	9.88	1.45E+08	1887040	107444	49568	23516220	6900624	91131688	1.36E+08	8063430	78439920	11022036
2003	10.51	2.13E+08	2489383	182088	51278	1.15E+08	2291924	1.04E+08	1.28E+08	4274141	82878101	15790142
2004	11.77	2.91E+08	2237889	251624	245070	1.81E+08	4759062	95001274	1.69E+08	12727620	1.57E+08	16147152
2005	12.98	4.48E+08	2549365	542063	102597	3.04E+08	4756261	1.05E+08	1.68E+08	11377108	1.57E+08	15402666
2006	15.53	3.7E+08	2752658	705176	44337	3.06E+08	9937978	77957488	1.59E+08	18189460	1.77E+08	59579939
2007	17.65	4.7E+08	3127476	29102	138986	2.62E+08	11429773	1.03E+08	1.95E+08	21500895	2.33E+08	1863132
2008	22.65	4.7E+08	1714458	772680	275671	98959509	7775191	1.21E+08	5.2E+08	16818351	4.58E+08	8364039
2009	24.54	4.17E+08	3644702	18125	494039	20061779	9338883	1.02E+08	3.72E+08	12717592	2.06E+08	31232510
2010	27.13	9.33E+08	4180202	320438	768845	40957126	5600750	1.34E+08	3.72E+08	13118283	3.16E+08	37226454
2011	29.52	2.12E+09	2378646	148241	634596	24000406	2208678	1.22E+08	6.3E+08	8439052	3.2E+08	1.18E+08
2012	31.68	3.43E+09	2307865	169992	418775	14649224	3013258	1.86E+08	6.01E+08	9510812	2.87E+08	1.39E+08
2013	34.50	2.63E+09	3168275	340359	338540	4510973	693762	2.57E+08	3.77E+08	9767547	2.21E+08	2.32E+08
2014	36.90	3.42E+09	3345173	89370	251079	1124892	2282669	2.56E+08	4.7E+08	7469933	2.97E+08	2.19E+08
2015	38.64	1.39E+09	4374476	113649	209744	478965	1603607	2.17E+08	5.23E+08	7471600	1.53E+08	2.04E+08
2016	39.95	8.15E+08	3379167	1414486	524694	2486208	619365	2.35E+08	4.34E+08	9388063	1.26E+08	1.42E+08
2017	41.47	1.08E+09	3172402	678936	334932	164004	1050632	2.28E+08	3.76E+08	7636431	1.19E+08	1.67E+08
2018	42.99	1.48E+09	2681290	83963	2080776	759991	2122882	2.1E+08	3.69E+08	7292904	2.4E+08	1E+08
2019	44.57	1.21E+09	2901289	58447	1722091	1094705	4906126	1.84E+08	3.73E+08	10453100	1.93E+08	1.6E+08
2020	43.76	7.46E+08	2753230	271873	679540	104016	4577410	1.68E+08	3.42E+08	13991749	2.3E+08	1.53E+08

Table 4: The t-test results

5.3.3. Unit Root Test

The Unit Root test was performed for stationary by using GDP as dependent variable and the top ten imported goods and another top ten exported good as independent variables. The findings were that none of the variables are stationary at level /I (0); on the other hand, the dependent variable, the GDP was found stationary at level I (1). As a general rule, the variables must be integrated in a similar way. It was discovered that all of the variables in regression test are not stationary and must be differentiated once before becoming stationary. Consequently, at a 5% level of significance, the null hypothesis of a unit root was rejected, and one variable was found among the data has a value less than 5%. Therefore, X12, which stands for women suits, (not knitted or crocheted) was excluded from the exported goods list.

5.3.4. Cointegration Test

After having applied the Cointegration test on the last data, it was found that four variables from the data have a P-value greater than 5%, which means that it had to be

excluded from the data sets to make sure the rest of those data have a long-term relationship. This was the purpose of running the Cointegration test on the data sets. The excluded variables are the following:

1- X2, which stand for petroleum oils, other than crude from the imported goods list.

2- X5, which stand for wheat or meslin flour, from the imported goods list.

3- X14, which stands for pile fabrics, including long pile fabrics and terry fabrics, knitted, from the exported goods list.

4- X15, which stands for garments; knitted or crocheted, from the exported goods list.

5.3.5. ARMA test

Autoregression (AR) and moving average (MA) were introduced to the regression during the ARMA test. Both indicators started at level 5 and steadily decreased one by one, yielding outcomes in which none of the indicators were used to this regression model due to inadequate P-values: Even at 1-0 and 0-1, AR-MA terms became unimportant. In other words, after applying this test on out date, it was found that the data series were located in the normal fluctuation mood and the fluctuation in the data during the time period of twenty years between 2000 and 2020 within a reasonable range, according to the criteria of the ARMA test.

Moreover, the results of the ARCH and Serial correlation tests are as follows: There is no ARCH effect and no serial correlation. As a consequence, no modifications to the regression model are required, and the findings stay unchanged from the previous phase.

5.3.6. Normality test

After having conducted the Normality test on the last variables, it was found that the data will remain normally distributed if excluding the variables that have a P-value greater than 5%. Regarding the purpose of the Normality test, and by adding dummy variables, the variables have a high value greater than 5%. Two variables with a high value greater than 5% remained in the test. As a result, the following variables were excluded:

1- X18, which stands for fabrics; knitted or crocheted, from the exported goods list.

2- X19, which stands for mineral or chemical fertilizers, from the exported goods list.

Chapter Six: Discussion, conclusion, and suggestions

6.0. Discussion

this chapter will discuss the final result of the empirical results, which depend on a detailed explanation of all the stages in which the data related to the top ten goods imported by Jordan and the top ten exports that Jordan exports and their impact on the GDP, which is considered the main indicator of economic growth for a twenty-year period from 2000 to 2020.

After conducting the tests related to OLS and excluding all the variables that do not directly affect the economic growth in Jordan, it was found that the variables that significantly have an effect on the growth of GDP in Jordan are four goods, two of which are imports and two which are exports, as follows:

No.	Name	Type	Code	Comtrade Code
1	Work trucks, self-propelled, not fitted with lifting or handling equipment	Import	X8	8709
2	Ethylene-vinyl acetate copolymers, in primary forms	Import	X9	3900130
3	Natural calcium phosphates; natural aluminum calcium phosphates and phosphatic chalk	Export	X17	2510
4	Animal, Livestock	Export	X20	1

Table 4: List of significant variables

It is important to clarify some concepts that have been used in the model, namely the following: Intercept means a coefficient reflecting the value of Y if all of the model's parameters are equal. The other concept is Estimate which shows the regression model coefficients. These are calculated using the ordinary least squares method, showing the degree and kind of relationship between the independent and dependent variables. The model gives the results that shows how much the change by one unit in significant independent variable (X's) will have an effect change on our dependent variable (Y).

Y= 6.589+0.545*X8+0.107*X9+0.147*X17+0.949*X20

However, the quality of the model is determined by the value of the R-squared (R^2). This means that when the value of the R^2 is high, then it is an indicator about the quality of the model. It was clearly high in the model, which was 91.9%; As a result, there is proof that the model has been utilized was quite successful.

6.1. Work Trucks

One of the most important information that must be known about Jordan is that it is a rentier country and the Jordanian economy depends mainly on the collection of taxes and fees. Among the most important fees and taxes imposed by the Jordanian state is the customs tax and license fees for allowing vehicles to travel on Jordanian roads and their drivers as well. Since then, importing trucks is considered one amongst the most significant goods that Jordan imports, which feeds the government budget with financial revenues on the one hand. On the other hand, most of these machines are imported by companies that use them for productive operations in the market, which leads to moving the production wheel for the Jordanian market. This means new job opportunities and also the payment of new taxes and fees to the Jordanian government. Consequently, these work trucks are a source of fiscal revenue not only by just receiving the customs tax by entering Jordan, but also it keeps supporting the government financially during the whole period of running this capital for those national enterprises. Hence, by increasing one unit of importing work trucks, the GDP will grow by 0.545 units. According to OEC, Jordan imported $895k in work trucks in 2020, making it the world's 94th highest importer of work trucks (OEC, 2022). Moreover, Jordan's average tariff in work trucks in 2017 was 5.21%, while the highest state in collecting tariffs by this type of goods was Angola with 6.67% (OEC, 2022). This is an indicator about the returns gains from importing this kind of goods from the government side.

6.2. Ethylene

Ethylene is one of the most significant elements used as an input in a variety of industries. This material enters into the manufacture of many products, and the outputs of this material are either materials for local use or for export.

Hence, the importance of this raw material for the Jordanian economy is considerable. Although, imports are carried out in large quantities, this raw material is converted into a final material ready for exports to the global market, and the extent of

the impact and importance of exports on the local economy are substantial. Jordan ranked 47th among the largest importing countries for this substance. Furthermore, ethylene has been among the top ten imported goods Jordan imported in 2020 (OEC, 2022). Therefore, the result was very logical in the model used as this material was considered according to the model among the variables that have a significant positive effect on GDP, as an increase of one unit of this material affects GDP by 0.107.

6.3. Natural Calcium Phosphates

Exports is one of the most significant sources of economic growth for any nation because of the beneficial influence it has on the economy, as it increases the amount of international reserves and foreign currency liquidity into the country. It is also based on extending the market for local product; therefore, boosting earnings, as well as expanding new markets leadings to increase in productivity and new job opportunities. As a consequence, it is regarded reasonable that the outcome of the model utilized in this study is the presence of a positively impacting variable on GDP among Jordanian commodities exported, such as natural calcium phosphates.

Jordan was regarded the fourth greatest worldwide exporter of this product, and Indonesia, India, Japan, Turkey, and then Saudi Arabia, respectively, were among the major global importers of this product from Jordan (OEC, 2022).

As a consequence, the model utilized in this study generated a highly reasonable result, and the model employed is of excellent quality, as previously stated. The R^2 value reached 91.9%. which is one unit change in natural calcium phosphates positively effect on our GDP by 0.147.

6.4. Animal, Live stocks

As mentioned above about the impact of export on the economy, the last variable that has a significant positive impact on Jordan's GDP growth was the exporting of animal livestock. In 2020 Jordan exported about 153 million US dollars' worth of live animals according to United Nation Comtrade statistics.

Two-thirds of Jordan's export potential for live animals (other than poultry), worth $415 million, remains untapped. The majority of this untapped export potential stems from a potential export of live sheep, which has a US$ 390 million untapped potential (World

Bank, 2020). However, regarding the model result, one unit change in animal livestock will have a positive effect on Jordan's GDP by 0.949.

6.5. Conclusion

The major objectives of the study were to define the main economic vital goods that have a positive impact on the GDP as an economic parameter and to ascertain how the international trade of goods affects the economy of Jordan.

The definitions of international trade and maritime transport, and their relations were taken into account in certain parts of the study. Additionally, a market study of Jordan's export and import of goods was conducted, along with analyses of the key cargo flows and the volume of these goods that Jordan produced. The study analyzes the GDP, exports, and imports trends in Jordan over the last 20 years. For transparent research, data was carefully gathered from officially reliable sources. The processes necessary to generate the findings are detailed so that the inexperienced reader may grasp the procedure and the calculations process. The SPSS application was utilized in the research to generate an OLS regression and perform a quantitative analysis of the data.

The descriptive statistics, unit root test, correlation test, t-test, cointegration test, ARMA test, normality test, and Linear regression test, were used to exclude the inappropriate variables. With a rise of one unit, it kept goods that have a significant impact on the Jordanian economy, which was represented on the GDP growth. Moreover, the empirical finding of this study showed that imported work trucks (X8), imported ethylene (X9), exported natural calcium phosphate (X17), and exported animal livestock (X20) have positive impact on economic growth in Jordan.

Ultimately, special emphasis was devoted in this study to the patterns and features of the most important commodities/goods for the nation, as derived by mathematical operations, and how the gathered data may be utilized by government entities; and policymakers in the country to maximize revenues to continued growth.

6.6. Suggestions for further research

There is always room for improvement in every scientific area, and this study is not any different. This growing body of knowledge on the link between international trade and economic growth bodes well for future research. This study was the first to employ maritime trade and statistics based on trade balance parameters, such as imports and

exports, and measured their influence on GDP growth as a primary indicator for economic growth in any nation. However, towards the years ahead, different macroeconomic variables such as the inflation rate, the balance of trade, and maritime trade and services can be evaluated using the OLS regression model.

Another key topic for future study is the use of clear and more complex approaches in Linear Regression models employing large data. Furthermore, another future study route is to connect the great frequency of analytical data tool. Researchers would be able to fully use the benefits of machine learning techniques to extract and identify essential facts from large volumes of data and gain a bigger number of meaningful variables by shifting to a big data environment, to investigate the best effective strategy for assessing the elements influencing GDP growth in each country. Furthermore, this study may be utilized to discover the major elements that impact GDP growth in other nations or a specific region within a country while also measuring GDP growth.

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